



Programmable-Video Signal Generator for Digital TV

VG-849C

Instruction Manual

Ver.1.00



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for Digital TV

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2007.1

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ASTRODESIGN,Inc

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BEFORE OPERATION

Introduction

Thank you very much for purchasing this model VG-849C video signal generator. This manual contains details on the operation procedures to be followed when the VG-849C (RB-1848) is used, the checkpoints and precautions to be observed, and so on. Improper handling may result in malfunctioning. Before using the VG-849C, 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. This 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 pressure vessel. Doing so may heat up the generator to abnormally high levels, cause smoking, run the risk of the generator's catching fire and/or damage 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.

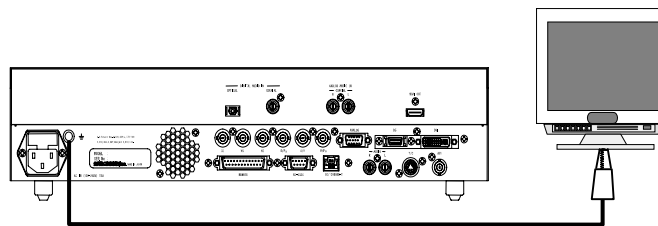
Concerning foreign matter

- 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 VG-849C to a display unit, use the FG cable provided to connect the frame ground (FG) terminal on the VG-849C to the frame ground terminal on the display unit. If these terminals are not connected together, some of the very costly parts (such as the output digital-to-analog converter) inside the VG-849C may fail. Take special care when connecting the generator to a display unit which is under development.



Connect one end of the cable to the FG terminal on the VG-849C.

Connect the other end of the cable to the FG terminal on the display unit using an alligator clip.

- When disconnecting the VG-849C from the display unit, first disconnect the connecting cables, and then disconnect 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 PC card.
- When priority is to be given to accuracy, do not start using the generator straight away: instead, turn on the power of the VG-849C and allow it to warm up for about 10 to 15 minutes before use so as to ensure that the VG-849C is ready to operate stably.

Concerning impact

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

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.

Concerning the configuration of this manual

This manual is the instruction manual for the VG-849C. In the configuration presented below, it contains details on the operating procedures, checkpoints, etc. Please take the time to read through the manual prior to use to ensure that the generator will be operated properly.

● Read this first!

BEFORE OPERATION

This section contains the safety precautions, and a description of how the manual is configured and what is packed with the generator.

Chapter 1 CONCERNING THE VG-849C

A general description of the VG-849C is given in this chapter.

Chapter 2 OPERATING PROCEDURES

The basic operating procedures are provided in this chapter. The procedures given here are the same as the ones described in chapter 3 and beyond.

● Basic functions

Chapter 3 VG-849C SYSTEM SETTINGS

The system settings (**FUNC5**) of the VG-849C are described in this chapter.

Chapter 4 SIGNAL OUTPUT AND DATA REGISTRATION PROCEDURES

Details of the functions (FUNC0-4, 6, 8-D) other than the system settings function which are used to output the signals, and edit and register the data, for instance, are contained in this chapter.

● Detailed settings (timing data, pattern data)

Chapter 5 TIMING DATA CONFIGURATION AND SETTING PROCEDURES

This chapter gives an outline of the timing data and the procedures used to set the timing data.

Chapter 6 PATTERN DATA CONFIGURATION AND SETTING PROCEDURES

This chapter gives an outline of the pattern data and the procedures used to set the pattern data.

● Maintenance function

Chapter 7 SELF-CHECK

This chapter gives an outline of the self-check function and the procedures used to execute the function.

● Other

Chapter 8 MULTI-BIT MODE (❖OPTION)

This chapter provides details on the multi-bit mode which is an optional function.

Chapter 9 REMOTE CONTROL

The RB-614C and RB-649 remote control boxes are described in this chapter.

Chapter 10 REFERENCE

This chapter provides details on the internal data, the error messages and other reference information.

Chapter 11 SPECIFICATIONS AND CHECKPOINTS

The VG-849C's specifications and checkpoints are contained in this chapter.

APPENDIX (FUNCTION LIST)

This contains a list of functions and the operating menus for the main functions.

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 for this generator since the use of any non-designated items may cause malfunctioning.

■ Standard accessories

- VG-849C main unit
- VG-849C (RB-1848) instruction manual (what you are now reading): 1 copy
- CompactFlash (CF) card: 1 pc
- PC card adapter for CompactFlash cards: 1 pc
- PC card case: 1 pc
- SP-8848 software installation CD (for Windows): 1 pc
- SP-8848 instruction manual: PDF version (packed with the SP-8848 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-849C.

■ Optional accessories

- RB-1848:
Remote control box used with the VG series
- RB-614C:
Remote control box used with the VG series
When this box is connected to the VG-849C, programs can be called by their numbers, the character, dot, crosshatch and other pattern data can be turned ON or OFF, and the RGB signals can be switched ON or OFF.
- RB-649:
Remote control box used with the VG series
- VG series terminal command instruction manual
The generators in the VG series can be operated using the dedicated terminal commands from an external computer (such as a PC). The commands and data are received and sent through the RS-232C interface or LAN.

1

CONCERNING THE VG-849C

1.1 General description

This programmable video signal generator designed for digital TV applications (hereafter referred to simply as the "VG-849C") is an all-in-one video signal generator which supports applications in all areas of the display instrumentation field. It can deliver RGB analog output signals and DVI output signals as well as NTSC/PAL/SECAM (VBS connector), D5 connector, S connector and HDMI output signals. In terms of the analog output signals, the model supports color difference signals and tri-level sync signals. It can provide bitmap displays with a full color capability of 16.77 million colors. Its output signals which support a wide range of displays such as CRTs, LCDs and PDPs as well as digital TV displays enable the generator to be used for the development of technology for video-related equipment as well as on the production lines and in the inspection and maintenance operations for such equipment.

The HDMI output supports HDMI1.3 and Deep Color as well. By supporting the multi-bit mode which is an optional function, it is capable of displaying many different patterns with up to 36 bits.

The timing data, pattern data and other outputs can be easily set using the SP-8848 or the controls on the RB-1848. It is also possible for users to create their own special patterns and register natural images.

The generator also supports TV-oriented functions such as closed caption, V-chip, Teletext and Macrovision. (* Macrovision is an optional function. Contact Astro if it is to be supported.)

1.2 Features

■ All-in-one model

In spite of its compact body, this generator can deliver a wide range of output signals including analog outputs and DVI outputs as well as NTSC/PAL/SECAM (VBS connector), D5 connector, S connector and HDMI outputs. There is no need for any adapters, etc.

■ Wide dot clock frequency ranges

The dot clock frequencies supported by the VG-849C are the 5 to 300 MHz range for analog outputs, the 25 to 165 MHz range for DVI serial digital outputs, and the 25 to 165 MHz range for HDMI outputs.

■ HDMI1.3 supported

The HDMI output supports HDMI1.3.

■ Full-color outputs supported

The generator supports full-color displays consisting of 16.77 million colors. By supporting the multi-bit mode which is an optional function, it is capable of providing displays using up to 36 bits (up to 68.7 billion colors).

■ LAN supported

The program data stored on PC cards can be directly edited from a PC connected through the RS-232C interface or LAN.

■ Registration of program data on a PC card

A total of 849 program data can be registered on a PC card. PC screens or natural images can also be registered. On a notebook PC or other PC equipped with a PC card slot, the data can be copied using Explorer provided with Windows 98SE, Windows 2000 or Windows XP.

■ Creation of optional patterns

In addition to the conventional basic patterns (11 types including character, crosshatch, color bar and gray scale) and optional patterns (up to 64 types can be incorporated), 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.

■ Sample data incorporated inside

A total of 450 types of timing data and 450 types of pattern data are registered inside the VG-849C as sample data. They can be combined in any way, and the resulting signals output. They come in handy when a PC card is not being used. The sample data can also be used when editing program data.

■ Windows-compatible editing and registration software (SP-8848) provided as standard accessory

This software, which runs in Windows, can be used to edit and register the program data and exercise control over the signal output.

1.3 Data configuration

The data output by the VG-849C is controlled 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.

Table 1.3.1 Program data block configuration

Block	Description	
Valid/invalid	Program data valid/invalid	
Timing data	H-Timing	Horizontal timing
	V-Timing	Vertical timing
	OUTPUT	Output condition
	AUDIO	Audio output
	HDMI	HDMI output
	InfoFrame	InfoFrame
	ACP	ACP/ISRC Packet
	Caption	Closed caption/V-chip
	TeleText	Teletext
	Macrovision *1	Macrovision
Pattern data	Pattern Select	Pattern select
	Graphic Color	Graphic color
	CHARA	Character pattern
	CROSS	Crosshatch pattern
	DOTS	Dot pattern
	CIRCLE	Circle pattern
	COLOR	Color bar pattern
	GRAY	Gray scale pattern
	BURST	Burst pattern
	WINDOW	Window pattern
	OPT1	Optional pattern 1
	OPT2	Optional pattern 2
	CURSOR	Cursor pattern
	NAME	Program name
	ACTION	Pattern action
	CEC	CEC function

*1: Optional function

The various program data, optional patterns and user character patterns are contained as sample data on the EPROM inside the VG-849C body.

These types of data can be output as is for use or they can be used as the source data when data is to be registered on a PC card. (* The internal data can be changed temporarily, but the changes cannot be saved. On the other hand, data copied onto a PC card can be edited or saved.)

Table 1.3.2 gives the number of internal sample data, Table 1.3.3 gives the number of data which can be registered on a PC card, and Fig. 1.3.1 shows the relationship between the internal data and PC card data for the program data, optional patterns and user character patterns.

For details on the internal data, refer to "10.1 Internal data."

Table 1.3.2 Number of internal sample data

	Number of data
Program data	150 (850 to 999) × 3 sets
Optional patterns	64 (00H to 3FH)
User character patterns	16 (F0H to FFH)

Table 1.3.3 Number of data which can be registered on a PC card

	Number of data	
Program data	849 (1 to 849)	
Optional patterns	64 (40H to 7FH)	
Optional patterns (image data)	64 (80H to BFH)	* This number depends on the image data size and card capacity.
User character patterns	16 (E0H to EFH)	
Number of characters in program names	20 characters	
Number of groups	99 (1 to 99)	* For details on groups, refer to "1.4 Concerning groups."
Number of group data	98 (1 to 98)	
Number of characters in group names	20 characters	

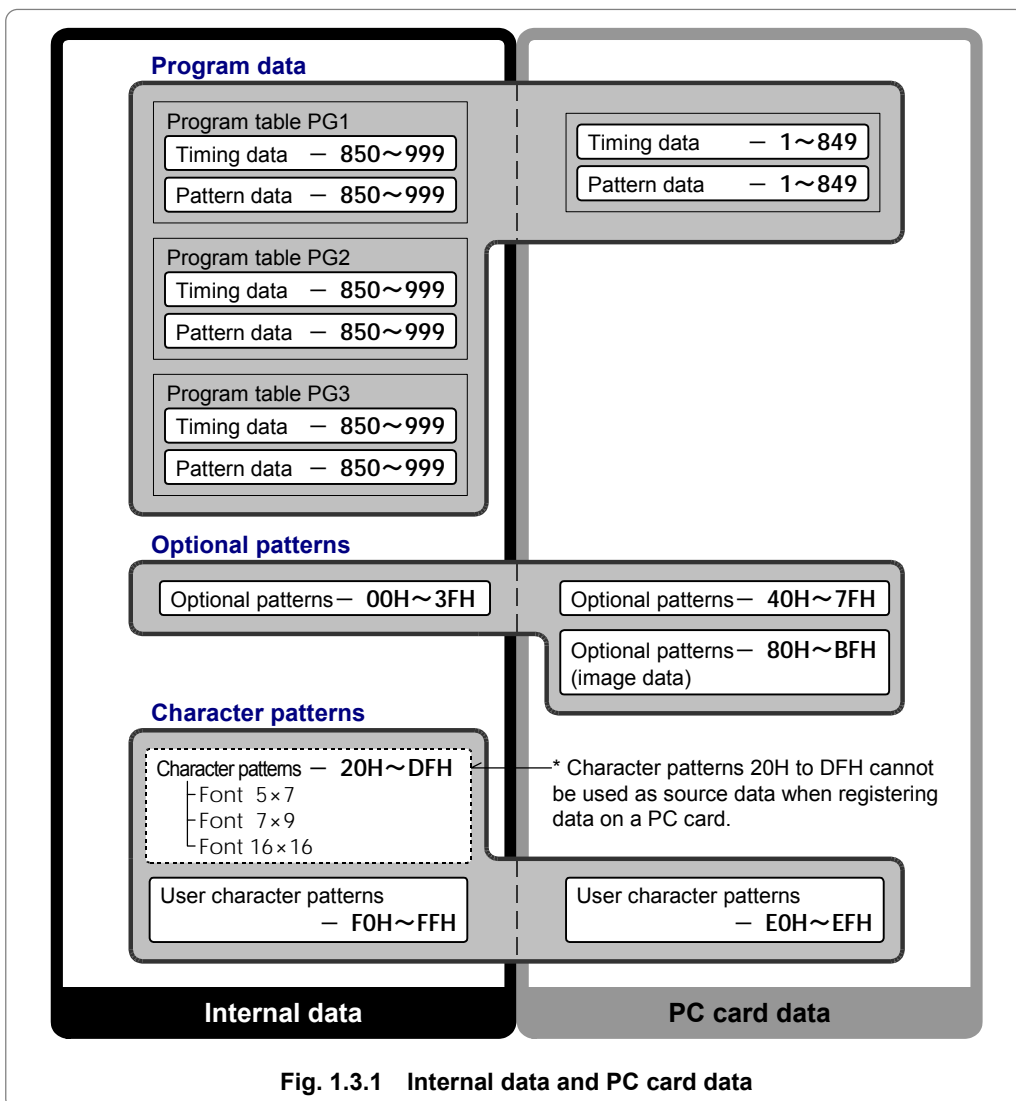


Fig. 1.3.1 Internal data and PC card data

1.4 Concerning groups

A "group" refers to a program data table in which the user can register any program data. It is also possible to select data of one program number for the timing data and another program number for the pattern data. The data is output on a group by group basis, and so by registering only the data required, operating ease is enhanced in cases where multiple program data are to be output. The data relating to groups is stored on the PC cards.

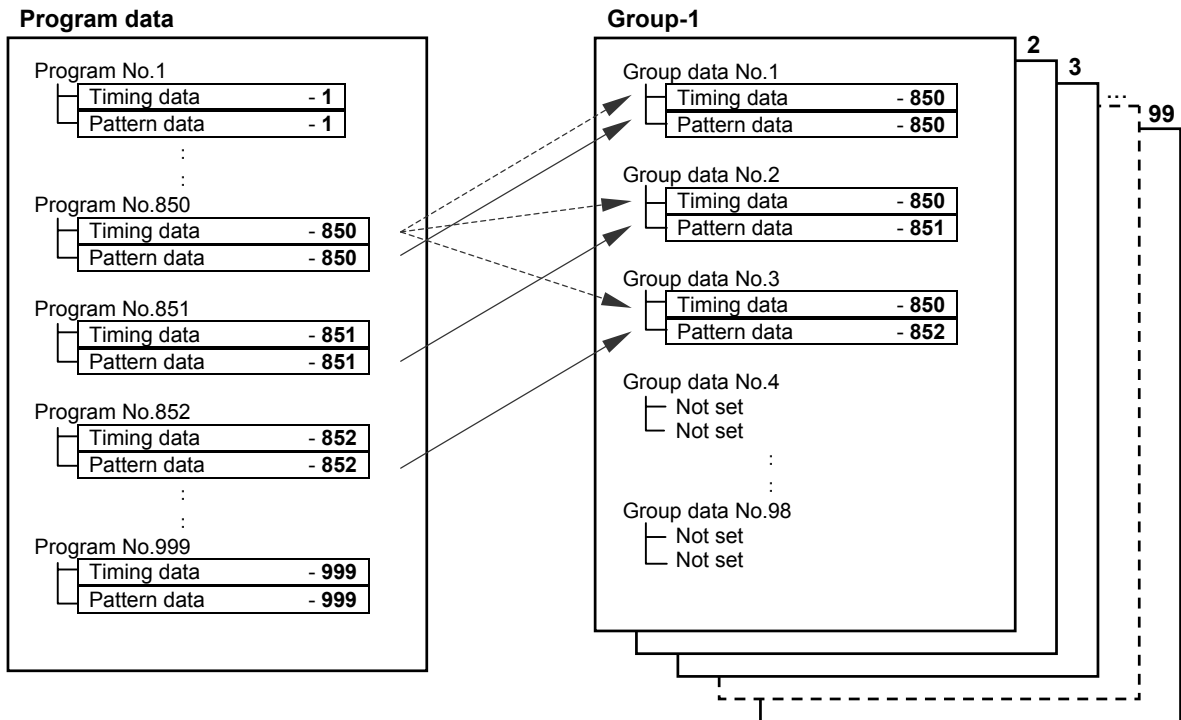


Fig. 1.4.1 Configuration of a group

1.5 Concerning the operating modes

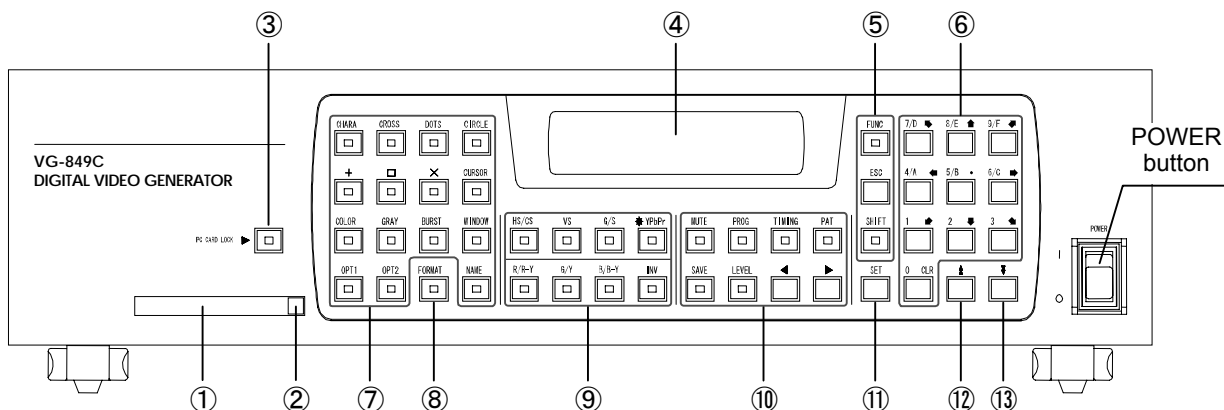
The VG-849C has four operating modes, each of which is outlined below.

Table 1.5.1 List of operating modes

Mode	Reference section	Description
Direct display mode	4.1.1	The video signals of the data in the program whose number has been selected are output in this mode. Any program number from 1 to 999 can be selected.
Group display mode	4.1.2	The video signals of the data in the group whose number has been selected are output in this mode. Only the number registered for a particular group can be selected as the group data number. (Max. 98 groups)
Auto display mode	4.2	The video signals of the data in the program or group whose number has been selected are output automatically in this mode in accordance with the specified delay time.
Self-check mode	Chapter 7	Whether the hardware devices are functioning correctly, etc. is checked in this mode.

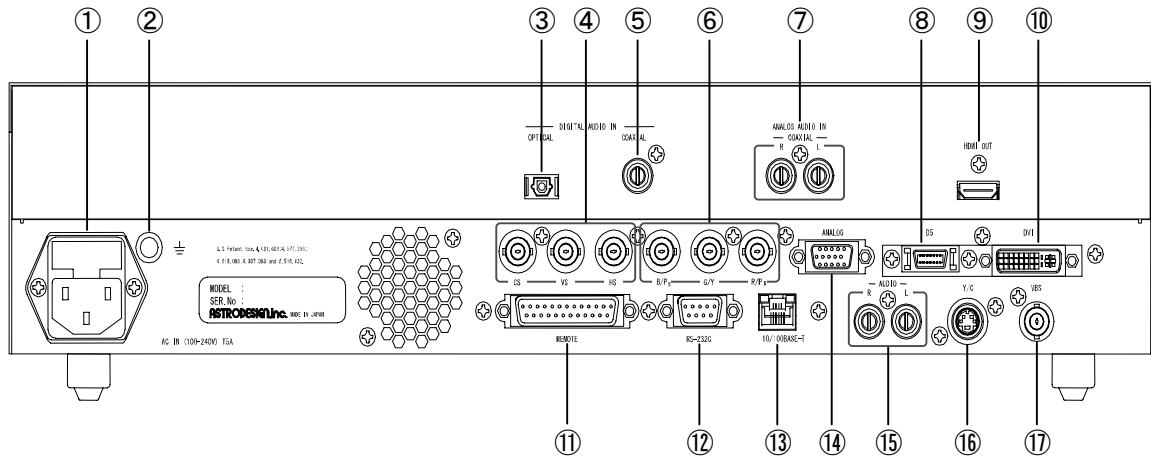
1.6 Panel parts and their functions

1.6.1 VG-849C front panel



(1)	PC card slot	Insert the PC card here. To eject it, press the EJECT button on the right of the slot.	
	CAUTION	Always handle the PC cards very carefully. When inserting or ejecting a PC card, follow the steps in "2.5 How to insert and eject the PC cards." If the wrong steps are taken, the data on the PC card may be destroyed, and the PC card may no longer be recognized even when it is re-inserted.	
(2)	EJECT button	Use this to eject the PC card.	
(3)	[LOCK] button	Press this for 5 seconds to release the lock before ejecting the PC card. While the lock is engaged, the LED is lighted; when it is released, the LED goes off.	
(4)	LCD	The menu settings, program numbers, timing data, etc. appear here. (Two lines each containing 24 characters are displayed.)	
(5)	These keys are used to execute or abort the functions and program data and to select the input signals.		
	[FUNC] key	Press this first when selecting a function. When it is selected, its LED lights.	
	[ESC] key	This is used to abort data editing and return to the previous screen.	
	[SHIFT] key	While this key is selected, the number keys are used as the A to F keys. When it is selected, its LED lights.	
(6)	Number keys	These keys are used to input the data. When one of these keys is used together with the [SHIFT] key, hexadecimal values represented by the letters A to F can also be input.	
(7)	Pattern keys	These keys are used to select the patterns and output signals. When a key is selected, its LED lights.	
(8)	[FORMAT] key	This is used to edit data while the program data is being executed. When it is selected, its LED lights.	
(9)	Output control keys	These keys are used to select the output signals. When a key is selected, its LED lights. Refer to " 4.1.7 Switching the output video signals and sync signals."	
(10)	These keys are used to execute or edit the program data. When a key is selected, its LED lights.		
	[MUTE] key	This is to switch On/Off of audio output while the program data is being executed.	
	[LEVEL] key	This is used to adjust the output level, display the screen on which to input characters from the display unit, etc.	
	[PROG] key	[SAVE] key	This is used to save the data.
	[TIMING] key	[◀] key	This is used to move to the previous item (on the LCD screen).
	[PAT] key	[▶] key	This is used to move to the next item (on the LCD screen).
(11)	[SET] key	This key is used to execute the functions and program data.	
(12)	[▲] key	This increments the program numbers by 1 (+1). It is also used to display the previous page on the LCD.	
(13)	[▼] key	This decrements the program numbers by 1 (-1). It is also used to display the next page on the LCD.	

1.6.2 VG-849C rear panel



(1)	AC input socket	One end of the power cable is connected here. A voltage from 100V to 120V or 200V to 240V is supported.
	CAUTION	The POWER switch must always be used to turn the generator's power on and off. Turning the power on and off by plugging in and unplugging the AC power cable may damage the PC card.
(2)	Frame ground (FG)	Connect this frame ground terminal to the frame ground terminal of the unit which is connected to the VG-849C.
(3)	TOSLINK input connector (coaxial)	Digital audio input connector
(4)	BNC analog output connectors	HS = Horizontal sync signal, VS = vertical sync signal, CS = composite sync signal.
(5)	COAX input connector (coaxial)	Digital audio input connector
(6)	BNC analog output connectors	The RGB or YPbPr video signals are output from these connectors.
(7)	AUDIO input connectors	The audio signals are input to these connectors
(8)	D connector	Video signals complying with the D5 standard format are output from this connector. RGB signals are output while the [YPbPr] key LED on the RB-1848 is off. (Only YPbPr output signals are ON in the case of internal programs.)
(9)	HDMI connector	
(10)	DVI digital serial connector (CH1)	(The analog rated value is OFF.)
(11)	Remote connector (25-pin female)	This is used to connect an optional remote control box (RB-1848, RB-649 or RB-614C) to operate the generator by remote control.
(12)	RS-232C connector (9-pin male)	This is used to connect a personal computer using an RS-232C cable.
(13)	Ethernet port (10/100BaseTX)	This port is used for connection to a LAN using the Ethernet cable.
(14)	D-SUB 15-pin (mini)	Analog output connector.
(15)	AUDIO output connectors	These are the audio output connectors. Frequencies ranging from 100 Hz to 20 kHz can be set.
(16)	S connector	NTSC/PAL/SECAM Y/C video output connector
(17)	VBS output connector	NTSC/PAL/SECAM VBS composite video output connector

2

OPERATING PROCEDURES

2.1 Concerning the VG-849C's functions

The VG-849C has 14 functions including ones for outputting the video signals and for editing and registering the output data. Each function is selected by pressing the **FUNC** key, the number key which corresponds to the function number, and the [SET] key in this order.

A list of these functions is provided below.

Table 2.1.1 List of functions

No.	Function	Description	Main applications	Reference page
0	Direct display	This executes <u>the direct display mode</u> (for outputting the video signals of the data in the program whose number has been selected) or <u>the group display mode</u> (for outputting the video signals of the data in the group whose number has been selected). ^{*1}	Adjustments and inspections on production lines	p.39
1	Auto display	This sets or executes <u>the auto display mode</u> (for automatically outputting the video signals of the data in the program or group whose number has been selected in accordance with the specified delay time).	Demonstrations, service life tests	p.50
2	Program edit	This temporarily changes the program data, and outputs signals.	Tests and evaluations undertaken by development and engineering departments	p.51
3	PC card edit	This edits the program data, and registers it on the PC card.	Creation of PC cards	p.51
4	PC card copy	This copies the data registered on the PC card.	Creation of PC cards	p.53
5	Config edit	This performs the VG-849C system settings.	-	p.13
6	Group data edit	This registers the group data on the PC card.	Registration of data in group display mode	p.60
8	Character edit	This edits the user character patterns and registers them.	Tests and evaluations undertaken by development and engineering departments	p.62
9	List display	This lists the registered data on the display.	Tests and evaluations undertaken by development and engineering departments	p.64
A	YPbPr coefficient table edit	This edits the coefficient tables for the YPbPr data output.	-	p.69
B	Panel ROM copy	This copies the program data of an existing VG model ^{*2} , with which PC cards cannot be used, onto a PC card.	-	p.71
C	HDCP setting	This sets the HDCP mode.	-	p.72
D	Calibration	This calibrates the signal output levels.	-	p.83
E	IA-5XX	Reserved for IA series. ^{*3}	-	

*1: When "0" has been selected as the group number setting of config edit **FUNCS**, the direct display mode is established; when a number from 1 to 99 has been selected, the group display mode is established.

*2: VG-813, 823, 826A and 827

*3: Consult Astrodesign separately concerning the IA series of interface conversion adapters.

2.2 Operating mode when the generator's power is just turned on

The VG-849C has four operating modes. The operating mode can be selected by operating a key when the generator's power is being turned on.

Table 2.2.1 Operating mode and key operation when the power is just turned on

Key operation	Operating mode
When the POWER switch is set to ON	The VG-849C starts up in the direct display mode or group display mode. ^{*1}
When the POWER switch is set to ON while the SET key is held down ^{*2}	The VG-849C starts up in the auto display mode.
When the POWER switch is set to ON while the [▲] key is held down ^{*2}	The VG-849C starts up in the self-check mode.

*1: When "0" has been selected as the group number setting of config edit **FUNC5**, the direct display mode is established; when a number from 1 to 99 has been selected, the group display mode is established.

*2: Hold the key down for about two seconds after the POWER switch has been set to ON.

2.3 Concerning the cursor movements on the LCD display

Not only is the program data being output displayed on the LCD but the setting items are also displayed during data editing. To set a data item, move the cursor by operating the keys listed below, and input the setting using the number keys.

Table 2.3.1 Cursor movements on the LCD display

Key	Resulting operation
▶	Used to move the cursor to the next item.
◀	Used to move the cursor to the previous item.
▲	Used to display the previous page.
▼	Used to display the next page.

2.5 How to insert and eject the PC cards

2.5.1 How to insert the PC card

- (1) **Insert the PC card into the slot in the direction indicated by the arrow on the card's top surface.**

Insert the card firmly as far as it will go.

A beep tone is heard.

The LED lights. migi → Check that the card is locked in position.

If the card is locked properly, a beep tone is heard.



2.5.2 How to eject the PC card

- (1) **Press the [LOCK] key for 5 seconds.**

A beep tone is heard.

- (2) **Lightly press the EJECT button to the right of the card slot.**

The EJECT button pops out.

- (3) **Firmly press the EJECT button to eject the card.**

Check that the lock is released and that the LED goes off.

If the card is unlocked properly, a beep tone is heard.



CAUTION

- 1) For the PC card, use the CompactFlash card and PC card adapter packed with the generator. The generator's warranty does not cover any problems in operation which are caused by the use of any other type of card or adapter.
- 2) Be absolutely sure to follow the above steps to insert and eject PC cards. Taking any other steps may damage the data on the PC card and make it impossible for the PC card to be recognized even when it is re-inserted.
- 3) It takes two or three seconds for the LED to go off after the EJECT button is pressed and the card is removed. This is because it takes time for the VG generator to process the ejection of the PC card. Refrain from performing any operations during these seconds.

3

VG-849C SYSTEM SETTINGS

3.1 Concerning the system settings (config edit FUNC5)

The table below lists the items which are set using config edit **FUNC5**.

For details on how to access the item setting menus and how to save the data, refer to the next following pages; for details on the item settings, refer to the page number provided in the "reference page" column below.

Table 3.1.1 System settings (1)

No.	Setting item	Description	Reference page
1	Group number	For setting group numbers.	p.16
2	Beep tone	For selecting whether to turn the beep tone ON or OFF.	p.16
3	Pattern display mode	For selecting a single pattern or multi pattern.	p.17
4	NAME display mode	For selecting the program name (NAME) display mode.	p.17
5	Terminal mode	For selecting the external control interface (RS-232C/LAN).	p.18
6	Data mode	For selecting the format for the conditions under which the program data is output.	p.19
7	Baud rate/data bits	For selecting the RS-232C baud rate and data bits.	p.19
8	Parity bit/stop bit	For selecting the RS-232C parity bit and stop bits.	p.20
9	Start program	For selecting the program to be executed when the power is turned on.	p.20
10	DDC pattern	For selecting the port when executing DDC optional patterns.	p.21
11	IP address/port no.	For setting the IP address and port number of the LAN.	p.22
12	License key	License key (this cannot be changed).	p.23
13	VBS level fine adjustment	For finely adjusting the VBS output level.	p.23
14	Video level fine adjustment	For finely adjusting the RGB video output level.	p.24
15	Digital level mode	For selecting the digital output level mode.	p.25
16	Key lock mode	For selecting the key lock mode for preventing the erroneous operation of the [LEVEL] and [FUNC] keys.	p.25
17	Terminal mode display	For selecting what is to be displayed on the LCD when the terminal mode is established.	p.26
18	Internal program table	For selecting the internal program tables.	p.26
19	VBS output filter	For setting the VBS and Y/C output filter.	p.27
20	DDC transfer clock	For selecting the clock frequency during DDC.	p.28

Table 3.1.2 System settings (2)

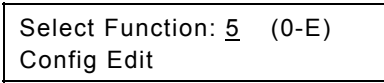
21	DDC read method	For selecting the DDC read mode.	p.28
22	HDMI automatic reflection	For selecting ON or OFF for the automatic reflection of the InfoFrame and ACP/ISRC Packet setting items.	p.30
23	Automatic HDMI audio output	For setting the automatic HDMI audio output.	p.32
24	Tri-level sync signal mode	For selecting the tri-level sync signal mode	p.33
25	RB-614C H-T key	For selecting the H-T key function of the RB-614C.	p.34
26	Drawing dots for 1-pixel drawing	For setting the drawing dots for 1-pixel drawing in the TV timing mode.	p.34
27	InfoFrame type	For selecting the InfoFrame packet type. (HDMI Ver.1.1)	p.34
28	CEC logical address	For setting the logical address for HDMI CEC.	p.35
29	Overlay cursor	For setting the overlay display of the cursor to ON or OFF.	p.36
30	Mute key	For selecting the [MUTE] key function.	p.36
31	Scroll trigger ^{*1}	For setting the scroll trigger function to ON or OFF.	p.37
32	HDMI output bit mode ^{*1}	For selecting the HDMI output bit mode (multi-bit mode).	p.38

*1: Optional function

3.2 Setting procedures

3.2.1 Accessing the item setting menus

(1) Press the [FUNC] key, [5]key and [SET] key.

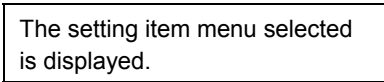


Select Function: 5 (0-E)
Config Edit

Fig. 3.2.1 Selecting the function

(2) Use the [▲] key and [▼] key to switch the menu, and access the menu for setting the item to be changed.

Use the [▶] and [◀] keys to move between items on the same setting menu.



The setting item menu selected
is displayed.

Fig. 3.2.2 Selecting the setting items

3.2.2 Temporarily reflecting the data changes

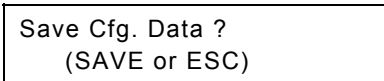
After the settings have been changed, press the [SET] key to reflect the data. These changes will be retained until the power is turned off.

3.2.3 Saving the data changes

The data is saved on the flash ROM inside the VG-849C. It can be saved at any time while the setting menu of config edit **FUNC5** is open.

(1) Press the [SAVE] key.

The [SAVE] key LED blinks, and a prompt asking whether data is to be saved appears on the display.



Save Cfg. Data ?
(SAVE or ESC)

Fig. 3.2.3 Saving the data

(2) Press the [SAVE] key.

The data is saved, and the [SAVE] key LED goes off.

CAUTION

Do not turn off the power before the [SAVE] key LED has gone off. Malfunctioning may occur if it is turned off in error while the LED is still lighted.

* If the [ESC] key is pressed instead, operation returns to the function selection screen (Fig. 3.2.1).

3.3 Detailed settings for the items

[1] Setting the group number

Select the group number (0 to 99).

Use the number keys to input the group number. (Factory setting: "0")

Cfg:Group No: 0 (00-99)

Fig. 3.3.1 Selecting the group number

NOTE

When "0" is selected, the data is output in the direct display mode. (Refer to "4.1.1 Direct output (direct display mode).")
When a number other than "0" is selected, the corresponding group number is output in the group display mode. (Refer to "4.1.2 Group data output (group display mode).")

[2] Setting the beep tone

Select ON or OFF for the beep tone.

Cfg:Beep :ON (0/1)

Fig. 3.3.2 Selecting the beep tone

Table 3.3.1 Beep tone selection method

Key	LCD display	Description
0	OFF	The beep tone is not sounded.
1	ON	The beep tone is sounded. (Factory setting)

[3] Setting the pattern display mode

Select the pattern display mode (Disp Mode).

```
Cfg:Disp Mode : 0 (0/1)
Single Pattern
```

Fig. 3.3.3 Selecting the pattern display mode

Table 3.3.2 Pattern display mode selection method

Key	LCD display	Description
0	Single Pattern	Only one pattern can be selected when switching patterns using the pattern keys. (Example: If the [CROSS] key is selected when the [CHARA] key is already selected, the [CHARA] key selection will be released.)
1	Multi Pattern	A multiple number of patterns can be selected when switching patterns using the pattern keys. (Example: If the [CROSS] key is selected when the [CHARA] key is already selected, both patterns appear together on the display.) (Factory setting)

[4] Setting the NAME display mode

Select the program name (NAME key) display mode.

```
Cfg:NAME Display Mode :
Standard (0/1)
```

Fig. 3.3.4 Selecting the NAME display mode

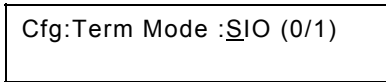
Table 3.3.3 NAME display mode selection method

Key	LCD display	Description
0	Standard	In the NAME ON status, the program name, dot clock frequency, horizontal sync frequency, vertical sync frequency, Hdisp and Vdisp are displayed. (Factory setting)
1	Simple (NAME Only)	In the NAME ON status, only the program name is displayed.

* For details on the NAME display, refer to “6.14 Setting the program name.”

[5] Setting the terminal mode.

Select the external control interface in the terminal mode.



Cfg:Term Mode :SIO (0/1)

Fig. 3.3.5 Selecting the external control interface

Table 3.3.4 External control interface selection method

Key	LCD display	Description
0	SIO	The external control interface of the VG-849C is set to RS-232C. (Factory setting)
1	LAN	The external control interface of the VG-849C is set to LAN.

- * When the VG-849C is to be controlled using the Windows software program (SP-8848) supplied, the terminal mode must be set to match the interface of the PC used.
- * When using the terminal commands, refer to the separate "VG Series: Terminal Command Instruction Manual."

CAUTION

The settings must be saved and the system restarted when the terminal mode has been changed. (The settings are not reflected by the act of saving them alone. They will take effect only when the system is next started.)

[6] Setting the data mode

Select the output condition format (analog/digital) for the program data registered on the PC card.

```
Cfg:MemCard Mode:0 (0/1)
Analog
```

Fig. 3.3.6 Selecting the data mode

Table 3.3.5 Data mode selection method

Key	LCD display	Description
0	Analog	The analog-only output condition data is set as per the data on the PC card. (Factory setting)
1	Digital	The analog-only output condition data is set to the initial values.

Shown in the table on the right are the analog-only output condition data items and initial values.

Table 3.3.6 Analog-only output condition data

Item	Initial value
Video	0.70 [V]
Setup	0.00 [V]
Sync	0.30 [V]
RGB/YPbPr	RGB
YPbPr No.	0

[7] Setting the baud rate and data bits

Select the RS-232C baud rate (RS-Speed) and data bits (RS-Dlen).

```
Cfg:RS-Speed:38400 (0-4)
RS-Dlen :8 (0/1)
```

Fig. 3.3.7 Selecting the baud rate and data bits

Table 3.3.7 Baud rate selection method

Key	LCD display	Description
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. (Factory setting)
3	57600	The baud rate is set to 57600 bps.
4	115200	The baud rate is set to 115200 bps.

Table 3.3.8 Data bit selection method

Key	LCD display	Description
0	7	Seven bits are set as the data bits.
1	8	Eight bits are set as the data bits. (Factory setting)



Bear in mind that some restrictions (00H to 7FH) may apply to the terminal commands which can be used if the number of data bits has been set to 7-bit.

[8] Setting the parity and stop bit(s)

Select the RS-232C parity (RS-Parity) and stop bit(s) (RS-Stop).

```
Cfg:RS-Parity:NONE (0-2)
RS-Stop :1 (0/1)
```

Fig. 3.3.8 Selecting the parity and stop bit(s)

Table 3.3.9 Parity selection method

Key	LCD display	Description
0	NONE	"None" is selected as the parity. (Factory setting)
1	EVEN	"Even" is selected as the parity.
2	ODD	"Odd" is selected as the parity.

Table 3.3.10 Stop bit selection method

Key	LCD display	Description
0	1	1 bit is selected as the stop bit. (Factory setting)
1	2	2 bits are selected as the stop bits.

[9] Setting the start program

Select the numbers of the programs to be executed (Start Prg No) when the power is turned on.

Use the number keys to input the number of the timing data program (TIM) and pattern data program (PAT). (Factory setting: 0 for TIM, 0 for PAT)

```
Cfg:Start Prg No TIM:850
PAT:850
```

Fig. 3.3.11 Selecting the numbers of the start programs

NOTE

When the power is turned on and the direct display mode has started up, the programs whose numbers are set here will be executed. If no program is to be executed when the power is turned on, set "0" for both.

[10] Setting the DDC pattern

Select the port to be used when DDC optional pattern No.0EH or 2EH is executed.

* For details on the DDC optional patterns, refer to “10.1.2.1 Concerning the DDC patterns (No.0E, 22, 23, 2E).”

OPT Pattern #0E(DDC) : Disable (0-3)

Fig. 3.3.10 Selecting the DDC pattern port

Table 3.3.11 DDC pattern port selection method

Key	LCD display	Description
0	Disable	Disabled. (Factory setting)
1	DVI	The DVI port is selected.
2	D-SUB	The D-Sub port is selected.
3	HDMI	The HDMI port is selected.

● Executing the DDC optional patterns

When optional patterns No.0EH, 22H, 23H or 2EH is executed, the EDID is captured from the display connected to the VG-849C, for example, and displayed.

The step in “Setting the DDC pattern” above must be taken for executing optional pattern No.0EH or 2EH.

* If the data capture is unsuccessful at this time, no further operations can be performed for about 30 seconds since another attempt will be made to capture the data. If “Disable” is selected, the EDID is not captured, and no patterns are displayed.
Select the “Disable” setting when the unit connected does not support DDC.

For optional patterns No.22H and 23H, the port is fixed, and EDID is captured regardless of the above settings.

- No.22H: Fixed to DVI port.
- No.23H: Fixed to D-Sub port.

[11] Setting the IP address and port number

Set the IP address and port number.

```
Cfg: IP:192.168.  1.  1
PortNo: 8000
```

Fig. 3.3.11 Setting the IP address and port number

Table 3.3.12 IP address and port number setting method

Setting item	Key	LCD display	Description
IP address (IP)	Number keys	XXX.XXX.XXX.XXX	Use these keys to set the IP address of the VG-849C. Setting range: 0.0.0.0 to 255.255.255.255 Factory setting: 192.168.0.2
Port number	Number keys	XXXXX	Use these keys to set the number of the port on the VG-849C to be used for receiving data. Setting range: 1024 to 65535 Factory setting: 8000

CAUTION

- The same IP address and port number settings as the configuration settings of the accessory software program (SP-8848) must be selected.
- The IP address of the unit (such as a PC) connected to the VG-849C requires the same network address as the IP address of the VG-849C.
- The VG-849C supports IP address classes A, B and C. IP address Class D also exists, but since the addresses in this class are special IP addresses used for multi-cast communication, they should not be used.
- The settings must be saved and the system restarted when the IP address or port number has been changed. (The settings are not reflected by the act of saving them alone. They will take effect only when the system is next started up.)

● Concerning general IP address settings

IP addresses fall into two categories: global addresses which are allocated to computers connected to the Internet, and private addresses which are used by LANs, etc.

Depending on the IP address, the following conventions apply to the private addresses used for LANs.

◆ Class A (10.0.0.0 to 10.255.255.255)

The number used for the 3-digit number for the first block is always "10," and it is followed by combinations of numbers from 0 to 255 for the subsequent blocks. Use of this class of IP address enables up to 16 million computers to be connected by a single network.

◆ Class B (172.16.0.0 to 172.31.255.255)

The number used for the 3-digit number for the first block is always "172," and numbers from 16 to 31 are used for the 3-digit number for the second block. Use of this class of IP address enables up to 65,534 computers to be connected by a single network.

◆ Class C (192.168.0.0 to 192.168.255.255)

The numbers used for the 3-digit number for the first two blocks are always "192.168," and numbers from 0 to 255 are used for the 3-digit number for the third block. Numbers "0," "1" and "255" are not normally allocated as the 3-digit number for the fourth block. Use of this class of IP address enables up to 254 computers to be connected by a single network. The IP addresses in class C are used to configure small-scale LANs.

[12] Setting the license key

This setting is for the license key for the HDCP function, etc. It was set at the factory and should not be changed.

Cfg:LICENSE KEY: 0

Fig. 3.3.12 Setting the license key

[13] Finely adjusting the VBS level

Finely adjust the VBS output level.

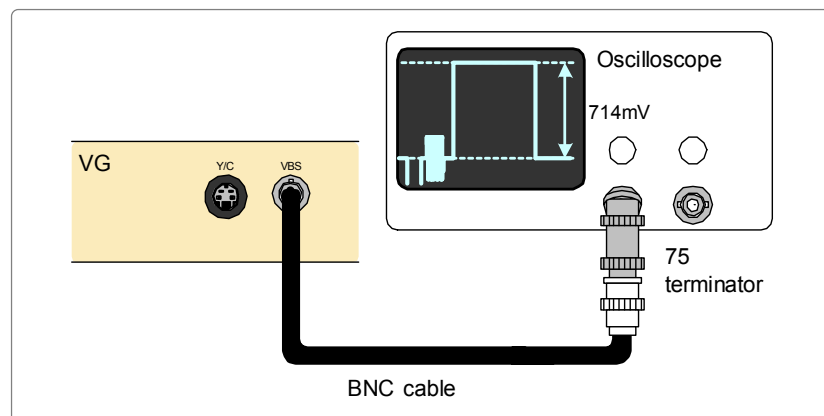
Set the pattern to a white monotone at any timing data at which output is possible. (Example of pattern creation: Set all the patterns to OFF, and select the [INV] key. Set the digital level to "255.")

Cfg:VBSLevelAdjustment

Fig. 3.3.13 VBS output level fine adjustment

● **How to adjust the VBS output level**

- (1) The VBS output level fine adjustment mode is established by pressing the [LEVEL] key while the above display is shown. The [LEVEL] key LED now lights.
- (2) The output level can be increased using the [\blacktriangle] key and reduced using the [\blacktriangledown] key. The adjustment range extends from approx. 600mV to 1600mV. Use an oscilloscope, etc. to check the level.



- (3) The fine adjustment mode can be exited by pressing the [LEVEL] key again. The [LEVEL] key LED now goes off.
- (4) To reflect the results of the fine adjustment, save the data. (The [SET] key cannot be used to make temporary changes.)

[14] Finely adjusting the video level

Finely adjust the RGB video output level.

Set the pattern to a white monotone at any timing data at which output is possible. (Example of pattern creation: Set all the patterns to OFF, and select the [INV] key. Set the digital level to "255.")

After selecting the adjustment color and video output level which is to be finely adjusted, establish the fine adjustment mode, and proceed with the fine adjustments.

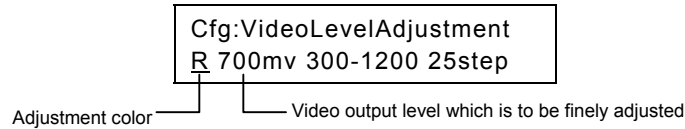


Fig. 3.3.14 Video output level fine adjustment

● How to select the adjustment color

Table 3.3.13 Adjustment color selection method

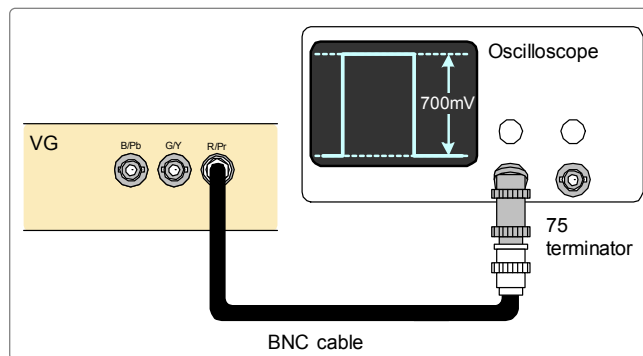
Key	LCD display	Description
0	R	The adjustment color is set to red.
1	G	The adjustment color is set to green.
2	B	The adjustment color is set to blue.

● How to select the video output level which is to be finely adjusted

The video output level to be finely adjusted can be selected in the range of 300mV to 1200mV, and it can be set in 25mV increments. Use the number keys to input the level directly. Fractions which are not divisible by 25 (which is not an increment of 25mV) are ignored. (Example: 724mV ⇒ 700mV)

● How to adjust the selected video output level

- (1) The fine adjustment mode is established by pressing the [LEVEL] key. The [LEVEL] key LED now lights.
- (2) The output level can be increased using the [▲] key and reduced using the [▼] key. The adjustment is in the approximate range of -25mV to +25mV. Use an oscilloscope, etc. to check the level.
- (3) When the fine adjustments have been completed or when the mode is to be exited, press the [LEVEL] key again. The [LEVEL] key LED now goes off.
- (4) Repeat steps (1) to (3) to adjust another color and level. Upon completion of all the fine adjustments, to reflect the results of the fine adjustments, save the data. (The [SET] key cannot be used to make temporary changes.)



NOTE

- The video output level fine adjustment procedure is used to adjust more finely the video output level which has already been calibrated (refer to "4.11 How to execute calibration (calibration [FUNC])").
- Calibration is performed at the factory prior to shipment.

[15] Setting the digital level mode

Select the digital level mode.

Cfg:Digital Level Mode : 0-255 (0/1)

Fig. 3.3.15 Selecting the digital level mode

Table 3.3.14 Digital level mode selection method

Key	LCD display	Description
0	0-255	For outputting at a level of 0 to 255 without converting the digital level. (Factory setting)
1	16-235	For converting the digital level and outputting at a level of 16 to 235.

CAUTION

At the "16 to 235" setting, the VBS and Y/C outputs are OFF. Other analog outputs are also output at the level established by the "16 to 235" setting.

[16] Setting the key lock mode

Select the key lock mode for preventing malfunctioning.

Cfg:Func & Level Lock: No Mask (0-3)

Fig. 3.3.16 Selecting the key lock mode

Table 3.3.15 Key lock mode selection method

Key	LCD display	Description
0	No Mask	The [FUNC] and [LEVEL] keys can be used as usual. (Factory setting)
1	Level key Lock	The operation of the [LEVEL] key ^{*1} is set to be inhibited.
2	Func Lock	The operation of the [FUNC] key ^{*2} is set to be inhibited.
3	Func & Level Lock	The operation of both the [LEVEL] key ^{*1} and [FUNC] keys ^{*2} is set to be inhibited.

*1: The operation of the [LEVEL] key using the direct display **FUNC0** is inhibited.

*2: The operation of the [FUNC] key for function no.1-4 and 6-D is inhibited.

[17] Setting the terminal mode display

Select the LCD screen display in the terminal mode.

```
Cfg:Term mode display
      Normal (0-1)
```

Fig. 3.3.17 Selecting the terminal mode display

Table 3.3.16 Terminal mode display selection method

Key	LCD display	Description
0	Normal	No displays appear in the terminal mode. (Factory setting)
1	Display	A flashing "T" appears at the top right of the LCD screen in the terminal mode.

[18] Setting the internal program table

Select the program table of the internal data.

```
Cfg:InternalProgramTable
      : PG1 Table (1-3)
```

Fig. 3.3.18 Selecting the internal program table

Table 3.3.17 Internal program table selection method

Key	LCD display	Description
1	PG1 Table	Table PG1 which is compatible with existing generators is selected. (Factory setting)
2	PG2 Table	Table PG2 based on the EIA/CEA-861-B standard is selected.
3	PG3 Table	Table PG3 based on the EIA/CEA-861-C standard is selected.

Tables consisting of standard timing data for systems such as EIA, VESA and NTSC and PAL which support analog TV sets

[19] Setting the VBS output filter

Select the VBS and Y/C output filter.

Change the filter level to suit the pattern displayed.
This setting represents the gain for a frequency of 3.6 MHz.



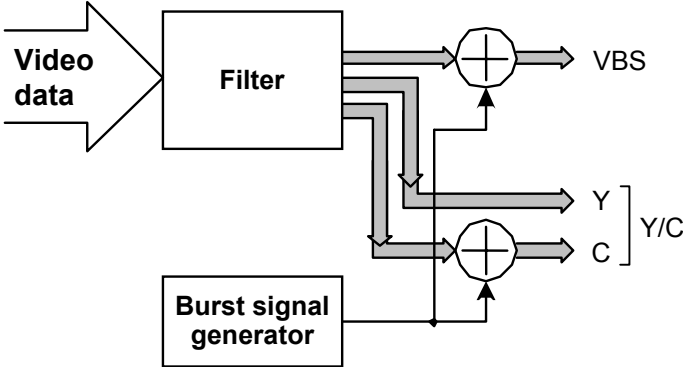
Fig. 3.3.19 Selecting the VBS output filter level

Table 3.3.18 VBS output filter level selection method

Key/LCD display	Description	
0	3.5dB gain	Low when a frequency band for character, burst signals, etc. is required
1	1.0dB gain	↓
2	-1.0dB	↓
3	-3.0dB	↓
4	-7.0dB (factory setting)	↓
5	-7.0dB *1	High when a frequency band for color bar signals, etc. is not required

● Concerning the filter settings

This setting is related to the internal data, and is added to the video data and sync signals. It has no effect on the burst signals.



Outline diagram of VBS and Y/C output filter

*1: Concerning setting "5"
The set gain is the same as setting "4," but the video data is averaged out in 3-pixel increments and output.

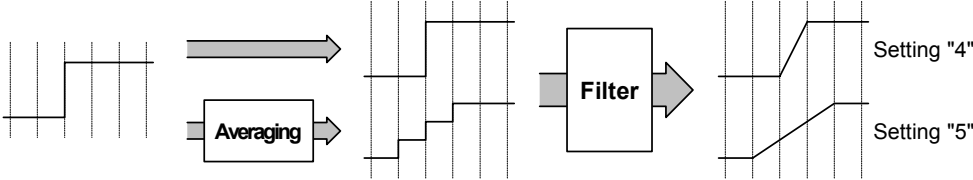


Fig. 3.3.20 Figure showing settings "4" and "5"

[20] Setting the DDC transfer clock

Select the clock frequency for DDC.

Cfg:I2c Trans Clock : 100KHz (0-4)

Fig. 3.3.21 Selecting the DDC transfer clock

Table 3.3.19 DDC transfer clock selection method

Key	LCD display	Description
0	20KHz	The clock frequency is set to 20 kHz.
1	40KHz	The clock frequency is set to 40 kHz.
2	60KHz	The clock frequency is set to 60 kHz.
3	80KHz	The clock frequency is set to 80 kHz. (Factory setting)
4	100KHz	The clock frequency is set to 100 kHz.

[21] Setting the DDC read method

Select the DDC read method.

Cfg:DDC Access Method: Enhanced DDC (0-2)
--

Fig. 3.3.22 Selecting the DDC read method

Table 3.3.20 DDC read method selection method

Key	LCD display	Description
0	Auto & Select DDC	For identifying the monitor support mode and establishing access. (Factory setting)
1	Enhanced DDC	For accessing EDID in the enhanced DDC mode.
2	Plug & Display DDC	For accessing EDID in the Plug & Display DDC mode.

● Concerning the DDC read mode

There are two DDC read methods: Enhanced DDC and Plug and Display DDC. The EDID data in up to 4 blocks is accessed as shown below.

(1) Enhanced DDC

This method is used for access with the segment pointer.

Table 3.3.21 Enhanced DDC mode access

Block	Segment Pointer	Device Address	Sub Address
0	00h	A0h	00h
1	00h	A0h	80h
2	01h	A0h	00h
3	01h	A0h	80h

(2) Plug & Display DDC

This method is used for access with the segment pointer.

Table 3.3.22 Plug & Display DDC mode access

Block	Segment Pointer	Device Address	Sub Address
0	----	A0h	00h
1	----	A0h	80h
2	----	A2h	00h
3	----	A2h	80h

● Concerning Auto & Select DDC

In the Auto & Select DDC mode, operations are performed as shown in the diagram below.

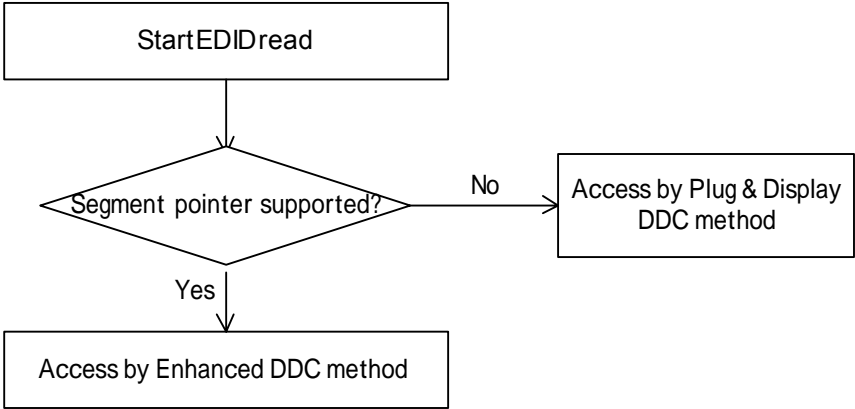


Fig. 3.3.23 Auto & Select DDC mode operations

[22] Setting the HDMI automatic reflection

Select ON or OFF for the automatic reflection of the InfoFrame and ACP/ISRC packet (timing data) item settings.

When automatic reflection is set to ON, the settings for the items on the left side of Table 3.3.24 on the next page are reflected in the InfoFrame and ACP/ISRC packets.

When it is set to OFF, the data is output as is using the current settings established in the program.

```
Cfg:HDMI AUTO SELECT
: OFF (0/1)
```

Fig. 3.3.24 Selecting HDMI automatic reflection

Table 3.3.23 HDMI automatic reflection selection method

Key	LCD display	Description
0	OFF	The settings are not automatically reflected. (Factory setting)
1	SELECTED	The settings are automatically reflected.



If program data has been saved using PC card edit **FUNC3** when "SELECTED" (automatic reflection) is set, the InfoFrame data and ACP/ISRC packet data after the automatic reflection will be saved.

Table 3.3.24 Items which are automatically reflected

AVI InfoFrame					
Items to be set			AVI InfoFrame settings which are reflected		
Output condition	AFD Type		Active Aspect Ratio	Bar setting	
		Optional pattern No.1F display setting	Display pattern Aspect setting	Top Bar Bottom Bar Left Bar Right Bar	Calculated by display setting
Horizontal timing	Aspect ratio (Hdisp / Vdisp = ar)		Picture Aspect Ratio		
Vertical timing		1.2667 < ar < 1.4	4:3		
		1.6889 < ar < 1.8667	16:9		
	Other	No Data			
HDMI output	Video Format		RGB or YCbCr		
		RGB	RGB		
		Y444	YC444		
	Y422-16, Y422-20, Y422-24	YC422			
	Repetition		Repetition		
	1 to 10	Same setting as left			

Audio InfoFrame					
Items to be set		Audio InfoFrame settings which are reflected			
HDMI output	AudioSrc (audio signals)	Channel Count	Coding Type	Sample Size	
		OFF	-	-	
		TOSLINK, COAX	Refer	Refer	Refer
		ANALOG	2ch	IEC60958	24bit
	INTERNAL	2ch	IEC60958	*1	
	AudioSamp (sampling frequency)	Sample Frequency			
	32, 44.1, 48, 88.2, 96, 176.4, 192 kHz	Same setting as left			
*1: Setting for [6] Setting the internal audio bit width in "5.6 Setting the HDMI output"					

ACP/ISRC Packet							
Items to be set		ACP/ISRC Packet settings which are reflected					
ACP/ISRC Packet	ACP Type	DVD-Audio Type	Copy Permission	Copy Number	Quality	Transaction	Packet ON/OFF
		DVD Audio	1	-	-	-	-
	Other	0	0 (Copy Freely)	0 (once)	0	0 (Not Present)	ISRC1 OFF ISRC2 OFF
	ISRC Continued	Packet ON/OFF					
	0 (no ISRC2)	ISRC2 OFF					

* Program settings are reflected as is in those places indicated by "-" in the table.

[23] Setting the automatic HDMI audio output

Select ON or OFF for the HDMI audio output when an internal program (No.850 to 999) has been selected.

When ON is selected for the HDMI audio output, the HDMI audio signals are output as the default when an internal program has been selected. Conversely, when OFF is selected, the default OFF setting is established.

Cfg:HDMI Internal Audio Prg.850-999 : OFF (0/1)
--

Fig. 3.3.25 Selecting the HDMI audio output

Table 3.3.25 HDMI audio output selection method

Key	LCD display	Description
0	OFF	The HDMI audio output is set to OFF. (Factory setting)
1	ON	The HDMI audio output is set to ON.

The settings for the HDMI audio which is output are listed in the table below. For details of the settings, refer to "5.6 Setting the HDMI output."

Table 3.3.26 HDMI audio output selection method

Setting item	Setting range	
Audio signals	INTERNAL	
Audio sampling frequency	48kHz	
Audio output channel	ON for channel 1 and channel 2 only; OFF for all other channels	
Bit width	16bit	
Output level	L	-19.99dB
	R	-19.99dB
Output frequency	L	1000Hz
	R	1000Hz
SWEEP	OFF	

CAUTION

When a program (No.1 to 849) which has been created is selected, the audio output corresponding to the settings of that program will be established regardless of the settings listed in the above table.

[24] Setting the tri-level sync signal mode

Select the tri-level sync signal mode.

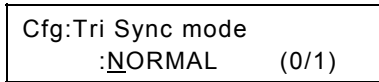


Fig. 3.3.26 Selecting the tri-level sync signal mode

Table 3.3.27 Tri-level sync signal mode selection method

Key	LCD display	Description
0	NORMAL	Normal mode: Normal output (factory setting)
1	SHIFT	Shift mode: Output compatible with existing VG generators

● What is the tri-level sync signal mode?

Fig. 3.3.27 shows the relationship between the tri-level sync signals and horizontal sync signals (HS) for the VG-849C when 1080i system or other tri-level sync signals (refer to [1] Setting the sync signal output mode in “5.4 Setting the output condition data”) are output. (Normal mode)
 For an existing VG generator (VG-828 or VG-828-D), this relationship is shown in Fig. 3.3.28. When the shift mode is established, the timing data from the existing VG generator can be output in the same way from the VG-849C, and the data is output as shown in Fig. 3.3.29.

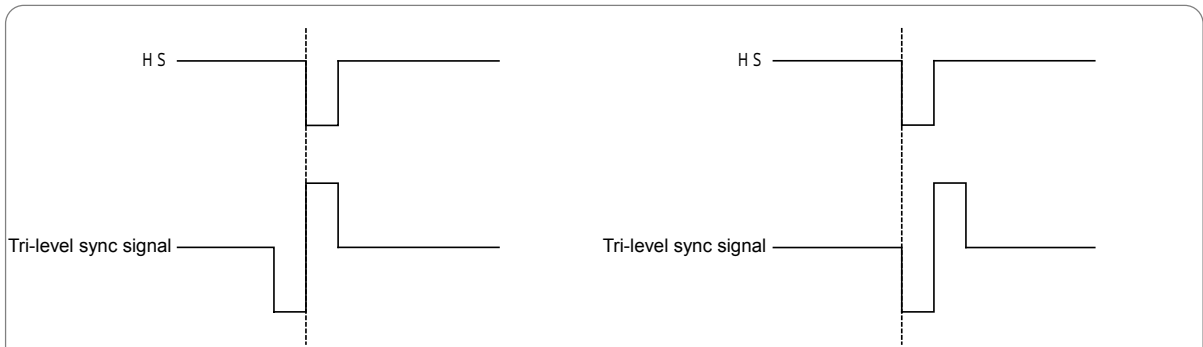


Fig. 3.3.27 Sync signals of VG-849C (normal mode) **Fig. 3.3.28** Sync signals of existing VG generator

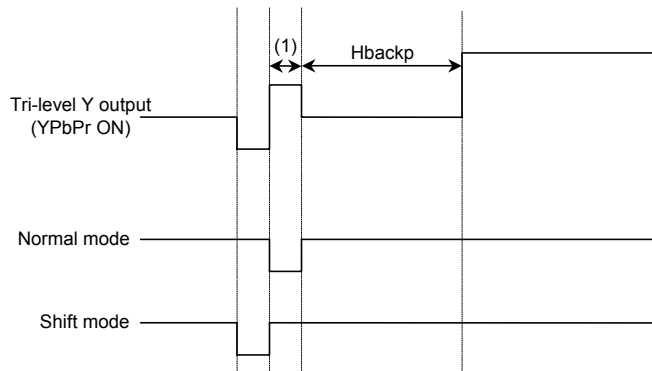


Fig. 3.3.29 Comparison between normal mode and shift mode



- Even in the shift mode, the setting established in the normal mode remains unchanged for Hbackp.
- If Hbackp has been read from the timing data of an existing VG generator in the shift mode, it will be Hbackp-(1) which was set by the existing generator.

[25] Setting the RB-614C H-T key function

Select the function of the H-T key on the RB-614C (remote control box).

Cfg:RB614C H-T KEY
: GROUP (0/1)

Fig. 3.3.30 Selecting the RB-614C H-T key function

Table 3.3.28 RB-614C H-T key function selection method

Key	LCD display	Description
0	GROUP	The H-T key on the RB-614C is set to function as the group key. (Factory setting)
1	CURSOR	The H-T key on the RB-614C is set to function as the cursor key.

[26] Setting the drawing dots for 1-pixel drawing

Select the drawing dots for 1-pixel drawing in the TV timing (NTSC, PAL or SECAM) mode.

Cfg:TV Timing Dot Mode
: 2dot (0/1)

Fig. 3.3.31 Selecting the drawing dots

Table 3.3.29 Drawing dot selection method

Key	LCD display	Description
0	2dot	One pixel is drawn with two dots. (Factory setting)
1	1dot	One pixel is drawn with one dot.

CAUTION

It is when a crosshatch, dot, circle, center marker, edge marker or diagonal line pattern is drawn that this setting is reflected.

[27] Setting the InfoFrame type

Select the type of InfoFrame packet to be sent when HDMI Ver.1.1 is used.

Cfg:InfoFrame SPD/MPEG
Select: SPD (0/1)

Fig. 3.3.32 Selecting the InfoFrame packet type

Table 3.3.30 InfoFrame packet type selection method

Key	LCD display	Description
0	SPD	The SPD InfoFrame is sent. (Factory setting)
1	MPEG	The MPEG InfoFrame is sent.

[28] Setting the logical address for CEC

Set the logical address for CEC when an internal program (No.850 to 999) has been selected.

When an internal program has been selected and an HDMI CEC pattern (option No.35) is displayed, the CEC function works as a monitor mode. The logical address established at this time will function as the address specified by this setting. For details on the CEC function, refer to "6.16 CEC function."

Cfg:Prg 850-999 OPT-35 Logical Address: 0h (0-F)

Fig. 3.3.33 Setting the logical address

Table 3.3.31 Logical address setting method

Key	LCD display	Description
Number keys (+ [SHIFT] key)	Xh	These specify the logical addresses for HDMI CEC in internal programs. (Factory setting: "1")


CAUTION

When a program (No.1 to 849) which has been created is selected, the CEC function corresponding to the settings of that program will be executed regardless of this setting.

[29] Setting the overlay cursor

Set the overlay display when a cursor pattern is displayed to ON or OFF.

Cfg:Overlay Cursor:OFF
(0/1)

Fig. 3.3.34 Selecting the overlay display

Table 3.3.32 Overlay display selection method

Key	LCD display	Description
0	OFF	The normal cursor pattern is displayed. The background is displayed in the color which has been set. (Factory setting)
1	ON	The cursor pattern is displayed on top of another pattern which is displayed.

[30] Setting the MUTE key

Select the [MUTE] key function.

Cfg:MUTE Key Function:
Audio Mute (0/1)

Fig. 3.3.35 Selecting the mute key function

Table 3.3.33 Mute key function selection method

Key	LCD display	Description
0	Audio Mute	The [MUTE] key works as the audio muting function (audio output ON/OFF switching) key. (Factory setting)
1	AV Mute	The [MUTE] key works as the HDMI AV muting function key.

CAUTION

At either setting, the status is switched (from ON to OFF or vice versa) by pressing the [MUTE] key. However, in the case of AV MUTE, the default value (AV muting OFF) is restored by switching the program or timing data.

[31] Setting the scroll trigger (❖optional function)

Set the scroll trigger function to ON or OFF.

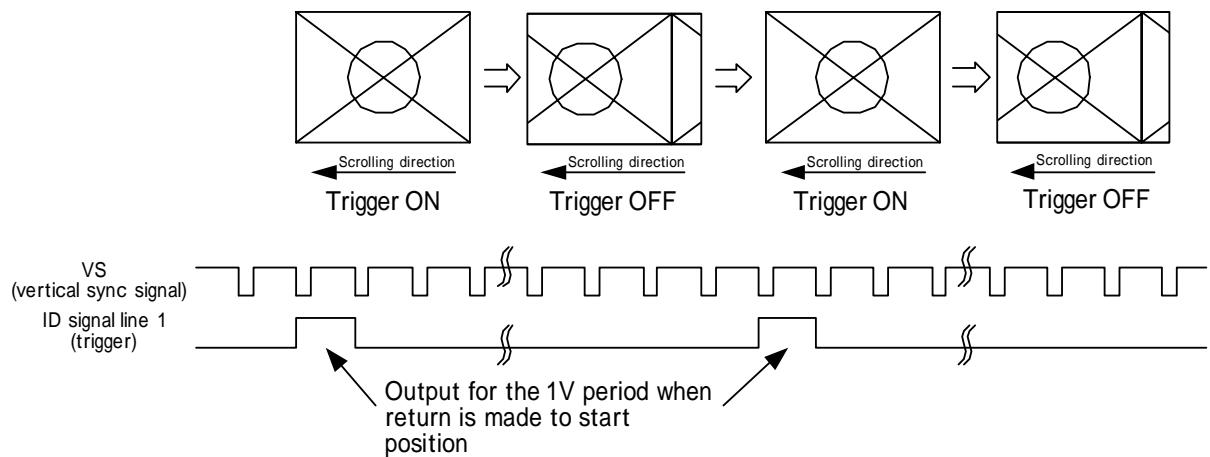
```
Cfg:Output ScrollTrigger
:OFF(0/1)
```

Fig. 3.3.36 Selecting the scroll trigger

Table 3.3.34 Scroll trigger selection method

Key	LCD display	Description
0	OFF	Trigger signals are not output during scrolling. (Factory setting)
1	ON	Trigger signals are output during scrolling. <ul style="list-style-type: none"> • The ID signal line 1 of the D5 connector is used as the output connector. • The 1V period trigger ON signal is output when scrolling has returned to the start position.

● **Example: When the scroll trigger function is ON and scrolling is performed toward the left**



CAUTION

- In the case of a multiple number of scroll “ON” planes (graphic, character and window), trigger ON is not output if the scroll settings (step and direction) are different.
- In the case of a single scroll “ON” plane, the trigger signal is output in accordance with the setting concerned.
- With horizontal (left-right) or vertical (up-down) scrolling, trigger ON can be output for either direction, but in the case of scrolling in both directions (toward the top right, for instance), the trigger signal is output in accordance with the horizontal direction.
- The ID signal line 1 of the D5 connector is used for the trigger signal when the scroll trigger function is ON regardless of whether scrolling is ON or OFF.

[32] Setting the HDMI output bit mode (❖optional function)

Select the HDMI output bit mode.

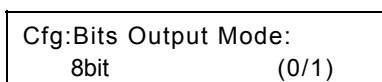


Fig. 3.3.37 Selecting the output bit mode

Table 3.3.35 Output bit mode selection method

Key	LCD display	Description
0	8BIT	The patterns are drawn using 8 bits. (Factory setting)
1	MULTI BIT	The patterns are drawn in the multi-bit mode.

For details on the multi-bit mode, refer to “Chapter 8 MULTI-BIT MODE (❖OPTION).”

4

SIGNAL OUTPUT AND DATA REGISTRATION PROCEDURES

4.1 Output of video signals (direct display FUNC0)

The video signals of the program data stored internally or registered on PC cards are output using the direct display **FUNC0**.

In addition, the program data settings can be changed (but not saved) while the signals are being output.

Two operating modes, the direct display mode and the group display mode, are supported here. If, when performing the "[1] Setting the group number" of the config edit **FUNC5**, group No.0 is set, the direct display mode is established; if any group No. from 1 to 99 is set, the group display mode is established.

4.1.1 Direct output (direct display mode) p.40

This section describes the direct display mode.

4.1.2 Group data output (group display mode) p.41

This section describes the group display mode.

4.1.3 Changing the group numbers p.42

This section describes how to make temporary changes to group numbers. The settings cannot be saved.

Operation can be performed in the same way whether in the direct display mode or group display mode.

4.1.4 Switching the output patterns

4.1.5 Cursor operations

4.1.6 Changing the window RGB levels

4.1.7 Switching the output video signals and sync signals

4.1.8 Switching audio output muting ON or OFF

4.1.9 Changing the video and audio output levels

4.1.10 Scrolling the output patterns

4.1.11 Changing the pattern data settings

4.1.12 Changing the timing data settings from p.42

These sections describe the items which can be operated or changed during signal output. The changed data cannot be saved.

Operation can be performed in the same way whether in the direct display mode or group display mode.

4.1.1 Direct output (direct display mode)

- Set the group No. to "0."
(This setting is performed by config edit **FUNC5** or by following the steps in "4.1.3 Changing the group numbers.")

(1) Press the [FUNC] key, [0] key and [SET] key.

The direct display mode appears on the LCD display.

Select Function: 0 (0-E)
Direct Display

Fig. 4.1.1 Selecting the function

(2) Use the number keys to input the program number (3 digits). (Example: "001")

- Program numbers 001 to 849 are used for PC cards; program numbers 850 to 999 are used for the internal data.

* When using the internal data, the internal program tables (PG1, 2 and 3) must be set. (Config edit **FUNC5**)

* For details on the internal data, refer to "10.1.1 Program data."

- One- or 2-digit numbers (1 to 99) can be input using the number key(s) followed by the [SET] key. (Example: [1] key → [SET] key)
- Program numbers can also be selected using the [▲] key and [▼] key. Numbers which have not been registered and program numbers with "invalid" set for the data are ignored.

PG1: 0:

Fig. 4.1.2 Inputting the program number

* Normally, this screen appears when the VG-849C starts up as well. (Refer to "2.2 Operating mode when the generator's power is just turned on.")

(3) The video signals of the program whose number was selected are now output.

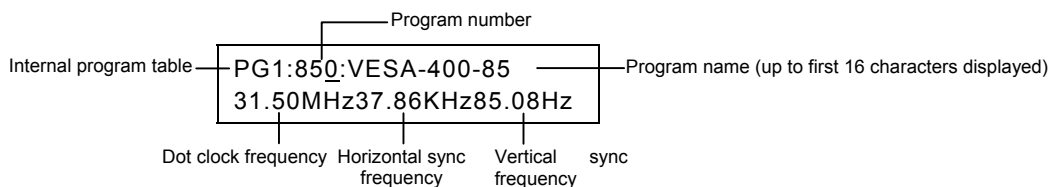


Fig. 4.1.3 Outputting the video signals

CAUTION

The dot clock frequency, horizontal sync frequency and vertical sync frequency are indicated on the LCD screen using the last two digits (two decimal places).

● How to switch to another program

Proceed with the operation in step (2). When the following is used as a reference and the program number is specified after the applicable key has been pressed, some of the program data (timing data only or pattern data only) can be switched before the outputting of the signals.

- To switch the program data (timing data or pattern data): [PROG] key
- To switch only the timing data: [TIMING] key
- To switch only the pattern data: [PAT] key

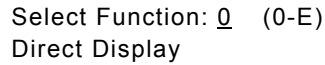
● Operations can be performed and changes made while the signals are being output.

Refer to "4.1.4 Switching the output patterns" (p.42) to "4.1.12 Changing the timing data settings" (p.49).

4.1.2 Group data output (group display mode)

- Any numbers from 1 to 99 can be set for the numbers of the groups which are to be output. (The numbers are set using config edit **FUNC5** or by following the steps in “4.1.3 Changing the group numbers.”)
- The group data is registered using group data edit **FUNC6**.

(1) Press the [FUNC] key, [0] key and [SET] key.



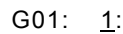
Select Function: 0 (0-E)
Direct Display

Fig. 4.1.4 Selecting the function

The group display mode appears on the LCD screen.

(2) Use the number keys to input the group data number (2 digits). (Example: “01”)

- A number with only one digit (1 to 9) can be input using the number key followed by the [SET] key. (Example: [1] key → [SET] key)
- Group data numbers can also be selected using the [\blacktriangle] key (+1) and [\blacktriangledown] (-1) key. Numbers for group data which has not been registered are ignored.



G01: 1:

Fig. 4.1.5 Inputting the group data number

(3) The video signals of the group data whose number was selected are now output.

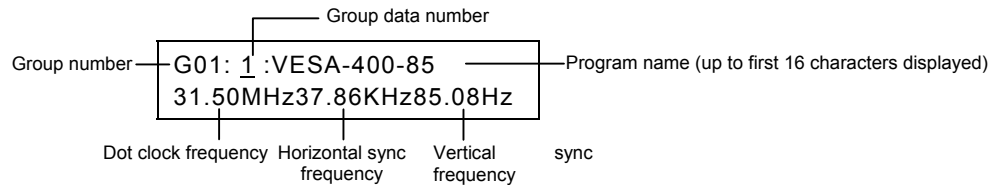


Fig. 4.1.6 Outputting the video signals

CAUTION

The dot clock frequency, horizontal sync frequency and vertical sync frequency are indicated on the LCD screen using the last two digits (two decimal places).

● How to switch to other group data

Proceed with the operation in step (2).

● How to switch to another group

Refer to “4.1.3 Changing the group numbers” (p.42).

● Operations can be performed and changes made while the data signals are being output.

Refer to “4.1.4 Switching the output patterns” (p.42) to “4.1.12 Changing the timing data settings” (p.49).

4.1.3 Changing the group numbers

- (1) Press the [ESC] key.

The screen on which to change the group number now appears.

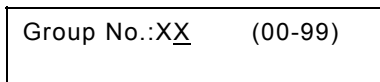


Fig. 4.1.7 Changing the group number

- (2) Use the number keys to input the group number.

The group number can also be selected one at a time using the [▲] key and [▼] key.

- (3) Press the [SET] key.

The group number is changed, and either the direct display mode or group display mode appears on the LCD screen.



The group number set here cannot be saved. To save the setting, use config edit **FUNC5**.

4.1.4 Switching the output patterns

Use the following as a reference, and press the applicable key among the keys listed below. The LED of the selected key lights, and the pattern data is output.

* When “Single Pattern” has been selected as “[3] Setting the pattern display mode” of config edit **FUNC5**, only one pattern can be selected. When “Multi Pattern” has been selected, a multiple number of patterns can be selected. However, only one pattern can be selected for optional pattern 1 or optional pattern 2 regardless of the mode.

Table 4.1.1 Pattern data to be output

Key	Pattern data to be output	Remarks
CHARA	Character pattern	
CROSS	Crosshatch pattern	
DOTS	Dot pattern	
CIRCLE	Circle pattern	
+	Center marker pattern	
□	Edge marker pattern	
×	Diagonal line pattern	
CURSOR	Cursor pattern	Refer to “4.1.5 Cursor operations.”
COLOR	Color bar pattern	
GRAY	Gray scale pattern	
BURST	Burst pattern	
WINDOW	Window pattern	Refer to “4.1.6 Changing the window RGB levels.”
OPT1	Optional pattern 1	
OPT2	Optional pattern 2	
NAME	Program name	The program name, dot clock frequency, etc. are displayed. Refer to “6.14 Setting the program name” and (2) in “4.10.3.3 What appears on the display during HDCP execution.”

4.1.5 Cursor operations

■ Displaying the cursor pattern

The cursor pattern is displayed when the [CURSOR] key is pressed. The LED of the [CURSOR] key lights, and the cursor coordinates are displayed on the LCD screen.

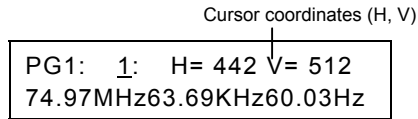


Fig. 4.1.8 Cursor pattern position

■ Cursor pattern function keys

The number keys are used for cursor pattern operations. These keys and the operations they perform are shown below.

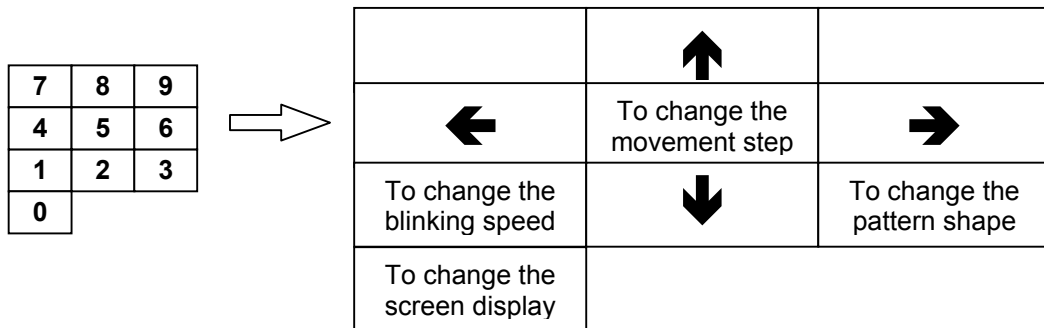


Fig. 4.1.9 Operations performed by cursor keys and key positions

Table 4.1.2 Cursor pattern function keys

Key	Function
0	This changes the method used to display the coordinates and steps on the screen. (No display → Normal 1 mode → Normal 2 mode → Reverse 1 mode → Reverse 2 mode)
1	This changes the blinking speed. (No blinking → once in 1V → ... → once in 64V)
2	This moves the cursor downward.
3	This changes the pattern shape and switches the normal mode to the sub-pixel mode or vice versa. Normal mode (Cross → V-Line) → Sub-pixel mode (5×5 → Cross → V-Line) → Normal mode (5×5) ... hereafter repeated. Normal mode: The cursor moves in pixel increments. (The cursor is displayed in the color which has been set.) Sub-pixel mode: The cursor moves in increments of R, G and B with which the pixels are configured. The cursor color is displayed in the sequence of red → green → blue when it moves to the right and blue → green → red when it moves to the left.
4	This moves the cursor to the left.
5	This changes the movement step. (100dots → 10dots → 1dot)
6	This moves the cursor to the right.
8	This moves the cursor upward.



While the cursor pattern is being moved, no operations involving the use of the number keys (such as the input of program numbers) can be performed.

■ Moving the cursor

The cursor is moved using the [2], [4], [6] and [8] number keys. When it moves, the screen display and the values of the cursor coordinates displayed on the LCD screen change.

Table 4.1.3 Cursor movements

Key	Movement direction
2	↓: Downward
4	←: Toward the left
6	→: Toward the right
8	↑: Upward

* When the Reverse 1 or Reverse 2 mode is used as the screen display method, the top and bottom of the display will be reversed, and in anticipation of this, therefore, the directions in which the cursor is moved by the keys will be reversed under normal circumstances. (Key 2 will move the cursor upward, key 4 toward the right, key 6 toward the left, and key 8 downward.)

■ Switching the screen display method

The screen display method is switched using the [0] number key.

Table 4.1.4 Screen display method

Display method	Display	Description of display
No display		
Pixel units: Normal 1 or Reverse 1 mode	(0, 0 : STEP10)	(Horizontal H coordinate, vertical V coordinate: movement steps) * The top left of the display serves as the origin point (H=0, V=0) of the coordinates.
RGB units: Normal 2 or Reverse 2 mode	(GATE = 1 : STEP10) (R = 1 G = 2 B = 3)	(Vertical gate coordinate: movement steps) (R color, G color, B color) horizontal coordinate * The top left of the display serves as the origin point (Gate=1, R=1, G=2, B=3) of the coordinates.

Each time the [0] number key is pressed, the display method is switched by one setting in the following sequence. "No display" is the default method.

No display (default) → Pixel units Normal1 → RGB units Normal2 → Pixel units Reverse1^{*1} → RGB units Reverse2^{*1} → No display → (hereafter repeated)

*1: "Reverse" is the Normal display with its characters rotated 180° so that its position is reversed at the top and bottom.

■ Switching the cursor blinking speed

The blinking speed of the cursor is changed using the [1] number key. Each time the [1] key is pressed, the speed is changed by one setting in the following sequence. "No blinking" is the default speed.

No blinking → Blinking once in 1V → Blinking once in 2V → Blinking once in 4V → Blinking once in 8V
Blinking once in 16V → Blinking once in 32V → Blinking once in 64V → (hereafter repeated)

■ Changing the cursor shape

The shape of the cursor is changed using the [3] number key. Each time the [3] key is pressed, the shape is changed by one setting in the following sequence. “Cross-shaped cursor” is the default shape.

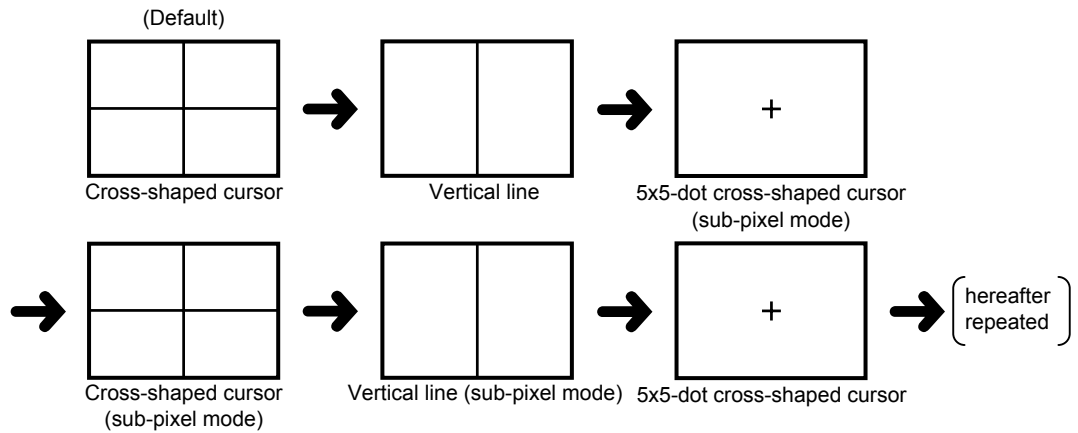


Fig. 4.1.10 Cursor shapes

■ Switching the movement steps of the cursor

The step amount of the cursor when any of the cursor movement keys has been operated is changed using the [5] number key.

Each time the [5] key is pressed, this amount is changed by one setting in the following sequence. “10 dots” is the default amount.

10 dots (default) → 1 dot → 100 dots → 10 dots → (hereafter repeated)

4.1.6 Changing the window RGB levels

The window RGB levels can be varied if either of the following settings has been selected for the window pattern (refer to "6.11 Setting the window pattern").

- When format F has been selected
- When a format from 0 to 7 has been selected, and the flicker interval has been set to 0 (If the flicker interval has been set to a value other than 0, the flicker operation will take priority, making it no longer possible for the RGB levels to be varied.)

(1) Press the [WINDOW] key.

The LED of the [WINDOW] key lights, and the RGB levels are displayed on the LCD screen.

RGB levels

PG1: 1:WIN(255,255,255)
74.97MHz63.69KHz60.03Hz

Fig. 4.1.11 Window RGB levels

(2) Change the window RGB levels.

Table 4.1.5 RGB level changes

Key	Operation	
A ([SHIFT]→[4])	The level is automatically increased.	
	Speed of change	Format F: Speed which has been set by the level change speed (Flicker). Formats 0 to 7: 1 level in one V period
B ([SHIFT]→[5])	The level is automatically reduced.	
	Speed of change	Format F: Speed which has been set by the level change speed (Flicker). Formats 0 to 7: 1 level in one V period
C ([SHIFT]→[6])	The level stops changing.	
E ([SHIFT]→[8])	The level is incremented by 1 setting.	
F ([SHIFT]→[9])	The level is decremented by 1 setting.	



While the window levels are being changed, no operations involving the use of the number keys (such as the input of program numbers) can be performed.

4.1.7 Switching the output video signals and sync signals

Use the following as a reference, and press the applicable key among the keys listed below. The LED of the selected key lights, and the signals are switched.

Table 4.1.6 Video and sync signals to be output

Key	Signals output
R, G, B	R/G/B or R-Y/Y/B-Y signals
INV	Output inversion of R/G/B or R-Y/Y/B-Y signals
HS/CS, VS (polarity is inverted by pressing the [SHIFT] key)	HS/CS and VS signals
G/S	Green-on-sync signal
YPbPr (RGB signals when LED is off)	YPbPr signals

4.1.8 Switching audio output muting ON or OFF

Select the setting by pressing the [MUTE] key.

- When the LED of the [MUTE] key is lighted: The audio output is set to OFF (muted).
- When the LED of the [MUTE] key is off: The audio output is set to ON.

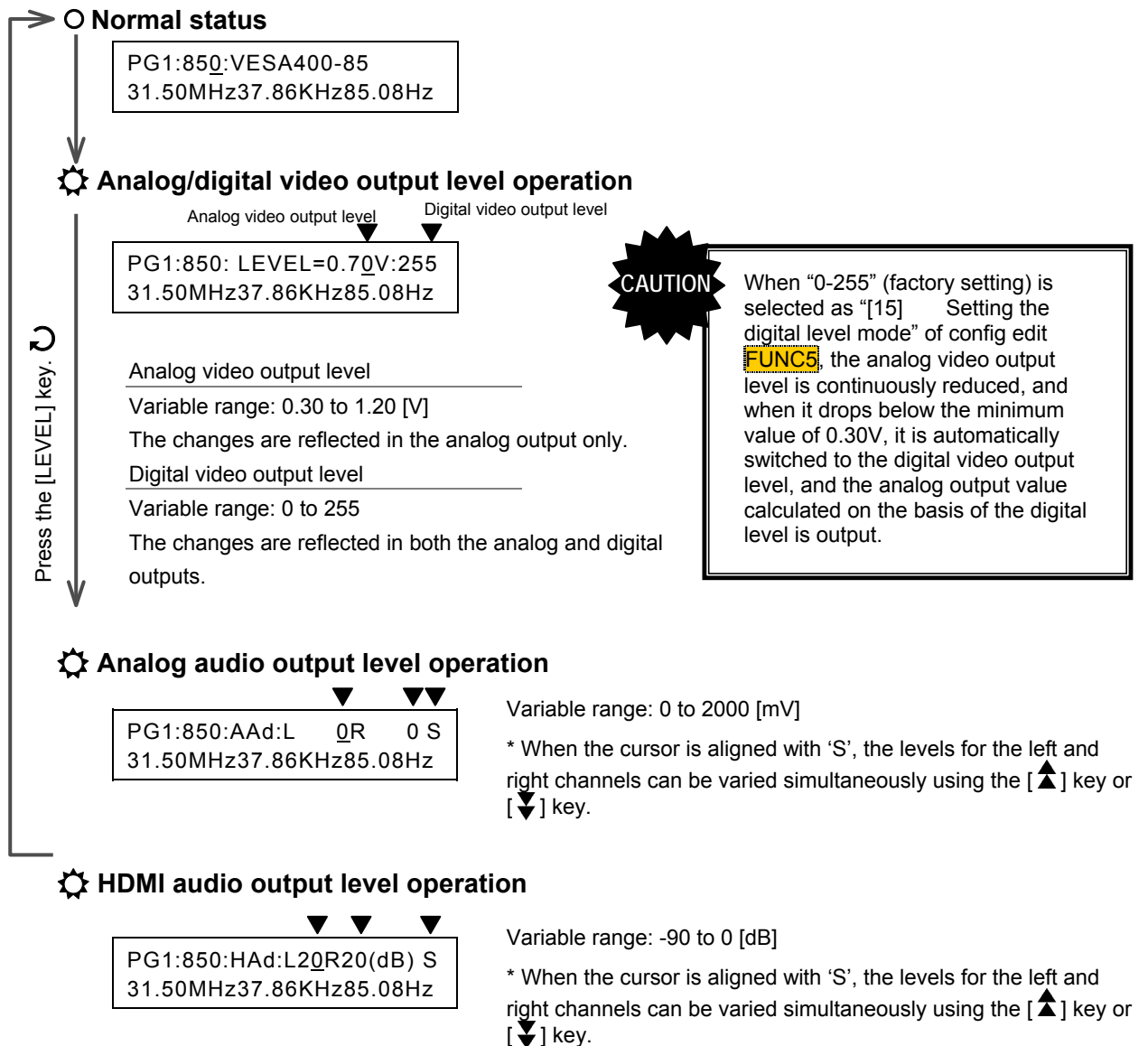
CAUTION

The function of the [MUTE] key differs depending on "[30] Setting the MUTE key" of config edit **FUNC5**. When "AV Mute" is set, it functions as the HDMI AV Mute key.

4.1.9 Changing the video and audio output levels

The analog/digital video output level, analog audio output level and HDMI audio output level can be varied.

- The menu is selected by pressing the [LEVEL] key.
- Input the values using the number keys, and press the [SET] key. The values can also be incremented or decremented using the [▲] key and [▼] key.
- The changes are reflected in the outputs immediately.



4.1.10 Scrolling the output patterns

(1) Press the [FORMAT] key and [+] key.

The screen on which to select the scrolling appears.

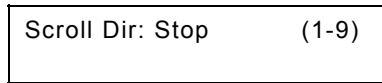


Fig. 4.1.12 Scrolling the pattern

(2) Select the scroll direction using the number keys and scroll the pattern.

Table 4.1.7 Selecting the direction in which to scroll the pattern

Key	LCD display	Description	
1	L-D	For scrolling the pattern toward the bottom left.	The pattern is scrolled in the specified direction.
2	D	For scrolling the pattern downward.	
3	R-D	For scrolling the pattern toward the bottom right.	
4	L	For scrolling the pattern toward the left.	
5	Stop	For stopping the scrolling.	
6	R	For scrolling the pattern toward the right.	The pattern is scrolled in the specified direction.
7	L-U	For scrolling the pattern toward the top left.	
8	U	For scrolling the pattern upward.	
9	R-U	For scrolling the pattern toward the top right.	

* The pattern action settings are reflected for the amount of scroll movement horizontally and vertically and interval (time in frame increments or in field increments for interlaced scanning). (Refer to "6.15 Setting pattern action.")

(3) Press the [FORMAT] key.

The original display is restored.



Scrolling operations cannot be performed when the HDCP, audio sweep, closed caption/V-chip, Teletext or Macrovision function is being used. (Refer to "11.4.4 Concerning functions which cannot be executed simultaneously.")

4.1.11 Changing the pattern data settings

- (1) **Press the [FORMAT] key.**
The LED of the [FORMAT] key lights.
- (2) **Press the pattern key corresponding to the pattern which is to be changed.**
The screen on which to set the pattern data appears on the LCD.
- (3) **Edit the pattern data, and output it. (Refer to "PATTERN DATA CONFIGURATION AND SETTING PROCEDURES" in chapter 6.)**
* If the [□] key is pressed, the pattern action setting screen appears; if the [×] key is pressed, the graphic color setting screen appears.
- (4) **Press the [FORMAT] key.**
Operation returns from the pattern data setting screen to the original display.

* The data edited here cannot be saved.
What has been edited here remains in effect until a new program is executed using direct display **FUNC0**, auto display **FUNC1** or other function or until the program data is edited using the PC card edit **FUNC3** or PC card copy **FUNC4**.
To save the data on the PC card, use PC card edit **FUNC3**.

4.1.12 Changing the timing data settings

- (1) **Press the [FORMAT] key.**
The LED of the [FORMAT] key lights.
- (2) **Press the [TIMING] key.**
The screen on which to set the timing data appears on the LCD.
- (3) **Edit the pattern data, and output it. (Refer to "TIMING DATA CONFIGURATION AND SETTING PROCEDURES" in chapter 5.)**
* Each time the TIMING is pressed, the data (horizontal timing data, vertical timing data, ...) is switched.
- (4) **Press the [FORMAT] key.**
Operation returns from the timing data setting screen to the original display.

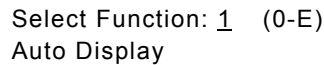
* The data edited here cannot be saved.
What has been edited here remains in effect until a new program is executed using direct display **FUNC0**, auto display **FUNC1** or other function or until the program data is edited using the PC card edit **FUNC3** or PC card copy **FUNC4**.
To save the data on the PC card, use PC card edit **FUNC3**.

4.2 Automatic output of video signals (auto display FUNC1)

The auto display mode is set and executed using auto display **FUNC1**.

In this mode, the video signals of the program data in the group or program whose number has been selected are automatically output in accordance with the specified delay time.

- (1) Press the [FUNC] key, [1] key and [SET] key.



Select Function: 1 (0-E)
Auto Display

Fig. 4.2.1 Selecting the function

The auto display mode appears on the LCD screen.

- (2) Use the number keys to input the group number.



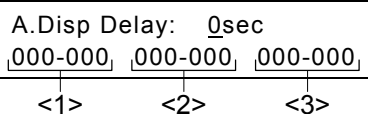
Group No. : 0 (0-99)

Fig. 4.2.2 Selecting the group number

When a group number from "1" to "99" has been selected, the programs registered in that group are displayed with each delay time.

To specify the program range, set "0."

- (3) Use the number keys to input the delay time and program numbers.



A.Disp Delay: 0sec
000-000, 000-000, 000-000
<1> <2> <3>

Fig. 4.2.3 Inputting the delay time and program numbers

The setting items and display differ depending on the group number setting.

- When 1 to 99 has been specified as the group number

Only the delay time is set. The setting range is 0 to 999 seconds.

No program numbers are displayed.

- When 0 has been specified as the group number

Delay time: Setting range of 0 to 999 seconds

Program No.: ● Input this in 3 digits (example: "001").

- The programs are output in sequence from No.XXX to No.YYY.
- Three sets--<1>, <2> and <3>--can be registered, and they are executed in the sequence of <1> → <2> → <3>.
- When "000" has been set for 'XXX' or 'YYY,' the set with this setting is not executed.

- (4) To save the settings, press the [SAVE] key. (Skip this step if the settings are not going to be saved.)

While the settings are being saved, the LED of the [SAVE] key lights, and when the saving process has been completed, the LED goes off.

- (5) Press the [SET] key.

The auto display mode operations are executed.

- To abort the output, press the [ESC] key. The output is aborted, and operation returns to the setting screen.
- If the power is turned on while the [SET] key is held down, auto display mode operations can be executed.

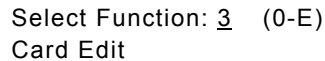
4.3 Editing the program data (program edit/PC card edit FUNC2/FUNC3)

Program data is edited using the program edit **FUNC2**. This function is used to make temporary changes to program data and output the resulting signals (the changed data is not saved).

In contrast, PC card edit **FUNC3** is used to edit and register the program data. It is used to edit the program data and save it on the PC card.

The editing procedure is described below using PC card edit **FUNC3** as an example.

- (1) Press the [FUNC] key, [3] key and [SET] key.



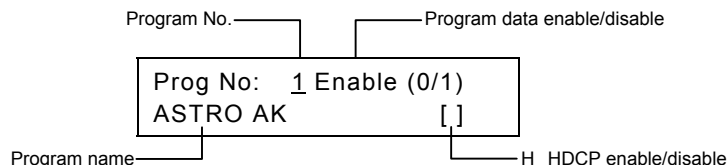
Select Function: 3 (0-E)
Card Edit

Fig. 4.3.1 Selecting the function

- (2) Use the number keys to input the program number (3 digits). (Example: "001")

- One- or 2-digit numbers (1 to 99) can be input using the number key(s) followed by the [SET] key. (Example: [1] key → [SET] key)
- Program numbers can also be selected using the [▲] key (+1) and [▼] key (-1).
- For details on the internal data, refer to "10.1.1 Program data."

The program name, program data "Enable" or "Disable," and "HDCP enabled (H)" or "disable (blank)" now appear on the screen.



Program No. _____ Program data enable/disable _____
Prog No: 1 Enable (0/1)
ASTRO AK []
Program name _____ H HDCP enable/disable _____

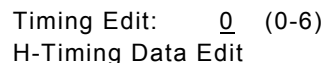
Fig. 4.3.2 Inputting the program number

- (3) Edit the data.

● When timing data is to be changed

Press the [TIMING] key.

The LED of the [TIMING] key blinks, and the timing data setting menu is accessed. For details on the timing data setting procedure, refer to "TIMING DATA CONFIGURATION AND SETTING PROCEDURES" in Chapter 5.)



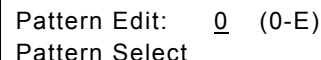
Timing Edit: 0 (0-6)
H-Timing Data Edit

Fig. 4.3.3 Setting the timing data

● When pattern data is to be changed

Press the [PAT] key.

The LED of the [PAT] key blinks, and the pattern data setting menu is accessed. For details on the pattern data setting procedure, refer to "PATTERN DATA CONFIGURATION AND SETTING PROCEDURES" in Chapter 6.)



Pattern Edit: 0 (0-E)
Pattern Select

Fig. 4.3.4 Setting the pattern data

● To return from a setting screen

When the [ESC] key is pressed, the display screen shown in Fig. 4.3.2 of step (2) is restored.

● To check the changed data

When the [SET] key is pressed on the timing data setting or pattern data setting screen, the signals of the changed data are output.

CAUTION

Do not change the dot clock frequency, horizontal sync frequency or vertical sync frequency for NTSC (program No.968), PAL (program No.969) or SECAM (program No.964) contained inside the VG-849C since doing so will make it no longer possible to output the signals through the VBS and Y/C connectors.

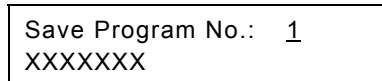
(4) Save the edited data.

PC card edit **FUNC3** is the only function that can be used to save the data.

- 1) Return to the display screen shown in Fig. 4.3.2 of step (2).
- 2) Set "Enable" for program data Enable/Disable.
 - 1: Enable
 - 0: Disable

* Use the "Disable" setting to prohibit the use of specific program data on the PC card. Normally, the "Enable" mode is selected. Programs for which "Disable" has been set will no longer be subject to the program selection in response to the [▲] key and [▼] key or to auto display **FUNC1** execution.

- 3) Input the program name (using not more than 20 characters).
Either input the character codes "20 to DF" directly or select the characters from the display (refer to "2.4 How to input characters from the display").
- 4) Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.



Save Program No.: 1
XXXXXXX

Fig. 4.3.5 Saving the data

- 5) Check the program number and program name, and press the [SAVE] key.
The program data is now saved on the PC card, and the LED of the [SAVE] key goes off.

● To edit other data

After the data has been edited and saved, press the [PROG] key, input the program number, and follow the same operating procedure.

4.4 Copying program data (PC card copy FUNC4)

- (1) Press the [FUNC] key, [4] key and [SET] key.

Select Function: 4 (0-E) Card Copy

Fig. 4.4.1 Selecting the function

- (2) While referring to Table 4.4.1, use the number keys to select the type of copy function, and press the [SET] key.

Card Copy Sel :0(0-C) 1 Prog Data Copy

Fig. 4.4.2 Selecting the type of copy function

Table 4.4.1 Copy function types

Key	LCD display	Description of copy function	Reference page
0	1 Prog Data Copy	For copying program data in 1-program increments.	p.54
1	1 Prog Tim Data Copy	For copying timing data in 1-program increments.	
2	1 Prog Pat Data Copy	For copying pattern data in 1-program increments.	
3	BLK Prog Data Copy	For copying program data in increments of multiple blocks.	p.54
4	CHR Data Copy	For copying user character patterns in 1-character increments.	p.55
5	IMG Data Copy	For copying image data in 1-data increments.	p.55
6	OPT Data Copy	For copying user-created optional patterns in 1-data increments.	p.56
7	Group Data Copy	For copying group data in 1-group increments.	p.56
8	Auto Data Copy	For copying the auto display data.	p.57
9	Card Erase	For erasing all the data on the PC card.	p.57
A	All Copy	For copying all the data on the PC card.	p.58
B	1 Prog Data Erase	For erasing the program data in 1-program increments.	p.59
C	Card Initialize	For initializing PC cards.	p.59

- (3) The procedures described below differ depending on the type of copy function used. Refer to the page concerned in the “reference page” column for each item.



Concerning the handling of PC cards

For the steps to insert and eject the PC cards, follow the steps in “2.5 How to insert and eject the PC cards.”

Taking any other steps may damage the data on the PC card and make it impossible for the PC card to be recognized even when it is re-inserted.

■ Copying data in 1-program increments (1 Prog [Data/Tim Data/Pat Data] Copy)

- (1) Use the number keys to input the number (1 to 999) of the program whose data is to be copied, and press the [SET] key.

* The VG-849C's internal programs (No.850 to 999) can also be selected as the copy source.

```
1 Prog Data Copy
Source Prog: 1
```

Fig. 4.4.3 Inputting the copy source data program number

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Use the number keys to input the number (1 to 849) of the program into which the data is to be copied, and press the [SET] key.

The data is now written into the copy destination.

* The VG-849C's internal programs (No.850 to 999) cannot be selected as the copy destinations.

```
1 Prog Data Copy
Dist. Prog: 2
```

Fig. 4.4.4 Inputting the copy destination data program number

- (4) To copy other programs, repeat the above steps after the screen in step (1) has reappeared.

■ Copying program data in increments of multiple blocks (BLK Prog Data Copy)

- (1) Use the number keys to input the range of the program numbers (1 to 999) whose data is to be copied, and press the [SET] key.

* The VG-849C's internal programs (No.850 to 999) can also be selected as the copy source.

```
Blk Prog Data Copy
Source Prog: 1- 1
```

Fig. 4.4.5 Inputting the copy source data program numbers

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Use the number keys to input the range of the program numbers (1 to 849) into which the data is to be copied, and press the [SET] key.

The data is now written into the copy destination.

* The VG-849C's internal programs (No.850 to 999) cannot be selected as the copy destinations.

```
Blk Prog Data Copy
Dist. Prog: 11- 20
```

Fig. 4.4.6 Inputting the copy destination data program numbers

- (4) To copy other programs, repeat the above steps after the screen in step (1) has reappeared.

■ Copying user character patterns (CHR Data Copy)

- (1) Input the user character code (E0H to EFH, F0H to FFH) whose character pattern is to be copied, and press the [SET] key.

* The VG-849C's internal user character patterns (F0H to FFH) can also be selected as the copy sources.

```
CHR Data Copy
Source  CHR:E0
```

Fig. 4.4.7

Inputting the copy source user character code

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Input the user character code (E0H to EFH) serving as the copy destination, and press the [SET] key.

The data is now written into the copy destination.

* The VG-849C's internal user character patterns (F0H to FFH) cannot be selected as the copy sources.

```
CHR Data Copy
Dist.   CHR:E1
```

Fig. 4.4.8

Inputting the copy destination user character code

- (4) To copy other user character patterns, repeat the above steps after the screen in step (1) has reappeared.

■ Copying image data (IMG Data Copy)

- (1) Use the number keys to input the image data number (1 to 64) serving as the copy source, and press the [SET] key.

```
IMG Data Copy
Source  IMG:1
```

Fig. 4.4.9 Inputting the copy source image data number

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Use the number keys to input the image data number (1 to 64) serving as the copy destination, and press the [SET] key.

```
IMG Data Copy
Dist.   IMG:2
```

Fig. 4.4.10 Inputting the copy destination image data number

The data is now written into the copy destination.

- (4) To copy other image data, repeat the above steps after the screen in step (1) has reappeared.

■ Copying optional patterns (OPT Data Copy)

* The VG-849C's internal optional patterns (00H to 3FH) cannot be selected as the copy sources or destinations.

- (1) Input the optional pattern number (40H to 7FH) serving as the copy source, and press the [SET] key.

```
OPT Data Copy
Source  OPT:40
```

Fig. 4.4.11 Inputting the copy source optional pattern number

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Input the optional pattern number (40H to 7FH) serving as the copy destination, and press the [SET] key.

```
OPT Data Copy
Dist.   OPT:41
```

Fig. 4.4.12 Inputting the copy destination optional pattern number

The data is now written into the copy destination.

- (4) To copy other optional patterns, repeat the above steps after the screen in step (1) has reappeared.

■ Copying group data (Group Data Copy)

- (1) Input the group number (1 to 99) serving as the copy source, and press the [SET] key.

```
Group Data Copy
Source Group: 1
```

Fig. 4.4.13 Inputting the copy source group number

- (2) To copy the data on one PC card onto another PC card, replace the PC card with the one which will serve as the copy destination.
- (3) Input the group number (1 to 99) serving as the copy destination, and press the [SET] key.

```
Group Data Copy
Dist.   Group: 2
```

Fig. 4.4.14 Inputting the copy destination group number

The data is now written into the copy destination.

- (4) To copy other group data, repeat the above steps after the screen in step (1) has reappeared.

■ Copying auto display data (Auto Data Copy)

- (1) Insert the PC card serving as the copy source, and press the [SET] key.

Auto Data Copy Set Source & Push SET

Fig. 4.4.15 Setting up the copy source PC card

- (2) Insert the PC card serving as the copy destination, and press the [SET] key.

Auto Data Copy Set Dist. & Push SET
--

Fig. 4.4.16 Setting up the copy destination PC card

The data is now written into the copy destination.

- (3) To copy other auto display data, repeat the above steps after the screen in step (1) has reappeared.

■ Erasing all the data on a card (Card Erase)

- (1) Insert the PC card all of whose data is to be erased, and press the [SET] key.

Card Erase Set Source & Push SET

Fig. 4.4.17 Inserting the PC card

"Erasing" appears on the LCD, and data erasure begins.
The original display is restored upon completion of erasure.

* It may take several minutes for the data to be erased.

- (2) To erase all the data on other cards, repeat the above steps after the screen in step (1) has reappeared.

■ Copying all the data (All Copy)

When using this function

The All Copy function divides the 64MB PC card supplied into two parts, and loads the data into each part. It takes about 10 minutes for the data to be copied. If a PC capable of reading PC cards is available, it is faster and safer to use it for copying. When using the VG-849C to copy all the data, use steps (1) to (5) below as a general guideline.

CAUTION

- Do not eject the PC card while data is being copied. Doing so may damage the PC card.
- When replacing the PC card, do not mistake the copy source card for the copy destination card or vice versa. Doing so may destroy the data.

- (1) **Insert the PC card serving as the copy source, and press the [SET] key.**

The first session data is read from the copy source.

```
Card All Copy      [1/1]
Set Source & Push SET
```

Fig. 4.4.18 Setting up the copy source PC card

- (2) **Insert the PC card serving as the copy destination, and press the [SET] key.**

The first session data is written on the copy destination.

```
Card All Copy      [1/2]
Set Dist. & Push SET
```

Fig. 4.4.19 Setting up the copy destination PC card

- (3) **Again insert the PC card serving as the copy source, and press the [SET] key.**

The second session data is read from the copy source.

```
Card All Copy      [2/2]
Set Source & Push SET
```

Fig. 4.4.20 Setting up the copy source PC card

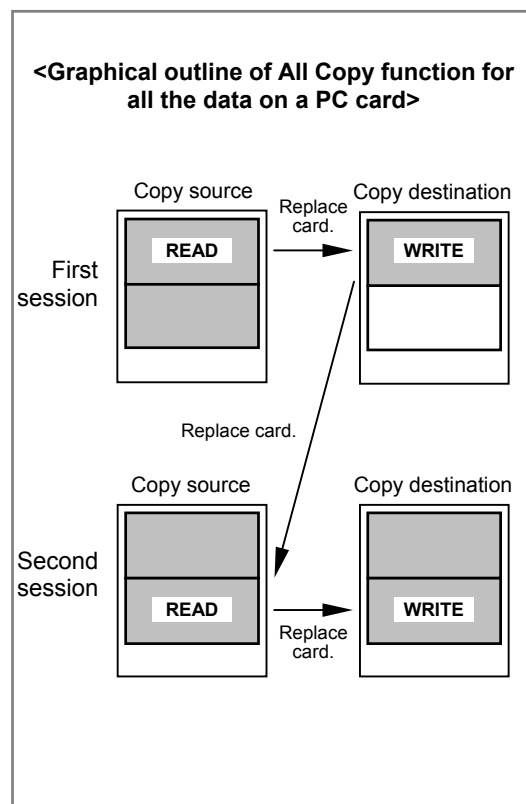
- (4) **Insert the PC card serving as the copy destination, and press the [SET] key.**

The second session data is written on the copy destination.

```
Card All Copy      [2/2]
Set Dist. & Push SET
```

Fig. 4.4.21 Setting up the copy destination PC card

- (5) **To copy all the data of other PC cards, repeat the above steps after the screen in step (1) has reappeared.**



■ Erasing programs in 1-program increments (1 Prog Data Erase)

- (1) Insert the PC card, input the number of the program to be erased, and press the [SET] key.

1 Prog Data Erase Push SET Prog: 1

Fig. 4.4.22 Setting up the PC card

After the program has been erased, the "Prg NoXXX Erase Complete" message appears on the LCD screen, and then the original display is restored.

- (2) To erase other programs, repeat the above steps after the screen in step (1) has reappeared.

■ Initializing the PC cards (Card Initialize)

- (1) Insert the PC card, and press the [SET] key.

Card Initialize Set Card & Push SET
--

Fig. 4.4.23 Setting up the PC card

The "Now initializing..." message appears on the LCD screen, and initializing starts. After the card has been initialized, the "Complete" message appears on the LCD screen, and then the display shown in Fig. 4.4.23 is restored.

Card Initialize Complete.

Fig. 4.4.24 Completion of initialization

- (2) To initialize other PC cards, repeat the above steps after the screen in step (1) has reappeared.

4.5 Editing group data (group data edit FUNC6)

When the data in a multiple number of programs is to be output, the programs can be executed one at a time by changing their numbers in ascending or descending order using the [\blacktriangle] key or [\blacktriangledown] key in the direct display mode. In the group display mode, on the other hand, programs (group data) can be executed in the order in which they were registered using group data edit **FUNC6**.

Each group data consists of a timing data program and a pattern data program.

If, for instance, group data No.1 is executed, the pattern data in program No.900 will be executed using the timing data in program No.850, as shown in the table below.

Table 4.5.1 Examples of group data

Group data No.	Timing data program No.	Pattern data program No.
1	850	900
2	851	901
:	:	:

- (1) Press the [FUNC] key, [6] key and [SET] key.

Select Function: 6 (0-E)
 Group Edit

Fig. 4.5.1 Selecting the function

- (2) Use the number keys to input the group number (1 to 99), and press the [SET] key.

Group No.: 1

Fig. 4.5.2 Inputting the group number

- (3) Set the group data.

Input the program number of the timing data (Tim) and program number of the pattern data (Pat). This can be set in group data No.1 to 98.

GEdit 01:Tim=850 Pat=900
 (01) 02:Tim=851 Pat=901

→

GEdit 03:Tim=850 Pat=902
 (01) 04:Tim=851 Pat=903

→

...

Fig. 4.5.3 Setting the group data (TIMING/PAT)

- There is no need to perform all the settings: "0" may be kept as the setting.
- When "0" is set for both the timing data and pattern data, the data will not be executed in the group display mode. (It will be skipped when the [\blacktriangle] key or [\blacktriangledown] key is pressed.)
 If "0" is set for either the timing or pattern data, only data for which "0" is not set will be executed. For instance, when "0" is set for the timing data, only the pattern data is executed, and the timing data will be the same as the data last output.

There is a simpler way to input the group data settings if all the timing data and pattern data are to be set in the same program number. next page

● **When setting all the timing data and pattern data in the same program number**

Press the [PROG] key.

The LED of the [PROG] key lights, and the LCD screen is switched.

```
GEdit 01:Prg=850
(01) 02:Prg=851
```

Fig. 4.5.4 Setting the group data (PROG)

Input the program number.

The same program number is set for the timing data and pattern data.

Table 4.5.2 Selection method

Key	Key LED	Description
PROG	PROG key lights.	The same program number is set for the timing data and pattern data for all the group data in the selected group.
TIMING PAT	TIMING/PAT key lights.	The timing data and pattern data are set separately.

(4) Save the edited data.

1) Press the [SAVE] key.

The LED of the [SAVE] key blinks, and the LCD screen is switched.

```
Save Group No.: 1
XXXXXXXX
```

Fig. 4.5.5 Saving the data

- 2) Use the number keys to input the number of the group (1 to 99) in which the data is to be saved.
- 3) Input the group name (with up to 20 characters).
Either input the character codes "20 to DF" directly or select the characters from the display (refer to "2.4 How to input characters from the display").
- 4) Press the [SAVE] key.
The group data is saved, and the LED of the [SAVE] key goes off.

- The data can be saved at any time during editing.
- If the [ESC] key is pressed, operation returns to the previous screen without the data having been saved.

4.6 Editing user character patterns (character edit FUNC8)

CAUTION

- User character patterns are edited while they are on the display. Before proceeding with the editing, connect the display device to the VG-849C, and check that the patterns are displayed properly.
- The VG-849C's internal user character patterns (F0H to FFH) can be read out but not registered.

- (1) Press the [FUNC] key, [8] key and [SET] key.

Select Function: 8 (0-E)
Character Edit

Fig. 4.6.1 Selecting the function

- (2) Use the number keys to input the character code (E0H to FFH), and press the [SET] key.

* A letter from A to F can be input by pressing the [SHIFT] key followed by one of the number keys.

CHR Edit :E0 (E0-FF)

Fig. 4.6.2 Inputting the character code

The character pattern appears on the display

CHR Edit :E0
Editing on Display

Fig. 4.6.3 LCD display

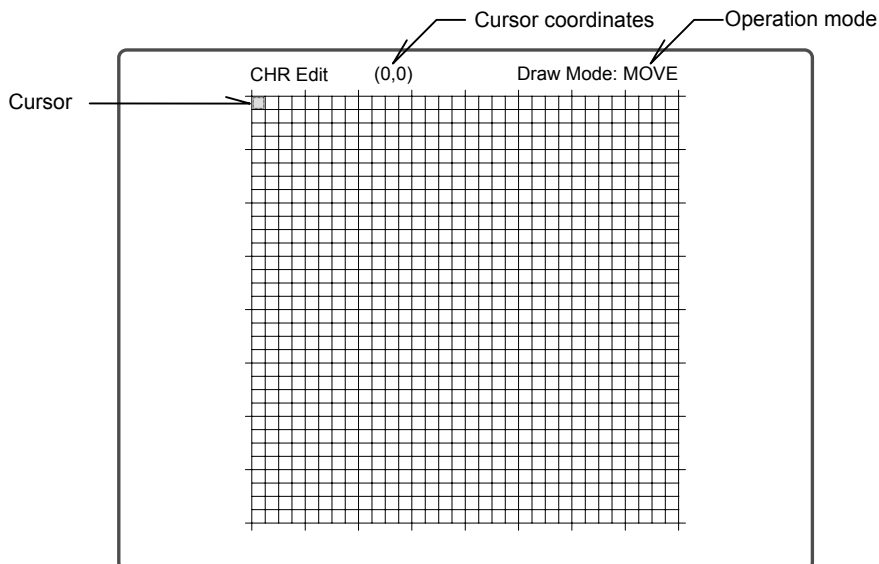


Fig. 4.6.4 What is displayed

(3) Edit the character pattern while referring to the following.**Table 4.6.1 Function keys for editing the character patterns**

Key	Function
1 to 4, 6 to 9	<ul style="list-style-type: none"> • In the dot setting mode: Used to move the cursor or draw in the direction of the arrows of the number keys. • In the dot clearing mode: Used to move the cursor or clear in the direction of the arrows of the number keys. • In the movement mode: Used to move the cursor (but not to draw) in the direction of the arrows of the number keys. • In the shift mode: Used to shift the character pattern in the designated direction of the arrows of the number keys.
5	Used to select the drawing mode (dot setting → dot clearing → movement).
SET	Used to switch between drawing and clearing the dot where the cursor is positioned.
0 / CLR	Used to clear all the dots inside the cell.
SHIFT	Used to switch between the shift mode and drawing mode. <ul style="list-style-type: none"> • ON: Shift mode • OFF: Drawing mode (dot setting, dot clearing, movement)
INV	Used to invert the level of the dot inside the cell.
HS	Used to return to the home position at the left or right of the cursor position (alternating movement between far left and far right).
VS	Used to return to the home position above or below the cursor position (alternating movement between very top and very bottom).
ESC	Used to abort the editing and return to the previous LCD screen.

(4) Save the edited data.

- 1) Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.

Save CHR :E0 (E0-EF)

Fig. 4.6.5 Saving the data

- 2) Use the number keys to input the code (E0H to EFH) of the character pattern which is to be saved.
- 3) Press the [SAVE] key.
The data is saved, and the LED of the [SAVE] key goes off.

- The data can be saved at any time during editing.
- If the [ESC] key is pressed instead, operation returns to the previous screen without the data having been saved.

4.7 Listing the data on the display (list display FUNC9)

CAUTION

- The list display function is used to display the lists on the display screen. Before proceeding with the list display, connect the display device to the VG-849C, and check that the display appears properly.
- Group Name List, OPT Name List, IMG Name List and Group Data List cannot be displayed unless the PC card is installed in the generator.

(1) Press the [FUNC] key, [9] key and [SET] key.

Select Function: 9 (0-E)
Lists

Fig. 4.7.1 Selecting the function

* Hereafter, if the [ESC] key is pressed while a key operation is being performed, the previous screen is restored.

(2) While referring to the table below, use one of the number keys to select the list to be displayed, and press the [SET] key.

* When Group Data List is to be selected, select the group number before pressing the [SET] key.

Select Type: 0 (0-5)
Program Data List

Fig. 4.7.2 Selecting the list

Table 4.7.1 List selection method

Key	LCD display/list name	List displayed	Reference page
0	Program Data List	Used to display the program data ^{*1} of the program numbers concerned.	p.65
1	Program Name List	Used to display a list of the program names.	p.66
2	Group Name List	Used to display a list of the group names.	p.66
3	OPT Name List	Used to display a list of the optional pattern names.	p.67
4	IMG Name List	Used to display a list of the image data names.	p.67
5	Group Data List	Used to display the group data ^{*1} registered in the group.	p.68

*1: The program names, horizontal sync frequency, vertical sync frequency, program data enable/disable, horizontal timing, vertical timing, output condition, audio output, HDMI output, InfoFrame and ACP/ISRC packet data are displayed.

(3) The procedures described below differ depending on the type of list. Refer to the page concerned in the “reference page” column for the item concerned.

■ Program Data List

Use the number keys to input the program number (3 digits, 001 to 999) to display the data of the program on the display.

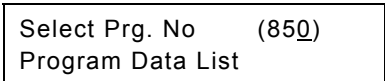
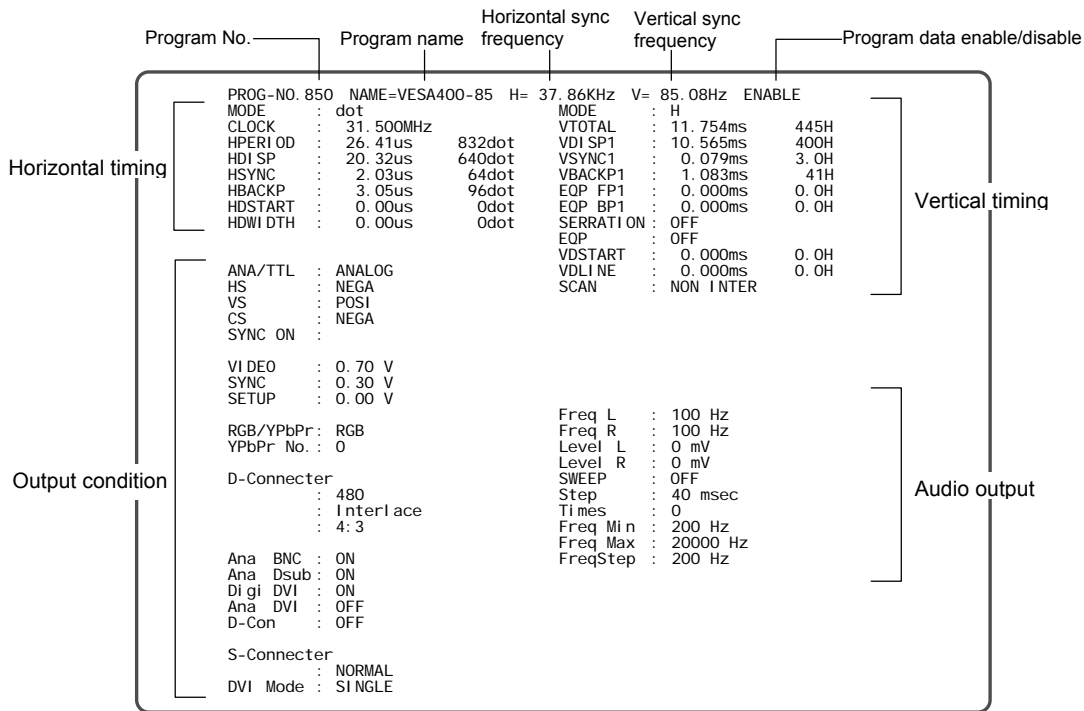


Fig. 4.7.3 LCD display



Use the [▶] or [◀] key to move between the screens.

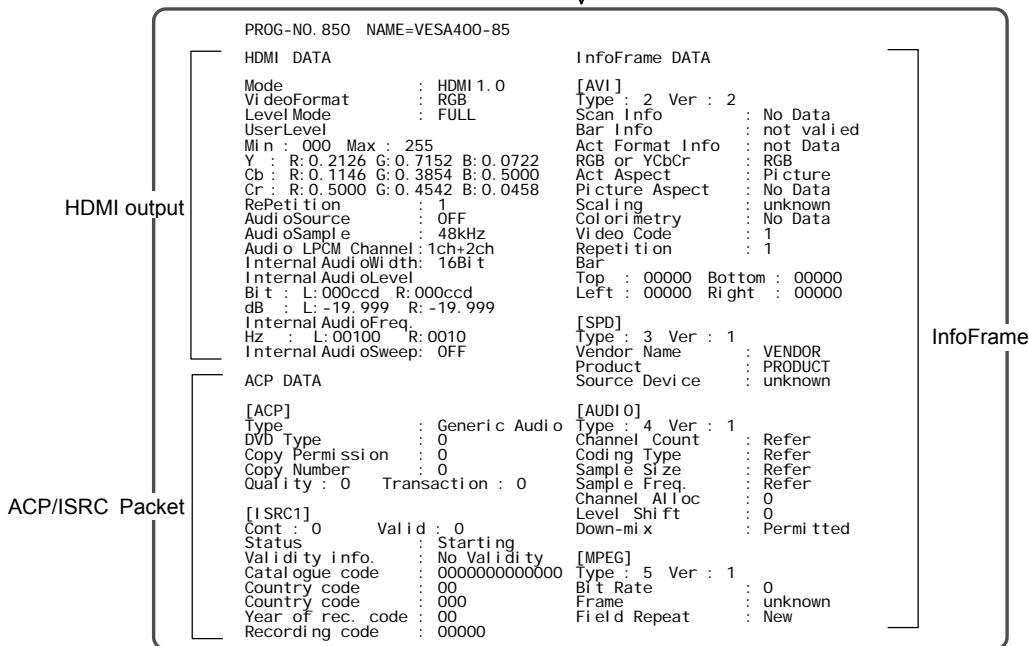


Fig. 4.7.4 Example of what is shown on the display

■ Program Name List

When the number (3 digits, 001 to 999) of the program to be displayed first is input using the number keys, the data in that program appears on the display first, and it is followed by the data of the subsequent programs.

```
Select Prg. No(Top=850)
Program Name List
```

Fig. 4.7.5 LCD display

```
Program Name List
Prog E/D DotClock H-Freq V-Freq Name           :Character List
850  E  31.50MHz  37.86KHz 85.08Hz VESA400-85   :Words
851  E  31.50MHz  37.86KHz 72.81Hz VESA480-72   :H Character 1
852  E  31.50MHz  37.50KHz 75.00Hz VESA480-75
      :
      :
```

Fig. 4.7.6 Example of what is shown on the display

■ Group Name List

When the number (2 digits, 01 to 99) of the group to be displayed first is input using the number keys, the data in that group appears on the display first, and it is followed by the data of the subsequent programs.

```
Select Grp. No(Top= 1)
Group Name List
```

Fig. 4.7.7 LCD display

```
Group Name List
NO  NAME
1  Group Data #1
2  Group Data #2
3  Group Data #3
   :
   :
```

Fig. 4.7.8 Example of what is shown on the display

■ OPT Name List

When the number (2 digits, 40H to 7FH) of the optional pattern to be displayed first is input using the number keys, the data of that optional pattern appears on the display first, and it is followed by the data of the subsequent programs.

* A letter from A to F can be input by pressing the [SHIFT] key followed by one of the number keys.

Select OPT No (Top=40)
OPT Name List

Fig. 4.7.9 LCD display

Number of used blocks (in 1KB increments) on PC card ———— Number of unused blocks (in 1KB increments) on PC card

OPT-PTN Li st B l o c k (Used=XXXXX, Unused=XXXXX)			
NO	SI ZE	NAME	
40	506	256	B l o c k C o l o r
41	255	64B-GRAY	
42	317	C r o s s & C i r c l e & G r a y	
	:		
	:		

← SIZE: Number of bytes of the optional pattern data.

Fig. 4.7.10 Example of what is shown on the display

■ IMG Name List

When the number (2 digits, 1 to 64) of the image data to be displayed first is input using the number keys, that image data appears on the display first, and it is followed by the subsequent image data.

Select IMG No (Top= 1)
IMG Name List

Fig. 4.7.11 LCD display

Number of used blocks (in 1KB increments) on PC ———— Number of unused blocks (in 1KB increments) on PC card

IMG data Li st B l o c k (Used=XXXXX, Unused=XXXXX)			
NO	OPT-NO	SI ZE	NAME
1	80	(1024, 768)	I m a g e # 1
2	81	(640, 480)	I m a g e # 2
3	82	(1920, 1440)	I m a g e # 3
	:		
	:		

← SIZE: Number of horizontal dots, number of vertical lines of image data
OPT-NO: Number of the optional pattern whose image is to be displayed

Fig. 4.7.12 Example of what is shown on the display

■ Group Data List

- (1) If, after selecting "5" on the list selection screen (Fig. 4.7.2), the [**▲**] key or [**▼**] key is pressed, the screen on which to input the group number appears. Use the number keys to input the number (2 digits, 01 to 99) of the group whose data is to be listed, and press the [SET] key.
- (2) Use the number keys to input the group number (2 digits, 01 to 98) to display the data of that group on the display.

```
GroupDataListNo
      :  1 (1-99)
```

Fig. 4.7.13 Selecting the group number

```
Select Prg. No   ( 1 )
Group Data List
```

Fig. 4.7.14 LCD display

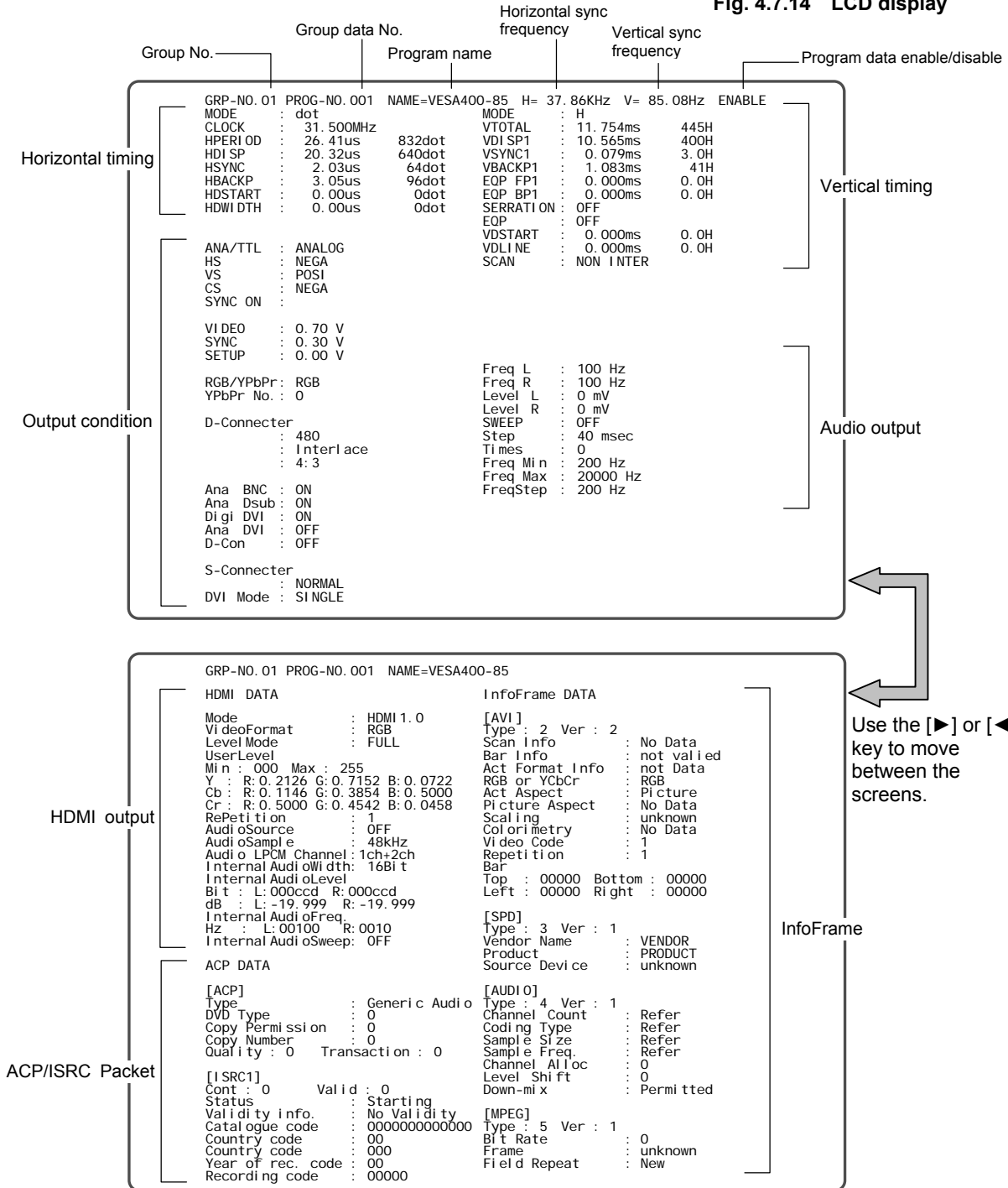


Fig. 4.7.15 Example of what is shown on the display

- (3) To switch to another group number, press the [ESC] key to return to the previous screen, and then input the group number.

4.8 Setting the color difference coefficients (YPbPr coefficient table edit **FUNCA**)

There are ten coefficient tables for conversion into YPbPr.

Tables No.0 to 3 comply with SMPTE standards; tables No.4 to 9 are for the users to set their own.

The YPbPr coefficient tables are valid when “YPbPr” has been selected as [4] Setting RGB/YPbPr in “5.4

Setting the output condition data.” The number of the table to be used is selected in [5] Setting the YPbPr coefficient table No. in “5.4 Setting the output condition data.”

CAUTION

These settings are not applied to the HDMI output. For details on setting the color difference coefficients of the HDMI output, refer to [3] Setting the color difference coefficients and repetition in “5.6 Setting the HDMI output.”

4.8.1 YPbPr coefficient tables

The table contents are shown below.

All the values in these tables are set with up to four decimal places.

Table 4.8.1 YPbPr coefficient table

No.	Coefficient								
	a	b	c	d	e	f	g	h	i
0	0.2126	0.7152	0.0722	0.1146	0.3854	0.5000	0.5000	0.4542	0.0458
1	0.2120	0.7010	0.0870	0.1161	0.3839	0.5000	0.5000	0.4448	0.0552
2	0.2990	0.5870	0.1140	0.1687	0.3313	0.5000	0.5000	0.4187	0.0813
3	0.2990	0.5870	0.1140	0.1687	0.3313	0.5000	0.5000	0.4187	0.0813
4 to 9	Same as No.0								

Table 4.8.2 Correlation with SMPTE standards for YPbPr coefficient tables

No.		
0	SMPTE 274M, 296M, RP-177	1920 × 1080, 1280 × 720
1	SMPTE 240M	Hivision (1920 × 1035)
2	SMPTE 293M	720 × 483
3	SMPTE 125M	NTSC

■ YPbPr calculation formula

$$Y = a \times R + b \times G + c \times B$$

$$Pb = -d \times R - e \times G + f \times B$$

$$Pr = g \times R - h \times G - i \times B$$

4.8.2 How to edit the YPbPr coefficient tables

- (1) Press the [FUNC] key, [A] key and [SET] key.

Select Function: A (0-E)
YPbPr Edit

Fig. 4.8.1 Selecting the function

- (2) Use the number keys to input the number of the table (0 to 9), and press the [SET] key.

The table numbers can also be changed one at a time using the [\blacktriangle] key or [\blacktriangledown] key.

YPbPr No.: 0 (0-9)
Name corresponding to coefficient — SMPTE 274M,296M,RP-177

Fig. 4.8.2 Inputting the table number

- (3) Use the number keys to input coefficients a to i (0 to 1.0000).

Y: a b c	Pb: d e f
	Pr: g h i
Y: 0.212 <u>6</u> 0.7152 0.0722	Pb: 0.114 <u>6</u> 0.3854 0.5000
	Pr: 0.5000 0.4542 0.0458

Fig. 4.8.3 Inputting the coefficients

- (4) Save the edited data.

- 1) Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.

Save YPbPr No.: 4

Fig. 4.8.4 Saving the data

- 2) Use the number keys to input the number of the table (0 to 9) serving as the save destination for the edited data.
- 3) Press the [SAVE] key.
The data is saved and the LED of the [SAVE] key goes off.

- The data can be saved at any time during editing.
- To reflect the data without saving it, do not use the [SAVE] key, but press the [SET] key. The values remain valid until the power is turned off.
- If the [ESC] key is pressed instead, operation returns to the previous screen without the data having been saved.



To restore the values in tables No.0 to 3 to the values given in Table 4.8.1, initialize the flash ROM as in "7.6 Flash ROM initialization". Bear in mind that the config edit **FUNC5** setting items, etc. will also be returned to the factory settings as a result.

4.9 Copying panel ROM data **FUNC**

The ROM data (program data, group data and user character patterns) of existing VG generator models (VG-813, 823, 826A, 827) with which PC cards cannot be used can be converted for use with the VG-849C, and saved on PC cards.

- (1) Use an RS-232C (crossover) cable to connect the VG-849C and the existing VG model.
- (2) Press the [FUNC] key, [B] key and [SET] key.

Select Function: B (0-E)
ROM Copy

Fig. 4.9.1 Selecting the function

- (3) Use the number keys to select the VG model serving as the data copy source.

Select VG type :0 (0/1)
VG823/813

Fig. 4.9.2 Selecting the data copy source VG model

Table 4.9.1 Data copy source VG model selection method

Key	LCD display/Generator model supported
0	VG823 / 813
1	VG826A / 827

- (4) Press the [▼] key to move to the next page, and use the number keys to select the data which is to be copied.

Table 4.9.2 Data copy selection method

Function :0 (0-2)
Block Prog. Data Copy

Fig. 4.9.3 Selecting the data to be copied

Key	LCD display	Data to be copied
0	Block Prog. Data Copy	Program data
1	Group Data Copy	Group data
2	Character Data Copy	User character patterns

- (5) Press the [▼] key to move to the next page, and select the ROM type serving as the copy source.

Panel ROM type :0 (0-2)
58C65P

Fig. 4.9.4 Selecting the ROM type as the copy source

Table 4.9.3 Copy source ROM type selection method

Key	LCD display/ROM type
0	58C65P
1	58C256P
2	AH-3000

- (6) Press the [▼] key to move to the next page, and enter the program numbers of the copy source and copy destination using the number keys.

Copy source (existing model)
Src Prg No. :001-010
Dst Prg No. :005-015
Copy destination (VG-849C)

Fig. 4.9.5 Entering the copy source and destination program numbers (for program data)

Table 4.9.4 Restrictions on copy range by data copied and ROM types

Data copied	58C65P	58C256P	AH-3000
Program data	001 to 040	001 to 740	001 to 779
Group data	01 to 02	01 to 40	01 to 08
User character	E0 to E3	E0 to E7	E0 to EE

- (7) Press the [SET] key. The data is now copied.



If data outside the setting range of the VG-849C is included in the copied program data, the program data concerned will be disabled.

4.10 Setting and executing HDCP (HDCP set **FUNC**)

The first step to take to execute HDCP is to set the conditions using HDCP set **FUNC**.

☞ “4.10.1 HDCP settings.”

Depending on what has been set by HDCP set **FUNC**, further settings are required for each program.

☞ “4.10.2 HDCP settings for each program data.”

After the above settings have been established, execute HDCP using direct display **FUNC**.

☞ “4.10.3 HDCP execution.”

4.10.1 HDCP settings

Using HDCP set **FUNC**, perform steps (1) to (5) below.

(1) Press the **[FUNC]** key, **[C]** key and **[SET]** key.

Select Function: C (0-E)
HDCP Setting

Fig. 4.10.1 Selecting the function

(2) Select the execution mode and display mode.

Exec. Mode: Enable (0-2)
Disp. Mode: NG Only (0-3)

Fig. 4.10.2 Selecting the execution mode and display mode

Table 4.10.1 Execution mode and display mode selection method

Item	Key	LCD display	Description
execution mode (Exec. Mode)	0	Disable	HDCP is not executed.
	1	Enable	HDCP is executed when all programs are executed.
	2	Program	HDCP is executed only when programs for which the program data HDCP item is set to “enable (H)” are executed. * HDCP must be set for each program data.
display mode (Disp. Mode)	0	NG Only	The results appear on the display only when the checks yields NG.
	1	All	The check results appear on the display every time.
	2	Pattern	HDCP is executed with the pattern displayed.
	3	SM&All	The check results appear on the display every time. Furthermore, when an SMPTE pattern or ramp pattern is selected, the check results and pattern are superimposed over each other on the display. SMPTE pattern: Optional patterns No.25H, 26H Ramp pattern: Optional patterns No.2BH, 2CH

- (3) Press the [▼] key to move to the next page, and set the authentication execution interval and version.

Interval:	1 sec	(1-10)
Version:	1.0	(0-2)

Fig. 4.10.3 Setting the execution interval and version

Table 4.10.2 Execution interval and version setting method

Item	Key	LCD display	Description
execution interval (Interval)	Number keys	XX	HDCP authentication is executed at the set interval (which is set in 1-second increments). Setting range: 1 to 10 [sec] (factory setting: "1")
version (Version)	0	1.0	HDCP Version 1.0
	1	1.1	HDCP Version 1.1
	2	EDID Check	The HDCP version is set on the basis of the EDID value.



The version setting takes effect only when "HDMI" has been set for "priority output port" in the output conditions (timing data). If version "1.1" is selected when "DVI" has been set for "priority output port," an error (E16A HDCP Bcaps Error) appears on the LCD screen.

- (4) Press the [▼] key to move to the next page, and set ON or OFF for automatic resetting when HDCP authentication is NG, and select the FIFOReady time restriction.

Ri NG Reset	:OFF	(0-1)
FIFO Ready	:4200ms	(0-7)

Fig. 4.10.4 Setting automatic resetting ON/OFF and FIFOReady time restriction

Table 4.10.3 Automatic resetting ON/OFF and FIFOReady time restriction setting method

Item	Key	LCD display	Description
Ri NG Reset	0	OFF	Authentication is not retried even when HDCP authentication is NG.
	1	ON	When HDCP authentication is NG, resetting is initiated, and authentication is retried starting with the initial authentication.
FIFO Ready	0	OFF	30 s
	1	600ms	600 ms
	2	1200ms	1200 ms
	3	1800ms	1800 ms
	4	2400ms	2400 ms
	5	3000ms	3000 ms
	6	3600ms	3600 ms
	7	4200ms	4200 ms

These keys are used to set the restriction on how long to wait for "FIFO Ready" to be returned after HDCP is commenced if the receiver connected is a repeater.



"Ri" indicated on the setting screen stands for "Video transmitter and receiver link synchronization verification values."

(5) Save the data which has been set.

- 1) Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.

Save HDCP Data ?
(SAVE or ESC)

Fig. 4.10.5 Saving the data

- 2) Press the [SAVE] key.
The data is saved and the LED of the [SAVE] key goes off.
The previous LCD screen is restored.

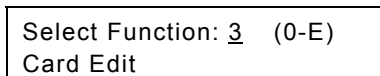
- To reflect the data without saving it, do not use the [SAVE] key, but press the [SET] key instead. The values remain value until the power is turned off.
- If the [ESC] key is pressed instead, operation returns to the previous screen without the data having been saved.

4.10.2 HDCP settings for each program data

If "Program" is selected for the execution mode (Exec. Mode) by HDCP set **FUNC3**, HDCP enable or disable must be set for each program data.
In this mode, when programs are executed, HDCP is executed for those programs in which the HDCP item of the program data is set to "enable," and it is not executed for those programs in which it is set to "disable."

The settings are performed using PC card edit **FUNC3**.

(1) Press the [FUNC] key, [3] key and [SET] key.



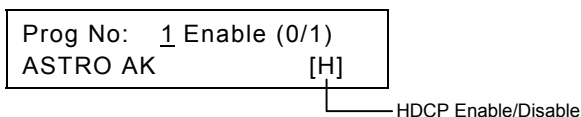
Select Function: 3 (0-E)
Card Edit

Fig. 4.10.6 Selecting the function

(2) Use the number keys to input the program number (3 digits). (Example: "001")

- One- or 2-digit numbers (1 to 99) can be input using the number key(s) followed by the [SET] key. (Example: [1] key → [SET] key)
- Program numbers can also be selected using the [▲] key (+1) and [▼] key (-1).

Use the [▶] key to move to the "HDCP Enable/Disable" item, and select Enable or Disable.



Prog No: 1 Enable (0/1)
ASTRO AK [H]
HDCP Enable/Disable

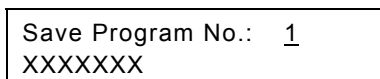
Fig. 4.10.7 Selecting enable or disable for HDCP

Table 4.10.4 HDCP enable/disable selection method

Key	LCD display	Description
0	(Blank)	Disable (HDCP is not executed when "Program" has been selected as the HDCP execution mode).
1	H	Enable (HDCP is executed when "Program" has been selected as the HDCP execution mode).

(3) Save the data which has been set.

- 1) Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.



Save Program No.: 1
XXXXXXX

Fig. 4.10.8 Saving the data

- 2) Press the [SAVE] key.
The program data is saved on the PC card, and the LED of the [SAVE] key goes off.

4.10.3 HDCP execution

CAUTION

- HDCP is executed only when programs are executed by direct display **FUNC0**.
- When operations are initiated by a function other than direct display **FUNC0**, the authentication check is not conducted, and so errors such as the hot plug error cannot be detected.
- Bear in mind that when HDCP is executed, restrictions apply to the horizontal timing (timing data) settings. (Refer to [3] in “5.1.12 DVI and HDMI output timing restrictions.”)
- When the receiver connected to the VG-849C is a repeater, authentication will not be undertaken and an error (E166 HDCP FIFOReady Error) will be displayed unless a value of at least “1” is used for DEPTH and COUNT.
- The HDCP function cannot be executed simultaneously with the pattern action, audio sweep and a few other functions. For details, refer to “11.4.4 Concerning functions which cannot be executed simultaneously.”

4.10.3.1 Executing HDCP

When a program is executed by direct display **FUNC0**, HDCP is executed simultaneously.

When the execution mode (Exec. Mode) of the HDCP set **FUNCC** is set to:

- Enable : HDCP is executed with all programs.
- Program : HDCP is executed with the programs for which HDCP enable “H” has been set by PC card edit **FUNC3**.
- Disable : HDCP is not executed.

* HDCP is executed at the port set as the “priority output port” in the output conditions (timing data) of the program data concerned.

● HDCP repeat authentication function

By pressing the [SHIFT] key and [ESC] key during HDCP execution, resetting is initiated, and HDCP authentication can be repeated.

4.10.3.2 LCD display during HDCP execution

Each time the authentication and encryption are completed during HDCP execution, the character at the bottom right of the LCD changes alternately in the following sequence: ***** → **-** → *****.

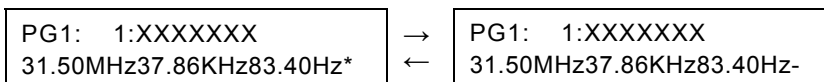


Fig. 4.10.9 LCD display during HDCP execution

4.10.3.3 What appears on the display during HDCP execution

1) When “NG Only,” “All” or “SM&All” has been selected as the display mode (Disp. Mode) by the HDCP set **FUNCC**

When “All” or “SM&All” is selected, the results are shown in [10] each time the HDCP authentication and encryption are completed.

When “NG Only” is selected, the results are shown in [10] only when the results are NG.

When “All” or “NG Only” is selected, the pattern is not displayed.

When “SM&All” is selected, the pattern--but only an SMPTE pattern or ramp pattern--is displayed superimposed onto the results shown below.

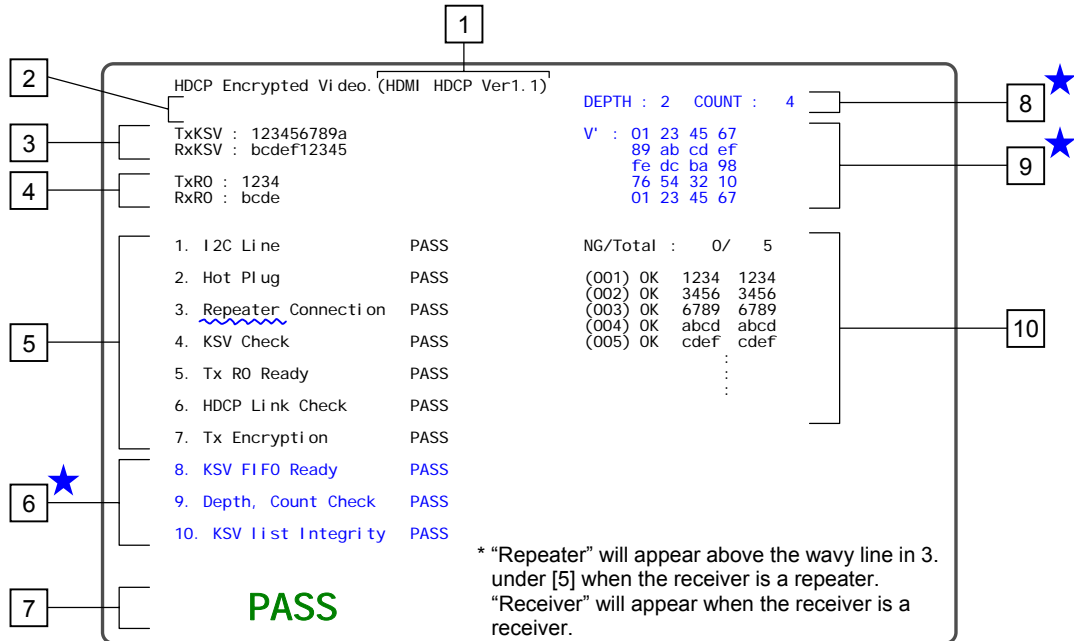


Fig. 4.10.10 What appears on the display during HDCP execution (NG Only/All/SM&All)

Details of what is displayed are given below.

The numbers marked with a blue asterisk (★) appear only when the receiver connected to the VG-849C is a repeater.

No.	Details	
1	The name of the port (HDMI or DVI) used to execute HDCP and the HDCP version (Ver.1.1 or 1.0) are displayed here.	
2	When an error results for the EDID, the nature of the error are displayed here. * This applies only when “EDID Check” has been selected for the version by HDCP set FUNCC .	
3	The “Key Selection Vectors” among the vectors for the HDCP keys are displayed here. “TxKSV” signifies the key selection vector at the transmitter end, and “RxKSV” signifies the key selection vector at the receiver end.	
4	The “Synchronization verification values” calculated by initial authentication are displayed here. “TxRO” is the value calculated for the transmitter end, and “RxRO” is the value calculated for the receiver end.	
5	The authentication status of the initial authentication is displayed here.	If “PASS” is displayed for an item, it means that the authentication was conducted successfully.
★ 6	The authentication status of the second initial authentication in the case of a repeater is displayed here.	
7	If all the authentications have been conducted successfully, “PASS” (green) is displayed here; otherwise, “NG” (red) appears.	
★ 8	The DEPTH (number of steps) and COUNT (total number of connections) of what is connected beyond the receiver which is in turn connected to the VG-849C are displayed here.	
★ 9	The values (V') for checking the adequacy of the KSV list beyond the receiver connected to the VG-849C are displayed here.	
10	The “Synchronization verification values” (Ri, Ri') for checking the adequacy of the link are displayed here. “Ri” is the value calculated for the transmitter end, and “Ri'” is the value calculated for the receiver end. If the values for the transmitter and receiver ends match, “OK” is displayed. (If OK is obtained as a result of a retry, “OK2” is displayed.)	

2) When “Pattern” has been selected as the display mode (Disp. Mode) by the HDCP set

FUNCC

HDCP authentication and encryption are executed while the pattern remains on the display.

Messages are displayed during HDCP execution at the top left of the display.

When the [NAME] key is pressed, the “program name,” for instance, is normally displayed, but here the EDID header, check sum inspection results and Synchronization Verification Values (Ri, Ri’) are displayed instead.

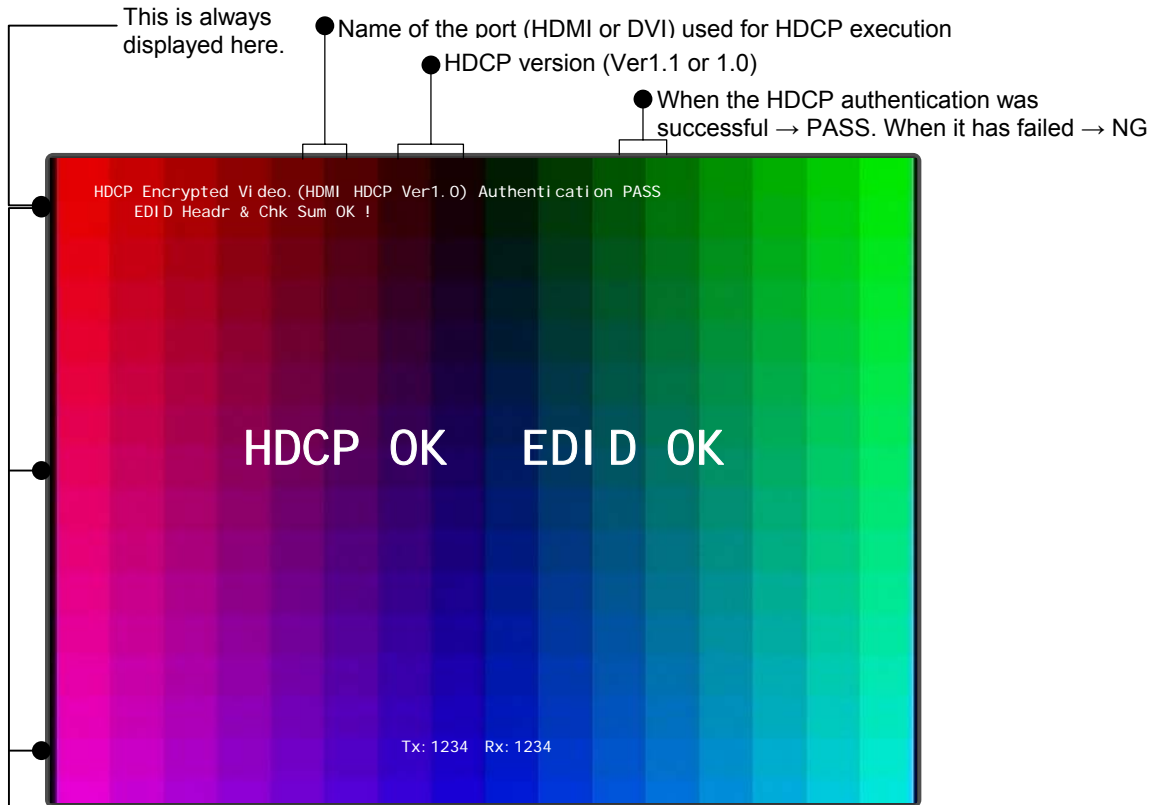


Fig. 4.10.11 What appears on the display during HDCP execution (Pattern)

These displays appear when the [NAME] key is pressed.

Top: EDID header, check sum inspection results ★

Middle: HDCP authentication status (OK or NG), EDID inspection results (OK or NG) ★

Bottom: Synchronization Verification Values

Tx: Value calculated for transmitter end (Ri)

Rx: Value calculated for receiver end (Ri')

The displays are updated each time HDCP authentication or enc

- ★ The EDID inspection results are displayed only when EDID has been acquired. EDID is acquired when “HDMI” is selected as the [11] priority output port setting in “5.4 Setting the output condition data,” and either “EDID Check” is set for “HDCP set **FUNCC** version” or “AUTO is selected as the [1] HDMI output mode setting in “5.6 Setting the HDMI output.”

4.10.3.4 When HDCP authentication has failed/error codes

If HDCP authentication has failed after the HDCP encryption has commenced, a disturbed image (like a sandstorm^{*1}) is output, and an error message appears at the bottom of the LCD screen. Under HDCP Ver.1.0, resetting is automatically initiated during timing switching, but under Ver.1.1, resetting is not initiated. Therefore, perform one of the following actions if a sandstorm appears.

- Use the repeat authentication function (by pressing the [SHIFT] key and [ESC] key).
- Disconnect and re-connect the cables.
- Turn off the power supply at the receiver end.
- Set the execution mode of HDCP set **FUNCC** to “Disable” to stop the execution, and then set to “Enable” and “Program” to resume.

The errors which may occur during HDCP execution are listed below.

Code	Message	Description
151H	HDCP Not Receiver	A repeater is connected.
152H	HDCP RiTimeout Error	A timeout (1ms) occurred in the Ri read instruction of the receiver.
153H	HDCP Tx KSV Error	The KSV of the transmitter does not contain twenty “0” and “1.”
154H	HDCP Rx KSV Error	The KSV of the receiver does not contain twenty “0” and “1.”
155H	HDCP Link Check Error	The values did not match during the initial authentication.
156H	HDCP Encrypt Error	Encryption was not completed.
157H	HDCP Hot Plug Error	The DVI connector is not connected to the receiver. *2
158H	HDCP Ri Ready Error	The Ready bit of the receiver was not set to high.
159H	HDCP DVIModeDual Err	The DVI mode is set to dual.
15aH	HDCP Hfp Error	The H front porch is “0.”
15bH	HDCP Hbp Error	The H back porch is “0.”
15cH	HDCP Hblank Error	The H blanking interval is less than “128.”
15dH	HDCP Vfpp Error	The V front porch is “0.”
15eH	HDCP H-TIM Error	H timing error.
15fH	HDCP 1/2 Clock Mode	Timing for the 1/2 clock mode has been set.
160H	I2C ACK Error Tx	ACK is not returned from the transmitter.
161H	I2C ACK Error Rx	ACK is not returned from the receiver.
162H	I2C Line Error	The I2C line is not operating properly.
164H	HDCP Rx Not HDMIMODE	The receiver was not set itself to the HDMI mode when the HDCP version is 1.1 or when version 1.1 was judged to be supported in the EDID check mode.
165H	HDCP Ri NG	The values of Ri and Ri' do not match.
166H	HDCP FIFOReady Error	FIFO Ready is not established within the restricted time.
167H	HDCP Depth Error	The value for DEPTH is “7” or more.
168H	HDCP Count Error	The value for COUNT is “128” or more.
169H	HDCP List Error	The values of V and V' do not match.
16aH	HDCP Bcaps Error or HDCP Setting Error	The HDMI output (HDCP version based on this output) and HDCP version do not match. Refer to the next section for details.

*1: This is a kind of white noise resembling what appears on the TV screen after broadcasting has ended.

*2: If the connector is re-connected after a hot plug error has occurred, the HDCP authentication and encryption will be resumed.

● E16Ah Concerning “HDCP Bcaps error” and “HDCP Setting error”

With the HDMI output, the HDCP versions are normally as follows.

- (1) HDCP version 1.0 when DVI is established as the HDMI output mode
- (2) HDCP version 1.1 when HDMI1.0 or 1.1 is established as the HDMI output mode

A Bcaps error is judged to have occurred when the HDMI setting and HDCP version setting which are output from the VG-849C and the corresponding settings of the sink device do not match.

There are two types of Bcaps error status, each of which is described in the table below.

Table 4.10.5 Bcaps Error types

Error name	Description
HDCP Setting Error	This error occurs when the VG-849C setting--that is to say, the HDMI output mode (DVI or HDMI version)--and the version setting for the HDCP setting FUNCC do not match.
HDCP Bcaps Error	This error occurs when the HDMI output mode which is output by the VG-849C and the HDCP version of the sink device do not match.

- When AUTO is established as the HDMI output mode, the statuses of the sink device (HDMI/DVI mode, HDCP version) are read, and it is output in the mode concerned.
This means that a Bcaps error will result if both settings of the sink device do not match.
- When EDID Check is established as the HDCP version setting, the HDCP version of the sink device is read, and it is output in the mode concerned.
This means that a Bcaps error will result if the HDMI output mode which has been set in the VG-849C and the HDCP version of the sink device do not match.

Depending on the combination of the VG-849C setting and sink device status, the error as shown below will be displayed.

Setting : HDCP Setting Error

Bcaps : HDCP Bcaps Error

Table 4.10.6 Bcaps error displays (1)

Sink device status		VG-849C setting		Error status	Remarks	
HDCP (Bcaps)	EDID setting	HDCP version FUNCC	HDMI mode FUNC3			
Ver.1.0	DVI	Ver.1.0	DVI			
			HDMI1.0	Setting		
			HDMI1.1	Setting		
			AUTO		DVI, HDCP1.0	
		Ver.1.1	DVI	Setting		
			HDMI1.0			
			HDMI1.1			
			AUTO		DVI, HDCP1.0	
		EDID Check	DVI			
			HDMI1.0	Bcaps		
			HDMI1.1	Bcaps		
			AUTO		DVI, HDCP1.0	
	HDMI	Ver.1.0	Ver.1.0	DVI		
				HDMI1.0	Setting	
				HDMI1.1	Setting	
				AUTO	Bcaps	HDMI, HDCP1.0
			Ver.1.1	DVI	Setting	
				HDMI1.0		
				HDMI1.1		
				AUTO	Bcaps	HDMI, HDCP1.0
EDID Check		DVI				
		HDMI1.0	Bcaps			
		HDMI1.1	Bcaps			
		AUTO	Bcaps	HDMI, HDCP1.0		

Table 4.10.7 Bcaps error displays (2)

Sink device status		VG-849C setting		Error status	Remarks
HDCP (Bcaps)	EDID setting	HDCP version FUNC3	HDMI mode FUNC3		
Ver.1.1	DVI	Ver.1.0	DVI		
			HDMI1.0	Setting	
			HDMI1.1	Setting	
			AUTO	Bcaps	DVI, HDCP1.0
		Ver.1.1	DVI	Setting	
			HDMI1.0		
			HDMI1.1		
			AUTO	Bcaps	DVI, HDCP1.1
		EDID Check	DVI	Bcaps	
			HDMI1.0		
			HDMI1.1		
			AUTO	Bcaps	DVI, HDCP1.1
	HDMI	Ver.1.0	DVI		
			HDMI1.0	Setting	
			HDMI1.1	Setting	
			AUTO		HDMI, HDCP1.0
		Ver.1.1	DVI	Setting	
			HDMI1.0		
			HDMI1.1		
			AUTO		HDMI, HDCP1.1
		EDID Check	DVI	Bcaps	
			HDMI1.0		
			HDMI1.1		
			AUTO		HDMI, HDCP1.1

*1: When AUTO is established as the HDMI mode, the Bcaps error is determined by the status of the device to which the VG-849C is connected, but the HDCP itself functions in the HDCP version which was set by HDCP setting FUNC3.

4.11 How to execute calibration (calibration **FUNCD**)

This section describes how the video output levels are calibrated.

Since the VG-849C's video output levels were adjusted during its shipment inspection using a 1.5-meter long cable, there is no need to calibrate the generator for normal use. When the cable used to connect the generator with the display is long or external conditions cause the video output levels to be at variance from the settings, proceed with calibration to suit the conditions concerned.

● What to have ready

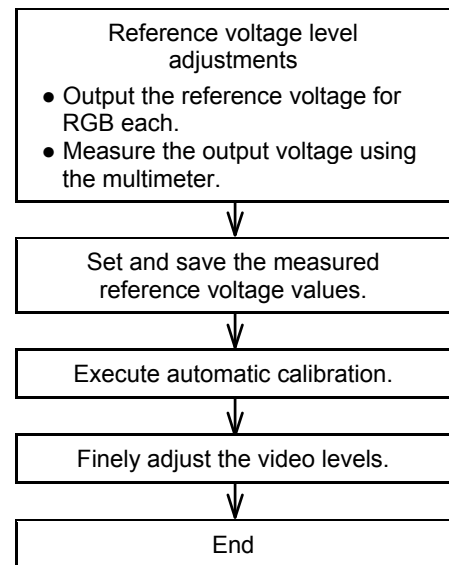
Provide the following equipment for executing calibration.

- Oscilloscope
A model which can measure voltage levels below 2mV during 700mV measurements is recommended.
- Multimeter
A model with a DC voltage accuracy of $\pm 0.5\%$ rdg. ± 5 dgt or less is recommended.
- 75 Ω terminator
A model with V.S.W.R. characteristics of less than 1.1 is recommended.
- BNC cable
Cable used for connecting the VG-849C with the display.

● Execution procedure

Follow the steps below for calibration.

Calibration procedure



(1) Executing calibration

Display the setting screen on which calibration is initiated.

CAUTION

Wait for about 15 minutes after turning on the generator's power to ensure that the generator's operation is stable before initiating calibration.

- 1) Press the [FUNC] key, [D] key and [SET] key.

Select Function: D (0-E)
Calibration

Fig. 4.11.1 Selecting the function

- 2) Press the [0] key, and select "OFF" for the automatic calibration function.

AutoCalibration: OFF (0/1)

Fig. 4.11.2 Selecting ON or OFF for the automatic calibration function

(2) Adjust the reference voltage level.

By using the internal setting of the VG-849C and measuring two actual output levels, both values are compensated.

- 1) Press the [▼] key to move to the next page.
- 2) As in the table below, press the key ([0] or [1] key) for the level to be adjusted.

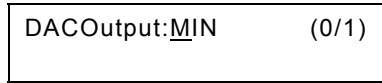


Fig. 4.11.3 Selecting the reference voltage level

Table 4.11.1 Reference voltage level selection method

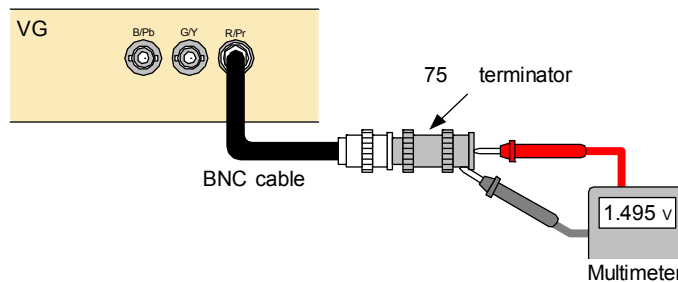
Key	LCD display	Description
0	MIN	Reference voltage level 1) (approx. -1000mV) is output.
1	MAX	Reference voltage level 2) (approx. 1500mV) is output.

- 3) Press the [SET] key. The "DAC MIN (or MAX) OUT" display appears. The above reference voltage is now output for RGB each.



Fig. 4.11.4 When reference voltage output is underway

- 4) Connect as shown below, and measure the output voltage for RGB each using the multimeter.



- 5) Press the [SET] key. The output is turned off, and the "DAC MIN (or MAX) OUT" display is cleared.
- 6) Repeat steps 2) to 5), and measure both reference voltage 1) and 2).

(3) Set and save the values of the measured reference voltages.

- 1) Press the [▼] key to move to the next page.
- 2) Input the values measured in (2) on the "Min" line for voltage 1) and on the "Max" line for voltage 2) using mV units in the sequence of R, G and B from the left.
* The sign can be switched to "+" with the [0] key and to "-" with the [1] key.

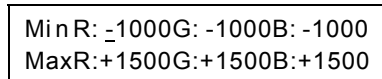


Fig. 4.11.5 Setting the reference voltages

- 3) Press the [SAVE] key. The LED of the [SAVE] key blinks.
- 4) Press the [SAVE] key. When the data has been saved, the "DACOUT VOLT DATA SAVE" message is displayed, and the LED of the [SAVE] key goes off.

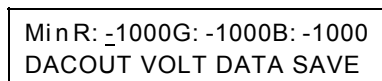
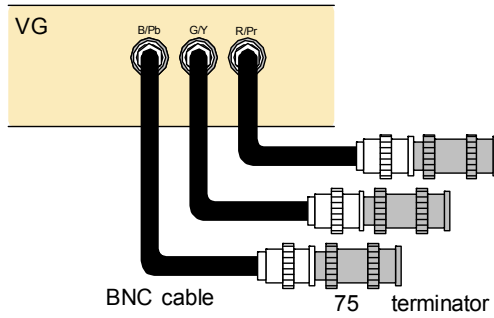


Fig. 4.11.6 Saving the data

(4) Automatic calibration execution

- 1) Press the [▼] key to move to the next page.
- 2) Connect as shown in the figure below.



- 3) Press the [1] key, and select "ON" for the automatic calibration function.

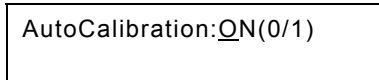


Fig. 4.11.7 Selecting ON or OFF for the automatic calibration function

- 4) Press the [SET] key. Automatic calibration now starts.

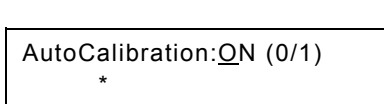


Fig. 4.11.8 When automatic calibration is underway

* During automatic calibration "*" moves continuously from left to right.

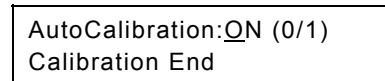
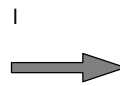


Fig. 4.11.9 When automatic calibration is completed (calibration successful)

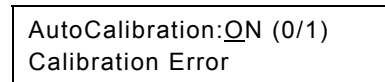


Fig. 4.11.10 When automatic calibration is completed (calibration unsuccessful)

● **Concerning errors**

An error is judged to have occurred and the calibration is terminated if, during calibration, the readout data yielded by the calibration is significantly different from the data inside the VG-849C. Check the connection environment again including the terminator and cables.

● **To forcibly terminate automatic calibration**

Press and hold down any key. When automatic calibration is forcibly terminated, the following display appears, and the previously calibrated table is reflected.

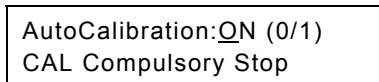


Fig. 4.11.11 When automatic calibration is forcibly terminated



Do not turn off the power while automatic calibration is being executed. Turning the power off by mistake may cause malfunctioning.

(5) Fine adjustment of video levels

Finely adjust the levels as instructed in "[14] edit FUNC5".

Finely adjusting the video level" of config

5

TIMING DATA CONFIGURATION AND SETTING PROCEDURES

5.1 Configuration of timing data and basic operations

The timing data consists of the horizontal timing data, vertical timing data, output conditions, audio output, HDMI output, InfoFrame, ACP/ISRC packets, closed caption/V-chip, Teletext and Macrovision (optional function).

5.1.1 Basic operations for settings

The timing data setting menu is accessed from program edit **FUNC2**, PC card edit **FUNC3** or direct display **FUNC0**.

While referring to Table 5.1.1 below, select the timing data whose settings are to be changed, and set the data details. For the data setting items and setting procedures, refer to the page concerned in the "reference page" column in the table.

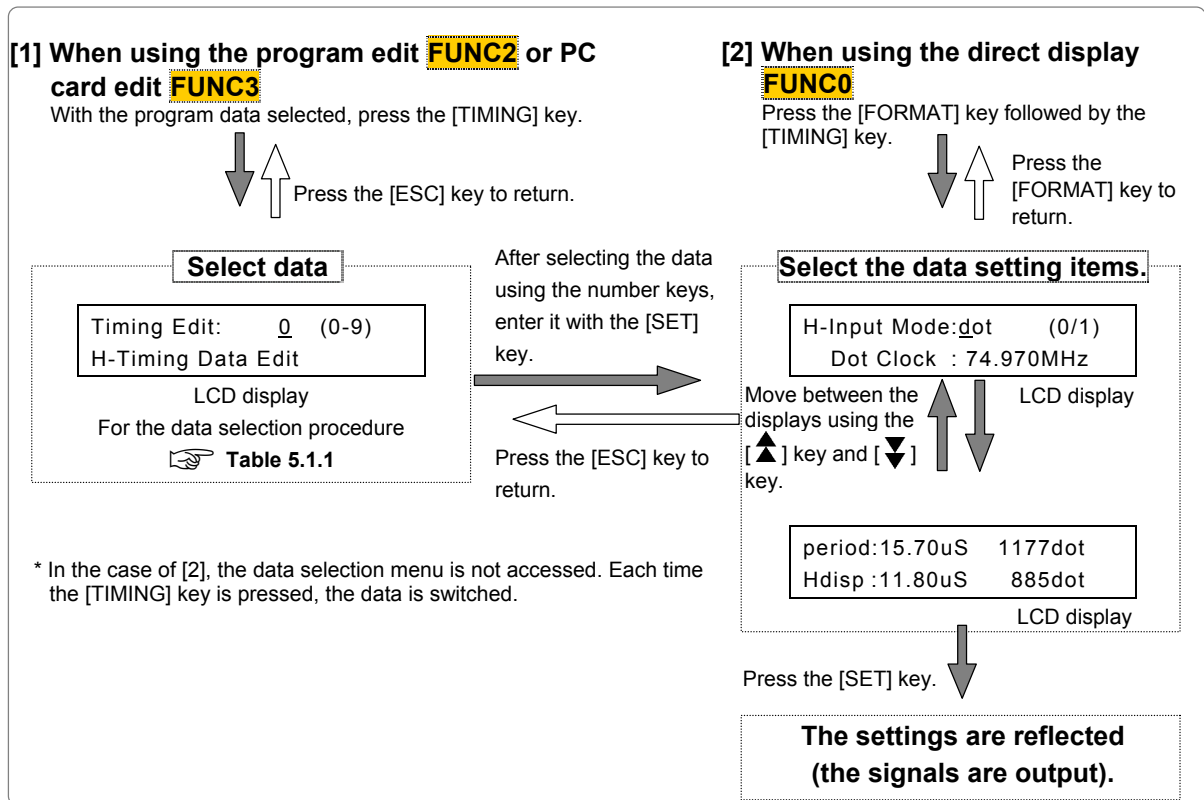
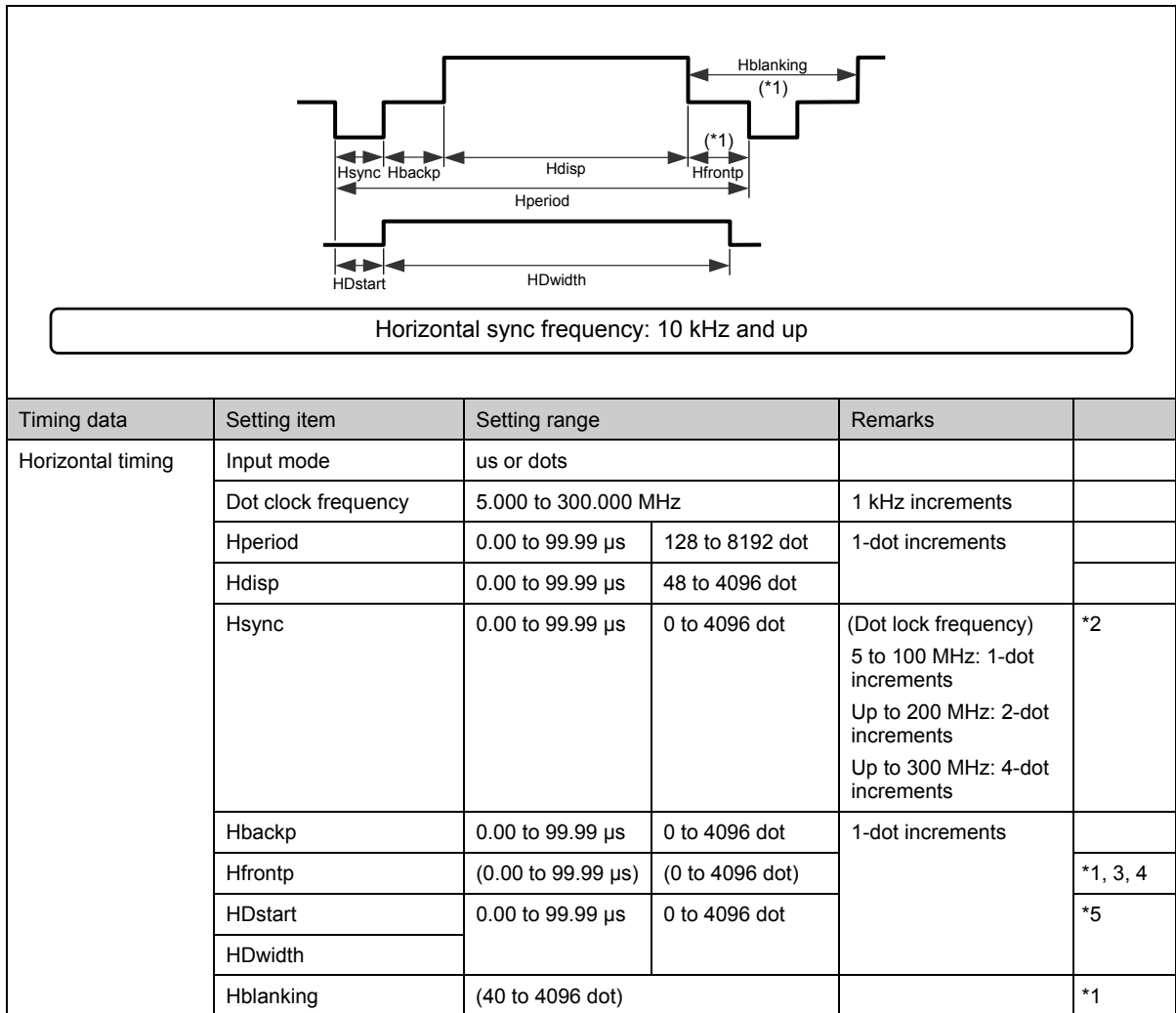


Fig. 5.1.1 Basic operations for setting the timing data

Table 5.1.1 Timing data selection method and reference pages

Key	LCD display	Timing data	Reference page	
			Configuration list	Setting details
0	H-Timing Data Edit	Horizontal timing	p.89	p.99
1	V-Timing Data Edit	Vertical timing	p.90	p.103
2	Output Data Edit	Output condition	p.91	p.113
3	Audio Data Edit	Audio output	p.92	p.125
4	HDMI Data Edit	HDMI output	p.92	p.129
5	InfoFrame Data Edit	InfoFrame	p.93	p.136
6	ACP Data Edit	ACP/ISRC Packet	p.95	p.147
7	Caption Data Edit	Closed caption/V-chip	p.96	p.154
8	TeleText Edit	Teletext	p.96	p.166
9	Macrovision Edit	Macrovision	Optional function	p.171

5.1.2 Horizontal timing data configuration list



- *1: Hfrontp and Hblanking are calculated from the values of other setting items.
 - $Hfrontp = Hperiod - Hdisp - Hsync - Hbackp$
 - $Hblanking = Hperiod - Hdisp$
- *2: When "0" is set for H FRONT PORCH, then set Hsync to:
 - 2 dots or more when the dot clock frequency is 100.001 to 200 MHz
 - 4 dots or more when the dot clock frequency is 200.001 to 250 MHz
- *3: Set Hfrontp within the setting range of:
 - 64 to 4096 dots when the dot clock frequency is 100.001 to 200 MHz and Hperiod is set in increments of other than 2 dots
 - 128 to 4096 dots when the dot clock frequency is 200.001 to 250 MHz and Hperiod is set in increments of other than 4 dots.
- *4: In the interlace scanning mode, set Hfrontp to:
 - 2 dots or more when the dot clock frequency is 5 to 100 MHz
 - 4 dots or more when the dot clock frequency is 100.001 to 200 MHz
 - 8 dots or more when the dot clock frequency is 200.001 to 250 MHz
 - "0" cannot be set.
- *5: The sum of HDstart and HDwidth cannot be set in excess of Hperiod.
 (* The settings can be edited to ensure data compatibility with other models, but they will be ignored by the VG-849C.)
 Set the sum within the following range: $[(HDstart + HDwidth) \leq Hperiod]$

* In addition to the above, other restrictions apply to the DVI and HDMI outputs.

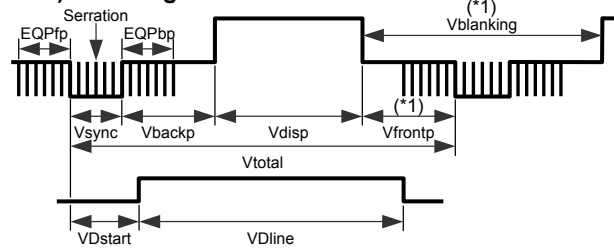
5.1.12 DVI and HDMI output timing restrictions

* Different restrictions apply in the multi-bit mode (optional function).

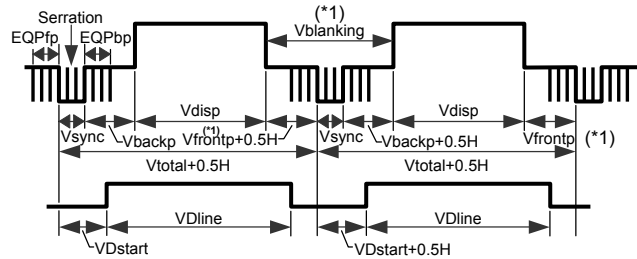
Chapter 8 MULTI-BIT MODE (OPTION) (p.221)

5.1.3 Vertical timing data configuration list

● Non-interlace (progressive) scanning



● Interlace scanning



Vertical sync frequency: 15.6 Hz and up

Timing data	Setting item	Setting range	Remarks	
Vertical timing	Input mode	H / ms		
	Scanning mode	Non-interlace, interlace & sync, interlace & video		
	Field mode	1 field or 2 fields		
	Vtotal	0.000 to 99.999 ms	4 to 8192 H	Non-interlace (progressive) 1H increments
			4 to 4096 H	Interlace scanning 1H/(0.5) increments *6
	Vdisp (1, 2)	0.000 to 99.999 ms	1 to 4096 H	1H increments *5
	Vsync (1, 2)	0.000 to 99.999 ms	1.0 to 99.0 H	0.5H increments *5, 6
	Vbackp (1, 2)	0.000 to 99.999 ms	0 to 4096 H	1H/(0.5) increments *5, 6
	Vfrontp (1, 2)	(0.000 to 99.999 ms)	(0 to 4096 H)	*1, 5, 6
	EQPfp (1, 2)	0.000 to 99.999 ms	0.0 to 99.0 H	0.5H increments *2, 3, 5
	EQPbp (1, 2)			
	Serration	OFF / 0.5H / 1H / EXOR		*2
	EQP (on / off)	OFF / ON		
	VDstart	0.000 to 99.999 ms	0.0 to 4095.0 H	0.5H increments *4
Vblanking	(2H or more)		*1	

*1: Vfrontp and Vblanking are calculated from the values of other setting items.

(only in non-interlace scanning mode; in the interlace scanning mode, refer to the figure above.)

*2: EQPfp, EQPbp and Serration cannot be set in 0.5H increments when tri-level sync signals are output in the non-interlace (progressive) scanning mode. Set them in 1H increments instead.

*3: Set EQPfp within the range of $[(EQPfp + 1H) \leq Hfrontp]$ when tri-level sync signals are output in the interlace scanning mode.

*4: The sum of VDstart and VDline cannot be set in excess of Vtotal

(* The settings can be edited to ensure data compatibility with other models, but they will be ignored by the VG-849C.)

Set the sum within the following range: $[(VDstart + VDline) \leq Vtotal]$

*5: In the 2-field mode for interlace scanning, different values can be set in the first field and second field.

*6: In the 2-field mode for interlace scanning, Vtotal, Vbackp and Vfrontp can be set in 0.5H increments. (In the 1-field mode for non-interlace or interlace scanning, they can be set only in 1H increments.) However, set them in such a way that the value of $[Vfrontp + Vsync + Vbackp]$ is in 1H increments.

* Different restrictions apply in the multi-bit mode (optional function).

Chapter 8 MULTI-BIT MODE (OPTION) (p.221)

5.1.4 Output condition data configuration list

Timing data	Setting item	Setting range	
Output condition	Sync signal output mode	ANALOG / TR1080 / TR1035 / TR720 / NTSC / PAL / SECAM / NTSC-M / NTSC-443 / PAL-M / PAL-60 / PAL-N / PAL-Nc	
	CV (composite video sync signal)	OFF / R / G / RG / B / RB / GB / RGB	
	CS (composite sync signal)	Nega / Pogi / OFF / HS / VS	
	HS (horizontal sync signal)	Nega / Posi / OFF / CS	
	VS (vertical sync signal)	Nega / Posi / OFF	
	Video output level	0.30 to 1.20V (in 0.01V increments)	
	Setup level	0.00 to 0.25 V (in 0.01V increments)	
	Sync signal level	0.00 to 0.60 V (in 0.01V increments)	
	RGB/YPbPr	RGB / YPbPr	
	YPbPr coefficient table number	0 to 9	
	D connector	Line1	480 / 720 / 1080
		Line2	Interlace, progressive
		Line3	4:3 / 4:3LB / 16:9
	BNC connector output	OFF / ON	
	D-Sub connector output		
	DVI-D connector output		
	DVI-A connector output		
	D connector output		
	S connector output format	Normal, letter-box, squeeze	
	DVI output mode	Single Link/(Dual Link)	
	Priority output port	ANALOG / DVI / HDMI	
	Aspect ratio	4:3, 16:9, same as screen resolution, user setting [H 1-255]:[V 1-255]	
	AFD	Aspect	4:3 / 16:9
		Type	0 to 12
		Color	0 to 255
		BG	
		Bar	
	Black insertion function ON/OFF	OFF / ON	
	Black insertion	Insertion position	Entire screen, left half, right half
		Pattern display (ON) time	0 to 255 V
		Black insertion (OFF) time	0 to 255 V

5.1.5 Audio output data configuration list

Timing data	Setting item		Setting range	
Audio output	Output frequency	L	100 to 20000 Hz (in 100 Hz increments)	
		R		
	Output level	L	0 to 2000 mV (in 50 mV increments)	
		R		
	SWEEP			OFF, frequency sweep, level sweep L → R, level sweep R → L
	Frequency sweep	Time step		40 to 340ms (in 20ms increments)
		Number of repetitions		Infinity, 1 to 15 times
		Minimum frequency		200 to 20000 Hz (in 100 Hz increments)
		Maximum frequency		
		Frequency step		200 to 19800 Hz (in 100 Hz increments)

5.1.6 HDMI output data configuration list

Timing data	Setting item		Setting range	
HDMI output	HDMI output mode		OFF / DVI / HDMI1.0 / HDMI1.1 / AUTO	
	Video format		RGB 24bit / 30bit / 36bit / YCbCr 4:4:4 24bit / 30bit / 36bit / YCbCr 4:2:2 16bit / 20bit / 24bit	
	Video level	Level mode		Full range, limited range, user setting
		Level, user setting	Min	Video format: RGB_24, Y444_24, Y422_16 : 0 to 255 RGB_30, Y444_30, Y422_20 : 0 to 1023 RGB_36, Y444_36, Y422_24 : 0 to 4095
			Max	
	Color difference coefficients	Y (a, b, c)		0 to 1.000
		Cb (d, e, f)		0 to 0.500
		Cr (g, h, i)		
	Repetition		1 to 10	
	Audio signal		OFF / TOSLINK / COAX / ANALOG / INTERNAL	
	Audio sampling frequency		32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz	
	Audio output channels 1+2ch, 3+4ch, 5+6ch, 7+8ch		OFF / ON	
	Internal sound	Bit width		16bit / 20bit / 24bit
		Output level mode		dB mode, bit mode
		Output level	L	Bit width, 16 bits: 0 to 7FFF -90.31 to 0 dB 20 bits: 0 to 7FFFF -114.40 to 0 dB 24 bits: 0 to 7FFFFFFF -138.48 to 0 dB
R				
Output frequency		L	When the sampling frequency is 32, 44.1 or 48 kHz: 20 and up (sampling frequency/2) Hz (in 20 Hz increments) When the sampling frequency is 88.2, 96, 176.4 or 192 kHz: 50 and up (sampling frequency/2) Hz (in 50 Hz increments)	
		R		
SWEEP		Off, frequency sweep		

5.1.7 InfoFrame data configuration list

Timing data	Setting item		Setting range
InfoFrame	InfoFrame ON/OFF AVI, SPD, Audio, MPEG		OFF / ON
	AVI InfoFrame	Type	2
		Version	1 / 2
		Scan Information	No Data / overscan / underscan
		Bar Information	No setting, vertical, horizontal, vertical/horizontal
		Active Format Information	Enabled, disabled
		RGB or YCbCr	RGB / YCbCr 4:4:4 / YCbCr 4:2:2
		Active Aspect Ratio	Picture / 4:3 / 16:9 / 14:9 / box 16:9 / box 14:9 / box>16:9 / 4:3 (14:9) / 16:9 (14:9) / 16:9 (4:3)
		Picture Aspect Ratio	No setting / 4:3 / 16:9
		Scaling	No setting, vertical, horizontal, vertical/horizontal
		Colorimetry	No setting / SMPTE / ITU709 / Extend
		Video Code	0 to 59
		Repetition	1 to 10
		Top Bar	Bottom Bar 0 to 65535
		Left Bar	
		RGB Quantization Range	Default / Limited / Full
		Extended Colorimetry	xvYCC601 / xvYCC709
		IT Content	No Data / IT Content
	SPD InfoFrame	Type	3
		Version	1
		Vendor Name	Max. 8 characters
		Product	Max. 16 characters
		Source Device	No setting / DigiSTB / DVD / DVHS / HDD / DVC / DSC / CD / Game / PC / Blu-Ray Disc / Super Audio CD

Timing data	Setting item		Setting range
	Audio InfoFrame	Type	4
		Version	1
		Channel Count	Refer to Stream Header / 2 to 8ch
		Coding Type	Refer to Stream Header / IEC60958 / AC3 / MPEG1 / MP3 / MPEG2 / AAC / DTS / ATRAC / One Bit Audio / Dolby Digital + / DTS-HD / MLP / DST / WMA Pro
		Sample Size	Refer to Stream Header / 16bit / 20bit / 24bit
		Sample Frequency	Refer to Stream Header / 32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz
		Channel Allocation	0 to 31
		Level Shift Value	0 to 15
		Downmix Inhibit	Permitted / Prohibited
	MPEG InfoFrame	Type	5
		Version	1
		Bit Rate	0 to 4294967295
		Frame	No setting / I PIC / B PIC / P PIC
		Field Repeat	New / Repeated

5.1.8 ACP/ISRC packet data configuration list

Timing data	Setting item	Setting range	
ACP/ISRC Packet	Packet ON/OFF ACP, ISRC1, ISRC2	OFF / ON	
	ACP Packet	ACP Type	Generic Audio / IEC60958 Audio / DVD Audio / Super Audio CD
		DVD-Audio Type	0 / 1
		Copy Permission	Granted by "Copy Freely," "Reserved" or depends on number of copies ("Copy Number" or prohibited)
		Copy Number	1 to 4, 6, 8, 10 times or Unlimited (Copy One Generation)
		Quality	0 to 3
		Transaction	Not present / Reserve
		Count_A	Prohibited (0) or Permitted 1 to 254 times or Unlimited (255)
		Count_S	
		Count_U	
		Q_A	CD Quality / DSD Quality
		Q_S	
		Q_U	
		Move_A	Movement prohibited/Movement permitted
		Move_S	
		Move_U	
	ISRC1 Packet	ISRC Continued	ISRC2 packet provided/not provided
		ISRC Valid	ISRC2 packet valid/invalid
		ISRC Status	Starting / Intermediate / Ending
		Validity Information	No Validity / ISRC / UPC/EAN / UPC/EAN and ISRC
		Catalogue Code	13-digit number
		Country Code	2 letters of English alphabet
		First Owner Code	3 alphanumerics
Year of recording Code		2-digit number	
Recording (item) Code	5-digit number		

5.1.9 Closed caption/V-chip data configuration list

Timing data	Setting item	Setting range
Closed caption	Output data	0 (internal caption data) / 1 to 20
	Loop	0 to 10 s (in 1s increments)
	Delay	0 to 10 s (in 1s increments)
	Internal caption data	Output mode Style
V-chip	Rating system	OFF / MPAA / U.S.TV / English / French
	MPAA ratings	G / PG / PG-13 / R / NC-17 / X / Not Rated / N/A
	U.S. TV ratings	TV-Y / TV-Y7 / TV-G / TV-PG / TV-14 / TV-MA
	U.S. TV rating system extension bits FV, V, S, L, D	OFF / ON
	Canadian English ratings	E / C / C8+ / G / PG / 14+ / 18+
	Canadian French ratings	E / G / 8ans+ / 13ans+ / 16ans+ / 18ans+
	Interval	1 to 1023 V (in 1V increments)

5.1.10 Teletext data configuration list

Timing data	Setting item	Setting range
Teletext	Output	Disable / Enable
	Data transfer mode	4 lines / 8 lines
	Pages 1 to 20	100 to 899

5.1.11 Macrovision data configuration list (❖ optional function)

Timing data	Setting item	Setting range
Macrovision	Output mode	NTSC-M : OFF / DVD/STB Type1 to 3 / VHS USA / VHS US obs. NTSC-J : OFF / DVD/STB Type1 to 3 / VHS Japan1 / VHS Japan2 NTSC-443, PAL-60, PAL-M : OFF / DVD/STB PAL, PAL-N, PAL-Nc, SECAM : OFF / DVD/STB / VHS

5.1.12 DVI and HDMI output timing restrictions

In addition to the restrictions described earlier, the DVI and HDMI outputs are subject to restrictions [1] to [4] below.



If a value failing to satisfy the restrictions has been set, the DVI or HDMI output will be automatically turned off.

[1] DVI outputs (all horizontal timing pulses)

Mode	Setting item	Setting range/restrictions
Single Link	Dot clock frequency	25 to 165 MHz
	All horizontal timing pulses ^{*1}	1-dot increments with a dot clock frequency from 25 to 100 MHz 2-dot increments with a dot clock frequency from 100.001 to 165 MHz
Dual Link ^{*2}	Dot clock frequency	50 to 300 MHz
	All horizontal timing pulses ^{*1}	4-dot increments

*1: Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking

*2: The standard VG-849C model supports Single Link only. Contact Astro concerning Dual Link.

[2] HDMI outputs (all horizontal timing pulses)

The HDMI output restrictions depend on the video format (refer to "5.6 [1] Setting the HDMI output mode and video format").

Mode	Setting item	Setting range/restrictions
Single Link	Dot clock frequency	Frequencies other than the range given below 25 to 165MHz
		When the video format is RGB_36, Y444_36 25 to 150MHz
	All horizontal timing pulses ^{*1}	1-dot increments when the dot clock frequency is 25 to 100 MHz 2-dot increments when the dot clock frequency is 100.001 to 165 MHz

*1: Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking

[3] DVI and HDMI outputs (Hblanking)

The setting range for Hblanking differs depending on the “HDMI output mode” setting in the HDMI output data, HDCP execution and whether Data Islands for HDMI are provided or not.

		HDCP execution	1 Data Island ^{*1}	2 Data Island ^{*1}	Hblanking setting range		
HDMI output mode	DVI				40	Restriction on VG-849C	
		○			56	Restriction on HDCP	
	HDMI				40	to 4096 dot	Restriction on VG-849C
		○			56		*2
		○	○		106		
		○	○	○	138		*3

*1: The “Data Islands” are the parts that send the InfoFrame and audio information by HDMI. InfoFrame is sent during the vertical blanking period; the audio information is sent during the horizontal blanking period.

*2: Restrictions on HDCP apply when a Data Island is not provided. However, data (such as the guard band characters of HDMI) differing from the HDCP-only mode are contained in the blanking period concerned.

*3: When two data packets have been used, Hblanking restrictions apply to [Single Packet Minimum Time (HDMI+HDCP+Audio 1ch) + 32 dots].

[4] HDMI outputs (audio sampling frequencies)

Since the audio information of HDMI is sent during the horizontal blanking period, there are restrictions on the audio sampling frequency depending on Hblanking and the number of audio channels.

Restrictions on sampling frequency: $(\text{Hblanking} - 74 [\text{dots}]) \geq 32 \times (\text{Fs} \times \text{Nch})/4$
 Where Fs: Audio sampling frequency [kHz]
 Nch: Number of audio channels [ch]

Using internal programs as examples, the restrictions on the sampling frequency when there are 2 and 8 audio channels are given below.

Internal program		Max. sampling frequency [kHz]	
No.	Timing data name	8ch	2ch
PG2 - 850 , 851	EIA640 × 480p@59.94/60	48	192
PG2 - 852 to 855	EIA720 × 480p@59.94/60	48	192
PG2 - 856 , 857	EIA1280 × 720p@59.94/60	96 (*1)	192
PG2 - 858 , 859	EIA1920 × 1080i@59.94/60	96 (*1)	192
PG2 - 860 to 863	EIA1440 × 480i@59.94/60	48	192
PG2 - 888 , 889	EIA1920 × 1080p@59.94/60	96 (*1)	192
PG2 - 890 , 891	EIA720 × 576p@50	48	192
PG2 - 892	EIA1280 × 720p@50	96 (*1)	192
PG2 - 893	EIA1920 × 1080i@50	96 (*1)	192
PG2 - 894 , 896	EIA1440 × 576i@50	48	192
PG2 - 912	EIA1920 × 1080p@50	96	192

*1: This is a restriction imposed by the VG-849C (transmitter used) rather than a restrictions imposed by the standard.

5.2 Setting the horizontal timing data

5.2.1 Horizontal timing data

The figure below shows how the horizontal timing data is set and what the different parts are called.

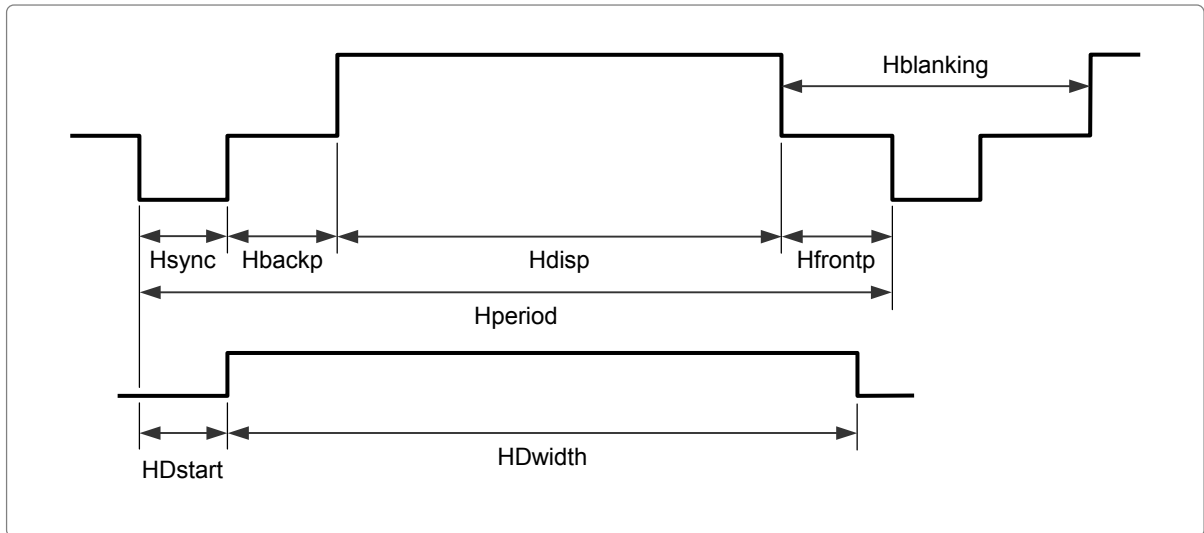


Fig. 5.2.1 Horizontal timing data

Hfrontp and Hblanking are calculated from the values of other setting items and, as such, their values cannot be input directly.

- $Hfrontp = Hperiod - Hdisp - Hsync - Hbackp$
- $Hblanking = Hperiod - Hdisp$

In addition to what is described in the setting details for the DVI and HDMI outputs, the horizontal timing data is subject to other restrictions. Refer to "5.1.12 DVI and HDMI output timing restrictions."

Table 5.2.1 Reference pages for setting details

No.	Setting item	Reference page
1	Input mode	p.100
	Dot clock frequency	
2	Hperiod	p.101
	Hdisp	
	Hblanking	
3	Hsync	p.102
	Hbackp	
	Hfrontp	
4	HDstart	p.102
	HDwidth	

5.2.2 Details of item settings

[1] Setting the input mode and dot clock frequency

H-Input Mode: dot (0/1)
 Dot Clock : 31.500MHz

Fig. 5.2.2 Setting the input mode and dot clock frequency

Table 5.2.2 Input mode and dot clock frequency setting method

Setting item	Key	LCD display	Description
Input mode (H-Input Mode)	0	μS	μs mode: The values for the items are input in microseconds.
	1	dot	dot mode: The values for the items are input in dots.
Dot clock (Dot Clock)	Number keys	XX.XXXMHz	Setting range: 5.000 to 300.000 MHz <ul style="list-style-type: none"> When the "C" ([SHIFT] + [6]) key is pressed, "*" appears on the LCD display, and the setting is fixed.

The input mode determines whether the values for the setting items are to be input in microseconds (μs) or dots. If, for instance, when the dot mode has been selected, a 'dot' value is changed, the 'μs' value will be automatically calculated. However, what actually happens differs slightly depending on the input mode and setting item. Refer to the table below.

Table 5.2.3 Input modes

		Setting item				
		Hperiod / Hdisp		Hsync / Hbackp / HDstart / HDwidth		Hfrontp / Hblanking
		μs setting	Dot setting	μs setting	Dot setting	μs / dot setting
Mode	μs					Data calculated from the values of other items regardless of the mode.
		* Values can be input in either microseconds or dots.		* Values cannot be input in dots.		
	dot					
		* Values cannot be input in microseconds.		* Values cannot be input in microseconds.		

- When the dot clock frequency is changed, the settings are re-calculated according to each item mode.
- When the dot clock frequency, Hperiod or Hdisp is changed in the microsecond mode, the dot clock frequency is compensated for on the basis of the Hperiod and Hdisp values.
- The settings for the dot clock frequency, Hperiod or Hdisp can be fixed. In this case, these fixed settings take priority over the input mode, and they will be used.

[2] Setting Hperiod, Hdisp and Hblanking

period:26.41uS	832dot
Hdisp :20.32uS	640dot

Fig. 5.2.3 Setting Hperiod and Hdisp**Table 5.2.4 Hperiod and Hdisp (Hblanking) setting method**

Setting item	Key	LCD display	Description
Hperiod	Number keys	XX.XXuS XXXXdot	Setting range: 0.00 to 99.99 [μ s], 128 to 8192 [dot] <ul style="list-style-type: none"> When the "E" ([SHIFT] + [8]) key is pressed, ""*"" appears on the LCD display, and the setting in microseconds is fixed. When the "F" ([SHIFT] + [9]) key is pressed, ""*"" appears on the LCD display, and the setting in dots is fixed.
Hdisp	Number keys	XX.XXuS XXXXdot	Setting range: 0.00 to 99.99 [μ s], 48 to 4096 [dot] <ul style="list-style-type: none"> When the "B" ([SHIFT] + [5]) key is pressed, ""*"" appears on the LCD display, and the setting in microseconds is fixed. When the "C" ([SHIFT] + [6]) key is pressed, ""*"" appears on the LCD display, and the setting in dots is fixed.
Hblanking			Hblanking is automatically calculated from the values of Hperiod and Hdisp. Calculation formula: $Hblanking = Hperiod - Hdisp$ Setting range: 40 to 4096 [dot]

* Even when items have been set in microseconds, ensure that the settings come within the prescribed setting ranges in terms of the numbers of dots.

[3] Setting Hsync, Hbackp and Hfrontp

Hsync	: 2.03uS	64dot
Hbackp	: 3.05uS	96dot

Fig. 5.2.4 Setting Hsync and Hbackp

Table 5.2.5 Hsync and Hbackp (Hfrontp) setting method

Setting item	Key	LCD display	Description
Hsync	Number keys	XX.XXuS XXXXdot	Setting range: 0.00 to 99.99 [μ s], 0 to 4096 [dot] * 1-dot increments with a dot clock frequency from 5 to 100 MHz 2-dot increments with a dot clock frequency from 100.001 to 200 MHz 4-dot increments with a dot clock frequency from 200.001 to 300 MHz
Hbackp	Number keys	XX.XXuS XXXXdot	Setting range: 0.00 to 99.99 [μ s], 0 to 4096 [dot]
Hfrontp			Hfrontp is automatically calculated from the values of Hperiod, Hdisp, Hsync and Hbackp. Calculation formula: $Hfrontp = Hperiod - Hdisp - Hsync - Hbackp$ Setting range: 0.00 to 99.99 [μ s], 0 to 4096 [dot]

* Even when items have been set in microseconds, ensure that the settings come within the prescribed setting ranges in terms of the numbers of dots.

CAUTION

- If "0" is set for Hfrontp, set Hsync to at least 2 dots when the dot clock frequency is 100.001 to 200 MHz or at least 4 dots when it is 200.001 to 300 MHz.
- Set Hfrontp within a range of 64 to 4096 dots when the dot clock frequency is 100.001 to 200 MHz and the Hperiod setting is in an increment of other than 2 dots or within a range of 128 to 4096 dots when the frequency is 200.001 to 300 MHz and the Hperiod setting is in an increment of other than 4 dots.
- During interlace scanning, set Hfrontp to at least 2 dots when the dot clock frequency is 5 to 100 MHz, at least 4 dots when it is 100.001 to 200 MHz or at least 8 dots when it is 200.001 to 300 MHz. "0" cannot be set.

[4] Setting HDstart and HDwidth

HDstart	: 0.00uS	0dot
HDwidth	: 0.00uS	0dot

Fig. 5.2.5 Setting HDstart and HDwidth

Table 5.2.6 HDstart and HDwidth setting method

Setting item	Key	LCD display	Description
HDstart	Number keys	XX.XX μ S XXXXdot	Setting range: 0.00 to 99.99 [μ s], 0 to 4096 [dot]
HDwidth	Number keys	XX.XX μ S XXXXdot	Setting range: 0.00 to 99.99 [μ s], 0 to 4096 [dot]

CAUTION

The sum of HDstart and HDwidth cannot be set in excess of Hperiod. (* The settings can be edited to ensure data compatibility with other models, but they will be ignored by the VG-849C.)
Set the sum within the following range:
 $(HDstart + HDwidth) \leq Hperiod$

5.3 Setting the vertical timing data

5.3.1 Vertical timing data

The figure below shows how the vertical timing data is set and what the various parts are called.

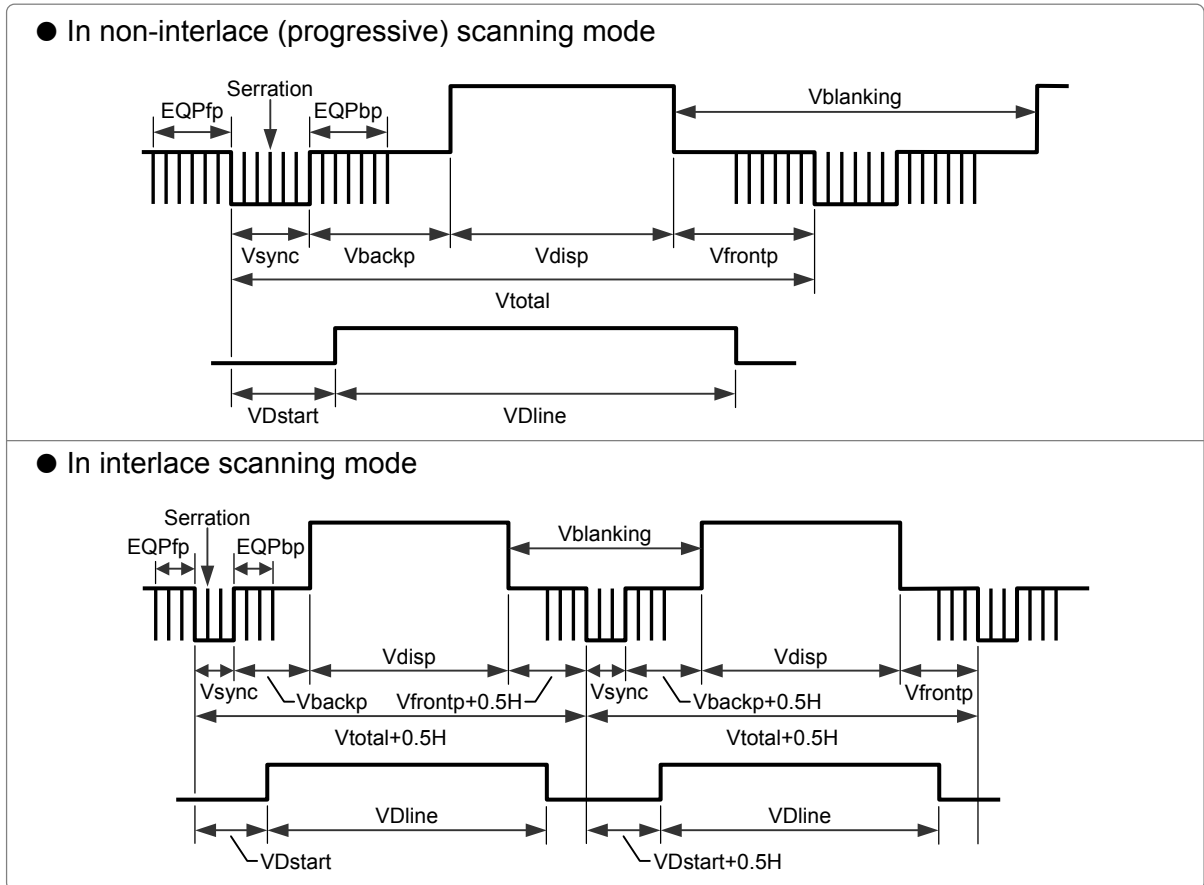


Fig. 5.3.1 Vertical timing data

Abbreviations used in text
 HS: Horizontal sync signal
 VS: Vertical sync signal
 CS: Composite sync signal

V_{frontp} and $V_{blanking}$ are calculated from the values of other setting items and, as such, their values cannot be input directly.

- $V_{frontp} = V_{total} - V_{disp} - V_{sync} - V_{backp}$
- $V_{blanking} = V_{total} - V_{disp}$ (only in non-interlace scanning mode; in the interlace scanning mode, refer to the figure above.)

Table 5.3.1 Reference pages for setting details

No.	Setting item	Reference page	No.	Setting item	Reference page	No.	Setting item	Reference page
1	Input mode	p.104	5	EQPfp1	p.108	9	Vsync2	p.112
	Scanning mode			EQPbp1			Vbackp2	
2	Field mode	p.105	6	Serration	p.110		Vfrontp2	
3	Vtotal	p.106		EQP (on/off)		7	VDstart	10
	Vdisp1		VDline	EQPbp2				
	Vblanking		4	8	Vdisp2		p.111	
Vsync1	p.107							
Vbackp1								
Vfrontp1								

5.3.2 Details of item settings

[1] Setting the input mode and scanning mode

V-Input Mode:H (0/1)
Scan:Non Interlace (0-2)

Fig. 5.3.2 Setting the input mode and scanning mode

Table 5.3.2 Input mode and scanning mode setting method

Setting item	Key	LCD display	Description
Input mode (V-Input Mode)	0	H	H mode: The values for the items are input in H units. * When this mode is selected, values cannot be input in microseconds.
	1	mS	ms mode: The values for the items are input in microseconds. * When this mode is selected, values cannot be input in H units.
Scanning mode (Scan)	0	Non Interlace	Non-interlace (progressive) scanning mode
	1	Inter&Sync	Interlace & sync mode
	2	Inter&Video	Interlace & video mode

The input mode determines whether the values for the setting items are to be input in H units or milliseconds (ms).

- H mode: A value is input in H units. →
[H setting and display] The input value is set and displayed as is.
↓
[ms display] The value in milliseconds is calculated from the H setting and horizontal sync frequency, and displayed.
- ms mode: A value is input in ms units. →
[H setting and display] The H value is calculated from the ms input value, set and displayed.
↓
[ms display] The value is re-calculated from the H setting and horizontal sync frequency, and displayed.

* The settings for Vtotal and Vdisp can be fixed. If this is the case, they take priority over the input mode, and these fixed settings will be used.

The figure below shows the differences based on the scanning mode.

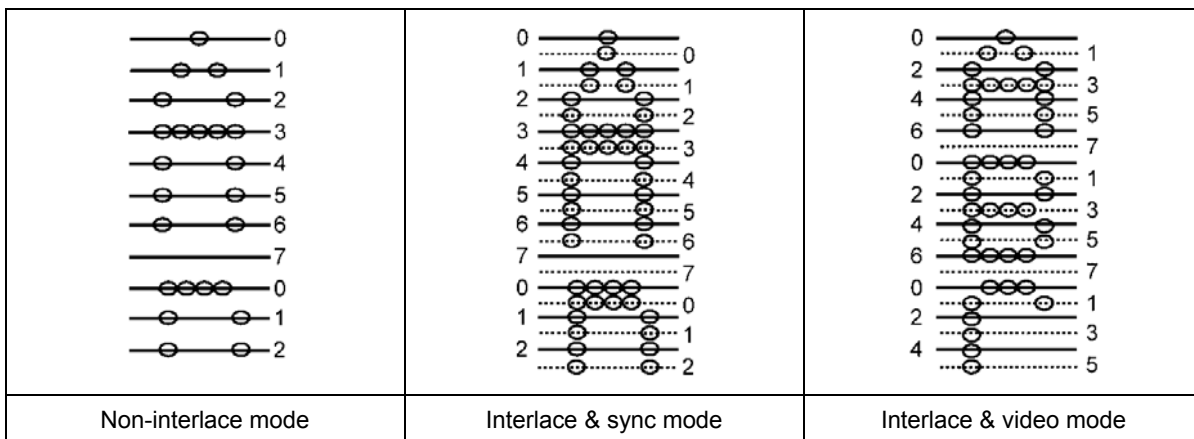


Fig. 5.3.3 Differences by scanning mode



When the interlace mode has been selected, set the number of scanning lines for one field in the vertical timing data items.

[2] Setting the field mode

The field mode is set when the interlace & sync mode or interlace & video mode has been selected as the scanning mode setting (see previous page).

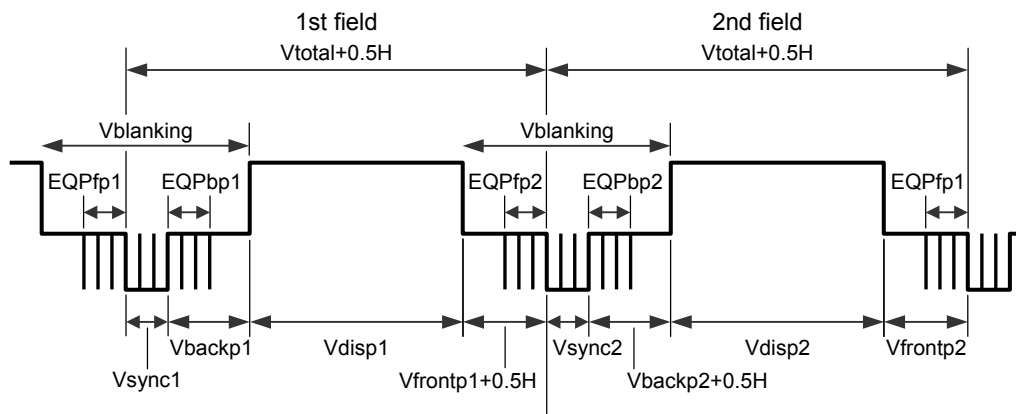
V Field Mode: 1 Field
 (1/2)

Fig. 5.3.4 Setting the field mode

Table 5.3.3 Field mode setting method

Setting item	Key	LCD display	Description
Field mode (V Field Mode)	1	1 Field	1-field mode: The same setting is used in both the 1st field and 2nd field. Vdisp1, Vsync1, Vbackp1, Vfrontp1, EQPfp1, EQPbp1
	2	2 Field	2-field mode: Different settings are used in the 1st field and 2nd field. 1st field: Vdisp1, Vsync1, Vbackp1, Vfrontp1 2nd field: Vdisp2, Vsync2, Vbackp2, Vfrontp2

● 2-field mode



CAUTION

- In the 2-field mode, V_{total} , V_{backp} and V_{frontp} can be set in $0.5H$ increments.
- In the 2-field mode, ensure that the value of $(V_{frontp1} + V_{sync1} + V_{backp1})$ or $(V_{frontp2} + V_{sync2} + V_{backp2})$ is set in $1H$ increments.

[3] Setting Vtotal, Vdisp1 and Vblanking

Vtotal :11.754mS	445H
Vdisp1:10.565mS	400H

Fig. 5.3.5 Setting Vtotal and Vdisp1

Table 5.3.4 Vtotal and Vdisp1(Vblanking) setting method

Setting item	Key	LCD display	Description
Vtotal	Number keys	XX.XXXmS XXXXH or XXXX.XH	<p>Setting range:</p> <p><u>In the non-interlace scanning mode</u> 0.000 to 99.999 [ms], 4 to 8192 [H] (in 1H increments)</p> <p><u>In the interlace scanning/1-field mode</u> 0.000 to 99.999 [ms], 4 to 4096 [H] (in 1H increments)</p> <p><u>In the interlace scanning/2-field mode</u> 0.000 to 99.999 [ms], 4.0 to 4096.0 [H] (in 0.5H increments)</p> <ul style="list-style-type: none"> • When the "E" ([SHIFT] + [8]) key is pressed, "*" appears on the LCD display, and the setting in microseconds is fixed. • When the "F" ([SHIFT] + [9]) key is pressed, "*" appears on the LCD display, and the setting in H is fixed.
Vdisp1	Number keys	XX.XXXmS XXXXH	<p>Setting range: 0.000 to 99.999 [ms], 1 to 4096 [H](in 1H increments)</p> <ul style="list-style-type: none"> • When the "B" ([SHIFT] + [5]) key is pressed, "*" appears on the LCD display, and the setting in microseconds is fixed. • When the "C" ([SHIFT] + [6]) key is pressed, "*" appears on the LCD display, and the setting in H is fixed.
Vblanking			<p>Vblanking is automatically calculated from the values of Vtotal and Vdisp.</p> <p>Calculation formula in non-interlace scanning mode: Vblanking = Vtotal - Vdisp1</p> <p>For Vblanking in the interlace scanning mode, refer to Fig. 5.3.1. Setting range: 2H or more</p>



The 1st field setting applies to Vdisp1 in the interlace scanning/2-field mode.

[4] Setting Vsync1, Vbackp1 and Vfrontp1

Vsync1: 0.079mS	3.0H
Vbp 1: 1.083mS	41H

Fig. 5.3.6 Setting Vsync1 and Vbackp1

Table 5.3.5 Vsync1 and Vbackp1 (Vfrontp1) setting method

Setting item	Key	LCD display	Description
Vsync1	Number keys	XX.XXXmS XX.XH	Setting range: 0.000 to 99.999 [ms], 1.0 to 99.0 [H] (in 0.5H increments)
Vbackp1 (Vbp1)	Number keys	XX.XXXmS XXXXH or XXXX.XH	Setting range: <u>In the non-interlace or interlace scanning/1-field mode</u> 0.000 to 99.999 [ms], 0 to 4096 [H](in 1H increments) <u>In the interlace scanning/2-field mode</u> 0.000 to 99.999 [ms], 0.0 to 4096.0 [H] (in 0.5H increments)
Vfrontp1			Vfrontp1 is automatically calculated from the values of Vtotal, Vdisp1, Vsync1 and Vbackp1. Calculation formula: $Vfrontp1 = Vtotal - Vdisp1 - Vsync1 - Vbackp1$ Setting range: <u>In the non-interlace or interlace scanning/1-field mode</u> 0.000 to 99.999 [ms], 0 to 4096 [H] (in 1H increments) <u>In the interlace scanning/2-field mode</u> 0.000 to 99.999 [ms], 0.0 to 4096.0 [H] (in 0.5H increments)

* When Vsync1 has been set in 0.5H increments, the actual Vbackp1 will be the setting + 0.5H. (See figure below)

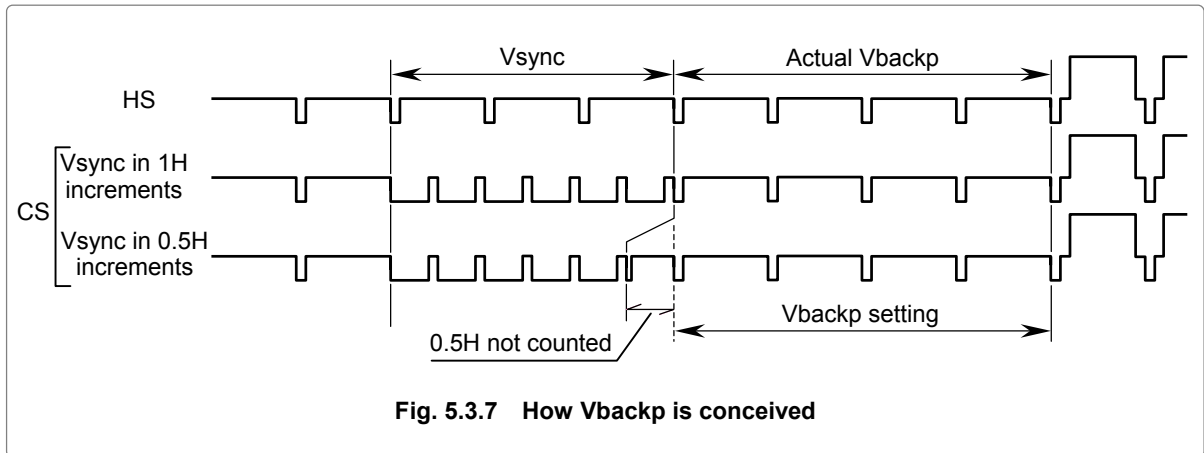


Fig. 5.3.7 How Vbackp is conceived

CAUTION In the interlace scanning/2-field mode, ensure that the value of (Vfrontp1 + Vsync1 + Vbackp1) is set in 1H increments.

[5] Setting EQPfp1 and EQPbp1

EQPfp 1: 0.000mS	0.0H
EQPbp1: 0.000mS	0.0H

Fig. 5.3.8 Setting EQPfp1 and EQPbp1

Table 5.3.6 EQPfp1 and EQPbp1 setting method

Setting item	Key	LCD display	Description
EQPfp1	Number keys	XX.XXXmS XX.XH	These are the ranges of this equalizing pulse inside the front porch. Setting range: 0.000 to 99.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)
EQPbp1	Number keys	XX.XXXmS XX.XH	These are the ranges of this equalizing pulse inside the back porch. Setting range: 0.000 to 99.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)

CAUTION

- When the non-interlace (progressive) scanning mode is used and tri-level sync signals are output, EQPfp1 and EQPbp1 cannot be set in 0.5H increments. Set them in 1H increments.
- When the interlace scanning mode is used and tri-level sync signals are output, EQPfp1 must be set within the range of $[(EQPfp + 1H) \leq Hfrontp]$.

The figure below shows how the EQP phase relationship is conceived.

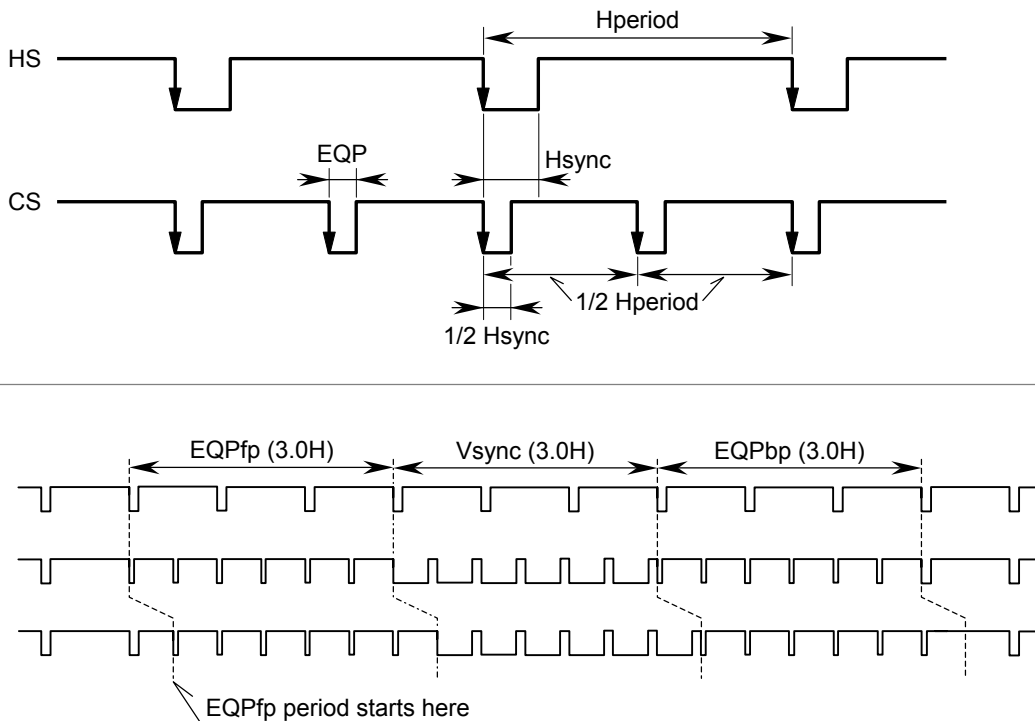


Fig. 5.3.9 How the EQP phase relationship is conceived

Setting examples Next page

Four examples of the EQPfp (1, 2), EQPbp (1, 2), EQP and Serration are shown below.

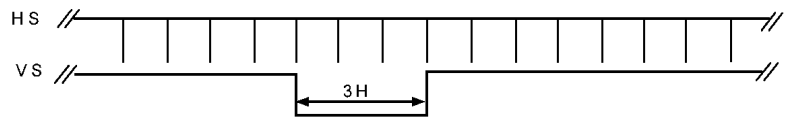


Fig. 5.3.10 EQP

<Example 1>

Table 5.3.7 Setting 1

Setting item	Setting
EQPfp	0H
EQPbp	0H
EQP	OFF
Serration	OFF



Fig. 5.3.11 Setting example 1

<Example 2>

Table 5.3.8 Setting 2

Setting item	Setting
EQPfp	0H
EQPbp	0H
EQP	OFF
Serration	0.5H



Fig. 5.3.12 Setting example 2

<Example 3>

Table 5.3.9 Setting 3

Setting item	Setting
EQPfp	3H
EQPbp	3H
EQP	ON
Serration	1H

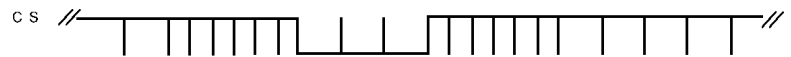


Fig. 5.3.13 Setting example 3

<Example 4>

Table 5.3.10 Setting 4

Setting item	Setting
EQPfp	3H
EQPbp	0H
EQP	OFF
Serration	OFF



Fig. 5.3.14 Setting example 4

[6] Setting Serration and EQP (ON/OFF)

Serration	:OFF	(0-3)
EQP (on/off)	:OFF	(0-1)

Fig. 5.3.15 Setting Serration and EQP (ON/OFF)

Table 5.3.11 Serration and EQP (ON/OFF) setting method

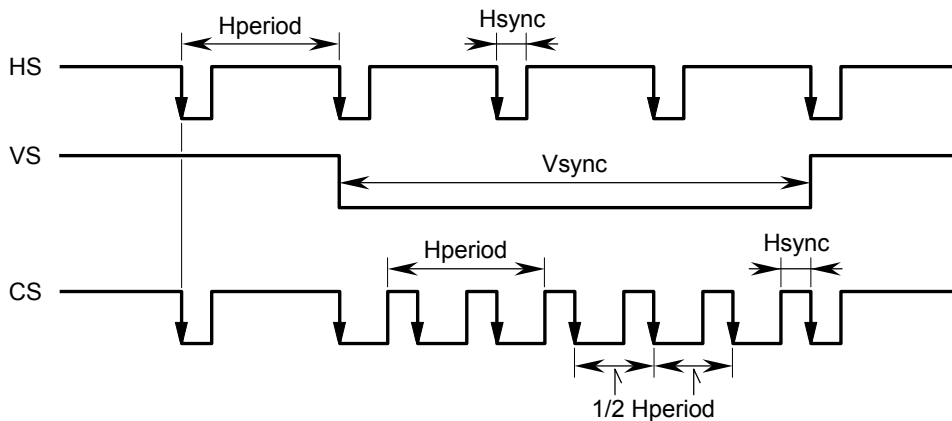
Setting item	Key	LCD display	Description
Serration	0	OFF	The serration pulse is not inserted.
	1	0.5H	The serration pulse is inserted in 0.5H increments.
	2	1H	The serration pulse is inserted in 1H increments.
	3	EXOR	EXOR of HS and VS is inserted as the serration pulse.
EQP	0	OFF	The equalizing pulse is not inserted in the EQPfp and EQPbp periods.
	1	ON	The equalizing pulse is inserted in the EQPfp and EQPbp periods.

CAUTION

Serration cannot be set in 0.5H increments when the non-interlace (progressive) scanning mode is used and tri-level sync signals are output.

The figure below shows how the phases correlate using examples of when Serration "0.5H" is selected and when Serration "EXOR" is selected.

● With Serration "0.5H"



● With Serration "EXOR"

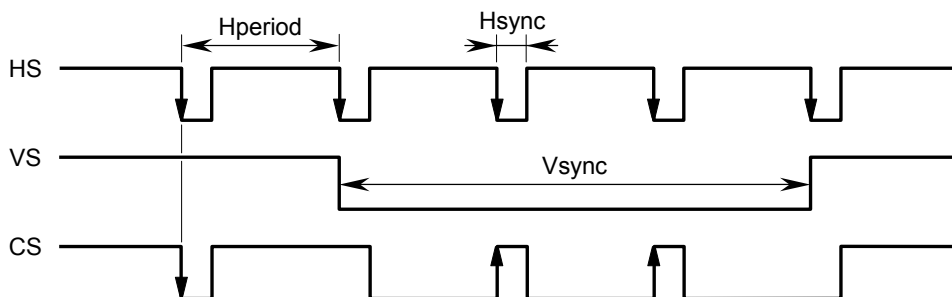


Fig. 5.3.16 Phase correlation of Serration

[7] Setting VDstart and VDline

VDstart : 0.000mS	0.0H
VDline : 0.000mS	0.0H

Fig. 5.3.17 Setting VDstart and VDline**Table 5.3.12 VDstart and VDline setting method**

Setting item	Key	LCD display	Description
VDstart	Number keys	XX.XXXmS XXXX.XH	Setting range: 0.000 to 99.999 [ms], 0.0 to 4095.0 [H] (in 0.5H increments) VDstart ≤ (Vtotal - 1H)
VDline	Number keys	XX.XXXmS XXXX.XH	Setting range: 0.000 to 99.999 [ms], 0.0 to 4095.0 [H] (in 0.5H increments) VDline ≤ Vtotal



The sum of VDstart and VDline cannot be set in excess of VTotal. (* The settings can be edited to ensure data compatibility with other models, but they will be ignored by the VG-849C.)
Set the sum within the following range:
(VDstart + VDline) ≤ Vtotal

[8] Setting Vdisp2

This is the setting for Vdisp in the second field.

This menu item is displayed only when the "interlace & sync mode" or "interlace & video mode" has been selected as the scanning mode setting and the "2nd field mode" has been selected as the field mode setting.

****2nd Field Menu****
Vdisp2:10.565mS 400H

Fig. 5.3.18 Setting Vdisp2**Table 5.3.13 Vdisp2 setting method**

Setting item	Key	LCD display	Description
Vdisp2	Number keys	XX.XXXmS XXXXH	Setting range: 0.000 to 99.999 [ms], 1 to 4096 [H] (in 1H increments) <ul style="list-style-type: none"> When the "B" ([SHIFT] + [5]) key is pressed, "*" appears on the LCD display, and the setting in microseconds is fixed. When the "C" ([SHIFT] + [6]) key is pressed, "*" appears on the LCD display, and the H setting is fixed.

[9] Setting Vsync2, Vbackp2 and Vfrontp2

These settings are for Vsync2, Vbackp2 and Vfrontp2 in the second field.
This menu item is displayed only when the “interlace & sync mode” or “interlace & video mode” has been selected as the scanning mode setting and the “2nd field mode” has been selected as the field mode setting.

Vsync2: 0.079mS	3.0H
Vbp 2: 1.083mS	41.0H

Fig. 5.3.19 Setting Vsync2 and Vbackp2

Table 5.3.14 Vsync2 and Vbackp2 (Vfrontp2) setting method

Setting item	Key	LCD display	Description
Vsync2	Number keys	XX.XXXmS XX.XH	Setting range: 0.000 to 99.999 [ms], 1.0 to 99.0 [H] (in 0.5H increments)
Vbackp2 (Vbp2)	Number keys	XX.XXXmS XXXX.XH	Setting range: 0.000 to 99.999 [ms], 0.0 to 4096.0 [H] (in 0.5H increments)
Vfrontp2			Vfrontp2 is automatically calculated from the values of Vtotal, Vdisp2, Vsync2 and Vbackp2. Calculation formula: $Vfrontp2 = Vtotal - Vdisp2 - Vsync2 - Vbackp2$ Setting range: 0.000 to 99.999 [ms], 0.0 to 4096.0 [H] (in 0.5H increments)

* When Vsync2 has been set in 0.5H increments, the actual Vbackp2 will be the setting + 0.5H.
(Refer to Fig. 5.3.7 in [4] Setting Vsync1, Vbackp1 and Vfrontp1.)

CAUTION

Ensure that the value of (Vfrontp2 + Vsync2 + Vbackp2) is set in 1H increments.

[10] Setting EQPfp2 and EQPbp2

This menu item is displayed only when the “interlace & sync mode” or “interlace & video mode” has been selected as the scanning mode setting and the “2nd field mode” has been selected as the field mode setting.

EQPfp 2: 0.000mS	0.0H
EQPbp2: 0.000mS	0.0H

Fig. 5.3.20 Setting EQPfp2 and EQPbp2

Table 5.3.15 EQPfp2 and EQPbp2 setting method

Setting item	Key	LCD display	Description
EQPfp2	Number keys	XX.XXXmS XX.XH	These are the ranges of this equalizing pulse inside the front porch. Setting range: 0.000 to 99.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)
EQPbp2	Number keys	XX.XXXmS XX.XH	These are the ranges of this equalizing pulse inside the back porch. Setting range: 0.000 to 99.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)

* For how the EQP phase correlation is conceived and setting examples, refer to [5] Setting EQPfp1 and EQPbp1.

CAUTION

Set EQPfp2 within the range of $[(EQPfp + 1H) \leq Hfrontp]$ when tri-level sync signals are output.

5.4 Setting the output condition data

This section provides details on the settings of the output condition data items.

Table 5.4.1 Reference pages for setting details

No.	Setting item	Reference page	No.	Setting item	Reference page		
1	Sync signal output mode	p.114	11	DVI output mode	p.119		
2	CV (composite video sync signal)	p.115		Priority output port			
	CS (composite sync signal)		12	Aspect ratio	p.120		
	HS (horizontal sync signal)			13		AFD	Aspect
	VS (vertical sync signal)		Type				
3	Video output level	p.116	14	Color	p.121		
	Setup level			BG			
	Sync signal level		15	Bar	p.121		
4	RGB / YPbPr	p.116		Reference: ■ Concerning the AFD pattern for evaluating the aspect ratio		p.122	
5	YPbPr coefficient table number		p.117	16	Black insertion function ON/OFF		p.124
6	D connector				Line1		
7		Line2	Pattern display (ON) time				
8	BNC connector output	p.117	16	Black insertion	Black insertion (OFF) time		
	D-Sub connector output						
9	DVI-D connector output	p.118					
	DVI-A connector output						
	D connector output						
10	S connector output format	p.118					

[1] Setting the sync signal output mode

OutputMode:ANALOG (0-C)

Fig. 5.4.1 Setting the sync signal output mode

For details on the standard timing in each mode, refer to the “Standard timing reference/internal program No.” column in the table below.

Table 5.4.2 Sync signal output mode setting method

Key	LCD display	Mode	Standard timing reference/internal program No.	Remarks
0	ANALOG	Binary analog mode		The generator is normally used with this mode set.
1	TR1080	Tri-level sync signal mode (1080 type)	970 to 973 (PG1)	The first field becomes the first line of DISP.
2	TR1035	Tri-level sync signal mode (1035 type)	974, 975 (PG1)	The second field becomes the first line of DISP. The Vdisp setting for the second field is incremented by 1. This means that the total number of Vdisp in one frame will be an odd number.
3	TR720	Tri-level sync signal mode (720 p)	976, 977 (PG1)	
4	NTSC	NTSC mode	950, 968 (PG1)	The VBS output is automatically set to ON. If the sync signals (Hsync, Hperiod, Vsync and Vtotal) settings selected differ from the standard timings contained inside the VG-849C, the VBS output is set to OFF.
5	PAL	PAL mode	969 (PG1)	
6	SECAM	SECAM mode	964 (PG1)	
7	NTSC-M	NTSC-M mode	994 (PG1) 924 (PG2)	
8	NTSC-443	NTSC-443 mode	925 (PG2)	
9	PAL-M	PAL-M mode	926 (PG2)	
A	PAL-60	PAL-60 mode	927 (PG2)	
B	PAL-N	PAL-N mode	928 (PG2)	
C	PAL-Nc	PAL-Nc mode	929 (PG2)	

[2] Setting the sync signals (CV, CS, HS and VS)

These settings select the polarities of the sync signals, set the signals ON or OFF, etc.

CV:RGB (0-7)	CS:N (0-4)
HS:N (0-3)	VS:P (0-2)

Fig. 5.4.2 Setting the sync signals (CV, CS, HS and VS)

Table 5.4.3 Sync signal (CV, CS, HS and VS) setting method

Setting item	Key	LCD display	Description
CV (composite video sync signal)	0		OFF
	1	R	The composite sync signal is carried on R.
	2	G	The composite sync signal is carried on G.
	3	RG	The composite sync signal is carried on R/G.
	4	B	The composite sync signal is carried on B.
	5	RB	The composite sync signal is carried on R/B.
	6	GB	The composite sync signal is carried on G/B.
CS (composite sync signal)	0	N	Negative
	1	P	Positive
	2	-	OFF
	3	HS	The horizontal sync signal is set.
	4	VS	The vertical sync signal is set.
HS (horizontal sync signal)	0	N	Negative
	1	P	Positive
	2	-	OFF
VS (vertical sync signal)	0	N	Negative
	1	P	Positive
	2	-	OFF

- The sync signals from the CS connector are output at an analog level (0.3V). This level is 0.6V, however, when tri-level sync signals are output.
- The sync signals from the HS connector are output at a TTL level (2V).

[3] Setting the video output, setup and sync signal levels

Video:0.70V Set-up:0.00V
Sync:0.30V

Fig. 5.4.3 Setting the video output, setup and sync signal levels

Table 5.4.4 Video output, setup and sync signal level setting method

Setting item	Key	LCD display	Description
Video output level (Video)	Number keys	X.XXV	This is the video signal level. Setting range: 0.30 to 1.20 [V] (in 0.01V increments)
Setup level (Set-up)	Number keys	X.XXV	This is the setup level. Setting range: 0.00 to 0.25 [V] (in 0.01V increments)
Sync signal level (Sync)	Number keys	X.XXV	This is the sync (G on Sync) signal level. Setting range: 0.00 to 0.60 [V] (in 0.01V increments)

CAUTION

Set the levels within the ranges of [Video ≥ Setup], [Video ≥ Sync] and [Video ≥ Setup + Sync]

[4] Setting RGB/YPbPr

This setting selects RGB or YPbPr (color difference) as the signals to be output.

RGB/YPbPr:YPbPr (0/1)

Fig. 5.4.4 Selecting RGB or YPbPr

Table 5.4.5 RGB/YPbPr selection method

Setting item	Key	LCD display	Description
RGB/YPbPr	0	RGB	RGB is selected as the signals to be output.
	1	YPbPr	YPbPr (color difference) is selected as the signals to be output.

[5] Setting the YPbPr coefficient table No.

This setting selects the YPbPr coefficient table No. used when “YPbPr” has been selected as “[4] Setting RGB/YPbPr”.

* For details on the YPbPr coefficient tables, refer to “4.8 Setting the color difference coefficients (YPbPr coefficient table edit **FUNCA**).”

YPbPr No.:0 (0-9)

Fig. 5.4.5 Setting the YPbPr coefficient table No.

Table 5.4.6 YPbPr coefficient table No. selection method

Setting item	Key/LCD display	Description
YPbPr coefficient table No.	0	SMPTE 274M, 296M, RP-177
	1	SMPTE 240M
	2	SMPTE 293M
	3	SMPTE 125M
	4 to 9	User settings

[6] Setting the D connector Line 1 identification signal

D-Connector Line1: 1080 (0-2)

Fig. 5.4.6 Setting the D connector Line 1 identification signal**Table 5.4.7 D connector Line 1 identification signal selection method**

Setting item	Key	LCD display	Description
D connector Line 1	0	480	Number of effective scanning lines: 480 (Identification voltage: 0V)
	1	720	Number of effective scanning lines: 720 (Identification voltage: 2.2V)
	2	1080	Number of effective scanning lines: 1080 (Identification voltage: 5V)

[7] Setting the D connector Line 2/Line 3 identification signals

Line2: Interlace (0/1) Line3: 4:3LB (0-2)
--

Fig. 5.4.7 Setting the D connector Line 1/Line 3 identification signals**Table 5.4.8 D connector Line 2/Line 3 identification signal selection method**

Setting item	Key	LCD display	Description
D connector Line 2	0	Interlace	Interlace scanning (Identification voltage: 0V)
	1	Progressive	Progressive scanning (Identification voltage: 5V)
D connector Line 3	0	4:3	Aspect ratio: 4:3 (Identification voltage: 0V)
	1	4:3LB	Aspect ratio: 4:3 letter-box (Identification voltage: 2.2V)
	2	16:9	Aspect ratio: 16:9 (Identification voltage: 5V)

[8] Setting the BNC and D-Sub connector outputs

Analog BNC :ON (0/1) Analog D-SUB :ON (0/1)
--

Fig. 5.4.8 Setting the BNC and D-Sub connector outputs**Table 5.4.9 BNC and D-Sub connector output selection method**

Setting item	Key	LCD display	Description
BNC connector output D-Sub connector output	0	OFF	The output is set to OFF.
	1	ON	The output is set to ON.

[9] Setting the DVI-D and DVI-A/D connector outputs

DVI-D : ON DVI-A:OFF
D-Connect:ON (0/1)

Fig. 5.4.9 Setting the DVI-D and DVI-A/D connector outputs

Table 5.4.10 DVI-D and DVI-A/D connector output selection method

Setting item	Key	LCD display	Description
DVI-D connector output	0	OFF	The DVI digital output is set to OFF.
	1	ON	The DVI digital output is set to ON.
DVI-A connector output	0	OFF	The DVI analog output is set to OFF.
	1	ON	The DVI analog output is set to ON.
D connector output	0	OFF	The D connector output is set to OFF.
	1	ON	The D connector output is set to ON.

[10] Setting the S connector (Y/C) output format

S-Connector : NORMAL
(0-2)

Fig. 5.4.10 Setting the S connector output format

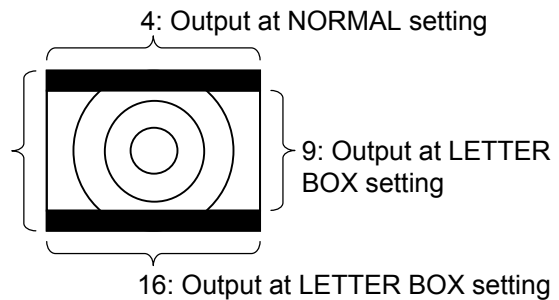
Table 5.4.11 S connector output format selection method

Setting item	Key	LCD display	Description
S connector output format (S-Connector)	0	NORMAL	Normal output (4:3) (C signal, DC voltage: 0V)
	1	LETTER BOX	Letter-box (C signal, DC voltage: 2.2V)
	2	SQUEEZE	Squeeze (C signal, DC voltage: 5V)

* Normally, the images are output in a 4:3 ratio. However, when the letter-box format has been selected, the images are output in the 16:9 ratio, and so the sections at the top and bottom are blacked out in the output.

When the letter-box format is selected, the output images appear as shown in the figure on the right.

3: Output at NORMAL setting



[11] Setting the DVI output mode and priority output port

DVI Mode : SINGLE(0/1)
PrimaryPort : ANALOG(0-2)

Fig. 5.4.11 Selecting the DVI output mode and priority output port**Table 5.4.12 DVI output mode and priority output port selection method**

Setting item	Key	LCD display	Description
DVI output mode (DVI Mode)	0	SINGLE	The signals are output in the Single Link mode.
	1	DUAL	The signals are output in the Dual Link mode.*1
Priority output port (PrimaryPort)	0	ANALOG	Analog output
	1	DVI	DVI output
	2	HDMI	HDMI output

*1: The standard VG-849C model supports Single Link only. Contact Astrodesign concerning Dual Link.

*1: The standard VG-849C model supports Single Link only. Contact Astrodesign concerning Dual Link.

The following restrictions are imposed on the output by the “priority output port” setting.

Table 5.4.13 Restrictions imposed by priority output port

			Priority output port		
			Analog	DVI	HDMI
Output	Analog	5 to 24.999 MHz	○	○	○
		25 to 100 MHz		○	○ 2-dot increments
		100.001 to 200 MHz		○ 2-dot increments	○ 2-dot increments
		200.001 to 300 MHz		○ 4-dot increments	○ 4-dot increments
	DVI	25 to 100 MHz	○	○	○ 2-dot increments
		100.001 to 165 MHz	○ 2-dot increments		○ 2-dot increments
	HDMI	25 to 100 MHz	Refer to “(4) Concerning the HDMI output” in “[2] Concerning the output connectors.”		
	Output connector for executing HDCP			OFF	DVI
Other			HDMI output OFF with YPbPr output		Always RGB output except for HDMI VBS output always OFF
Dot clock frequency			×: Cannot be output. ○: Can be output. × dot increment: Restriction on horizontal timing setting		

[12] Setting the aspect ratio

This setting selects the aspect ratio in which the patterns are drawn. It takes effect only when circle patterns are output or when optional pattern No.7, 8, 9, 17, 1E, 1F, 25, 26, 34 or 3D is output.

Aspect Mode : 4:3 (0-3)
User: H: 1 V: 1(1-255)

Fig. 5.4.12 Setting the aspect ratio

Table 5.4.14 Aspect ratio setting method

Setting item	Key	LCD display	Description
Aspect ratio (Aspect Mode)	0	4:3	The aspect ratio is set to 4:3.
	1	16:9	The aspect ratio is set to 16:9.
	2	Reso	The aspect ratio is set to the same ratio as the screen resolution.
	3	User	The aspect ratio is set to the ratio which has been input on the second line of the setting screen shown on the LCD display (see figure above).

[13] Setting the AFD Aspect and AFD Type

These settings are for the AFD pattern (optional pattern No.1F) which is used to evaluate the aspect ratio under the EIA/CEA-861B standard.

☞ Refer to "■ Concerning the AFD pattern for evaluating the aspect ratio" presented later in these instructions.

AFD Aspect : 4:3 (0/1)
AFD Type : 0 (0-12)

Fig. 5.4.13 Setting the AFD Aspect and AFD Type

Table 5.4.15 AFD Aspect and AFD Type setting method

Setting item	Key	LCD display	Description
AFD Aspect	0	4:3	in 4:3 coded frame
	1	16:9	in 16:9 coded frame
AFD Type	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)
	7		box 2:1 (center)
	8		box 11:5 (center)
	9		box 12:5 (center)
	10		4:3 (with shoot & protect 14:9 center)
	11		16:9 (with shoot & protect 14:9 center)
12		16:9 (with shoot & protect 4:3 center)	

[14] Setting the AFD Color and AFD background color

These settings are for the AFD pattern (optional pattern No.1F) which is used to evaluate the aspect ratio under the EIA/CEA-861B standard.

☞ “■ Concerning the AFD pattern for evaluating the aspect ratio” presented later in these instructions.

AFD Color : R255G255B255
AFD BG : R128G128B128

Fig. 5.4.14 Setting the AFD Color and AFD background color

Table 5.4.16 AFD Color and AFD background color setting method

Setting item	Key	LCD display	Description
AFD Color R, G, B	Number keys	XXX	The color of the optional pattern No.1F circle is designated. Setting range:0 to 255
AFD BG R, G, B	Number keys	XXX	The background color of the optional pattern No.1F circle is designated. Setting range: 0 to 255

[15] Setting the AFD bars

These settings are for the AFD pattern (optional pattern No.1F) which is used to evaluate the aspect ratio under the EIA/CEA-861B standard.

☞ “■ Concerning the AFD pattern for evaluating the aspect ratio” presented later in these instructions.

AFD Bar : R 0G 0B 0

Fig. 5.4.15 Setting the AFD bars

Table 5.4.17 AFD bar setting method

Setting item	Key	LCD display	Description
AFD Bar R, G, B	Number keys	XXX	The color of SideBar and LetterBox of optional pattern No.1F is designated. Setting range: 0 to 255

■ Concerning the AFD pattern for evaluating the aspect ratio

Optional pattern No.1F is the AFD pattern which is used to evaluate the aspect ratio under the EIA/CEA-861B standard. The AFD pattern is set in “[13] Setting the AFD Aspect and AFD Type” to “[15] Setting the AFD bars.”

Table 5.4.18 Setting items related to aspect ratio

No.	Setting item	Description
12	Aspect ratio (Aspect Mode)	Actual aspect ratio
13	AFD Aspect	CodeFrame of AFD defined by EIA/CEA-861B standard
	AFD Type	Number of AFD defined by EIA/CEA-861B standard
14	AFD Color	Color of optional pattern No.1F circle
	AFD BG	Background color of optional pattern No.1F circle
15	AFD Bar	Color of SideBar and LetterBox of optional pattern No.1F

“AFD Type” can be changed using the [▶] and [◀] keys while optional pattern No.1F is displayed.

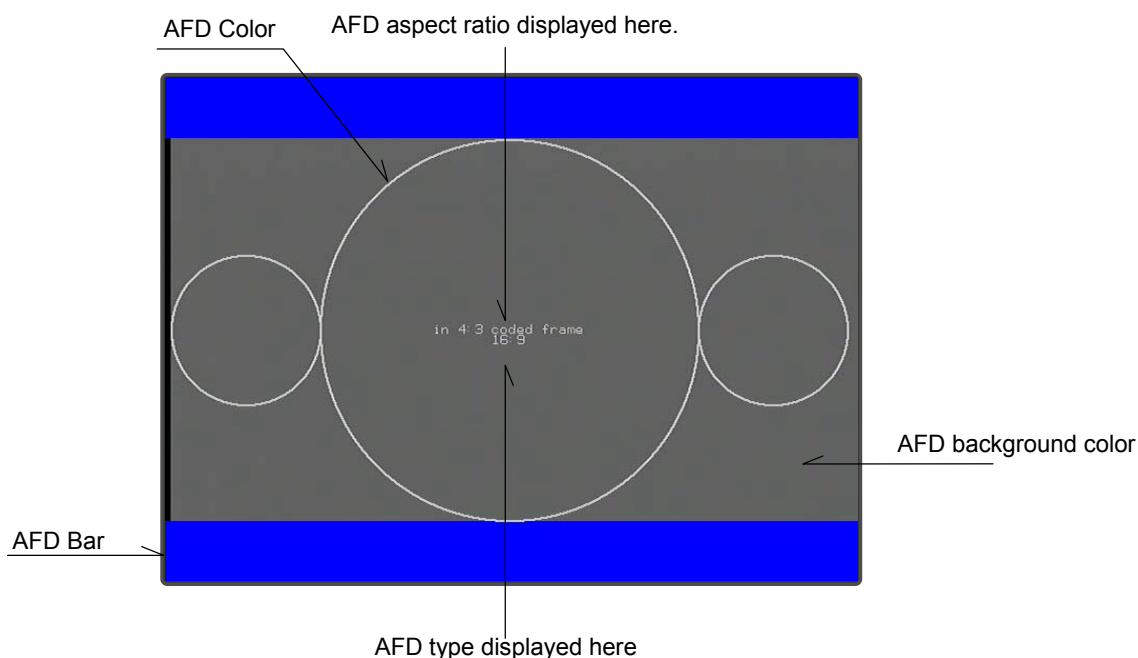


Fig. 5.4.16 Example of optional pattern No.1F display

* If, when “SELECTED” has been set for “[22] Setting the HDMI automatic reflection” for config edit FUNC5, optional pattern No.1F is displayed, the bar setting for AVI InfoFrame will be automatically changed to the value of the bars in optional pattern No.1F.


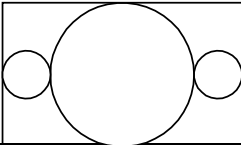
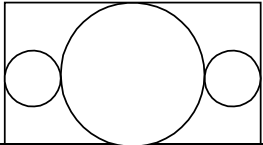
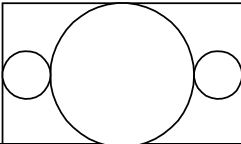
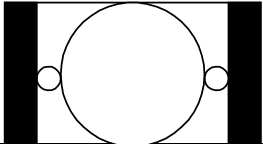
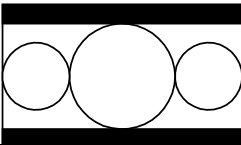
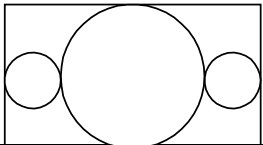
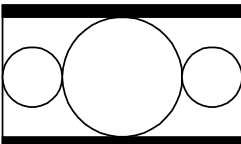
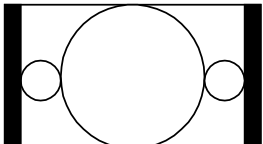
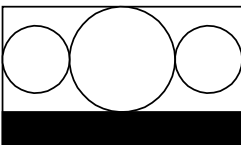
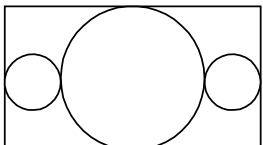
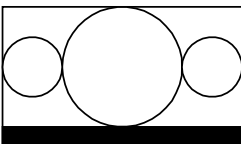
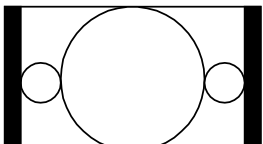
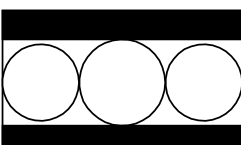
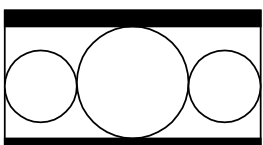
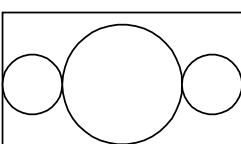
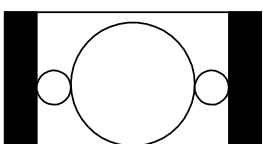
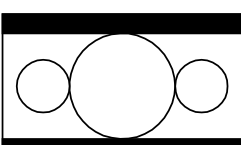
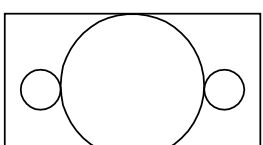
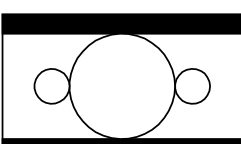
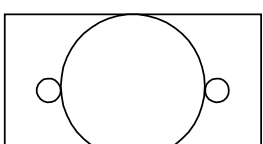
[AFD Type details]  Next page

Table 5.4.19 AFD Type details

AFD Type		AFD Aspect	
value	description	4:3	16:9
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)		
7	box 2:1 (center)		
8	box 11:5 (center)		
9	box 12:5 (center)		
10	4:3 (with shoot & protect 14:9 center)		
11	16:9 (with shoot & protect 14:9 center)		
12	16:9 (with shoot & protect 4:3 center)		

[16] Setting the black insertion

Insert Black Frame: OFF
Sel: All ON: 0 OFF: 0

Fig. 5.4.17 Setting the black insertion

Table 5.4.20 Black insertion setting method

Setting item	Key	LCD display	Description	
Black insertion function ON/OFF (Insert Black Frame)	0	OFF	A black image is not inserted. (Normal setting)	
	1	ON	A black image is inserted in accordance with the position and time settings.	
Insertion position (Sel)	0	All	Entire screen	These select the position where the black image is to be inserted.
	1	Left	Left half of screen	
	2	Right	Right half of screen	
Pattern display time (ON)	Number keys	XXX	Setting range: 0 to 255 [V]	
Black insertion time (OFF)	Number keys	XXX	Setting range: 0 to 255 [V]	

<Example: When “ON” for the black insertion function, “Left” for the insertion position, “60” for the pattern display time, and “30” for the black insertion time have been selected>

The diagram illustrates the timing of the black insertion function. It shows a sequence of four display states connected by arrows:

- Normal display:** A screen filled with a pattern of 'H' characters. Below it, the text reads "Display time: 60 [V]".
- Black image inserted:** The left half of the screen is black, and the right half contains the 'H' pattern. Below it, the text reads "Display time: 30 [V]".
- Normal display:** The screen returns to being fully filled with the 'H' pattern. Below it, the text reads "Display time: 60 [V]".
- Black image inserted:** The left half of the screen is black, and the right half contains the 'H' pattern. Below it, the text reads "Display time: 30 [V]".

After the final state, an arrow points to the text "Hereafter repeated".

5.5 Setting the audio output data

This section provides details on the settings of the audio output data items.

Table 5.5.1 Reference pages for setting details

No.	Setting item		Reference page
1	Output frequency	L	p.125
		R	
2	Output level	L	p.125
		R	
3	SWEEP		p.126
4	Frequency sweep	Time step	p.127
		Number of repetitions	
5	Frequency sweep	Minimum frequency	p.127
		Maximum frequency	
6	Frequency sweep	Frequency step	p.128

[1] Setting the output frequency

FREQ L : 100 Hz
FREQ R : 100 Hz

Fig. 5.5.1 Setting the output frequency

Table 5.5.2 Output frequency setting method

Setting item	Key	LCD display	Description
Output frequency (FREQ L/FREQ R)	Number keys	XXX00 Hz	Setting range: 100 to 20000 [Hz] (in 100 Hz increments)

[2] Setting the output levels.

LEVEL L : 0 mV
LEVEL R : 0 mV

Fig. 5.5.2 Setting the output levels

Table 5.5.3 Output level setting method

Setting item	Key	LCD display	Description
Output level (LEVEL L/LEVEL R)	Number keys	XXX0 mV	Setting range: 0 to 2000 [mV] (in 50 mV increments)

[3] Setting sweep

The audio sweep function can be selected.

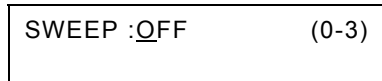


Fig. 5.5.3 Selecting sweep

Table 5.5.4 Sweep selection method

Setting item	Key	LCD display	Description
SWEEP	0	OFF	SWEEP OFF
	1	FREQ	Frequency sweep
	2	LEVEL L	Level sweep from left to right
	3	LEVEL R	Level sweep from right to left

● Frequency sweep

This refers to changing the frequency from the “Minimum frequency” to “Maximum frequency” at the “Frequency step” and “Time step”: this counts as one time. It is repeated for the number of times specified by the “Number of repetitions” setting.

● Level sweep

This refers to changing the output level from 0 to 2V in 50mV steps.

When sweeping from left to right: [Left 0V → 2V ⇒ right 0V → 2V ⇒ left 2V → 0V ⇒ right 2V → 0V] ⇒ ... Hereafter repeated.

When sweeping from right to left: [Right 0V → 2V ⇒ left 0V → 2V ⇒ right 2V → 0V ⇒ left 2V → 0V] ⇒ ... Hereafter repeated.

CAUTION

- The sweep function cannot be executed at the same time as the pattern action, HDCP or some of the other functions. For details, refer to “11.4.4 Concerning functions which cannot be executed simultaneously.”
- When the same setting is used for the left and right output frequencies and different settings are used for the output levels, the left and right phases will not be constant. To output the signals in-phase, be absolutely sure to set the outputs to the same levels.

[4] Setting the time step and number of repetitions for frequency sweep

SWEEP STEP : 40 msec (0-F)
SWEEP TIMES : 0 (0-15)

Fig. 5.5.4 Setting the time step and number of repetitions for frequency sweep**Table 5.5.5 Frequency sweep time step and number of repetitions setting method**

Setting item	Key	LCD display	Description
Time step (SWEEP STEP)	0	40	This sets the time interval per step.
	1	60	
	2	80	
	3	100	
	4	120	
	5	140	
	6	160	
	7	180	
	8	200	
	9	220	
	A	240	
	B	260	
	C	280	
	D	300	
	E	320	
F	340		
Number of repetitions (SWEEP TIMES)	Number keys	XX	The sweep is repeatedly executed for the number of times set. Setting range: 0 to 15 (0: infinite)

[5] Setting the minimum and maximum frequencies for frequency sweep

FREQ SWEEP (200-20000)
MIN: 200Hz MAX:20000Hz

Fig. 5.5.5 Setting the minimum and maximum frequencies for frequency sweep**Table 5.5.6 Frequency sweep minimum and maximum frequency setting method**

Setting item	Key	LCD display	Description
Minimum frequency (MIN)	Number keys	XXX00 Hz	Setting range: 200 to 20000 [Hz] (in 100 Hz increments)
Maximum frequency (MAX)			

[6] Setting the frequency step for frequency sweep

FREQ SWEEP (200-19800) STEP: <u>2</u> 00Hz

Fig. 5.5.6 Setting the frequency step for frequency sweep

Table 5.5.7 Frequency sweep frequency step setting method

Setting item	Key	LCD display	Description
Frequency step	Number keys	XXX00 Hz	Setting range: 200 to 19800 [Hz] (in 100 Hz increments)

5.6 Setting the HDMI output

This section provides details of the settings for the HDMI output data items.

* For details on HDMI, refer to “High-Definition Multimedia Interface Specification.”

Table 5.6.1 Reference pages for setting details

No.	Setting item		Reference page	
1	HDMI output mode		p.130	
	Video format			
2	Video level	Level mode	p.131	
		Level, user setting		Min
				Max
3	Color difference coefficients	Y (a, b, c)	p.131	
		Cb (d, e, f)		
		Cr (g, h, i)		
	Repetition			
4	Audio signal		p.132	
	Audio sampling frequency			
5	Audio output channel		p.132	
6	Internal sound	Bit width	p.133	
7		Output level mode	p.133	
8		Output level	L	p.134
			R	
9		Output frequency	L	p.134
			R	
10	SWEEP		p.135	

[1] Setting the HDMI output mode and video format

HDMI Mode :HDMI1.0(0-4) VideoFormat:RGB_24 (0-8)

Fig. 5.6.1 Setting the HDMI output mode and video format

Table 5.6.2 HDMI output mode and video format setting method

Setting item	Key	LCD display	Description
HDMI output mode (HDMI Mode)	0	OFF	Output OFF
	1	DVI	DVI mode * InfoFrame and Packet are not sent.
	2	HDMI1.0	HDMI 1.0 mode ACP, ISRC1 Packet and ISRC2 Packet are not sent.
	3	HDMI1.1	HDMI1.1 or subsequent mode
	4	AUTO	The EDID is checked, and the signals are output in the format which matches the format used by the receiver.
Video format (VideoFormat)	0	RGB_24	Output with RGB 24 bits (8 bits for each signal).
	1	RGB_30	Output with RGB 24 bits (10 bits for each signal).
	2	RGB_36	Output with RGB 24 bits (12 bits for each signal).
	3	Y444_24	Output with YCbCr 4:2:2 24 bits (8 bits for each signal).
	4	Y444_30	Output with YCbCr 4:2:2 30 bits (10 bits for each signal).
	5	Y444_36	Output with YCbCr 4:2:2 36 bits (12 bits for each signal).
	6	Y422_16	Output with YCbCr 4:2:2 16 bits (8 bits for each signal).
	7	Y422_20	Output with YCbCr 4:2:2 20 bits (10 bits for each signal).
	8	Y422_24	Output with YCbCr 4:2:2 24 bits (12 bits for each signal).



- 1) The setting range for Hblanking (horizontal timing) differs depending on the HDMI output mode setting. For details, refer to [3] in "5.1.12 DVI and HDMI output timing restrictions.")
- 2) Analog outputs and DVI outputs cannot be output in the color difference format when "HDMI" has been selected as the priority output port setting in "[11] Setting the DVI output mode and priority output port" in the output condition data section. Even when YCbCr has been selected as the video format setting, the signals will be forcibly output in the RGB format.
- 3) The "YPbPr" key supports analog outputs and DVI outputs only. It does not support the video format of HDMI.
- 4) When "HDMI 1.1" is selected as the HDMI output mode setting, only SPD InfoFrame or MPEG InfoFrame, whichever has been selected in "[27] Setting the InfoFrame type" of config edit **FUNC5**, is sent.
- 5) Even when "HDMI 1.0" or "HDMI 1.1" is selected as the HDMI output mode setting, the InfoFrame and Packet data will not be sent if "OFF" has been selected as their ON/OFF setting. (Refer to "[1] Setting InfoFrame (AVI, SPD, AUDIO, MPEG) ON/OFF in "5.7 Setting InfoFrame" and "[1] Setting the Packets (ACP, ISRC1, ISRC2) ON/OFF" in "5.8 Setting the ACP and ISRC Packets.")
- 3) The drawing pattern and setting timing restrictions differ depending on the video format setting and bit mode setting. Refer to "[32] Setting the HDMI output bit mode (Optional function)" under config edit **FUNC5** and "Chapter 8 MII TL-RIT MODE

[4] Setting the audio signals and sampling frequency

AudioSrc	:OFF	(0-4)
AudioSamp	:48kHz	(0-6)

Fig. 5.6.4 Setting the audio signals and sampling frequency

Table 5.6.5 Audio signal and sampling frequency setting method

Setting item	Key	LCD display	Description
Audio signal (AudioSrc)	0	OFF	This sets the audio output of HDMI to OFF.
	1	TOSLINK	TOSLINK digital input
	2	COAX	COAX digital input
	3	ANALOG	Analog input
	4	INTERNAL	Internal sound
Sampling frequency (AudioSamp)	0	32kHz	32kHz
	1	44.1kHz	44.1kHz
	2	48kHz	48kHz
	3	88.2kHz	88.2kHz
	4	96kHz	96kHz
	5	176.4kHz	176.4kHz
	6	192kHz	192kHz

* Since the audio data is sent during the horizontal blanking period, restrictions apply to the audio sampling frequency depending on Hblanking and the number of audio channels. For details, refer to [4] in "5.1.12 DVI and HDMI output timing restrictions."

[5] Setting the audio output channels

These settings select the channels from which the audio data for two channels serving as the source are to be output when "ANALOG" or "INTERNAL" has been selected as the "Audio signal" setting. A multiple number of pairs of channels--1+2ch, 3+4ch, 5+6ch and 7+8ch--can be selected.

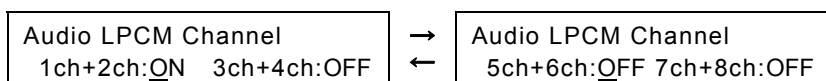


Fig. 5.6.5 Setting the audio output channels

Table 5.6.6 Audio output channel setting method

Setting item	Key	LCD display	Description
Audio output channels (Audio LPCM Channel) 1ch+2ch, 3ch+4ch, 5ch+6ch, 7ch+8ch	0	OFF	The audio output is set to OFF.
	1	ON	The audio output is set to ON.

* This setting takes effect only when "ANALOG" or "INTERNAL" has been selected as the "Audio signal" setting.

* Since the audio data is sent during the horizontal blanking period, restrictions apply to the audio sampling frequency depending on Hblanking and the number of audio channels. For details, refer to [4] in "5.1.12 DVI and HDMI output timing restrictions."

[6] Setting the internal audio bit width

InternalAudio Width :16bit (0-2)

Fig. 5.6.6 Setting the internal audio bit width**Table 5.6.7 Internal audio bit width setting method**

Setting item	Key	LCD display	Description
Bit width (InternalAudio Width)	0	16bit	16bit
	1	20bit	20bit
	2	24bit	24bit

* This setting takes effect only when "INTERNAL" has been selected as the "Audio signal" setting. In all other cases, the audio bit width is the same as the data input for TOSLINK or COAX. The width is 24 bits with ANALOG.

[7] Setting the internal audio output level mode

This setting selects the unit in which to specify the level in "[8] Setting the internal audio output level."

InternalAudio Level Input Mode : dB (0/1)
--

Fig. 5.6.7 Setting the internal audio output level mode**Table 5.6.8 Internal audio output level mode setting method**

Setting item	Key	LCD display	Description
Output level mode (InternalAudio Level Input Mode)	0	dB	dB mode: dB is selected as the unit to specify the "Output level."
	1	Bit	Bit mode: The bit is selected as the unit to specify the "Output level."

[8] Setting the internal audio output level

InternalAudio Level16bit
L: CCD h R: CCD h

Fig. 5.6.8 Setting the internal audio output level

Table 5.6.9 Internal audio output level setting method

Setting item	Key	LCD display	Description
Output level (InternalAudio Level) L, R	Number keys (+ [SHIFT] key)	XXXX h XXXXX h XXXXXXh -XXX.XXdB	The setting range differs depending on the setting for "Audio bit width." Setting range in the bit mode: Bit width 16bit ····· 0 to 7FFF 20bit ····· 0 to 7FFFF 24bit ····· 0 to 7FFFFF Setting range in the dB mode: Bit width 16bit ····· -90.31 to 0 [dB] 20bit ····· -114.40 to 0 [dB] 24bit ····· -138.48 to 0 [dB]

* Since the "Output level" data is stored as bit data, it may differ from what is displayed at the time of input when the mode is switched (between dB and bit) in the dB mode.

[9] Setting the internal audio output frequency

InternalAudio Freq.
L: 100 R: 100 (Hz)

Fig. 5.6.9 Setting the internal audio output frequency

Table 5.6.10 Internal audio output frequency setting method

Setting item	Key	LCD display	Description
Output frequency (InternalAudio Freq.) L, R	Number keys	XXXXX	The setting range differs depending on the setting for "Sampling frequency." Setting range when the sampling frequency is 32, 44.1 or 48 kHz: 20 and up (sampling frequency/2) [Hz] (in 20 Hz increments) Setting range when the sampling frequency is 88.2, 96, 176.4 or 192 kHz: 50 and up (sampling frequency/2) [Hz] (in 50 Hz increments)

* If the output frequency is not set in the units prescribed by the sampling frequency, it will be rounded down and output.

For instance, even if "50 Hz" (in 20 Hz increments [NG]) is set as the output frequency when the sampling frequency is 48 kHz, what is actually output will be "40 Hz" (in 20 Hz increments [OK]).

[10] Setting the internal audio sweep

InternalAudio Sweep :OFF (0/1)

Fig. 5.6.10 Setting the internal audio sweep**Table 5.6.11 Internal audio sweep setting method**

Setting item	Key	LCD display	Description
SWEEP (InternalAudio Sweep)	0	OFF	SWEEP OFF
	1	FREQ	Frequency sweep

5.7 Setting InfoFrame

This section provides details of the settings for the InfoFrame data items.

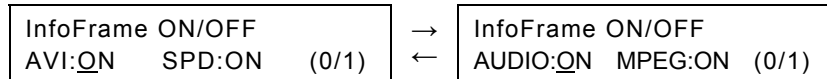
* For details on InfoFrame, refer to “High-Definition Multimedia Interface Specification.”

Table 5.7.1 Reference pages for setting details

No.	Setting item		Reference page	No.	Setting item		Reference page
1	AVI InfoFrame	ON/OFF	p.137	12	SPD InfoFrame	Type	p.142
	SPD InfoFrame				Version		
	Audio InfoFrame				Vendor Name	p.142	
	MPEG InfoFrame				Product	p.143	
2	AVI InfoFrame	Type	p.137	15	SPD InfoFrame	Source Device	p.143
		Version					
3	AVI InfoFrame	Scan Information	p.138	16	Audio InfoFrame	Type	p.144
4		Bar Information				17	Audio InfoFrame
4		Active Format Information	p.138	18	Audio InfoFrame		
		★ RGB or YCbCr				18	Audio InfoFrame
5		★ Active Aspect Ratio	p.139	19	Audio InfoFrame		
		★ Picture Aspect Ratio				19	Audio InfoFrame
6		Scaling	p.139	20	Audio InfoFrame		
		Colorimetry				20	Audio InfoFrame
7		Video Code	p.140	21	MPEG InfoFrame		
		★ Repetition				22	MPEG InfoFrame
8		★ Top Bar	p.140	23	MPEG InfoFrame		
	★ Bottom Bar		23			MPEG InfoFrame	Frame
9	★ Left Bar	p.140					
	★ Right Bar						
10	RGB Quantization Range	p.141					
	Extended Colorimetry						
11	IT Content	p.141					



- When “HDMI 1.1” is selected as the HDMI output mode setting for the HDMI output data, only SPD InfoFrame or MPEG InfoFrame, whichever has been selected in “[27] Setting the InfoFrame type” of config edit FUNC5, is sent.
- Items marked with a blue asterisk in the above table may be changed into values differing from the settings input using the automatic reflection function if “SELECTED” has been set for “[22] Setting the HDMI automatic reflection” of config edit FUNC5.
- Only the data values inside InfoFrame are subject to as the InfoFrame settings, and these settings have no effect on all the other outputs.

[1] Setting InfoFrame (AVI, SPD, AUDIO, MPEG) ON/OFF**Fig. 5.7.1 Setting InfoFrame ON/OFF****Table 5.7.2 InfoFrame ON/OFF setting method**

Setting item	Key	LCD display	Description
InfoFrame ON/OFF AVI, SPD, AUDIO, MPEG	0	OFF	The InfoFrame data concerned is not sent.
	1	ON	The InfoFrame data concerned is sent.

[2] Setting the type and version of AVI InfoFrame

AVI InfoFrame Type:2 Ver:2 (1/2)

Fig. 5.7.2 Setting the type and version of AVI InfoFrame**Table 5.7.3 AVI InfoFrame type and version setting method**

Setting item	Key/LCD display	Description
Version (Ver)	1	Version 1
	2	Version 2

* The "Type" setting is merely displayed: it cannot be changed.

[3] Setting the scan information and bar information of AVI InfoFrame

ScanInfo:No Data (0-2)
BarInfo :not valied (0-3)

Fig. 5.7.3 Setting the scan information and bar information of AVI InfoFrame

Table 5.7.4 AVI InfoFrame scan information and bar information setting method

Setting item	Key	LCD display	Description
Scan Information (ScanInfo)	0	No Data	No Data
	1	Over	overscan
	2	Under	underscan
Bar Information (BarInfo)	0	not valied	No setting
	1	Vert	Vertical
	2	Horiz	Horizontal
	3	Vert&Horiz	Vertical & horizontal

[4] Setting the active format information and RGB or YCbCr of AVI InfoFrame

ActFmtInfo :No Data (0/1)
RGBorYCbCr:RGB (0-2)

Fig. 5.7.4 Setting the active format information and RGB or YCbCr of AVI InfoFrame

Table 5.7.5 AVI InfoFrame active format information and RGB or YCbCr setting method

Setting item	Key	LCD display	Description
Active Format Information (ActFmtInfo)	0	No Data	Invalid
	1	valid	Valid
RGB or YCbCr	0	RGB	RGB
	1	YC422	YCbCr 4:4:4
	2	YC444	YCbCr 4:2:2

[5] Setting the active aspect ratio and picture aspect ratio of AVI InfoFrame

ActAspct:Picture	(0-9)
PicAspct:No Data	(0-2)

Fig. 5.7.5 Setting the active aspect ratio and picture aspect ratio of AVI InfoFrame**Table 5.7.6 [5] AVI InfoFrame active aspect ratio and picture aspect ratio setting method**

Setting item	Key	LCD display	Description
Active Aspect Ratio (ActAspct)	0	Picture	The active aspect ratio is set to be the same as the picture aspect ratio.
	1	4:3	4:3 from center
	2	16:9	16:9 from center
	3	14:9	14:9 from center
	4	box 16:9	16:9 from top
	5	box 14:9	14:9 from top
	6	box>16:9	Less than 16:9 from center
	7	4:3 (14:9)	4:3 from center (but 14:9 for inside picture)
	8	16:9 (14:9)	16:9 from center (but 14:9 for inside picture)
9	16:9 (4:3)	16:9 from center (but 4:3 for inside picture)	
Picture Aspect Ratio (PicAspct)	0	No Data	No setting
	1	4:3	4 : 3
	2	16:9	16 : 9

[6] Setting the scaling and colorimetry of AVI InfoFrame

Scaling:uknown	(0-3)
Colorimetry:No Data	(0-3)

Fig. 5.7.6 Setting the scaling and colorimetry of AVI InfoFrame**Table 5.7.7 AVI InfoFrame scaling and colorimetry setting method**

Setting item	Key	LCD display	Description
Scaling	0	unknown	No setting
	1	Horiz	Horizontal
	2	Vert	Vertical
	3	Horiz&Vert	Vertical & horizontal
Colorimetry	0	No Data	No setting
	1	SMPTE	SMPTE170M ITU601
	2	ITU709	ITU709
	3	Extend	Extend Colorimetry Information Valid

[7] Setting the video code and repetition of AVI InfoFrame

VideoCode : <u>1</u>	(0-59)
Repetition : 1	(1-10)

Fig. 5.7.7 Setting the video code and repetition of AVI InfoFrame

Table 5.7.8 AVI InfoFrame video code and repetition setting method

Setting item	Key	LCD display	Description
Video Code	Number keys	XX	Setting range: 0 to 59
Repetition	Number keys	XX	Setting range: 1 to 10

[8] Setting the top and bottom bars of AVI InfoFrame

TopBar : 0(0-65535)
BottomBar: 0(0-65535)

Fig. 5.7.8 Setting the top bar and bottom bar of AVI InfoFrame

Table 5.7.9 AVI InfoFrame top bar and bottom bar setting method

Setting item	Key	LCD display	Description
Top Bar	Number keys	XXXXX	Setting range: 0 to 65535
Bottom Bar	Number keys	XXXXX	Setting range: 0 to 65535

[9] Setting the left and right bars of AVI InfoFrame

LeftBar : 0(0-65535)
RightBar : 0(0-65535)

Fig. 5.7.9 Setting the left and right bars of AVI InfoFrame

Table 5.7.10 AVI InfoFrame left and right bar setting method

Setting item	Key	LCD display	Description
Left Bar	Number keys	XXXXX	Setting range: 0 to 65535
Right Bar	Number keys	XXXXX	Setting range: 0 to 65535

[10] Setting the RGB quantization range and extended colorimetry of AVI InfoFrame

Quant	:Default	(0-2)
ExtColor	:xvYCC601	(0/2)

Fig. 5.7.10 Setting the RGB quantization range and extended colorimetry of AVI InfoFrame**Table 5.7.11 AVI InfoFrame RGB quantization range and extended colorimetry setting method**

Setting item	Key	LCD display	Description
RGB Quantization Range	0	Default	Default
	1	Limited	Limited
	2	Full	Full
Extended Colorimetry	0	xvYCC601	xvYCC601
	1	xvYCC709	xvYCC709

[11] Setting the IT content of AVI InfoFrame

IT Content	:No Data(0/1)
------------	---------------

Fig. 5.7.11 Setting the IT content of AVI InfoFrame**Table 5.7.12 AVI InfoFrame IT content setting method**

Setting item	Key	LCD display	Description
IT Content	0	No Data	No Data
	1	IT Cont	IT Cont

[12] Setting the type and version of SPD InfoFrame

```
SPD InfoFrame
Type:3   Ver:1 (1)
```

Fig. 5.7.12 Setting the type and version of SPD InfoFrame

* The “Type” and “Version” settings are merely displayed: they cannot be changed.

[13] Setting the vendor name of SPD InfoFrame

```
VendorName      end
      :[VENDOR  ]
```

Fig. 5.7.13 Setting the vendor name of SPD InfoFrame

Table 5.7.13 SPD InfoFrame vendor name setting method

Setting item	Key	LCD display	Description
Vendor Name	Input using number keys (+ [SHIFT] key) or display ^{*1}	XXXXXX...	Max. 8 characters

*1: There are two ways to input the characters: input the character codes “20H to DFH” directly or select the characters from the display (refer to “2.4 How to input characters from the display”). However, characters cannot be input from the display if they have been edited using direct display **FUNCO**.

* When inputting the Vendor Name, move the cursor inside []; when exiting from the setting menu, move it to “end” at the top right.

[14] Setting the product of SPD InfoFrame

Product	end
: [PRODUCT]

Fig. 5.7.14 Setting the product of SPD InfoFrame**Table 5.7.14 SPD InfoFrame product setting method**

Setting item	Key	LCD display	Description
Product	Input using number keys (+ [SHIFT] key) or display ^{*1}	XXXXXX...	Max. 16 characters

*1: There are two ways to input the characters: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, characters cannot be input from the display if they have been edited using direct display **FUNC0**.

* When inputting the Product, move the cursor inside []; when exiting from the setting menu, move it to "end" at the top right.

[15] Setting the source device of SPD InfoFrame

SrcDevice: unknown (0-B)

Fig. 5.7.15 Setting the source device of SPD InfoFrame**Table 5.7.15 SPD InfoFrame source device setting method**

Setting item	Key	LCD display	Description
Source Device (SrcDevice)	0	unknown	No setting
	1	DigiSTB	DigiSTB
	2	DVD	DVD
	3	DVHS	DVHS
	4	HDD	HDD
	5	DVC	DVC
	6	DSC	DSC
	7	CD	CD
	8	Game	Game
	9	PC	PC
	A	Blu-Ray	Blu-Ray Disc (BD)
	B	SuperAuCD	Super Audio CD

[16] Setting the type and version of Audio InfoFrame

```
AUDIO InfoFrame
Type:4   Ver:1 (1)
```

Fig. 5.7.16 Setting the type and version of Audio InfoFrame

* The "Type" and "Version" settings are merely displayed: they cannot be changed.

[17] Setting the channel count and coding type of Audio InfoFrame

```
ChannelCnt :Refer   (1-8)
CodingType :Refer   (0-E)
```

Fig. 5.7.17 Setting the channel count and coding type of Audio InfoFrame

Table 5.7.16 Audio InfoFrame channel count and coding type setting method

Setting item	Key	LCD display	Description
Channel Count (ChannelCnt)	1	Refer	The setting for the audio data header is used.
	2	2ch	2ch
	3	3ch	3ch
	4	4ch	4ch
	5	5ch	5ch
	6	6ch	6ch
	7	7ch	7ch
	8	8ch	8ch
Coding Type	0	Refer	The setting for the audio data header is used.
	1	IEC60958	IEC60958
	2	AC3	AC3
	3	MPEG1	MPEG1
	4	MP3	MP3
	5	MPEG2	MPEG2
	6	AAC	AAC
	7	DTS	DTS
	8	ATRAC	ATRAC
	9	OneBitAu	One Bit Audio
	A	Dolby+	Dolby Digital +
	B	DTS-HD	DTS-HD
	C	MLP	MLP
	D	DST	DST
E	WMA Pro	WMA Pro	

[18] Setting the sample size and sample frequency of Audio InfoFrame

SampSize :Refer	(0-3)
SampFreq :Refer	(0-7)

Fig. 5.7.18 Setting the sample size and sample frequency of Audio InfoFrame**Table 5.7.17 Audio InfoFrame sample size and sample frequency setting method**

Setting item	Key	LCD display	Description
Sample Size (SampSize)	0	Refer	The setting for the audio data header is used.
	1	16bit	16bit
	2	20bit	20bit
	3	24bit	24bit
Sample Frequency (SampFreq)	0	Refer	The setting for the audio data header is used.
	1	32kHz	32kHz
	2	44.1kHz	44.1kHz
	3	48kHz	48kHz
	4	88.2kHz	88.2kHz
	5	96kHz	96kHz
	6	176.4kHz	176.4kHz
	7	192kHz	192kHz

[19] Setting the channel allocation and level shift value of Audio InfoFrame

ChannelAlloc: 0	(0-31)
LevelShift : 0dB	(0-15)

Fig. 5.7.19 Setting the channel allocation and level shift value of Audio InfoFrame**Table 5.7.18 Audio InfoFrame channel allocation and level shift value setting method**

Setting item	Key	LCD display	Description
Channel Allocation (ChannelAlloc)	Number keys	XX	Setting range: 0 to 31
Level Shift Value (LevelShift)	Number keys	XXdB	Setting range: 0 to 15

[20] Setting downmix inhibit of Audio InfoFrame

Down-mix:Permitted(0/1)

Fig. 5.7.20 Setting downmix inhibit of Audio InfoFrame**Table 5.7.19 Audio InfoFrame downmix inhibit setting method**

Setting item	Key	LCD display	Description
Downmix Inhibit (Down-mix)	0	Permitted	Downmix is permitted.
	1	Prohibited	Downmix is prohibited.

[21] Setting the type and version of MPEG InfoFrame

MPEG InfoFrame
Type:5 Ver:1 (1)

Fig. 5.7.21 Setting the type and version of MPEG InfoFrame

* The "Type" and "Version" settings are merely displayed: they cannot be changed.

[22] Setting the bit rate of MPEG InfoFrame

BitRate: 0M000K000Hz
(0-4294M967K295Hz)

Fig. 5.7.22 Setting the bit rate of MPEG InfoFrame

Table 5.7.20 MPEG InfoFrame bit rate setting method

Setting item	Key	LCD display	Description
Bit Rate	Number keys	XXXXM XXXX XXXHz	Setting range: 0 to 4294967295 * Each bit rate can be set in increments of 1000.

[23] Setting the frame and field repeat of MPEG InfoFrame

Frame :unknown (0-3)
FldRepeat:New (0/1)

Fig. 5.7.23 Setting the frame and field repeat of MPEG InfoFrame

Table 5.7.21 MPEG InfoFrame frame and field repeat setting method

Setting item	Key	LCD display	Description
Frame	0	unknown	No setting
	1	I PIC	I PIC
	2	B PIC	B PIC
	3	P PIC	P PIC
Field Repeat (FldRepeat)	0	New	A new field is set.
	1	Repeated	An existing field is set repeatedly.

5.8 Setting the ACP and ISRC Packets

This section provides details of the settings for the ACP and ISRC Packet items.

* For details on the ACP Packet and ISRC Packets: refer to:
 DVD standard [DVD Forum, "DVD Specifications for Read-Only Disc", "Part 4:AUDIO SPECIFICATIONS", Ver 1, March 1999.]
 [DVD Forum, "DVD Specifications for Read-Only Disc", "Part 4:AUDIO SPECIFICATIONS", Version-up Information (from 1.1 to 1.2), May 2000.]
 HDMI standard ["High-Definition Multimedia Interface Specification"]

Table 5.8.1 Reference pages for setting details

No.	Setting item		Reference page	No.	Setting item		Reference page
1	ACP Packet	ON/OFF	p.148	9	ISRC1 Packet	ISRC Continued	p.151
	ISRC1 Packet					ISRC Valid	
	ISRC2 Packet					ISRC Status	p.151
2	ACP Packet	ACP Type	p.148	11		Validity Information	p.152
3		★DVD-Audio Type	p.149	12		Catalogue Code	p.152
		★Copy Permission		13		Country Code	p.152
4		★Copy Number	p.149	14		First Owner Code	p.153
5		★Quality		15		Year of recording Code	p.153
		★Transaction	p.150				Recording (item) Code
6		Count_A	p.150	16			
		Count_S					
		Count_U					
7		Q_A	p.150				
		Q_S					
		Q_U					
8		Move_A	p.151				
		Move_S					
		Move_U					

CAUTION

- Items marked with a blue asterisk in the above table may be changed into values differing from the settings input using the automatic reflection function if "SELECTED" has been set for "[22] Setting the HDMI automatic reflection" of config edit **FUNC5**.
- For the ISRC2 Packet, all 0's are sent with the exception of the Packet Header.
- Only the data values inside the packets are subject to the ACP and ISRC Packet settings, and these settings have no effect on all the other outputs.

[1] Setting the Packets (ACP, ISRC1, ISRC2) ON/OFF

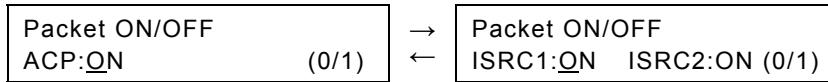


Fig. 5.8.1 Setting the Packets (ACP, ISRC1, ISRC2) ON/OFF

Table 5.8.2 Packets (ACP, ISRC1, ISRC2) ON/OFF setting method

Setting item	Key	LCD display	Description
Packet ON/OFF ACP, ISRC1, ISRC2	0	OFF	The packets concerned are not sent.
	1	ON	The packets concerned are sent.

[2] Setting the ACP type of ACP Packets

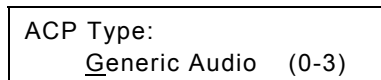


Fig. 5.8.2 Setting the ACP type of ACP Packets

Table 5.8.3 ACP Packet ACP type setting method

Setting item	Key	LCD display	Description
ACP Type	0	Generic Audio	Generic Audio
	1	IEC60958 Audio	IEC60958 Audio
	2	DVD Audio	DVD-Audio
	3	Super Audio CD	Super Audio CD

CAUTION

The setting items of the ACP Packets which are valid differ depending on the ACP type. (See table below)

		ACP Packet setting item	
		DVD-Audio Type Dependent Generation, Copy Permission, Copy Number, Quality, Transaction	Count_A, Count_S, Count_U, Q_A, Q_S, Q_U, Move_A, Move_S, Move_U
ACP Type	Generic Audio	<input type="radio"/>	
	IEC60958 Audio	<input type="radio"/>	
	DVD-Audio	<input type="radio"/>	
	Super Audio CD		<input type="radio"/>

○: Valid

[3] Setting the DVD audio type dependent generation and copy permission of ACP packets

DVD Audio Type :0 (0/1)
Copy Permission :0 (0-3)

Fig. 5.8.3 Setting the DVD audio type dependent generation and copy permission of ACP packets

Table 5.8.4 ACP packet DVD audio type dependent generation and copy permission setting method

Setting item	Key/LCD display	Description
DVD-Audio Type Dependent Generation (DVD Audio Type)	0	This sets '0.' * "0" must be set unless "DVD Audio" has been selected as the ACP type setting.
	1	This sets '1.' * "1" must be set when "DVD Audio" has been selected as the ACP type setting.
Copy Permission	0	Copy Freely (no copy restrictions)
	1	Reserve
	2	The copy restrictions are governed by the "Copy Number" setting.
	3	Copy prohibited

[4] Setting the copy number and quality of ACP Packets

Copy Number :0 (0-7)
Quality :0 (0-3)

Fig. 5.8.4 Setting the copy number and quality of ACP Packets

Table 5.8.5 ACP Packet copy number and quality setting method

Setting item	Key/LCD display	Description		
Copy Number	0	1 time	Copy is allowed up to the designated number of times.	
	1	2 times		
	2	4 times		
	3	6 times		
	4	8 times		
	5	10 times		
	6	3 times		
	7	The number of copy times is not restricted. (Copy One generation)		
Quality		Number of channels	Sampling frequency	Bit width
	0	2 channels or less	48 kHz or lower	16bit
	1	2 channels or less	No restrictions	No restrictions
	2	No restrictions	No restrictions	No restrictions
	3	No restrictions	48 kHz or lower	16bit

[5] Setting the transaction of ACP Packets

Transaction: 0 (0/1)

Fig. 5.8.5 Setting the transaction of ACP Packets

Table 5.8.6 ACP Packet transaction setting method

Setting item	Key/LCD display	Description
Transaction	0	Not present
	1	Reserve

[6] Setting Count_A, Count_S and Count_U of ACP Packets

Count_A: 0 Count_S: 0
Count_U: 0 (0-255)

Fig. 5.8.6 Setting Count_A, Count_S and Count_U of ACP Packets

Table 5.8.7 ACP Packet Count_A, Count_S and Count_U setting method

Setting item	Key	LCD display	Description
Count_A			This sets the maximum number of times the tracks can be digitally copied by an Approved Secure Recorder at the quality level defined by "Q_A."
Count_S			This sets the maximum number of times the tracks can be digitally copied by a Secure Recorder at the quality level defined by "Q_S."
Count_U			This sets the maximum number of times the tracks can be digitally copied by an Unlisted Recorder at the quality level defined by "Q_U."
Common	Number keys	XXX	Setting range: 0 to 255 0 : Prohibited 1 to 254 : Permitted up to the designated number of times 255 : No restrictions

[7] Setting Q_A, Q_S and Q_U of ACP Packets

Q_A:0 Q_S:0 Q_U:0 (0/1)

Fig. 5.8.7 Setting Q_A, Q_S and Q_U of ACP Packets

Table 5.8.8 ACP Packet Q_A, Q_S and Q_U setting method

Setting item	Key/LCD display	Description
Q_A, Q_S, Q_U	0	This permits digital copying at the CD quality level.
	1	This permits digital copying at the DSD quality level.

[8] Setting Move_A, Move_S and Move_U of ACP Packets

Move_A:0	Move_S:0
Move_U:0	(0/1)

Fig. 5.8.8 Setting Move_A, Move_S and Move_U of ACP Packets**Table 5.8.9 ACP Packet Move_A, Move_S and Move_U setting method**

Setting item	Key/LCD display	Description	
Move_A	0	Movement is prohibited.	What has been copied under the definition of Count_A is targeted.
	1	Movement is permitted.	
Move_S	0	Movement is prohibited.	What has been copied under the definition of Count_S is targeted.
	1	Movement is permitted.	
Move_U	0	Movement is prohibited.	What has been copied under the definition of Count_U is targeted.
	1	Movement is permitted.	

[9] Setting ISRC Continued and ISRC Valid of ISRC1 Packet

ISRC1 Cont :0	(0/1)
ISRC1 Valid :0	(0/1)

Fig. 5.8.9 Setting ISRC Continued and ISRC Valid of ISRC1 Packet**Table 5.8.10 ISRC1 Packet ISRC Continued and ISRC Valid setting method**

Setting item	Key/LCD display	Description
ISRC Continued (ISRC1 Cont)	0	The ISRC2 Packet does not exist.
	1	The ISRC2 Packet exists.
ISRC Valid	0	The ISRC2 Packet is invalid.
	1	The ISRC2 Packet is valid.

* Since the "ISRC Continued" setting will be reflected only in the data value inside the ISRC1 Packet if "OFF" has been set for "[22] Setting the HDMI automatic reflection" of config edit **FUNC5** with HDMI 1.1, the ISRC2 Packet will be sent regardless of the setting.

[10] Setting the ISRC status of the ISRC1 Packet

ISRC1 Status: Starting	(0-2)
---------------------------	-------

Fig. 5.8.10 Setting the ISRC status of the ISRC1 Packet**Table 5.8.11 ISRC1 Packet ISRC status setting method**

Setting item	Key	LCD display	Description
ISRC Status	0	Starting	This indicates the starting position of the track.
	1	Intermediate	This indicates the intermediate position of the track.
	2	Ending	This indicates the ending position of the track.

[11] Setting the validity information of the ISRC1 Packet

ISRC1 Validity info.:
No Validity (0-3)

Fig. 5.8.11 Setting the validity information of the ISRC1 Packet

Table 5.8.12 ISRC1 Packet validity information setting method

Setting item	Key	LCD display	Description
Validity Information (ISRC1 Validity info.)	0	No Validity	Both UPC/EAN and ISRC are invalid.
	1	ISRC	UPC/EAN is invalid; ISRC is valid.
	2	UPC/EAN	UPC/EAN is valid; ISRC is invalid.
	3	UPC/EAN and ISRC	Both UPC/EAN and ISRC are valid.

[12] Setting the catalogue code (UPC/EAN#1-13) of the ISRC1 Packet

ISRC1 Catalogue code:
000000000000

Fig. 5.8.12 Setting the catalogue code of the ISRC1 Packet

Table 5.8.13 ISRC1 Packet catalogue code setting method

Setting item	Key	LCD display	Description
Catalogue Code #1 to 13	Number keys	XXXXXXXXXXXXX (#1 → #13 in sequence from the left)	This sets the catalogue code.

[13] Setting the country code (ISRC#1, 2) of the ISRC1 Packet

ISRC1 Country code
:[00] end

Fig. 5.8.13 Setting the country code of the ISRC1 Packet

Table 5.8.14 ISRC1 Packet country code setting method

Setting item	Key	LCD display	Description
Country Code #1,2	Input using number keys [+ [SHIFT] key) or from display *1	XX (#1 → #2 from the left)	This sets the country code (2 letters of the alphabet)

*1: There are two ways to input the characters: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, characters cannot be input from the display if they have been edited using direct display **FUNCO**.

* When inputting the Country Code, move the cursor inside []; when exiting from the setting menu, move it to "end" at the top right.

[14] Setting the first owner code (ISRC#3-5) of the ISRC1 Packet

```
ISRC1 First owner code
      :[000]          end
```

Fig. 5.8.14 Setting the first owner code of the ISRC1 Packet**Table 5.8.15 ISRC1 Packet first owner code setting method**

Setting item	Key	LCD display	Description
First Owner Code #3 to 5	Input using number keys [+ [SHIFT] key) or from display ^{*1}	XXX (#3 → #5 from the left)	This sets the first owner code (3 alphanumerics)

*1: There are two ways to input the characters: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, characters cannot be input from the display if they have been edited using direct display **FUNC0**.

* When inputting the First Owner Code, move the cursor inside []; when exiting from the setting menu, move it to "end" at the top right.

[15] Setting the year of recording code (ISRC#6, 7) of the ISRC1 Packet

```
ISRC1 Year of recording
      code: 00
```

Fig. 5.8.15 Setting the year of recording code of the ISRC1 Packet**Table 5.8.16 ISRC1 Packet year of recording code setting method**

Setting item	Key	LCD display	Description
Year of recording Code #6, 7	Number keys	XX (#6 → #7 from the left)	This sets the last two digits of the Western calendar year as the year of recording.

[16] Setting the recording (item) code (ISRC#8-12) of the ISRC1 Packet

```
ISRC1 Recording (item)
      code: 00000
```

Fig. 5.8.16 Setting the recording (item) code of the ISRC1 Packet**Table 5.8.17 ISRC1 Packet recording (item) code setting method**

Setting item	Key	LCD display	Description
Recording (item) Code #8 to 12	Number keys	XXXXX (#8 → #12 from the left)	This sets the recording code and recording item code.

5.9 Setting the closed caption and V-chip functions

5.9.1 Introduction

- The closed caption function meets the EIA-608 standard; the V-chip function meets the EIA-744 standard.
- The closed caption and V-chip functions work with the following signal systems.
[NTSC-M, NTSC-J, NTSC-443, PAL-60, PAL, PAL-M, PAL-N, PAL-Nc]
- Output supports VBS composite outputs and Y/C video outputs.

CAUTION

- The closed caption and V-chip functions cannot be executed at the same time as when the HDCP, pattern action, audio sweep, Teletext or Macrovision function is being used. For details, refer to “11.4.4 Concerning functions which cannot be executed simultaneously.”
- An error of $\pm 5\text{mV}$ occurs in the white level of the images when the closed caption or V-chip function is started up.

Either closed caption or V-chip can be output, or both functions can be output simultaneously. For details on the item settings, refer to the page concerned in the “reference page” column of the table below.

Table 5.9.1 Reference page for details on closed caption settings

No.	Setting item	Reference page
1	Output data	p.156
2	Loop	p.156
	Delay	
3	Internal caption data	p.157
	Output mode Style	
List of internal caption data		p.158,159

Table 5.9.2 Reference page for details on V-chip settings

No.	Setting item	Reference page
1	Rating systems	p.160
2	MPAA ratings	p.161
	U.S. TV ratings	
3	Extension bits FV, V, S, L and D for U.S. TV rating systems	p.163
4	Canadian English rating	p.164
	Canadian French rating	
5	Interval	p.165

● What is "closed caption"?

Closed caption is a video technology developed in the United States to enable individuals with impaired hearing to enjoy movies, news broadcasts and other TV programs.

The term "closed" is used since the captions are not displayed on the screen with regular play. In contrast, captions such as the English-language subtitles used for video presentations of foreign movies are burned into the images at the outset so they are referred to as "open captions."

Although closed captions (CC) were originally developed as a technology for the hearing impaired, it is currently being spotlighted as a listening practice aid for people involved in education and for those who are learning foreign languages.

The CC subtitle data is superimposed onto line 21 (field 1) and line 284 (field 2) of the NTSC output signals, and output. Subtitle data has two modes: caption and text. Also available as a service is the Extended Data Service (EDS) which transfers titles, ratings and other program information using line 248 (field 2). The V-chip described below uses the EDS function.

A total of 32 characters per line can be displayed by CC. The number of available lines totals 15, but the maximum number is limited to 4 lines in the caption modes (CC1 to CC4). Fifteen lines can be displayed in the text modes (TXT1 to TXT4).

● What is the "V-chip"?

The V-chip is a semiconductor chip which blocks TV programs containing violence and sexual content. The "V" stands for violence, and programs are blocked using the ratings based on the extent of the violence and sexual content involved. When a rating is set in a receiver (TV set) incorporating the V-chip functions, the rating information of the EDS is decoded, and a decision as to whether to output each program to the screen is automatically determined on the basis of the ratings set.

● Line 21 waveform

The figure below shows the line 21 (284) waveform. The color burst is followed by a sine wave called the Clock Run-In and then by the start bit. The start bit is always "001." Two bytes of data (Character 1 and Character 2) are sent in one line. Character 1 and Character 2 are decoded on the basis of the LSB, and the odd parity is normally added to the MSB (bit 8).

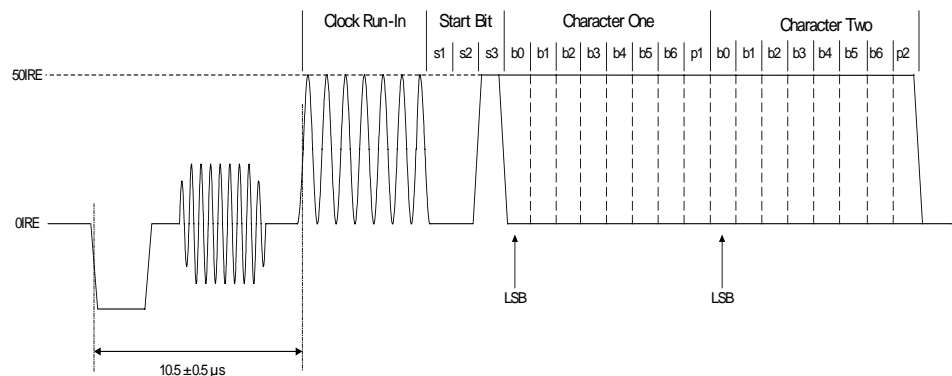


Fig. 5.9.1 Line 21 (284) waveform

5.9.2 Details of closed caption item settings

[1] Setting the output data

CaptionDataNo: 0
(0=Default 1-20=User)

Fig. 5.9.2 Setting the output data

Table 5.9.3 Output data setting method

Setting item	Key/LCD display	Description
Output data (CaptionDataNo)	0	This uses the internal caption data. (For details on the data, refer to "5.9.3 Internal caption data.")
	1-20	This uses the data (UserData) edited by SP-8848.

* UserData can be edited using the SP-8848 software program provided. The VG main unit does not have any editing functions.

[2] Setting loop and delay

CaptionLoop : 0sec(0-10)
CaptionDelay : 0sec(0-10)

Fig. 5.9.3 Loop and delay setting

Table 5.9.4 Loop and delay setting method

Setting item	Key	LCD display	Description
Loop	Number keys	XX sec	Setting range: 0-10 [s] The caption data is looped for the time set, and output.
Delay	Number keys	XX sec	Setting range: 0-10 [s] The caption data is output after the time set. The data is output only once.

CAUTION

- The data is not looped if "0" is set for Loop.
- Delay is set only when "0" has been set for Loop.

[3] Setting the internal caption data output mode and style

CaptionDefMode:OFF (0-8) DefStyle:PopOn (0-2)
--

Fig. 5.9.4 Setting the output mode and style**Table 5.9.5 Output mode setting method**

Setting item	Key	LCD display	Description
Output mode (CaptionDefMode)	0	OFF	This sets the closed caption function to OFF.
	1	CC1	This sets closed caption mode 1.
	2	CC2	This sets closed caption mode 2.
	3	CC3	This sets closed caption mode 3.
	4	CC4	This sets closed caption mode 4.
	5	TXT1	This sets text data mode 1.
	6	TXT2	This sets text data mode 2.
	7	TXT3	This sets text data mode 3.
8	TXT4	This sets text data mode 4.	

* Usually, the purpose of using the caption mode is to send text data relating to the content of TV programs. In the text mode, text data which is not related to the TV programs is sent.

Types of CC1 to CC4 and TXT1 to TXT4 services

CC1 : Primary Synchronous Caption Service (Caption service in primary language)
CC2 : Special Non-Synchronous Use Caption (Service which does not require synchronization with sound, etc.)
CC3 : Secondary Synchronous Caption Service (Caption service in secondary language)
CC4 : Special Non-Synchronous Use Caption (Service which does not require synchronization with sound, etc.)
TXT1 : First Text service (Text service)
TXT2 : Second Text service (Text service)
TXT3 : Third Text service (Text service)
TXT4 : Fourth Text service (Text service)

Table 5.9.6 Setting method for style in closed caption mode

Setting item	Key	LCD display	Description
Style (DefStyle)	0	PopOn	This sets the Pop
	1	RollUp	This sets the Roll
	2	PaintOn	This sets the Paint

Descriptions of closed caption styles

PopOn : The caption data is stored in the memory and displayed altogether at the point when all the data has been stored.

RollUp : The caption data is displayed character by character, and when the characters (max. 32) for one line are displayed, the line is rolled up by one step, and the caption data on the next line begins to be displayed.

PaintOn : The caption data is displayed character by character.



When a number from 1 to 20 has been selected for the output data in [1] Setting the output data, the contents of UserData take precedence, and the setting of this item is not reflected.

5.9.3 Internal caption data

■ CC1 to 4 (1/2)

Setting		Row, color, optional setting, etc.	Characters
CaptionDefMode	DefStyle		
CC1	Pop-on	ROW: 13 Background: Black, semi-transparent ext: White	Closed Caption Mode 1 Pop-On
	Roll-up	RU2 ROW: 2,3 ackground: Blue, non-transparent Text: Cyan (row 2), White (row 3)	Closed Caption Mode 1 Roll-up RU2
	Paint-on	ROW: 2,3,4 Background: Red, semi-transparent Text: Green	Closed Caption Mode 1 Paint-on ABCDEFGHIJKLMNOPQRSTUVWXYZ
CC2	Pop-on	ROW: 2 - Indent4 3 - Indent4, Tab Offset 2 Background: White, semi-transparent Text: Cyan, underlined	Closed Caption Mode 2 PopO 0123456789
	Roll-up	RU3 ROW: 13,14,15 - Indent4 Background: White, non-transparent Text: Green (row 13), white (rows 14, 15)	Closed Caption Mode 2 Roll-up RU3 !"#\$%&'()*ñ+
	Paint-on	ROW: 8 - Indent8, Tab Offset 3 9 - Indent4, Tab Offset 2 Background: Magenta, non-transparent Text: White, in italics	ClosedCaptionMode2 Paint-On abcdefg
CC3	Pop-on	ROW: 2,13 Background: Cyan, semi-transparent Text: Yellow, underlined, flashing	Closed Caption Mode 3 Pop-On ÀÉÓÚú'¡*.-©SM•□”
	Roll-up	RU4 ROW: 5 Background: Cyan, semi-transparent Text: Blue	Closed Caption Mode 3 Roll-up RU4 ĂăĬîîŌòŎôŦ \ ^ _ ~ ® ° … ¢ £ â éâéîôû
	Paint-on	ROW: 2 4 - Tab Offset 1 6 - Tab Offset 2 8 - Tab Offset 3 Background: White, non-transparent Text: Red	Closed Caption Mode 3 Paint-On ÀÂÇÈÉÊĚĭîŕŌŪùŪ«» ĂăĬîîŌòŎôŦ \ ^ _ ~ ĂăŎôŦŷ¶
CC4	Pop-on	ROW: 2 4 - Tab Offset 1 6 - Tab Offset 2 8 - Tab Offset 3 Background: Green, semi-transparent Text: White, flashing	Closed Caption Mode 4 Pop-On ÀÂÇÈÉÊĚĭîŕŌŪùŪ«» ĂăĬîîŌòŎôŦ \ ^ _ ~ ĂăŎôŦŷ¶
	Roll-up	RU3 ROW: 11,12,13 Background: Cyan, non-transparent Text: Green, in italics	Closed Caption Mode 4 Roll-up RU3 ĂăŎôŦŷ¶
	Paint-on	ROW: 5 - Indent4 6 - Indent4, Tab Offset 1 7 - Indent4, Tab Offset 2 8 - Indent4, Tab Offset 3 Background: Black, semi-transparent Text: White	Closed Caption Mode 4 Paint-On ABCDEFGHIJKLM nopqrstuvwxyz

■ TXT1 to 4 (2/2)

Setting		Row, color, optional setting, etc.	Characters
CaptionDefMode	DefStyle		
TXT1	-	Background: Black Text: White	Text Mode 1 Astrodesign, Inc. ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz !"#\$%&'()*+,-./ :;<=>?@[¥]^_` @ ° … ¢ £ â êäêîôû ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz
TXT2	-	Background: Black Text: White	Text Mode 2 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyzU
TXT3	-	Background: Black Text: White	Text Mode 3 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz
TXT4	-	Background: Black Text: White	Text Mode 4 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz

5.9.4 Details of V-chip item settings

[1] Setting the rating system

VChipSystem:OFF (0-4)

Fig. 5.9.5 Setting the rating system

Table 5.9.7 Rating system setting method

Setting item	Key	LCD display	Description
Rating system (VChipSystem)	0	OFF	This sets the V-chip to OFF.
	1	MPAA	This sets the rating system to MPAA.
	2	U.S.TV	This sets the rating system to U.S. TV.
	3	English	This sets the rating system to Canadian English.
	4	French	This sets the rating system to Canadian French.

Names and brief descriptions of rating systems

MPAA: Motion Picture Association of America

This organization was set up in order to promote the spread of American movies. Besides promoting exports overseas and cracking down on pirated movies, it is also active in many other fields. 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 general 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] Setting the MPAA and U.S. TV rating systems

VChipMPAA:G	(0-7)
VChipUSTV:TV-Y	(0-5)

Fig. 5.9.6 Setting the MPAA and U.S. TV ratings**Table 5.9.8 MPAA ratings setting method**

Setting item	Key	LCD display	Description
MPAA rating (VChipMPAA)	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.
	7	N/A	N/A (not applicable) is set.

Names and descriptions of the MPAA ratings

G: General Audience
For general audiences.

PG: Parental Guidance
Contains scenes unsuitable for 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
No restrictions

N/A: No restrictions (not supported under these ratings)


Table 5.9.9 U.S. TV ratings setting method

Setting item	Key	LCD display	Description
U.S. TV rating (VChipUSTV)	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.

Names and descriptions of U.S. TV ratings

- 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 although such programs are hardly ever broadcast.

[3] Setting the U.S. TV rating system extension bits.

ON or OFF can be selected for each of the extension bits--FV, V, S, L and D.
 The bits which can be set differ depending on the "U.S. TV ratings" setting.  Table 5.9.11

The cursor on the LCD display moves only to the bits which can be set. The cursor appears at "Non" for those bits which cannot be set.

VChipUSTVExtension (0/1)
 FV:- V:_ S:- L:- D:- Non

Fig. 5.9.7 Setting the U.S. TV rating extension bits

Table 5.9.10 U.S. TV rating extension bit setting method

Setting item	Key	LCD display	Description
Extension bits (VChipUSTVExtension) FV, V, S, L, D	0	-	The specified bit is set to OFF.
	1	*	The specified bit is set to ON.

Names and descriptions of U.S. TV rating extension bits

- 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

Table 5.9.11 U.S. TV ratings and extension bits which can be set

		Extension bit (●: can be set)				
		FV	V	S	L	D
U.S. TV rating	TV-Y					
	TV-Y7	●				
	TV-G					
	TV-PG		●	●	●	●
	TV-14		●	●	●	●
	TV-MA		●	●	●	

[4] Setting the Canadian English and Canadian French rating systems

VChipEnglish :E	(0-6)
VChipFrench :E	(0-5)

Fig. 5.9.8 Setting the Canadian English and French ratings

Table 5.9.12 Canadian English rating setting method

Setting item	Key	LCD display	Description
Canadian English rating (VChipEnglish)	0	E	"Exempt" is set as the Canadian English rating.
	1	C	"Children" is set as the Canadian English rating.
	2	C8+	"Children eight years and older" is set as the Canadian English rating.
	3	G	"General programming, suitable for all audiences" is set as the Canadian English rating.
	4	PG	"Parental guidance" is set as the Canadian English rating.
	5	14+	"Viewers 14 years and older" is set as the Canadian English rating.
	6	18+	"Adult programming" is set as the Canadian English rating.

Names and descriptions of Canadian English ratings

<p>E: Exempt No age restrictions apply.</p> <p>C: Children Programming may be viewed by all children.</p> <p>C8+: Children eight years and older Programming may be viewed by children aged 8 and above.</p> <p>G: General Programming, suitable for all audiences General programming</p>	<p>PG: Parental Guidance Permission of a parent required to view programming.</p> <p>14+: Viewers 14 years and older Programming may be viewed by children 14 years and older.</p> <p>18+: Adult Programming Programming for adults only.</p>
--	--

Table 5.9.13 Canadian French TV rating setting method

Setting item	Key	LCD display	Description
Canadian French rating (VChipFrench)	0	E	"Exempt" is set as the Canadian French rating.
	1	G	"General" is set as the Canadian French rating.
	2	8ans+	"Not recommended for young children" is set as the Canadian French rating.
	3	13ans+	"Programming may not be suitable for children under 13" is set as the Canadian French rating.
	4	16ans+	"Programming is not suitable for children under 16" is set as the Canadian French rating.
5	18ans+	"Programming restricted to adults" is set as the Canadian French rating.	

Names and descriptions of Canadian French ratings

<p>E: Exempt No age restrictions apply.</p> <p>G: General General programming.</p> <p>8ans+: Not recommended for young children Programming unsuitable for young children</p>	<p>13ans+: Programming may not be suitable for children under 13 Programming unsuitable for children aged 13 and under</p> <p>16ans+: Programming is not suitable for children under 16 Programming unsuitable for children aged 16 and under</p> <p>18ans+: Programming restricted to adults Programming for adults only.</p>
--	---

[5] Setting the interval

VChipInterval: <u>1</u> V (1-1023)

Fig. 5.9.9 Setting the interval**Table 5.9.14 Interval setting method**

Setting item	Key/LCD display	Description
Interval	Number keys	1-1023 (unit: V)

5.10 Setting Teletext

5.10.1 Introduction

- Teletext complies with the final draft of ETSI EN 300 706 Ver1.2.1.
- Teletext works with the **PAL (PAL-B, G, D, H or I)** TV signals.
- The Teletext output supports VBS composite outputs and Y/C video outputs.

CAUTION

- Teletext cannot be executed at the same time as when the HDCP, pattern action, audio sweep, closed caption/V-chip or Macrovision function is being used. For details, refer to “11.4.4 Concerning functions which cannot be executed simultaneously.”
- An error of $\pm 5\text{mV}$ occurs in the white level of the images when the Teletext function is started up.

For details on the item settings, refer to the page concerned in the “reference page” column of the table below.

Table 5.10.1 Reference page for details on Teletext settings

No.	Setting item	Reference page
1	Output	p.168
	Data transfer mode	
2	Page	p.168
List of internal Teletext data		p.169,170

● 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 period of the TV signals. Programs broadcast in Teletext include subtitled broadcasts, news broadcasts, weather forecasts and information on stocks and shares. Teletext has achieved a high penetration rate in various countries in Europe and Southeast Asia where the 625i 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 waveforms

The VBI and Teletext waveforms are shown below.

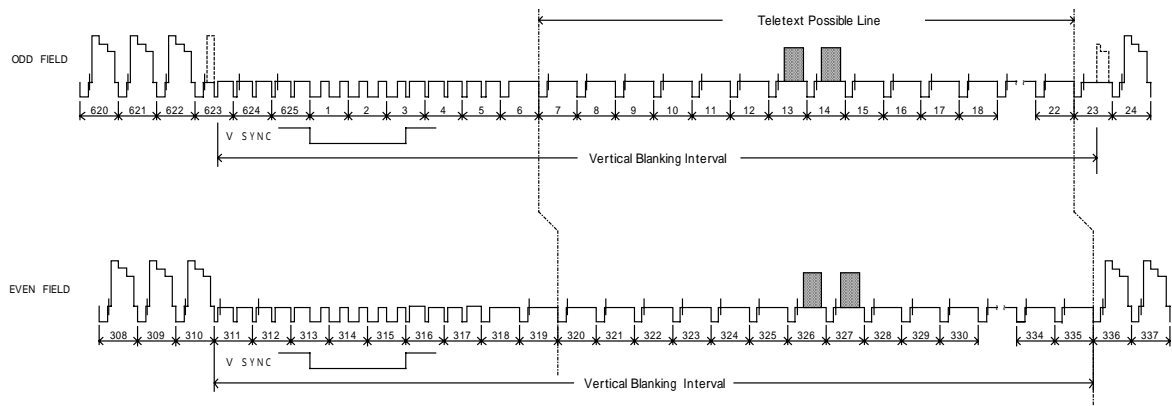


Fig. 5.10.1 VBI waveforms

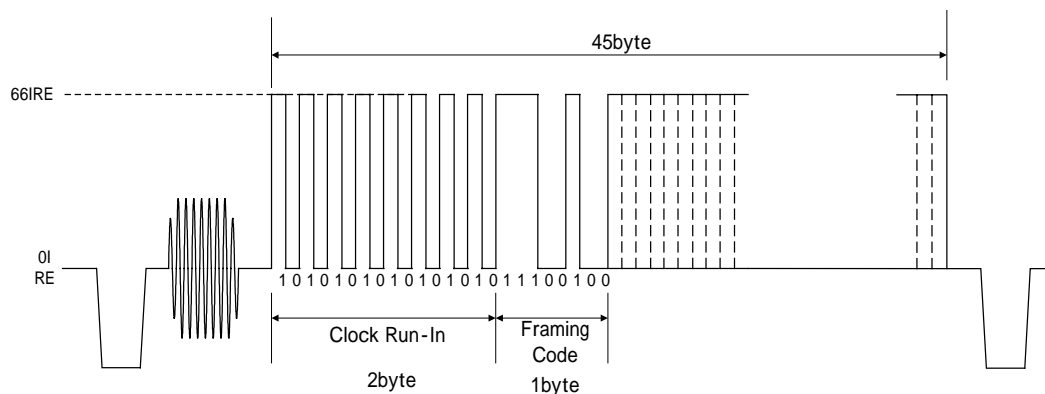


Fig. 5.10.2 Teletext waveforms

* The VG series supports the Teletext System B and has a data rate of 6.9375 MHz. In the 4-line mode, the data is always superimposed onto lines 20, 21, 333 and 334; in the 8-line mode, it is always superimposed on lines 13, 14, 20, 21, 326, 327, 333 and 334.

5.10.2 Details of item settings

[1] Setting the output ON/OFF and data transfer mode

TeleText:Disable	(0/1)
TeleTextLine:4	(0/1)

Fig. 5.10.3 Setting the output ON/OFF and data transfer mode

Table 5.10.2 Output ON/OFF and data transfer mode setting method

Setting item	Key	LCD display	Description
Output (TeleText)	0	Disable	Teletext is set to OFF.
	1	Enable	Teletext is set to ON.
Data transfer mode (TeleTextLine)	0	4	The mode for transferring Teletext data is set to 4 lines. Display lines: Field1 = 20, 21 Field2 = 333, 334
	1	8	The mode for transferring Teletext data is set to 8 lines. Display lines: Field1 = 13, 14, 20, 21 Field2 = 326, 327, 333, 334

[2] Setting the pages

The pages to be output are set here.

Details on the pages incorporated inside the VG-849C are shown in "5.10.3 Internal Teletext data." When numbers are set for pages with any other numbers, the default page on which only the page numbers are displayed will be output.

Up to 20 pages can be registered.

TeleTextPage (100-899)	→	4:10 <u>3</u> 5:200 6:201	→	...
1:10 <u>0</u> 2:101 3:102	←	7:202 8:203 9:204	←	

Fig. 5.10.4 Setting the pages to be output

Table 5.10.3 Output page setting method

Setting item	Key	LCD display	Setting range
Page (TeleTextPage)	Number keys	XXX	100 to 899

5.10.3 Internal Teletext data

■ (1/2)

Page	Contents	Screen	Page	Contents	Screen
100	Index Page		101	Test Page	
					Includes Flash and 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)	

■ (2/2)

Page	Contents	Screen	Page	Contents	Screen
206	Character (Czech /Slovak)		301	Colours	
302	White Flat		505	Clock Cracker	
515	Multi Page		555	Test Pattern1	
560	Test Pattern2		-	Other pages default page	

If page number 700 is selected

5.11 Setting Macrovision (❖ optional function)

5.11.1 Introduction

- There are two types of Macrovision signals, 1) and 2).
 - 1) AGC signals: These are used to add a multiple number of single-polarity pulses and dual-polarity pulses in pairs in and around the vertical blanking period.
 - 2) Color stripes: Method of pseudo-randomly phase-modulating the color burst.
- Macrovision works with the following TV signals:
 [**NTSC-M, NTSC-J, NTSC-443, PAL-60, PAL, PAL-M, PAL-N, PAL-Nc and SECAM.**]
 The color stripes are applied only in the DVD/STB mode for the NTSC-M and NTSC-J TV signals.
- Output supports VBS composite outputs and Y/C video outputs.

CAUTION

- Macrovision cannot be executed at the same time as when the HDCP, pattern action, audio sweep, closed caption/V-chip or Teletext function is being used. For details, refer to “11.4.4 Concerning functions which cannot be executed simultaneously.”
- An error of $\pm mV$ occurs in the white level of the video signals when the Macrovision function is started up.
- The effects of the Macrovision signals differ depending on the mode such as VHS or DVD/STB. Before use, check the terms and conditions of the contract with Macrovision Corp.

For details on the item settings, refer to the page concerned in the “reference page” column of the table below.

Table 5.11.1 Reference page for details on Macrovision settings

No.	Setting item	Reference page
1	Output mode	p.173

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*1: Reverse engineering:

This refers to the decompiling, disassembly or analysis of a software program or hardware in order to isolate its workings, specifications, objectives, constituent components, factor technology and other components. In regard to programs, is also refers to acts undertaken to acquire an understanding of the relationship between modules and to the analysis of the basic specifications of a system.

● What is "Macrovision"?

Macrovision is a copy protection system developed by Macrovision Corp.

This copy protection system is widely used by VHS, DVD-Video and other video sources on the market as well as by satellite broadcasting.

By causing the video deck's AGC (automatic gain control) circuit to malfunction, the system makes it impossible for output sources to be video-recorded properly. The AGC circuit is designed to adjust the gain of the input signals automatically in order to maintain the appropriate level of sensitivity, and today's consumer-use VTRs are almost invariably equipped with it.

It functions to brighten up dark pictures or darken excessively bright images and save them. Macrovision Corp.'s copy protection signals cause this AGC circuit to malfunction by mixing up signals with levels outside the ratings in the vertical blanking period while leaving the luminance and chrominance signal components of the video signals untouched. As a result, even if the signals are recorded, the screen brightness will vacillate, and these signals will also interfere with the sync signals and disrupt the picture.

These impediments make copied material unfit for viewing.

● What are "color stripes"?

As part of the Macrovision standard, color stripes are overlaid onto the regular Macrovision signals.

This method of superimposing modulated color burst signals onto video signals is also referred to as the color burst copy protection.

The color stripe function inserts thin horizontal lines into copied images so that, as with Macrovision, the images will be unfit for viewing.

5.11.2 Settings details

[1] Setting the output mode

Set the output ON or OFF and set the mode.
The mode that can be set differs by timing system.

Macrovision Mode :	
OFF	(0-5)

Fig. 5.11.1 Setting the output mode

Table 5.11.2 Output mode setting method

Setting item	Timing system	Key	Mode/LCD display
Output mode (Macrovision Mode)	NTSC-M	0	OFF
		1	DVD/STB Type 1 (AGC only)
		2	DVD/STB Type 2 (AGC + 2Line Colorstripe)
		3	DVD/STB Type 3 (AGC + 4Line Colorstripe)
		4	VHS USA
		5	VHS US obs.
	NTSC-J	0	OFF
		1	DVD/STB Type 1 (AGC only)
		2	DVD/STB Type 2 (AGC + 2Line Colorstripe)
		3	DVD/STB Type 3 (AGC + 4Line Colorstripe)
		4	VHS Japan 1
		5	VHS Japan 2
	NTSC-443	0	OFF
		1	DVD/STB
	PAL-60	0	OFF
		1	DVD/STB
	PAL-M	0	OFF
		1	DVD/STB
	PAL	0	OFF
		1	DVD/STB
		2	VHS
	PAL-N	0	OFF
		1	DVD/STB
		2	VHS
	PAL-Nc	0	OFF
		1	DVD/STB
		2	VHS
	SECAM	0	OFF
		1	DVD/STB
		2	VHS

6

PATTERN DATA CONFIGURATION AND SETTING PROCEDURES

6.1 Configuration of pattern data and basic operations

6.1.1 Configuration of pattern data

The pattern data consists of a total of 15 data, namely, the patterns such as character and crosshatch, graphic color which sets the colors of the patterns, pattern select^{*1} which sets the patterns to be output, and the pattern action which set the scroll, flicker and other pattern movements. (See Table 6.1.1)

All the patterns selected by pattern select are superimposed onto one another and displayed on the pattern display. Patterns are divided into four planes. When patterns are superimposed and displayed, the planes with the higher priority levels are displayed in the foreground.

*1: Patterns can also be selected using the output control keys (R, G, B and INV).

*2: The cursor plane is superimposed onto the other patterns and displayed only when "ON" has been selected for "[29] Setting the overlay cursor" of config edit **FUNC5**.

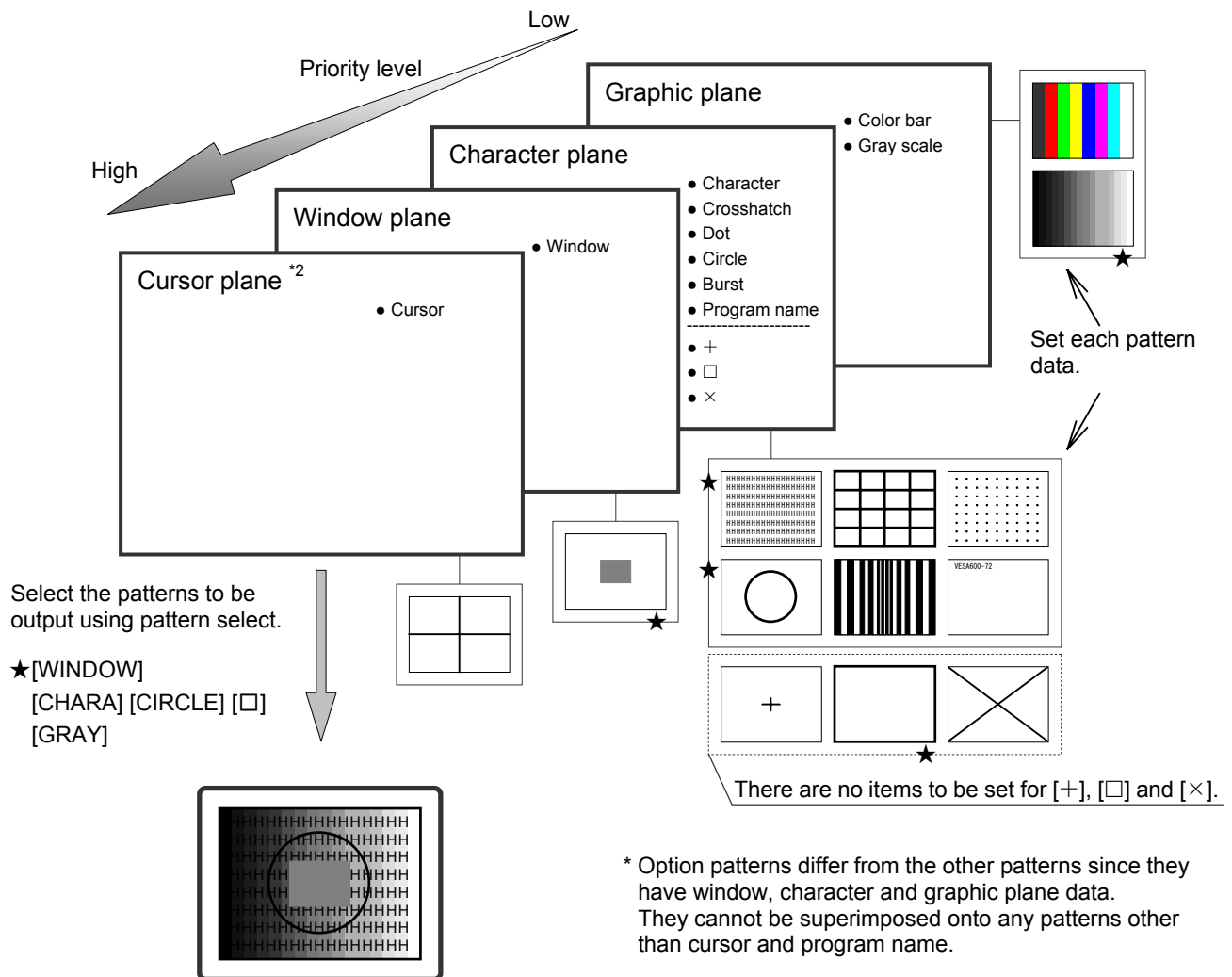


Fig. 6.1.1 Configuration of pattern data

6.1.2 Basic operations for settings

The pattern data setting menu is accessed from program edit **FUNC2**, PC card edit **FUNC3** or direct display **FUNC0**.

While referring to Table 6.1.1 below, select the pattern data whose settings are to be changed, and set the data details. For the data setting items and setting procedures, refer to the page concerned in the "reference page" column of the table.

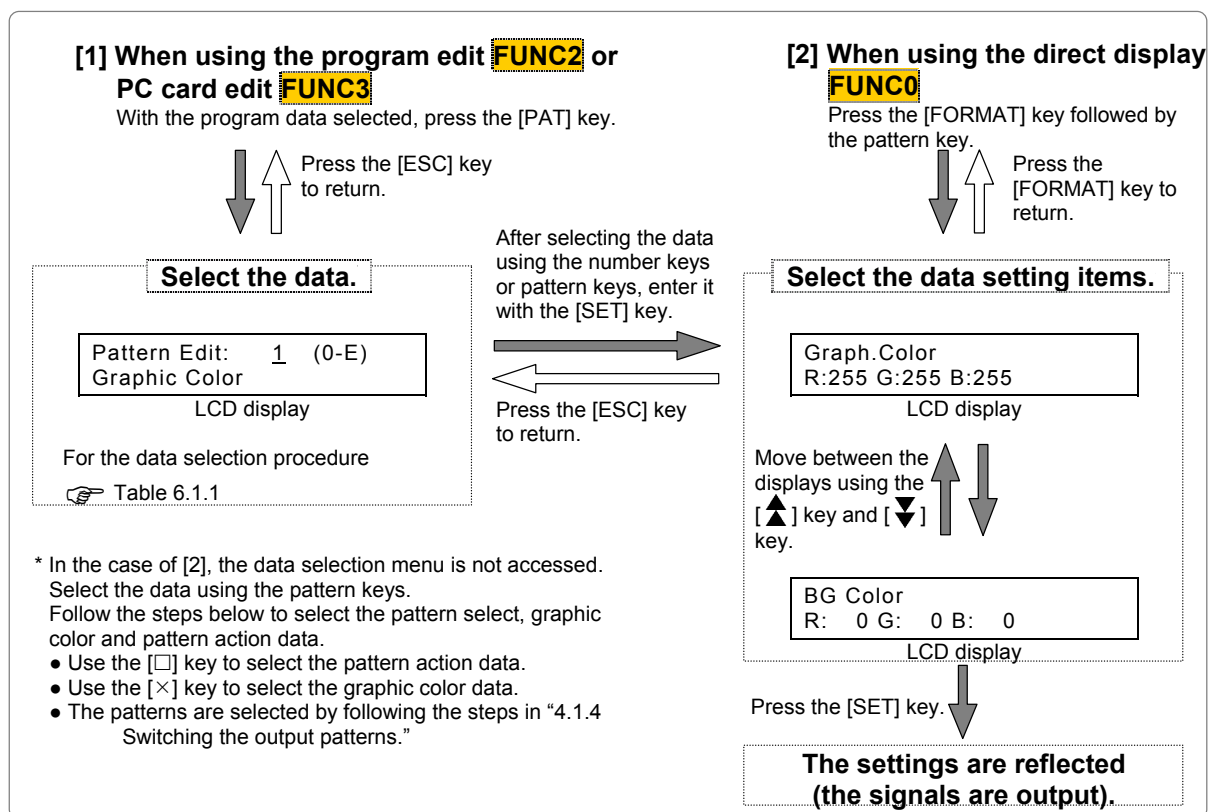


Fig. 6.1.2 Basic operations for setting the pattern data

Table 6.1.1 Pattern data selection method and reference pages

Key		LCD display	Pattern data	Reference page
Number keys	Pattern key			
0		Pattern Select	Pattern select	p.177
1		Graphic Color	Graphic color	p.177
2	CHARA	CHARA Data Edit	Character pattern	p.178
3	CROSS	CROSS Data Edit	Crosshatch pattern	p.180
4	DOTS	DOTS Data Edit	Dot pattern	p.182
5	CIRCLE	CIRCLE Data Edit	Circle pattern	p.184
6	COLOR	COLOR Data Edit	Color bar pattern	p.186
7	GRAY	GRAY Data Edit	Gray scale pattern	p.188
8	BURST	BURST Data Edit	Burst pattern	p.190
9	WINDOW	WINDOW Data Edit	Window pattern	p.191
A	OPT1	OPT1 Data Edit	Optional pattern 1	p.198
B	OPT2	OPT2 Data Edit	Optional pattern 2	
C	CURSOR	CURSOR Data Edit	Cursor pattern	p.199
D	NAME	NAME Data Edit	Program name	p.202
E		Action Edit	Pattern action	p.203
F		CEC	CEC function	p.209

6.2 Setting the pattern select

(1) Select the pattern which is to be output.

Press the pattern key and output control key. When a pattern is selected, the LED of its corresponding key lights.

- Pattern keys: CHARA, CROSS, DOTS, CIRCLE, +, □, ×, COLOR, GRAY, BURST, NAME, OPT1, OPT2, WINDOW, CURSOR
- Output control key: R, G, B, INV

Pattern Select
(CHARA-NAME,R/G/B/INV)

Fig. 6.2.1 Selecting the pattern

(2) To check the setting, press the [SET] key.

The pattern now appears on the display.

6.3 Setting the graphic color

The following items are set for the graphic color data.

- (1) Graphic color of character plane
- (2) Background color

(1) Set the graphic color of the character plane.

Graph.Color
R:255 G:255 B:255

Fig. 6.3.1 Setting the graphic color

Table 6.3.1 Graphic color setting method

Setting item	Key	LCD display	Setting range
Graphic color (Graph.Color) R, G, B	Number keys	XXX	0 to 255

(2) Set the background color.

BG Color
R: 0 G: 0 B: 0

Fig. 6.3.2 Setting the background color

Table 6.3.2 Background color setting method

Setting item	Key	LCD display	Setting range
Background color (BG Color) R, G, B	Number keys	XXX	0 to 255

6.4 Setting the character pattern

The following items are set for the character pattern data.

- (1) Format and font
- (2) Character code and cell size

(1) Set the format and font.

Format: <u>C</u> hara List	(0-2)
Font: 7*9	(0-2)

Fig. 6.4.1 Setting the format and font

Table 6.4.1 Format and font setting method

Setting item	Key	LCD display	Description
Format (Format)	0	Chara List	<p>Character list</p> <p>The character pattern (20H to DFH) specified by "Font" is repeatedly displayed.</p>
	1	All 1 Chara	<p>All one character</p> <p>The character pattern (character pattern or user character pattern) specified by "Character code" is repeatedly displayed.</p>
	2	Corner&Center	<p>Corner & center</p> <p>The character pattern (character pattern or user character pattern) specified by "Character code" is displayed in the layout shown in the figure on the right.</p>
Font (Font)	0	5*7	5 × 7
	1	7*9	7 × 9
	2	16*16	16 × 16
<p>The character pattern set (20H to DFH) to be used in selected.</p> <p>☞ "10.1.4 Character pattern data"</p>			

(2) Set the character code and cell size (horizontal, vertical).

Code: 48[H] (20H-FFH)
Cell: 16*16 (1-255)

Fig. 6.4.2 Setting the character code and cell size

Table 6.4.2 Character code and cell size setting method

Setting item	Key	LCD display	Description
Character code (Code)	Input using number keys (+ [SHIFT] key) or input from the display ^{*1}	XX [X]	This sets the character pattern to be displayed in the all one character or corner & center format. Setting range: 20 to FF
Cell size (Cell) H*V	Number keys	XXX*XXX	This sets the display size of one character. Setting range: 1 to 255 [dot]

*1: There are two ways to input the characters: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, characters cannot be input from the display if they have been edited using direct display **FUNCO**.

● Correlation between the font and cell size

<Example with 7 × 9 font and 16 × 16 cell size>

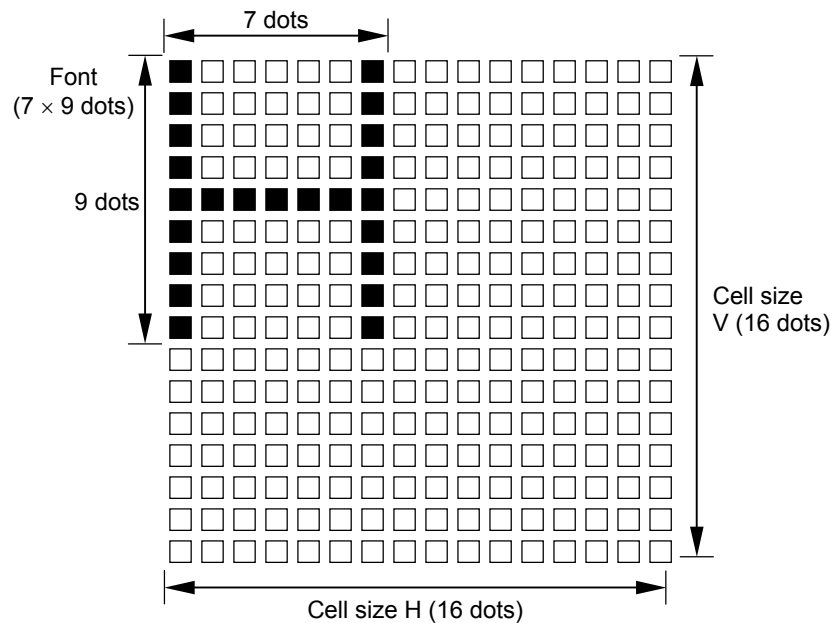


Fig. 6.4.3 Correlation between font and cell size

6.5 Setting the crosshatch pattern

The following items are set for the crosshatch pattern data.

- (1) Mode and format
- (2) Interval and line width

(1) Set the mode and format.

Mode:Line	(0/1)
Format:from Center	(0/1)

Fig. 6.5.1 Setting the mode and format

Table 6.5.1 Mode and format setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	Line	Line mode: <u>A number of crosshatch lines</u> is used to specify the interval.
	1	dot	Dot mode: <u>The number of dots between the crosshatch patterns</u> is used to specify the interval.
Format (Format)	0	from Center	Center of screen
	1	from LeftTop	Top left of screen

In the dot mode, the point to start the drawing is selected. (This item is invalid in the line mode.)

(2) Set the H and V interval and line width.

Interval :H= 20 V= 20
Width :H= 1 V= 1

Fig. 6.5.2 Setting the interval and line width

Table 6.5.2 Interval and line width setting method

Setting item	Key	LCD display	Description
Interval (Interval) H, V	Number keys	XXXX	In the line mode, the number of crosshatch lines is set. In the dot mode, the number of dots between the crosshatch patterns is set. Setting range: 0 to 9999 *1
Line width (Width) H, V	Number keys	XXX	Setting range: 1 to 255 [dot]

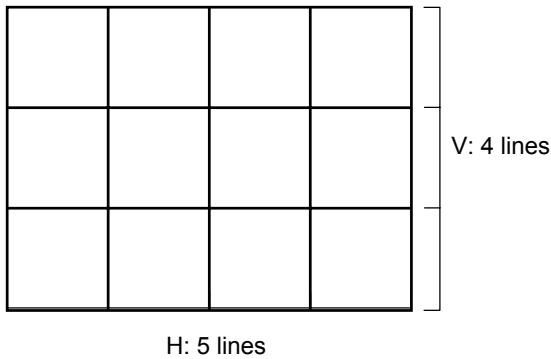
*1: The crosshatch in the H (or V) direction is not displayed if "0" is set for the H (or V) interval.

● Correlation between interval and mode

<Example 1>

Line mode

Interval H=5/V=4



<Example 2>

Dot mode

Interval H=300/V=250

Format: From top left

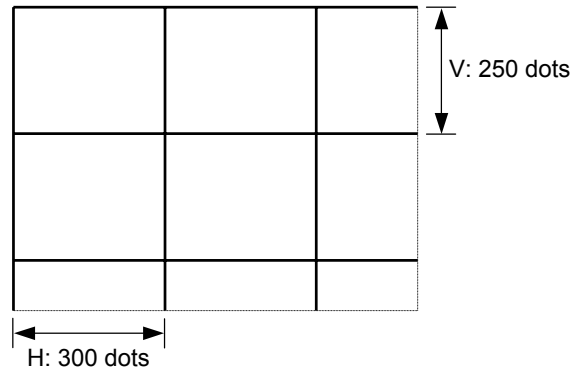


Fig. 6.5.3 Correlation between interval and mode

● When interval H and V are set to "0:1", "1:0" and "1:1"

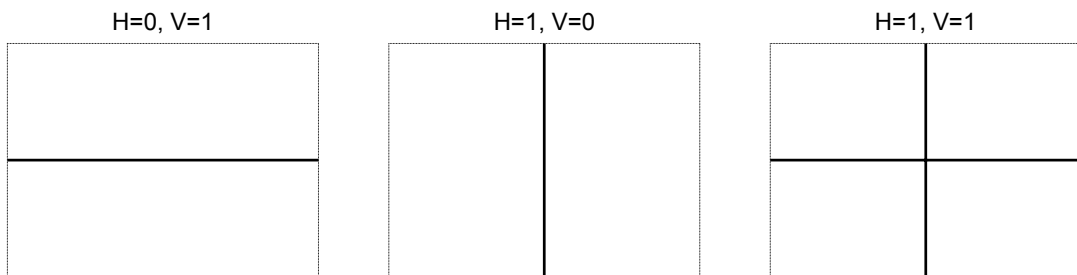


Fig. 6.5.4 Correlation between interval H and V

● Concerning the screen center

When "from center" is set as the format in the dot mode, the crosshatch pattern is displayed after the screen center is calculated. When both the number of dots and number of lines to be displayed are set to odd numbers, the screen center can be calculated, but when they are set to even numbers, the point which is the first dot to the right of the center and the first line below it is used as the actual screen center.

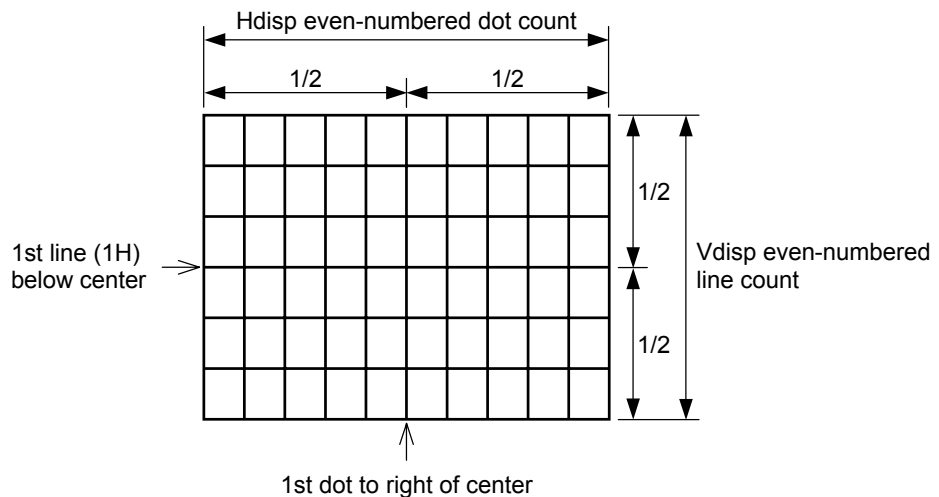


Fig. 6.5.5 Screen center

6.6 Setting the dot pattern

The following items are set for the dot pattern data.

- (1) Mode and format
- (2) Interval, dot size and dot type

(1) Set the mode and format.

Mode:Line	(0/1)
Format:from Center	(0/1)

Fig. 6.6.1 Setting the mode and format

Table 6.6.1 Mode and format setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	Line	Line mode: <u>A number of dot pattern lines</u> is used to specify the interval.
	1	dot	Dot mode: <u>The number of dots between the dots</u> is used to specify the interval.
Format (Format)	0	from Center	Center of screen In the dot mode, the point to start the drawing is selected. (This item is invalid in the line mode.)
	1	from LeftTop	Top left of screen

(2) Set the H and V intervals and the dot pattern size and type.

Interval:H= 20 V= 20
Size: 1dot Type:Rect(0/1)

Fig. 6.6.2 Setting the interval, dot pattern size and type

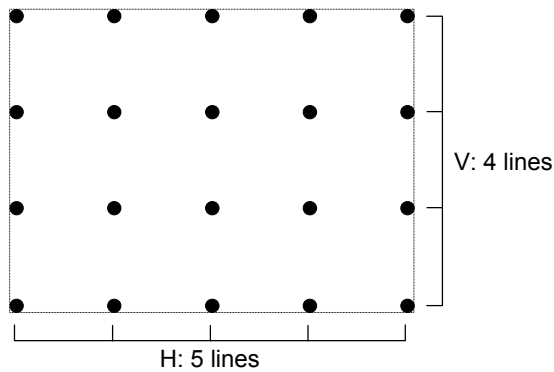
Table 6.6.2 Interval, dot pattern size and type setting method

Setting item	Key	LCD display	Description
Interval (Interval) H, V	Number keys	XXXX	Line mode: The number of dot patterns is set. Dot mode: The number of dots between dots is set. Setting range: 0 to 9999 *1
Size (Size)	Number keys	XX dot	Setting range: 1 to 15 [dot]
Type (Type)	0	Crcl	This draws dots in the shape of a circle whose diameter is the designated size.
	1	Rect	This draws dots in the shape of a square, one side of which is the designated size.

*1: The dot pattern is not displayed if "0" is set for H or V.

● Correlation between interval and mode

<Example 1>
Line mode
Interval H=5/V=4



<Example 2>
Dot mode
Interval H=300/V=250
Format:from LeftTop

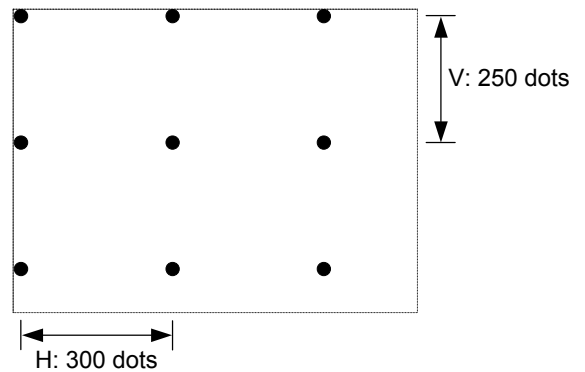


Fig. 6.6.3 Correlation between interval and mode

● When interval H and V are set to "1:1"

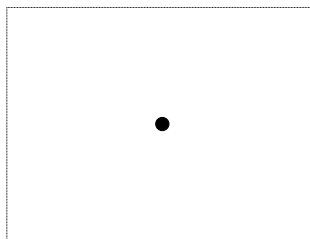


Fig. 6.6.4 Correlation between interval H and V

● Concerning the screen center

When "from center" is set as the format in the dot mode, the crosshatch pattern is displayed after the screen center is calculated. When both the number of dots and number of lines to be displayed are set to odd numbers, the screen center can be calculated, but when they are set to even numbers, the point which is the first dot to the right of the center and the first line below it are used as the actual screen center.

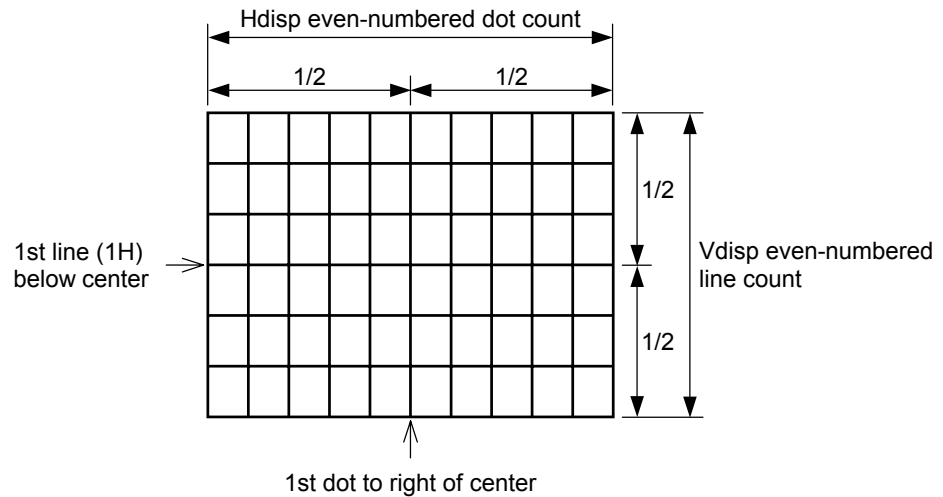


Fig. 6.6.5 Screen center

6.7 Setting the circle pattern

The format and aspect ratio are set for the circle pattern data.

Set the format and aspect ratio of the display.

Format: 0 (0-6)
Aspect: H= 0 V= 0

Fig. 6.7.1 Setting the format and aspect ratio

Table 6.7.1 Format and aspect ratio setting method

Setting item	Key	LCD display	Description
Format (Format)	0		Format 0 <ul style="list-style-type: none"> • Single circle • Center: 1/2H, 1/2V • Radius: 1/3V
	1		Format 1 <ul style="list-style-type: none"> • Concentric circles 1 • Center: 1/2H, 1/2V • Radius (from center): 1/6V, 1/3V, 1/2V, 1/2H
	2		Format 2 <ul style="list-style-type: none"> • Format 1 + (4 circles with 1/6V radius)
	3		Format 3 <ul style="list-style-type: none"> • Concentric circles 2 • Center: 1/2H, 1/2V • Radius (from center): addition of other circles inside 1/6V, 1/3V, 1/2V circles whose radii are 1/2 of the original 3
	4		Format 4 <ul style="list-style-type: none"> • Consecutive circles with 1/6V radius • Circles are displayed symmetrically both horizontally and vertically with the center (1/2H, V/2V) serving as the reference.
	5		Format 5 <ul style="list-style-type: none"> • Single circle painted out • Center: 1/2H, 1/2V • Radius: 1/3V
	6		Format 6 <ul style="list-style-type: none"> • 5 circles with 1/6V radius painted out
Aspect ratio (Aspect) H, V	Number keys	XXX	Setting range: 0 to 255 ^{*1}

*1: Perfectly round circles are always displayed regardless of the display resolution by setting the aspect ratio of the monitor. For example: H=4 and V=3 are set for an NTSC monitor (4:3), and H=16 and V=9 are set for an HDTV monitor (16:9). Perfectly round circles will not be drawn if "0" is set for H or V. (This is to ensure compatibility with generators in Astrodesign's existing VG series.)

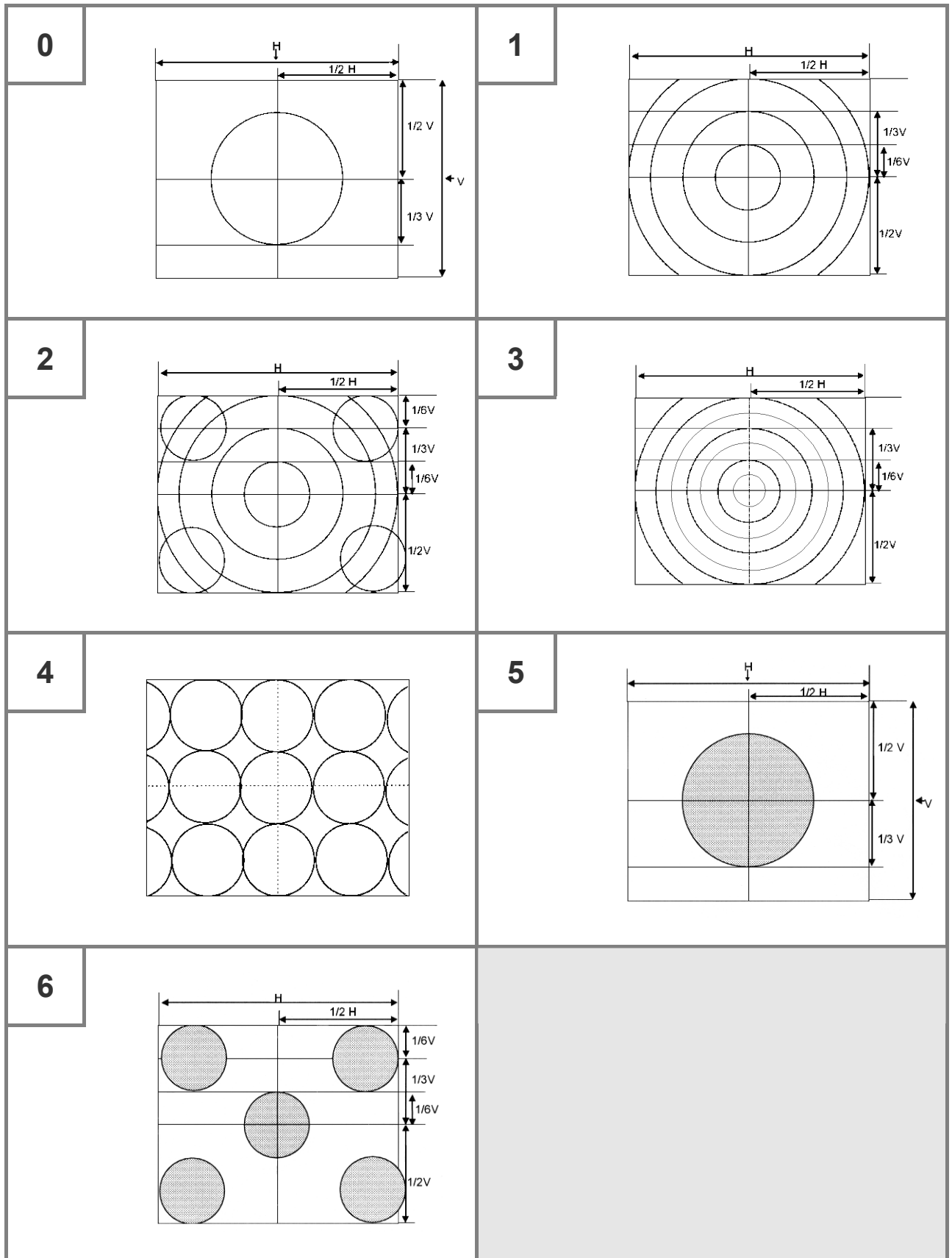


Fig. 6.7.2 Formats

6.8 Setting the color bar pattern

The following items are set for the color bar pattern data.

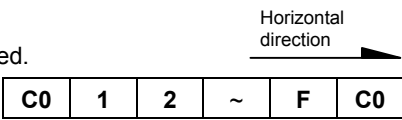
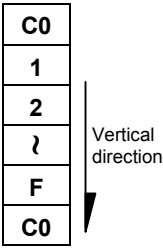
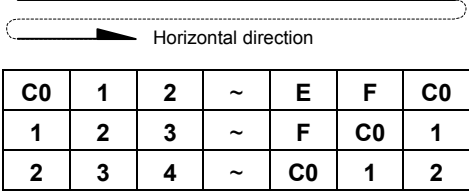
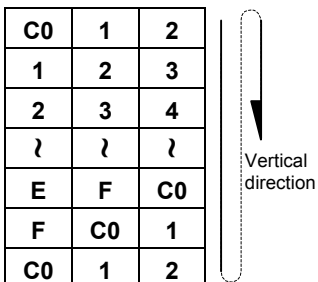
- (1) Mode and direction
- (2) Number of repetitions and interval
- (3) Color layout

(1) Set the mode and direction.

Mode:%	(0/1)
Direction:Hor	(0-3)

Fig. 6.8.1 Setting the mode and direction

Table 6.8.1 Mode and direction setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: <u>A percentage</u> is specified for the interval.
	1	dot	Dot mode: <u>A number of dots</u> is specified for the interval.
Direction (Direction)	The pattern is repeated in the designated direction in accordance with the settings for "number of repetitions," "interval" and "color layout."		
	0	Hor	Horizontal direction * The V interval is ignored. 
	1	Ver	Vertical direction * The H interval is ignored. 
	2	Hor&V	The pattern is repeated horizontally, and when the corner is reached, it is continued onto the next line which is obtained through division by the V interval. 
3	Ver&H	The pattern is repeated vertically, and when the corner is reached, it is continued onto the next column which is obtained through division by the H interval. 	

(2) Set the number of repetitions and the H and V intervals.

Repeat	:16	(1-16)
Interval	:H= 6.3 V= 6.3	

Fig. 6.8.2 Setting the number of repetitions and interval

Table 6.8.2 Number of repetitions and interval setting method

Setting item	Key	LCD display	Description
Number of repetitions (Repeat)	Number keys	XX	This sets the number of colors. Setting range: 1 to 16
Interval (Interval) H, V	Number keys	XXX.X	<u>In the % mode</u> Setting range: 0.0 to 100.0 [%]
		XXXX	<u>In the dot mode</u> Setting range: 1 to 9999 [dot]

<Example: For direction 2 (H & V)>

(3) Set the color layout (C0 to CF) of the color bars.

C0:_	1:R	2: G	3:RG	C8:_	9:R	A: G	B:RG
C4: B	5:R B	6: GB	7:RGB	CC: B	D:R B	E: GB	F:RGB

Fig. 6.8.3 Setting the color layout

Table 6.8.3 Color layout setting method

Setting item	Key	LCD display	Color
Color layout C0 to CF	0		None
	1	R	Red
	2	G	Green
	3	RG	Red, green
	4	B	Blue
	5	RB	Red, blue
	6	GB	Green, blue
	7	RGB	Red, green, blue

6.9 Setting the gray scale pattern

The following items are set for the gray scale pattern data.

- (1) Mode and direction
- (2) Number of repetitions and intervals
- (3) Level layout

(1) Set the mode and direction.

Mode: %	(0/1)
Direction: Hor	(0/1)

Fig. 6.9.1 Setting the mode and direction

Table 6.9.1 Mode and direction setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: The intervals are designated as a <u>percentage</u> .
	1	dot	Dot mode: The intervals are designated as a <u>number of dots</u> .
Direction (Direction)			The pattern is repeated in the designated direction according to the settings for the number of repetitions, intervals and level layout.
	0	Hor	The pattern is repeated in the horizontal direction, and when it arrives at a corner, it continues on the next line which has been divided by the V interval.
	1	Ver	The pattern is repeated in the vertical direction, and when it arrives at a corner, it continues on the next column which has been divided by the H interval.

(2) Set the number of repetitions and the H and V intervals.

Repeat : 1 <u>6</u>	(1-16)
Interval : H= 6.3 V= 6.3	

Fig. 6.9.2 Setting the number of repetitions and intervals

Table 6.9.2 Number of repetitions and interval setting method

Setting item	Key	LCD display	Description
Number of repetitions (Repeat)	Number keys	XX	The number of levels is set. Setting range: 1 to 16
Intervals (Interval) H, V	Number keys	XXX.X	<u>In the % mode</u> Setting range: 0.0 to 100.0 [%]
		XXXX	<u>In the dot mode</u> Setting range: 1 to 9999 [dot]

(3) Set the level layout (L0-LF) of the gray scale.

L0: 0	1: 17	2: 34	3: 51	L8:136	9:153	A:170	B:187
L4: 68	5: 85	6:102	7:119	LC:204	D:221	E:238	F:255

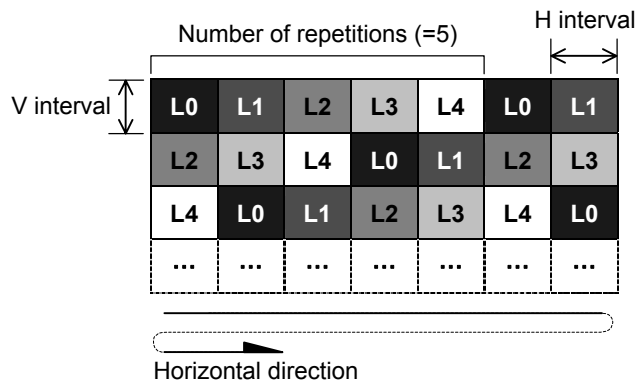
Fig. 6.9.3 Setting the level layout

Table 6.9.3 Level layout setting method

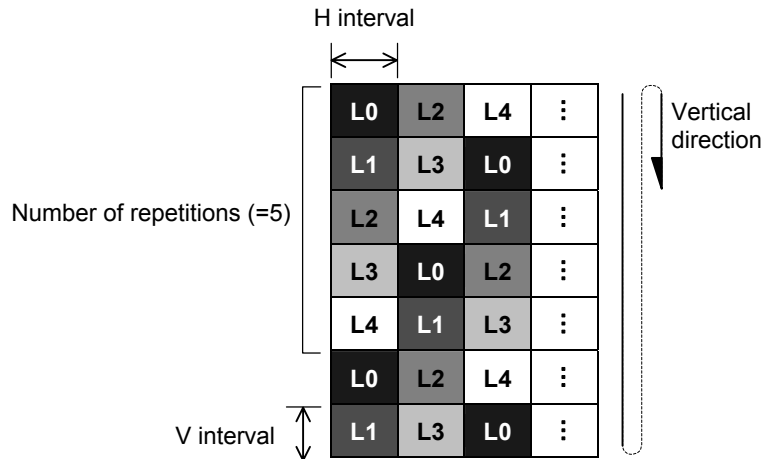
Setting item	Key	LCD display	Setting range
Level layout L0 to LF	Number keys	XXX	0 to 255

● Relationship between directions, number of repetitions and intervals

<Example 1: When the "0" (Hor) is set for the direction>



<Example 2: When the "1" (Ver) is set for the direction>



6.10 Setting the burst pattern

The format, interval and step are set for the burst pattern data.

Set the format, interval and step for the burst pattern data.

Format: $\underline{\text{L}}$ ->R	(0-3)
Interval: 5	Step= 1 dot

Fig. 6.10.1 Setting the format, interval and step

Table 6.10.1 Format, interval and step setting method

Setting item	Key	LCD display	Description
Format (Format)	0	L->R	The pattern is increased from left to right.
	1	L<-R	The pattern is increased from right to left.
	2	L<-C->R	The pattern is increased from the center to the left and right.
	3	L->C<-R	The pattern is increased from the left and right to the center.
Interval (Interval)	Number keys	XX	The number of vertical lines with same thickness which are to be displayed is set as the interval. Setting range: 1 to 99 [dot]
Step (Step)	Number keys	XX dot	The increment by which the line thickness is to be increased is set as the step. Setting range: 0 to 99 [dot]

<Example: When 0 is set for the format, 5 for the interval and 1 for the step>

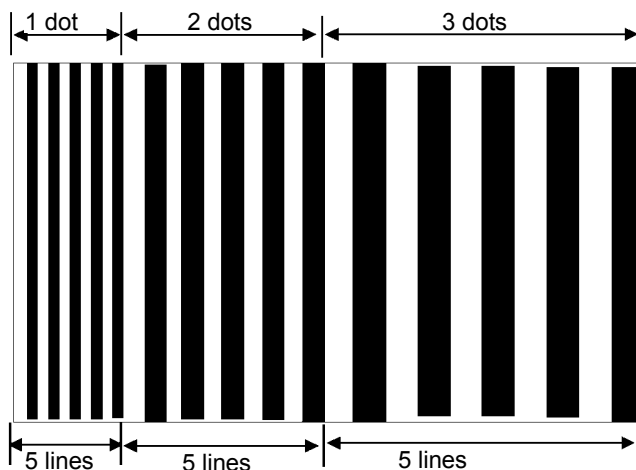


Fig. 6.10.2 Example of burst pattern setting

6.11 Setting the window pattern

The following items are set for the window pattern data.

- (1) Mode and format
- (2) Width and window color (RGB)
- (3) Format-related items (flicker interval, scrolling speed, level change speed)
- (4) Window center position (format E only)
- (5) Display time and RGB level (only when flicker interval "8 (4LEVEL)" has been selected for formats 0-7 or E)


(1) Set the mode and format.

Mode: %	(0/1)
Format: 1 WINDOW	(0-F)

Fig. 6.11.1 Setting the mode and format

Table 6.11.1 Mode and format setting

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: The widths (horizontal, vertical) are set as <u>a percentage</u> .
	1	dot	Dot mode: The widths (horizontal, vertical) are set as <u>a number of dots</u> .
Format (Format)			The window pattern is divided into the designated number. Flicker operation can be set.
	0	1 WINDOW	Format 0: 1 window
	1	4 WINDOW	Format 1: 4 windows (2×2)
	2	9 WINDOW	Format 2: 9 windows (3×3)
	3	16 WINDOW	Format 3: 16 windows (4×4)
	4	25 WINDOW	Format 4: 25 windows (5×5)
	5	64 WINDOW	Format 5: 64 windows (8×8)
	6	V3 WINDOW	Format 6: 3 windows in a vertical row (1×3)
	7	H3 WINDOW	Format 7: 3 windows in a horizontal row (3×1)
			The window pattern is scrolled in the designated direction. (1 window)
	8	LR SCROLL	Format 8: Horizontal scrolling (left and right)
	9	UD SCROLL	Format 9: Vertical scrolling (up and down)
	A	R SCROLL	Format A: Scrolling to the right
	B	L SCROLL	Format B: Scrolling to the left
	C	U SCROLL	Format C: Scrolling up
	D	D SCROLL	Format D: Scrolling down
	E	User POS	Format E: The position of the window can be designated.
	F	WIN-LEVEL	Format F: The window RGB level can be varied automatically by operating the A, B, C, E or F key when direct display FUNC0 is executed. (1 window) ☞ "4.1.6 Changing the window RGB levels"

[Format diagrams]  Next page

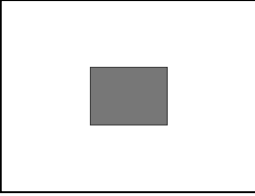
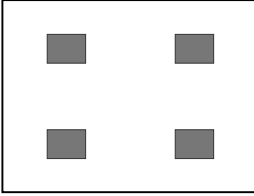
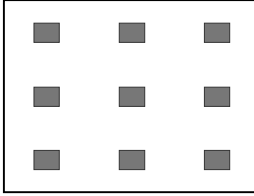
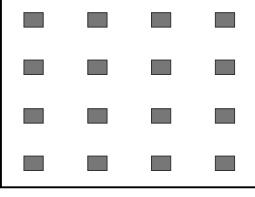
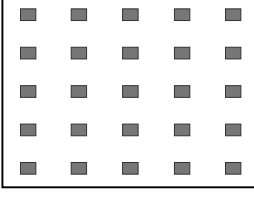
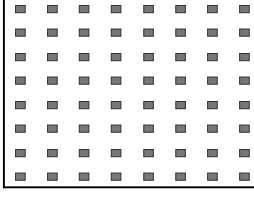
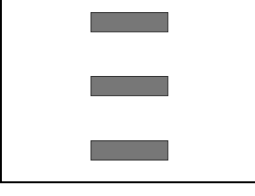
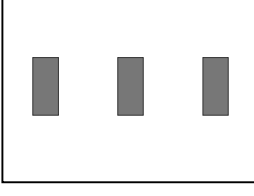
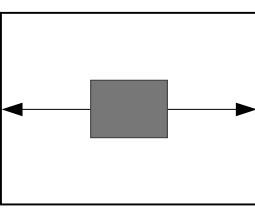
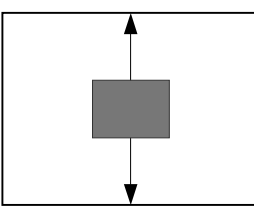
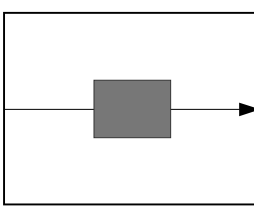
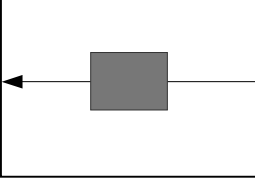
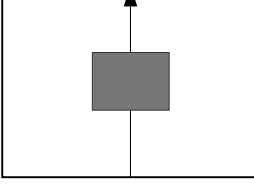
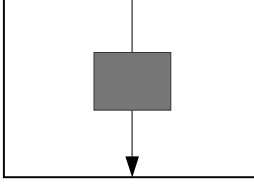
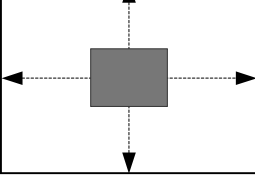
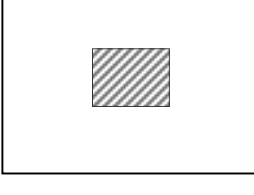
<p>[0] 1 window</p> 	<p>[1] 4 windows</p> 	<p>[2] 9 windows</p> 
<p>[3] 16 windows</p> 	<p>[4] 25 windows</p> 	<p>[5] 64 windows</p> 
<p>[6] 3 windows in a vertical row</p> 	<p>[7] 3 windows in a horizontal row</p> 	
<p>[8] Horizontal scrolling (left and right)</p> 	<p>[9] Vertical scrolling (up and down)</p> 	<p>[A] Scrolling to the right</p> 
<p>[B] Scrolling to the left</p> 	<p>[C] Scrolling up</p> 	<p>[D] Scrolling down</p> 
<p>[E] Window position designation</p> 	<p>[F] Window RGB level change</p> 	

Fig. 6.11.2 Formats

(2) Set the horizontal and vertical widths and the window color (RGB).

Width:H= 20.0 V= 20.0 R:255 G:255 B:255
--

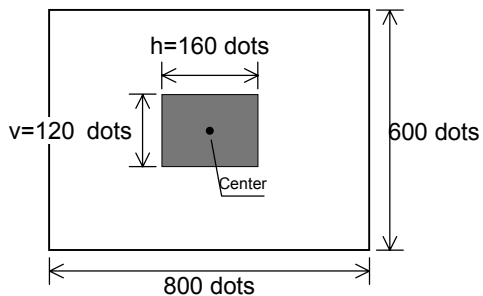
Fig. 6.11.3 Setting the horizontal and vertical widths and the window color

Table 6.11.2 Horizontal and vertical width and window color setting method

Setting item	Key	LCD display	Setting range
Width (Width) H, V	Number keys	XXX.X	In the % mode : 0.0 to 100.0 [%]
		XXXX	In the dot mode : 1 to 9999 [dot]
Window color R, G, B	Number keys	XXX	0 to 255

● Examples of H, V width settings
(when H width = 160 dots or 20%, V width = 120 dots or 20%)

<Example 1: When format 0 (1 window) is used>

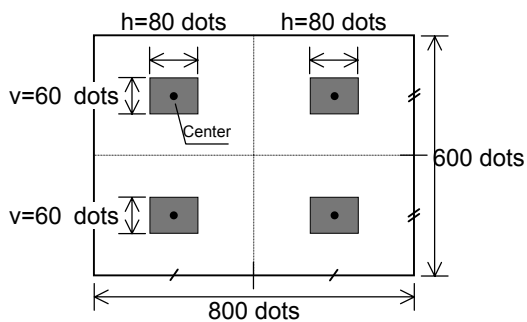
In the dot mode

H width = h = 160 [dot]

V width = v = 120 [dot]

In the % modeH width = $(h / 800) \times 100 = 20$ [%]V width = $(v / 600) \times 100 = 20$ [%]

<Example 2: When format 1 (4 windows) is used>

In the dot modeH width = $h \times 2 = 160$ [dot]V width = $v \times 2 = 120$ [dot]In the % modeH width = $(h \times 2 / 800) \times 100 = 20$ [%]V width = $(v \times 2 / 600) \times 100 = 20$ [%]

* When the window is to be divided, the total for all the windows is set.

(3) Perform the settings related to the selected format. These settings differ from one format to another.

- With formats 0 to 7 or E: Flicker interval. (The higher the value set, the longer the interval.)
- With formats 8 to D: Scrolling speed. (The higher the value set, the faster the speed.)
- With format F: Level change speed. (The higher the value set, the slower the speed.)

Flicker:0(None) (0-8)

Fig. 6.11.4 Performing the format-related settings

Table 6.11.3 Flicker interval setting method

Formats 0 to 7 or E			
Setting item	Key	LCD display	Description
Flicker interval (Flicker)	0	0 (None)	No flicker
	1	1 (1V)	1V (once per V period)
	2	2 (2V)	2V
	3	3 (4V)	4V
	4	4 (8V)	8V
	5	5 (16V)	16V
	6	6 (32V)	32V
	7	7 (64V)	64V
	8	8 (4LEVEL)	The window RGB level is set to one of 4 levels and varied at the desired interval (in V increments). * For the RGB level and time settings, refer to (5).
	9	9 (16LEVEL)	(❖Optional function) The 4 levels have been extended to 16 levels. The window RGB level is set to one of 16 levels.

Table 6.11.4 Scrolling speed setting method

Formats 8 to D				
Setting item	Key	LCD display	Description	
Scrolling speed (Flicker)	0	1V: 1 dot	1 dot	The pattern is moved by the designated number of dots in 1V (once per V period).
	1	1V: 2 dots	2 dots	
	2	1V: 3 dots	3 dots	
	3	1V: 4 dots	4 dots	
	4	1V: 8 dots	8 dots	
	5	1V: 16 dots	16 dots	
	6	1V: 32 dots	32 dots	
	7	1V: 64 dots	64 dots	

Table 6.11.5 Level change speed setting method

Formats F				
Setting item	Key	LCD display	Description	
Level change speed (Flicker)	0	1V: 1 level	1V (once per V period)	The RGB level is changed by one level at the designated time.
	1	2V: 1 level	2V	
	2	3V: 1 Level	3V	
	3	4V: 1 Level	4V	
	4	5V: 1 Level	5V	
	5	6V:1Level	6V	
	6	7V:1Level	7V	
	7	8V:1Level	8V	

(4) Set the window center position (but only for format E).

Format-E #1(20.0, 20.0)
Pos #2(80.0, 80.0)

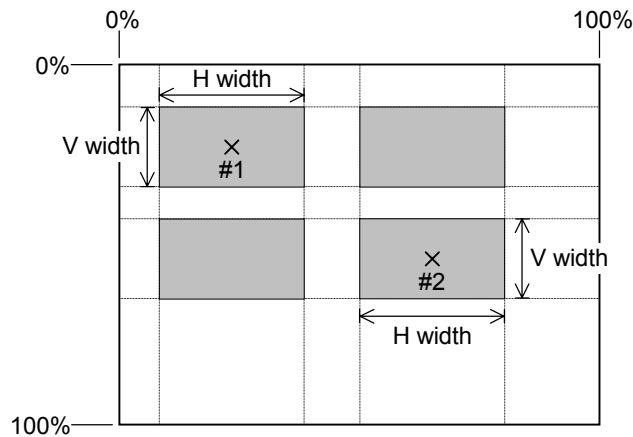
Fig. 6.11.5 Setting the window center position

Table 6.11.6 Window center position setting method

Setting item	Key	LCD display	Description
Window center position (Format-E Pos) #1, #2 (H, V)	Number keys	(XXX.X, XXX.X)	The window center position is designated. Setting range: 0.0 to 100.0 [%] *:When (0,0) has been set for #2, one window with #1 serving as the center position is displayed.

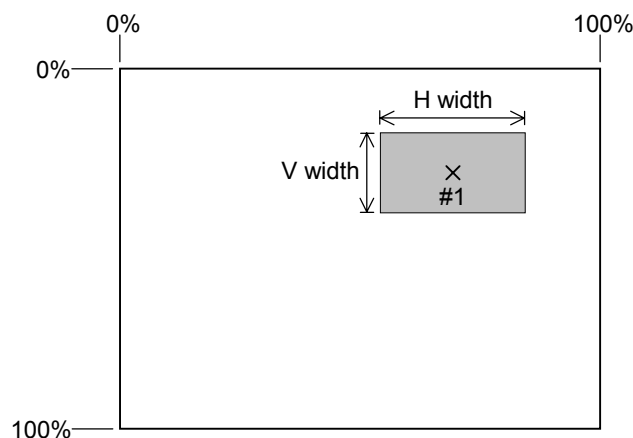
● When #2 is not (0,0)

Windows are formed from the sections produced by AND-ing the area bounded by the widths of the H and V settings with #1 serving as the center position with the area bounded by the widths of the H and V settings with #2 serving as the center position.



● When #2 is (0,0)

A window is formed from the area bounded by the widths of the H and V settings with #1 serving as the center position.



- (5) When flicker interval “8(4LEVEL)” has been selected for a pattern 0 to 7 or E, set the display time and RGB level (4 levels).

T0:	8	T1:	24	(0-255)
T2:	8	T3:	20	(0-255)

Fig. 6.11.6 Setting the display time

R0:	255	G0:	255	B0:	255
R1:	240	G1:	240	B1:	240

R2:	20	G2:	20	B2:	20
R3:	32	G3:	32	B3:	32

Fig. 6.11.7 Setting the RGB levels (4 levels)

Table 6.11.7 Display time and RGB level (4 levels) setting method

Setting item	Key	LCD display	Setting range
Display time T0 to 3	Number keys	XXX	0 to 255 [V]
RGB level R0 to 3 / G0 to 3 / B0 to 3	Number keys	XXX	0 to 255

- (6) (❖Optional function) When the “9 (16LEVEL)” flicker interval has been selected for a format from 0 to 7 or format E, set the display time and RGB level (16 levels). This is the same setting as for “4LEVEL.” With 16 levels, the display time can be set up to 999V.

Table 6.11.8 Display time and RGB level (16 levels) setting method

Setting item	Key	LCD display	Setting range
Display time T0 to 15	Number keys	XXX	0 to 999 [V]
RGB level R0 to 15 / G0 to 15 / B0 to 15	Number keys	XXX XXXX	In the 8-bit/LUT 10-bit mode: : 0 to 255 In the 10-bit mode: : 0 to 1023 In the 12-bit mode: : 0 to 4095

6.12 Setting the optional patterns

CAUTION

Optional patterns cannot be combined with any other patterns.

The “optional pattern No.” is set for the optional pattern data.
The same method is used to set option patterns 1 (OPT1) and 2 (OPT2).

Set the number of the optional pattern to be displayed.

Optional pattern 1	Optional pattern 2
OPT1-NO: <u>0</u> (00-BF)	OPT2-NO: <u>25</u> (00-BF)

Fig. 6.12.1 Setting the optional pattern number

Table 6.12.1 Optional pattern No. setting method

Setting item	Key	LCD display	Setting range
Option pattern No., OPT1-NO or OPT2-NO	Number keys	XX	00 to BF ^{*1}

- *1: Optional patterns 00H to 3FH: Internal optional pattern
Optional patterns 40H to 7FH: User-created optional patterns
Optional patterns 80H to BFH: Image data (#1 to #64) (registered by user)

For details on the internal optional patterns (00H to 3FH), refer to the “ 10.1.2 Optional pattern data” list (p.245).

- * For user-created optional patterns No.40H to 7FH, the source codes are created using a C language-like syntax, and compiled and registered using the Windows software (SP-8848) supplied.
For image data No.1 to 64, SP-8848 is used to register the image data created by any tool into optional pattern No.80H to BFH. For further details, refer to the operating instructions of the SP-8848 or Help.
* The internal optional patterns No.00H to 3FH cannot be edited or copied.

6.13 Setting the cursor pattern

The following items are set for the cursor pattern data.

- (1) Format and position display mode
- (2) Flicker interval and movement step
- (3) Cursor color and background color

(1) Set the format and position display mode.

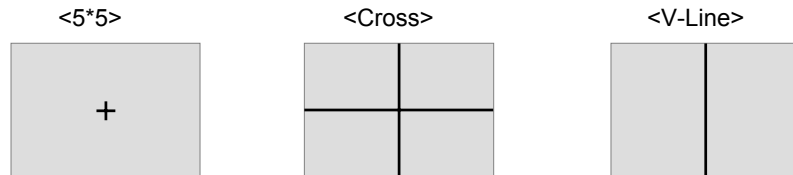
Format:Cross	(0-5)
Pos.Disp:OFF	(0-4)

Fig. 6.13.1 Setting the format and position display mode

Table 6.13.1 Format setting method

Setting item	Key	LCD display	Description	
Format (Format)	0	5*5	For setting a cross-shaped cursor consisting of 5 horizontal dots and 5 vertical dots.	Normal mode
	1	Cross	For setting a cross-shaped cursor which fills the entire screen.	
	2	V-Line	For setting a vertical line as the cursor.	
Format (Format)	3	5*5 (RGB)	For setting a cross-shaped cursor consisting of 5 horizontal dots and 5 vertical dots.	Sub-pixel mode
	4	Cross (RGB)	For setting a cross-shaped cursor which fills the entire screen.	
	5	V-Line (RGB)	For setting a vertical line as the cursor.	

Cursor shapes



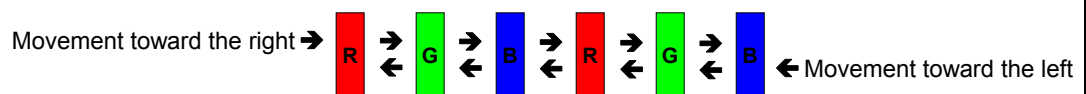
Pixel increment



RGB increment

Normal mode: The cursor moves in 1-pixel increments.
The cursor color is displayed in the color which has been set.

Sub-pixel mode: The cursor moves in the RGB increments which make up the individual pixels.
The cursor color is displayed in the sequence of R→G→B when the cursor moves toward the right and in the sequence of B→G→R when the cursor moves toward the left.



[Position display mode setting] Next page

(2) Set the flicker interval and movement step.

Flicker	:0(None)	(0-7)
Step	:10 dot	(0-2)

Fig. 6.13.2 Setting the flicker interval and movement step**Table 6.13.3 Flicker interval and movement step setting method**

Setting item	Key	LCD display	Description
Flicker interval (Flicker)	0	0 (None)	No flicker
	1	1 (1V)	1V (once per V period)
	2	2 (2V)	2V
	3	3 (4V)	4V
	4	4 (8V)	8V
	5	5 (16V)	16V
	6	6 (32V)	32V
	7	7 (64V)	64V
Movement step (Step)	0	1 dot	1 dot
	1	10 dots	10 dots
	2	100 dots	100 dots

Flicker occurs at the designated interval.

The cursor moves in increments of the designated number of dots.

(3) Set the cursor color (R/G/B) and background color (BR/BG/BB).

R:255	G:255	B:255
BR:127	BG:127	BB:127

Fig. 6.13.3 Setting the cursor color and background color**Table 6.13.4 Cursor color and background color setting method**

Setting item	Key	LCD display	Setting range
Cursor color R, G, B	Number keys	XXX	0 to 255
Background color BR, BG, BB	Number keys	XXX	0 to 255

6.14 Setting the program name

The display position, font and program name are set for the program name data.

Set the display position, font and program name.

```
Pos: L-T   Font: 5*7
XXXXXXXXXX
```

Fig. 6.14.1 Setting the display position, font and program name

Table 6.14.1 Display position, font and program name setting method

Setting item	Key	LCD display	Description	
Display position (Pos)	0	Cntr	Center of the screen	This selects where on the screen the program name is to be displayed.
	1	L-T	Top left of the screen	
	2	L-B	Bottom left of the screen	
	3	R-T	Top right of the screen	
	4	R-B	Bottom right of the screen	
	5	C-T	Top center of the screen	
	6	C-B	Bottom center of the screen	
Font (Font)	0	5*7	5 × 7	This selects the character pattern used for display. ☞ "10.1.4 Character pattern data"
	1	7*9	7 × 9	
	2	16*16	16 × 16	
Program name	Input using number keys (+ [SHIFT] key) ^{*1} or input from display	XXXXX...	Max 20 characters	

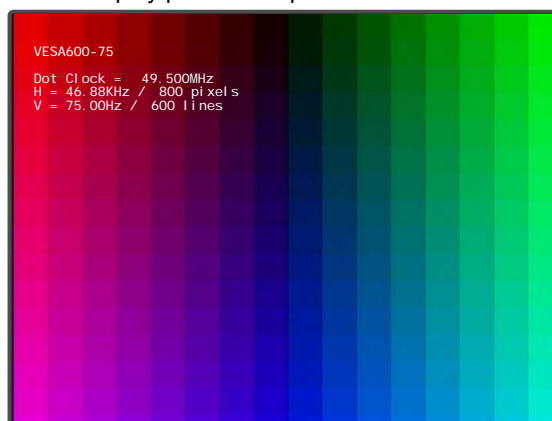
*1: There are two ways to input program names: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, names cannot be input from the display if they have been edited using direct display **FUNC0**.

* When the [NAME] key has been selected, the program name, dot clock frequency, horizontal sync frequency, vertical sync frequency, Hdisp and Vdisp are shown or only the program name is shown on the display depending on the **FUNC5** NAME display setting. For details on the setting method, refer to "[4] Setting the NAME display mode."

● Example of display (When Standard has been set as the NAME display mode)

Display position: Top left of the screen

Program name
Dot Clock = Dot clock frequency
H = Horizontal sync frequency/Hdisp
V = Vertical sync frequency/Vdisp



6.15 Setting pattern action



The pattern action function cannot be executed at the same time as when the HDCP, audio sweep and some other functions are being used. For details, refer to "11.4.4 Concerning functions which cannot be executed simultaneously."

By setting the pattern action data, scrolling and palette scrolling on the graphic planes, scrolling on the character plane and scrolling on the window plane as well as flicker and simple moving picture can be executed.

For details on simple moving pictures, refer to 6.15.2.

6.15.1 Setting method

The following items are set for the pattern action data.

- (1) Execution interval
- (2) Graphic plane -- Scrolling ON/OFF, scrolling direction
- (3) Character plane -- Scrolling ON/OFF, scrolling direction
- (4) Graphic plane, character plane -- Scrolling step
- (5) Number of repetitions for simple moving picture
- (6) Window plane -- Scrolling ON/OFF, flicker ON/OFF
Graphic plane -- Palette scrolling ON/OFF
- (7) Window plane -- Scrolling direction, step
- (8) Graphic plane -- Palette scrolling step, start position, end position

(1) Set the pattern execution interval (in V increments).

Action Interval1: <u> 1 </u> V (1-255)

Fig. 6.15.1 Setting the execution interval

Table 6.15.1 Execution interval setting method

Setting item		Key	LCD display	Setting range
Execution interval	Action Interval1	Number keys	XXX V	1 to 255
	Action Interval2, 3, 4	Number keys	XXX V	0 to 255 (0: when no interval is going to be used)

* When Action Interval 2, 3 or 4 is used, the conditions set will be repeated in sequence from 1.
(Example: When a value other than "0" has been set for Action Interval 2 or 3, the following will be repeated:
Active Interval 1 → 2 → 3 → 1 → 2 → 3)
By means of this setting, a number of different types of scrolling such as simulated 2-3 pulldown can be performed. For normal scrolling, set "0" for Action Interval 2, 3 and 4.

Pull-down scrolling: Using the scrolling function, 2-3 pull-down and other types of scrolling can be achieved artificially.

● What is 2-3 pull-down?

This is a conversion system for harmonizing 30 fps (frames per second) 60-field NTSC signals with 24 fps films when converting regular movies and other film sources into video signals (a process referred to as "telecine"). The first frame of the film is converted into the equivalent of two fields and the second frame into the equivalent of three fields, and these five fields are repeated for every two frames of the film so that 24 frames are made the equivalent of 60 fields.

(2) Set the graphic plane scrolling and scrolling direction.

G-SCR:OFF	(0/1)
G-Dir :L-D	(0-9)

Fig. 6.15.2 Setting the graphic plane scrolling ON/OFF and direction

Table 6.15.2 Graphic plane scrolling ON/OFF and direction setting method

Setting item	Key	LCD display	Description	
Scrolling (G-SCR)	0	OFF	Scrolling is not executed. (Factory setting)	
	1	ON	Scrolling is executed.	
Scrolling direction (G-Dir)	0	Mov	The display start coordinates are moved, and simple moving picture is executed.*1	
	1	L-D	Scrolling toward the bottom left.	Scrolling is executed in the designated direction.
	2	D	Scrolling downward.	
	3	R-D	Scrolling toward the bottom right.	
	4	L	Scrolling toward the left.	
	6	R	Scrolling toward the right.	
	7	L-U	Scrolling toward the top left.	
	8	U	Scrolling upward.	
9	R-U	Scrolling toward the top right.		

*1: For details on the simple moving picture, refer to “6.15.2 Concerning the simple moving picture function.”

(3) Set the character plane scrolling and scrolling direction.

C-SCR:OFF	(0/1)
C-Dir :L-D	(1-9)

Fig. 6.15.3 Setting the character plane scrolling ON/OFF and scrolling direction

Table 6.15.3 Character plane scrolling ON/OFF and scrolling direction setting method

Setting item	Key	LCD display	Description	
Scrolling (C-SCR)	0	OFF	Scrolling is not executed. (Factory setting)	
	1	ON	Scrolling is executed.	
Scrolling direction (C-Dir)	1	L-D	Scrolling toward the bottom left.	Scrolling is executed in the designated direction.
	2	D	Scrolling downward.	
	3	R-D	Scrolling toward the bottom right.	
	4	L	Scrolling toward the left.	
	6	R	Scrolling toward the right.	
	7	L-U	Scrolling toward the top left.	
	8	U	Scrolling upward.	
	9	R-U	Scrolling toward the top right.	

(4) Set the graphic plane and character plane scrolling step.

The same step is used for the graphic plane and character plane.

G&C-Step1 H= <u>1</u> , V= 1 (1- 255)
--

Fig. 6.15.4 Setting the graphic plane and character plane scrolling step**Table 6.15.4 Graphic plane and character plane scrolling step setting method**

Setting item		Key	LCD display	Setting range
Scrolling step in H direction, V direction	G&C-Step1	Number keys	XXX	H : 1 to 255 [dot] V : 1 to 255 [H] * Set the frame size for simple moving picture. H : 1 to 4095 [dot] V : 1 to 4095 [H]
	G&C-Step2, 3, 4	Number keys	XXX	H : 0 to 255 [dot] (0: when no step is going to be used) V : 0 to 255 [H]

* When Action Interval 2, 3 or 4 is used, select the settings to match G&C-Step 2, 3 and 4. For normal scrolling, set "0" for G&C-Step 2, 3 and 4.

(5) Set the number of simple moving picture repetitions.

G-Repeat H= <u>1</u> , V= 1 (1-15)

Fig. 6.15.5 Setting the number of simple moving picture repetitions**Table 6.15.5 Number of simple moving picture repetition setting method**

Setting item	Key	LCD display	Setting range
Number of repetitions (G-Repeat) in H direction, V direction	Number keys	XX	1 to 15

* This setting is valid only when "Mov" has been set as the graphic plane scrolling direction (G-Dir).

(6) Set the window scrolling and flicker, and graphic plane palette scrolling.

What is to be referenced in the LUT (look-up table) is moved for palette scrolling. This takes effect only for the graphic plane.

W-SCR :OFF	W-FLK:OFF (0/1)
P-SCR :OFF	(0/1)

Fig. 6.15.6 Setting the window scrolling, and flicker and palette scrolling

Table 6.15.6 Window scrolling and flicker, and palette scrolling setting method

Setting item	Key	LCD display	Description
Scrolling (W-SCR)	0	OFF	Window scrolling is not executed. (Factory setting)
	1	ON	Window scrolling is executed.
Flicker (W-FLK)	0	OFF	Window flicker is not executed.
	1	ON	Window flicker is executed.
Palette scrolling (P-SCR)	0	OFF	Palette scrolling is not executed. (Factory setting)
	1	ON	Palette scrolling is executed.

(7) Set the window scrolling direction and step.

W-Dir :L	(1-9)
W-Step1 : 1	(1-255)

Fig. 6.15.7 Setting the window scrolling direction and step

Fig. 6.15.7 Window scrolling direction and step setting method

Setting item	Key	LCD display	Description
Scrolling direction (W-Dir)	1	L-D	The window is scrolled toward the bottom left.
	2	D	The window is scrolled downward.
	3	R-D	The window is scrolled toward the bottom right.
	4	L	The window is scrolled toward the left.
	6	R	The window is scrolled toward the right.
	7	L-U	The window is scrolled toward the top left.
	8	U	The window is scrolled upward.
	9	R-U	The window is scrolled toward the top right.
Scrolling step	W-Step1	Number keys	XXX The step is the same for the horizontal and vertical directions. Setting range: 1 to 255
	W-Step2, 3, 4	Number keys	XXX The step is the same for the horizontal and vertical directions. Setting range: 0 to 255 (0: when no step is going to be used)

* When Action Interval2-4 is used for the execution interval, choose a W-Step2-4 setting which corresponds. When conducting normal scrolling, set "0" for W-Step2-4.

(8) Set the palette scrolling step, start position and end position.

P-Step: ±(0/1) 0(0-128)
P-Sta: 0 End: 0(0-255)

Fig. 6.15.8 Setting the palette scrolling step, start position and end position**Table 6.15.8 Palette scrolling step, start position and end position setting method**

Setting item		Key	LCD display	Description
Scrolling step (P-Step)	Sign	0	+	Used for setting a positive value.
		1	-	Used for setting a negative value.
	Number of steps	Number keys	XXX	Setting range: 1 to 128
Start position (P-Sta)		Number keys	XXX	Setting range: 0 to 255
End position (End)		Number keys	XXX	Setting range: 0 to 255

6.15.2 Concerning the simple moving picture function

This function enables simple moving pictures to be displayed by drawing a multiple number of pictures in the drawing area and moving the display start coordinates.

Provided as an example here is a description of the display method used for 640 × 480 9-frame simple moving pictures.

(1) Create the images.

Create the 640 × 480 9-frame images consisting of 1920 × 1440 images stacked three vertically and three horizontally. (See Fig. 6.15.9)

(2) Register the images created in optional patterns No.80H to BFH (image data No.1 to 64) using the Windows software (SP-8848) provided.

(3) Set the program data.

Described here are the settings for pattern data only. Timing data use the regular settings.

- 1) Set the number of the optional pattern registered in (2) as "optional pattern 1" or "optional pattern 2."
- 2) Select the optional pattern (OPT1 or OPT2) using "pattern select."
- 3) Set the execution interval (Action Interval 1), graphic plane scrolling (G-SCR), scrolling direction (G-Dir), scrolling step (G&C-Step1) and number of simple moving picture repetitions (G-Repeat) using "Pattern action."

- Action Interval 1: Set the time interval during which the frame is to be moved in V increments.
- Scrolling (G-SCR): Select "ON."
- Scrolling direction (G-Dir): Select "Mov."
- Scrolling step (G&C-Step1): Set the frame size. In this case, it is "H=640" and "V=480."
- Number of simple moving picture repetitions (G-Repeat): Set the number of times the frames are to be moved in the horizontal and vertical direction. In this case, it is "H=3" and "V=3."

CAUTION

Set scroll steps H and V to correspond with the number of dots for H disp and number of lines (H) for V disp in the timing data. (Refer to "5.1 Configuration of timing data and basic operations.") If they do not correspond, the image may be displayed out of position.

As a result of the above settings, images #1 to #9 with a 640 × 480 frame size are displayed in the sequence of #1 → #2 → ... → #9 by moving the display start coordinates from the 1920 × 1440 images registered in the optional pattern.

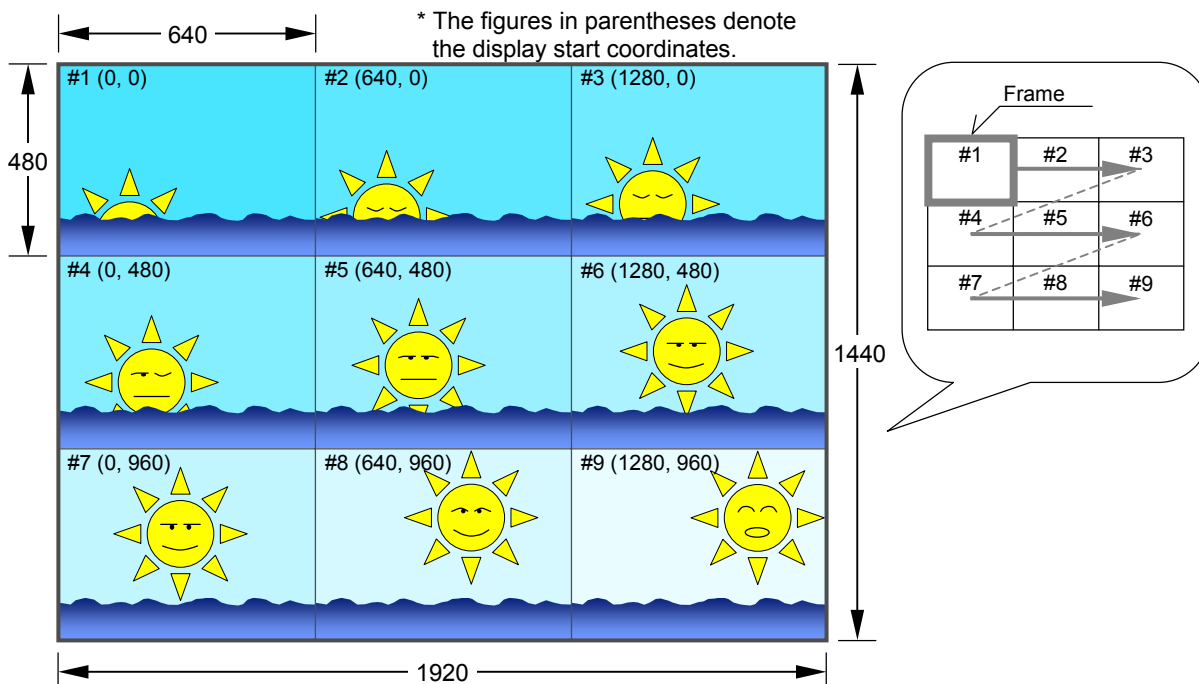
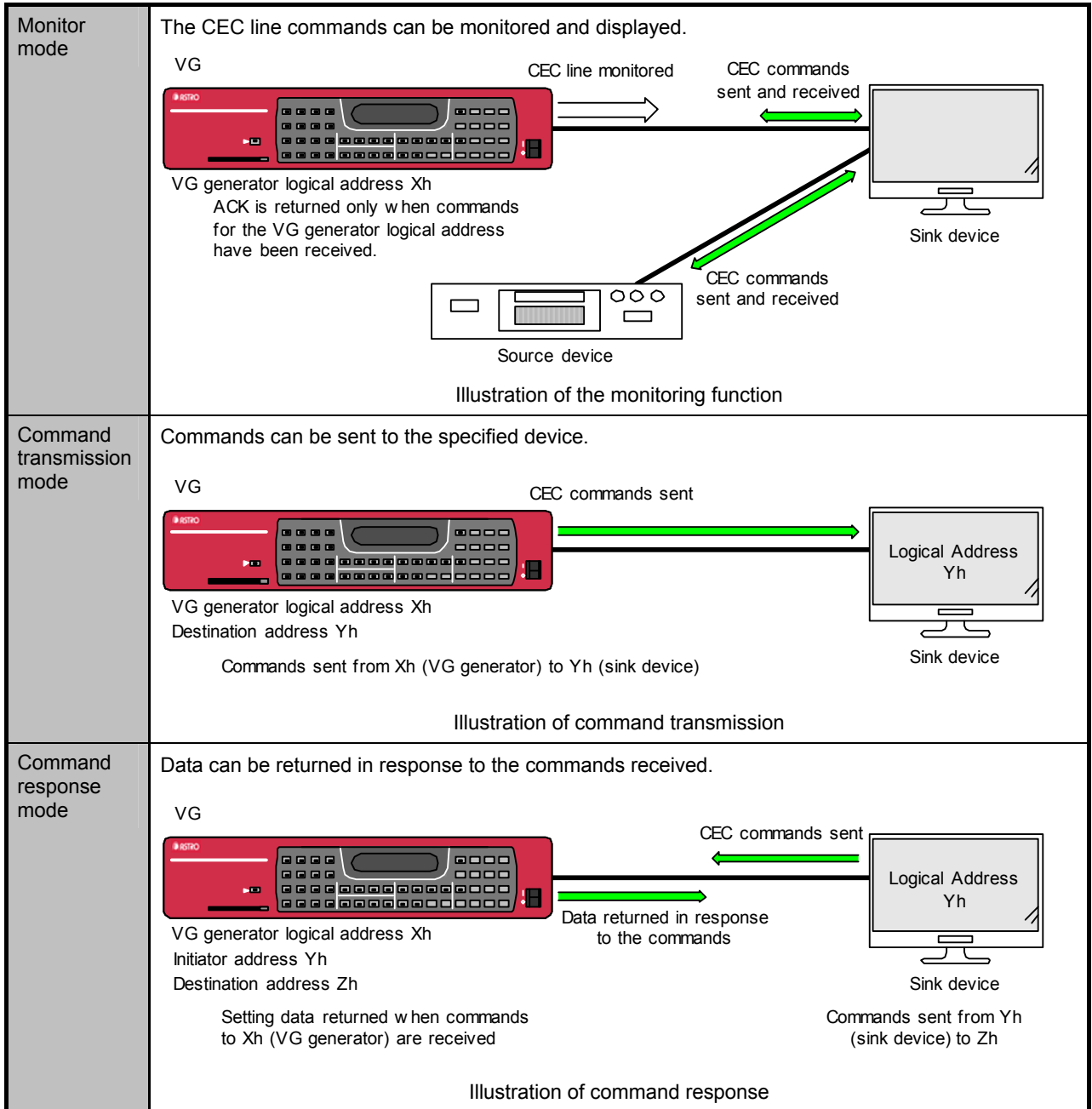


Fig. 6.15.9 Example of images for simple moving pictures

6.16 CEC function

6.16.1 General description

- Described in this section is the procedure for executing the HDMI CEC function.
- Simple transmission and reception can be undertaken using the HDMI CEC function.



● Execution procedure

The following operations are performed for the HDMI CEC function.

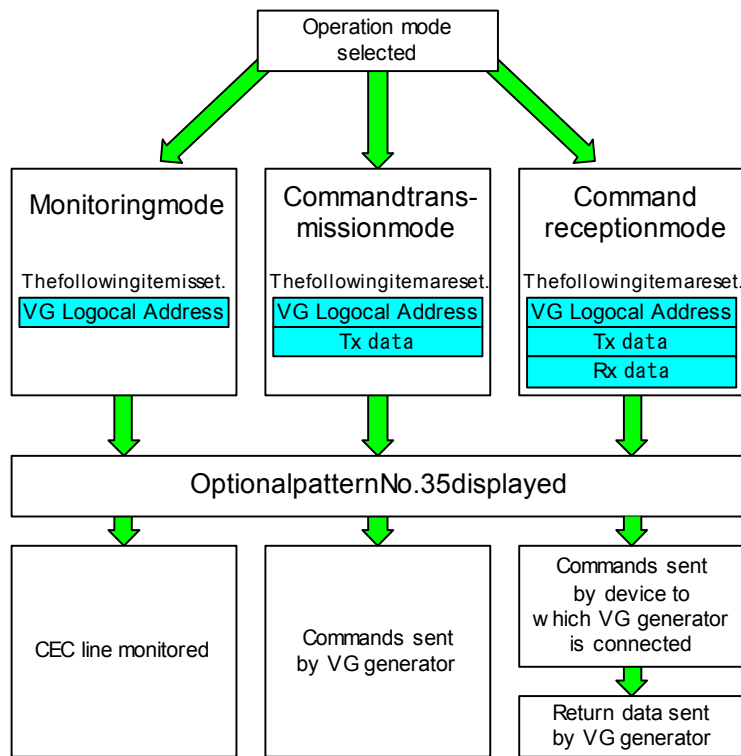


Fig. 6.16.1 CEC operation mode execution procedure

In the command transmission mode, the commands are sent at the moment when optional pattern 35 has been selected.

If command transmission is established as the CEC setting and OPT.35 is set as the pattern in the program ahead of time, then commands will be sent at the moment when the program concerned has been selected.

6.16.2 Details of settings

- The CEC function data is set as follows.
- The items to be set differ depending on the CEC operation mode. (Only the items required can be set.)

[1] VG generator settings

Set the CEC function mode and logical address of the VG generator itself.

CEC : Monitor	(0-2)
VG Logical Addr : 0h	(0-F)

Fig. 6.16.2 Setting the CEC operation mode and logical address

Table 6.16.1 CEC operation mode and logical address setting method

Setting item	Key	LCD display	Description
CEC operation mode	0	Monitor	For selecting the monitoring mode.
	1	Transmission	For selecting the command transmission mode.
	2	Response	For selecting the command response mode.
Logical Address	Number keys	X	Setting range: 0 to Fh For setting the logical address of the VG generator.

[2] Setting the Tx data

Establish the settings which are to be sent from the VG generator.

Tx:Destination:0h (0-F)

Fig. 6.16.3 Setting the destination address

Table 6.16.2 Destination address setting method

Setting item	Key	LCD display	Description
Destination Logical Address	Number keys	X	Setting range: 0 to Fh For setting the logical address of the destination (address of the device to which the data is to be sent) to which the data is sent by the VG generator.

Tx: Op Code:0h (00-FF)
Parameter Num: 0 (0-14)

Fig. 6.16.4 Setting the operation code and parameter number

Table 6.16.3 Operation code and parameter number setting method

Setting item	Key	LCD display	Description
Op Code	Number keys	XX	Setting range: 00 to FFh For setting the operation code (operation command) to be sent by the VG generator.
Parameter number	Number keys	XX	Setting range: 00 to 14 For setting the parameter (number of data) to be sent by the VG generator.

Tx:Parameter1-7: (00-FF)
00 00 00 00 00 00 00

Tx:Parameter8-14: (00-FF)
00 00 00 00 00 00 00

Fig. 6.16.5 Setting the parameter

Table 6.16.4 Parameter setting method

Setting item	Key	LCD display	Description
Parameter 1 to 14	Number keys	XX	Setting range: 00 to FFh For setting the parameter which identifies the data to be sent.

[3] Setting the Rx data

Establish the settings concerning the commands to which the VG generator is to respond.

Rx:Initiator	:0h (0-F)
Destiantion	:0h (0-F)

Fig. 6.16.6 Setting the initiator and destination addresses**Table 6.16.5 Initiator and destination address setting method**

Setting item	Key	LCD display	Description
Initiator Logical Address	Number keys	X	Setting range: 0 to Fh For setting the logical address of the initiator (address of the device initiating the transmission) of the commands to which the VG generator is to respond.
Destination Logical Address	Number keys	X	Setting range: 0 to Fh For setting the logical address of the destination (address of the device to which the data is to be sent) to which are sent the commands that the VG generator is to respond to.

Rx: Op Code : 0h	(00-FF)
Parameter Num: 0	(0-14)

Fig. 6.16.7 Setting the operation code and parameter**Table 6.16.6 Operation code and parameter setting method**

Setting item	Key	LCD display	Description
Op Code	Number keys	XX	Setting range: 00 to FFh For setting the operation code (operation command) to which the VG generator is to respond.
Parameter number	Number keys	XX	Setting range: 00 to 14 For setting the parameter (number of data) to which the VG generator is to respond.

Rx:Parameter1-7:	(00-FF)
00 00 00 00 00 00 00	

Rx:Parameter8-14:	(00-FF)
00 00 00 00 00 00 00	

Fig. 6.16.8 Setting the parameter**Table 6.16.7 Parameter setting method**

Setting item	Key	LCD display	Description
Parameter 1 to 14	Number keys	XX	Setting range: 00 to FFh For setting the parameter (number of data) to which the VG generator is to respond.

7

SELF-CHECK

7.1 Concerning the self-check

The VG-849C has a function (self-check function) that makes it possible to determine whether the hardware devices are functioning properly.



Turn the power off when exiting the self-check.

7.1.1 How to start up the self-check

Turn on the power of the VG-849C while pressing the [**▲**] key.

The buzzer sounds, and the self-check mode starts up.

* All the LEDs light when the RB-1848 is connected.

The version information, MAC address and other information listed below are displayed in sequence at intervals of 5 seconds or so.

Display sequence	Description	Display screen
(1)	Version information	Firmware VG-849 Self Check Mode ROM Version : 5.00
		Hardware BOARD REV: 000B3019h BOARD TYPE: 00010103h
		HDMI output HDMI: 40.FF
(2)	Support for optional functions	Closed caption, Teletext, V-chip CC&T&Vchip :ON MacroVision :ON
		Macrovision
		Scroll trigger Scroll Trigger :ON
		Window 16 levels Window 16Level Flicker: Enable
		Multi-bit MULTI BIT :ON
(3)	Support for additional patterns ^{*1} (options)	Pattern 001 :ON Pattern 002 :ON . . .
(4)	Other device information	Serial no. S/N :XXXXXXXX
		MAC address MAC: XX:XX:XX:XX:XX:XX

*1: Contact an Astrodesign sales representative for details on the optional patterns which can be added.

7.1.2 Types of check items

A list of the self-check items is provided below.

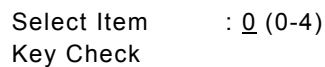
Table 7.1.1 Check items

Check item	Description	Reference page
Key check	For checking the keys and LEDs on the front panel of the VG-849C.	p.216
PC card check	For checking the PC card.	p.217
RS-232C check	For checking the RS-232C loopback.	p.218
Flash ROM check	For checking the internal flash ROM.	p.219
Flash ROM initialization	For initializing the internal flash ROM.	p.220

* If the [ESC] key is pressed during any of the checks, the check is aborted, and the check item selection screen returns to the display.

7.2 Key check

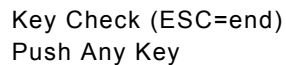
- (1) Press the [0] key and [SET] key.



Select Item : 0 (0-4)
Key Check

Fig. 7.2.1 Selecting key check

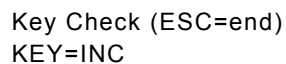
- (2) Press the key to be checked.



Key Check (ESC=end)
Push Any Key

Fig. 7.2.2 Selecting the key

The pressed key now appears on the LCD screen. (Example: [▲] key)



Key Check (ESC=end)
KEY=INC

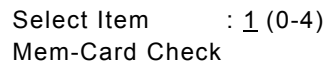
Fig. 7.2.3 Displaying the results

7.3 PC card check

CAUTION

A PC card is required for this check. Ensure that the card has been inserted correctly before conducting the check.

- (1) Press the [1] key and [SET] key.

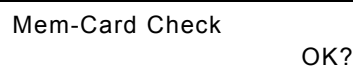


```

Select Item      : 1 (0-4)
Mem-Card Check
  
```

Fig. 7.3.1 Selecting PC card check

- (2) Press the [SET] key.

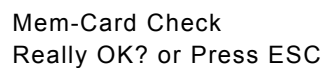


```

Mem-Card Check
                                OK?
  
```

Fig. 7.3.2 Verifying the check

- (3) Press the [SET] key.



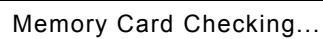
```

Mem-Card Check
Really OK? or Press ESC
  
```

Fig. 7.3.3 Executing the check

The PC card check is now executed.

- 1) While the card is being checked, the screen shown below appears on the LCD.

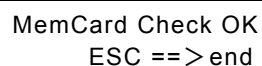


```

Memory Card Checking...
  
```

Fig. 7.3.4 Check in progress

- 2) When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.



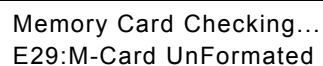
```

MemCard Check OK
ESC ==> end
  
```

Fig. 7.3.5 Check completed

NOTE

The error buzzer sounds if an error has occurred. The screen shown below appears on the LCD.



```

Memory Card Checking...
E29:M-Card UnFormatted
  
```

7.4 RS-232C check

CAUTION

A connector is required for this check. Ensure that the connector has been installed correctly before conducting the check.

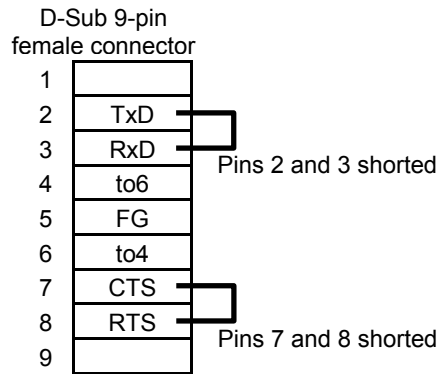


Fig. 7.4.1 Connector

- (1) Press the [2] key and [SET] key.

```
Select Item      : 2 (0-4)
RS232C(LoopBack)
```

Fig. 7.4.2 Selecting RS-232C check

RS-232C loopback is executed.

```
RS-232C Check
OK : R=rr W=ww
Read data | Write data
```

Fig. 7.4.3 Executing the check

- (2) When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

```
RS-232C Check OK
ESC ==> end
```

Fig. 7.4.4 Check completed

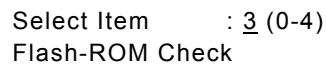
NOTE

The error buzzer sounds if an error has occurred. The check is aborted (the 20H to 7FH codes are checked). The screen shown below appears on the LCD.

```
RS-232C Check
ERR : R=rr W=ww
```

7.5 Flash ROM check

- (1) Press the [3] key and [SET] key.

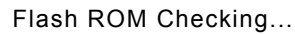


Select Item : 3 (0-4)
Flash-ROM Check

Fig. 7.5.1 Selecting Flash ROM check

- (2) Press the [SET] key.

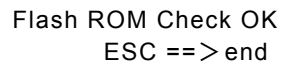
The internal flash ROM is checked.



Flash ROM Checking...

Fig. 7.5.2 Executing the check

- (3) When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

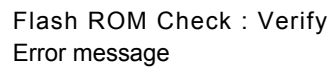


Flash ROM Check OK
ESC ==> end

Fig. 7.5.3 Check completed

NOTE

The error buzzer sounds if an error has occurred. The check is aborted. The screen shown below appears on the LCD.



Flash ROM Check : Verify
Error message

7.6 Flash ROM initialization

CAUTION

When this operation is performed, the contents of the internal flash ROM will be initialized to the factory setting.

- (1) Press the [4] key and [SET] key.

Select Item : 4 (0-4)
Flash-ROM Init.

Fig. 7.6.1 Selecting Flash ROM initialization

- (2) Press the [SET] key.

Flash ROM Init.
Restore cofing data. OK?

Fig. 7.6.2 Executing the initialization

The internal flash ROM is initialized.

- (3) When the initialization is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

Flash ROM Init. OK
ESC ==> end

Fig. 7.6.3 Initialization completed

8

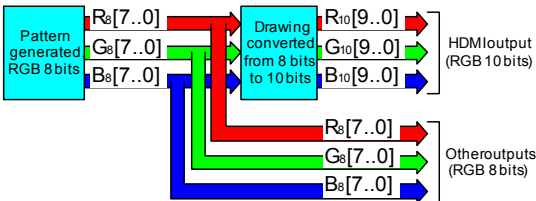
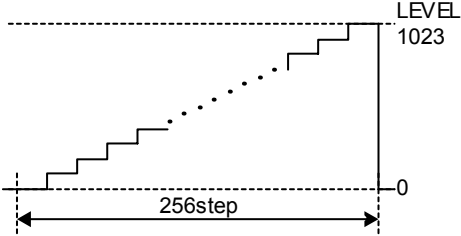
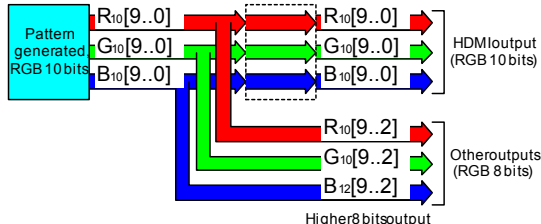
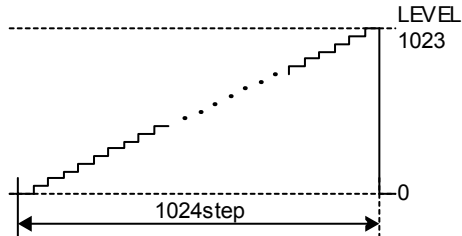
MULTI-BIT MODE (❖OPTION)

8.1 General description

In the multi-gradation gray scale output mode which has been set as the video format, the multi-bit mode makes it possible to generate patterns corresponding to the gray scale concerned. In the past, these patterns were generated with RGB 24 bits (8 bits for each signal), but in this mode patterns can be shown with RGB 36 bits (12 bits for each signal).

For details on the video formats, refer to “5.6 Setting the HDMI output.”

The multi-bit mode is selected in the HDMI output bit mode of config edit **FUNC5**. (Refer to “3.3 [32] Setting the HDMI output bit mode (❖optional function).”)

8 bits (standard mode)	MULTI BIT (Multi-bit mode)
<p>Patterns drawn with 8 bits are converted into the output gray scale, and output.</p> <p>The number of colors generated simultaneously is 256 x RGB with 12 bits as well.</p>	<p>Patterns corresponding to the output gray scale are generated, and output.</p> <p>The number of colors generated simultaneously is 4096 x RGB with 12 bits as well.</p>
<p>Example of video format RGB 30-bit output</p>  <p>For a ramp output</p> 	<p>Example of video format RGB 30-bit output</p>  <p>For a ramp output</p> 



Multi-bit support is provided by HDMI outputs only. Even in the same mode, only the higher 8 bits are output for the other outputs.

The table below lists the main differences between the standard mode (8 bits) and multi-bit mode. The specifications of each mode differ depending on the video format.

Table 8.1.1 Differences between standard mode (8 bits) and multi-bit mode

HDMI output bit mode	Video format	No. of colors which can be generated	No. of output bits	Frequency restrictions		Resolution
				HDMI output	Other	
8BIT (standard mode)	RGB_24 Y444_24 Y422_24	256 colors each for R, G and B (approx. 160,000 colors)	8bit×3 (24bit)	25 to 165MHz	Analog: 5 to 300MHz DVI: 25 to 165MHz	4096×4096
	RGB_30 Y444_30 Y422_30	256 colors each for R, G and B (approx. 160,000 colors)	10bit×3 (30bit)	25 to 165MHz		
	RGB_36 Y444_36	256 colors each for R, G and B (approx. 160,000 colors)	12bit×3 (36bit)	25 to 150MHz		
	Y422_36	256 colors each for R, G and B (approx. 160,000 colors)	12bit×3 (36bit)	25 to 165MHz		
MULTI BIT (multi-bit mode)	RGB_24 Y444_24 Y422_24	256 colors each for R, G and B (approx. 160,000 colors)	8bit×3 (24bit)	25 to 165MHz	Analog: 5 to 165MHz DVI: 25 to 165MHz	2048×2048
	RGB_30 Y444_30 Y422_30	1024 colors each for R, G and B (approx. 1 billion colors)	10bit×3 (30bit)	25 to 165MHz		
	RGB_36 Y444_36	4096 colors each for R, G and B (approx. 68.7 billion colors)	12bit×3 (36bit)	25 to 150MHz		
	Y422_36	4096 colors each for R, G and B (approx. 68.7 billion colors)	12bit×3 (36bit)	25 to 165MHz		



Multi-bit support is provided by HDMI outputs only. Even in the same mode, only the higher 8 bits are output for the other outputs.

8.2 Settings to be changed

Some settings are different between the standard mode (8 bits) and multi-bit mode.

8.2.1 Changes in level settings

In the multi-bit mode, the settings related to the level are established as set forth below in accordance with the video format.

Table 8.2.1 Changes in level settings

Description		Reference page	8BIT (standard mode)	MULTI BIT (multi-bit mode)		
			All modes	RGB_24 Y444_24 Y422_24	RGB_30 Y444_30 Y422_30	RGB_36 Y444_36 Y422_36
FUNC0 Direct display	Variable window RGB level	p.46	R:0-255 G:0-255 B:0-255	R:0-255 G:0-255 B:0-255	R:0-1023 G:0-1023 B:0-1023	R:0-4095 G:0-4095 B:0-4095
	Digital video output level	p.47				
	Graphic color level	p.177				
FUNC2 FUNC3 Pattern data	Background color level	p.177				
	Gray scale pattern level	p.188				
	Window pattern level	p.191				
	Cursor pattern Cursor color Background color	p.199				
Bitmap pattern support		-	24bit	24bit	30bit	36bit

8.2.2 Changes in timing settings

In the multi-bit mode, the timing-related settings are as listed below depending on the video format.

Table 8.2.2 Changes in timing settings

Timing data	Setting item	Setting range			Setting increment in multi-bit mode
			8 bits (standard mode)	Multi bits (multi-bit mode)	
Horizontal timing data	Input mode	$\mu\text{s} / \text{dot}$			
	Dot clock frequency	-	5.000 to 300.000 MHz	5.000 to 165.000 MHz	1 kHz increments
	Hperiod	0.00 to 99.99 μs	128 to 8192 dot	128 to 4096 dot	Up to 100.000 MHz: 1-dot increments 100.001 MHz and up: 2-dot increments
	Hdisp	0.00 to 99.99 μs	48 to 4096 dot	48 to 2048 dot	
	Hsync	0.00 to 99.99 μs	0 to 4096 dot	0 to 2048 dot	
	Hbackp	0.00 to 99.99 μs	0 to 4096 dot	0 to 2048 dot	
	Hfrontp	(0.00 to 99.99 μs)	(0 to 4096 dot)	(0 to 2048 dot)	
	HDstart	0.00 to 99.99 μs	0 to 4096 dot	0 to 2048 dot	
	HDwidth				
Hblanking	(40 to 4096 dot)				
Vertical timing data	Input mode	H / ms			
	Scanning mode	Non-interlace, interlace & sync, interlace & video			
	Field mode	1 field, 2 fields			
	Vtotal	0.000 to 99.999 ms	4 to 8192 H (non-interlace)	4 to 4096 H (non-interlace)	1H increments
			4 to 4096 H (interlace)	4 to 2048 H (interlace)	1H (or 0.5H) increments
	Vdisp (1, 2)	0.000 to 99.999 ms	1 to 4096 H	1 to 2048 H	1H increments
	Vsync (1, 2)	0.000 to 99.999 ms	1.0 to 99.0 H		0.5H increments
	Vbackp (1, 2)	0.000 to 99.999 ms	0 to 4096 H	0 to 4096 H	1H (or 0.5H) increments
	Vfrontp (1, 2)	(0.000 to 99.999 ms)	(0 to 4096 H)	(0 to 4096 H)	
	EQPfp (1, 2)	0.000 to 99.999 ms	0.0 to 99.0 H		0.5H increments
	EQPbp (1, 2)				
	Serration	OFF / 0.5H / 1H / EXOR			
	EQP (on / off)	OFF / ON			
	VDstart	0.000 to 99.999 ms	0.0 to 4095.0 H		0.5H increments
	VDline				
	Vblanking	(2 H or more)			

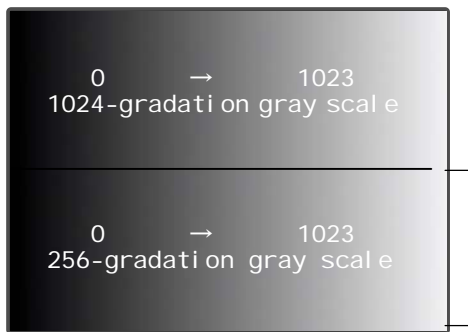
8.2.3 Changing the internal patterns

In the multi-bit mode, the following internal optional patterns are changed into patterns corresponding to multi-gradation gray scale expressions.

No.	8BIT (standard mode)	MULTI BIT (multi-bit mode)
3E	ANSI pattern (Hor Reso) * Graphic representation	Full-step & 256-gradation gray scales H direction ramp ^{*2}
3F	ANSI pattern (Ver Reso) * Graphic representation	Full step H direction ramp ^{*2}

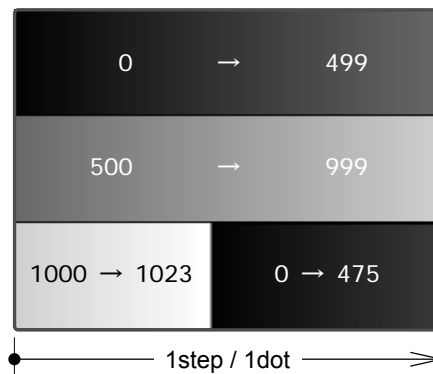
The changes are described using the RGB 10-bit output as the video format.

No.3E



The bottom level is always a 256-gradation gray scale regardless of the output bit mode.

No.3F (when Hdisp is 500 dots)



8.3 Other restrictions

In addition to the restrictions outlined above, the following restriction also apply in the multi-bit mode. If any of the restrictions apply, perform the operations with the bit mode set to “8 bits.”

Table 8.3.1 Other restrictions

Item		Setting range/restriction
Output	Analog outputs (BNC,Dsub,D5,DVI-A)	The maximum frequency of analog outputs is 165 MHz. Composite output timing data (such as NTSC data; refer to “10.4 Standard signal timing signal specifications”) cannot be output.
	VBS output	The VBS output is always OFF.

9

REMOTE CONTROL

By connecting the RB-614C or RB-649 remote control box, the VG-849C can be operated by remote control.

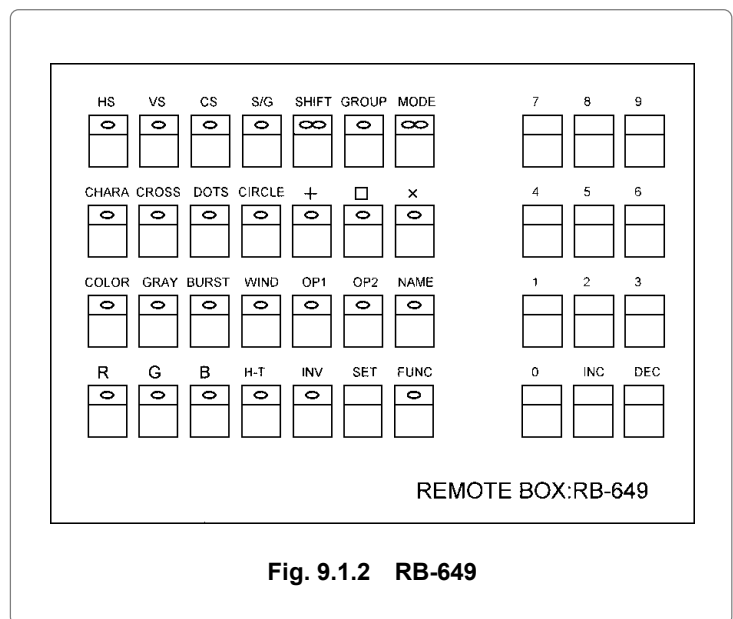
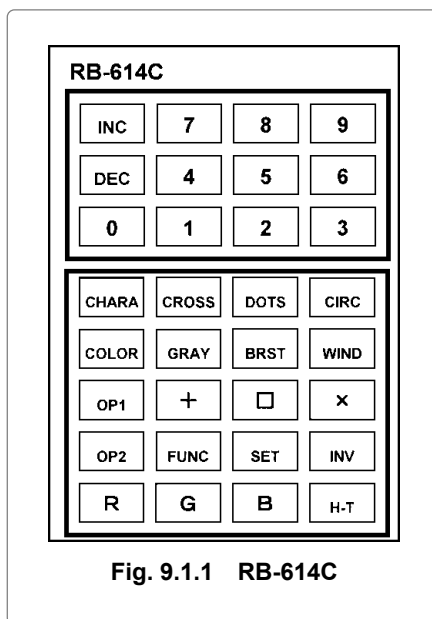
The following three functions can be executed using the RB-614C or RB-649. Neither box can be used to edit program data, etc. (Refer to “11.4.2 Restrictions on functions used by SP-8848, RB-614C and RB-649.”)

Functions which can be executed by remote control

- Direct display **FUNC0**
- PC card data copy **FUNC4**
- List display **FUNC9**

9.1 RB-614C/RB-649

9.1.1 Key layout diagrams






9.1.2 Connections

Connect the connecting cable of the RB-614C or RB-649 to the remote connector on the rear panel of the VG-849C.

9.1.3 Concerning the key operations

The keys of the RB-614C and RB-649 listed in the table below can be used in place of the corresponding VG-849C/RB-1848 keys.

Table 9.1.1 Table of RB-1848, RB-614C and RB-649 key correspondences

RB-1848	RB-614C	RB-649
CHARA to OPT2 (*1)	CHARA to OPT2	CHARA to OPT2
CURSOR	H-T (*4)	H-T
FORMAT	-	-
NAME	-	NAME
MUTE to  (*2)	-	-
PROG, TIMING, PAT	-	MODE (*5)
(*3)	H-T (*4)	GROUP
HS/CS, VS, G/S	-	HS, VS, CS, S/G
YPbPr	-	-
R/R-Y, G/Y, B/B-Y	R, G, B	R, G, B
INV	INV	INV
FUNC	FUNC	FUNC
ESC	-	-
SHIFT	-	SHIFT
SET	SET	SET
0 to 9	0 to 9	0 to 9
	INC	INC
	DEC	DEC

*1) CHARA, CROSS, DOTS, CIRCLE, +, □, ×, COLOR, GRAY, BURST, WINDOW, OPT1, OIPT2

*2) MUTE, SAVE, LEVEL, ◀, ▶

*3) The function of the GROUP key on the RB-649 corresponds to the [ESC] key used to change the group numbers with direct display **FUNC0** on the RB-1848. (Refer "4.1.3 Changing the group numbers.")

*4) Either the GROUP key function or CURSOR key function can be selected for the [H-T] key on the RB-614C. The selection is set using "[25] Setting the RB-614C H-T key function" of config edit **FUNC5**.

*5) The [MODE] key on the RB-649 works as follows in the direct display mode.

- Lighted (red, green): All the program data is executed.
- Lighted (red): Only the timing data is executed.
- Lighted (green): Only the pattern data is executed.

10

REFERENCE

This chapter contains information on the following subjects.

● Details of internal data

Program data	
Commentary	p.229
PG1 No.850 to 999	p.230
PG2 No.850 to 999	p.235
PG3 No.850 to 999	p.240
Optional pattern data	
Codes 00H to 3FH	p.245
User character pattern data	
Codes F0H to FFH	p.250
Character pattern data	
5×7	p.255
7×9	p.257
16×16	p.259

● Concerning PC cards

Usable PC cards, data registration formats, etc.	p.263
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● List of error messages

● Standard signal timing specifications

10.1 Internal data

10.1.1 Program data

----- Commentary -----

- * Areas left blank in the PG1 timing data denote default timing data (VGA).
- * Areas left blank in the PG2 timing data denote default timing data (program No.850: EIA640 × 480p@59.94).
- * Areas left blank in the PG3 timing data denote default timing data (program No.850: EIA640 × 480p@59.94).
- * “N” and “P” used for sync polarity denote negative and positive, respectively.
- * The value calculated for two fields is displayed on the LCD screen as the vertical frequency during interlace scanning. The value calculated for one field is used in this manual.
- * The priority output port for programs whose timing data name starts with “EIA” (refer to “[11] Setting the DVI output mode and priority output port” in “5.4 Setting the output condition data”) is set to “HDMI.” The priority output port for all other programs is set to “ANALOG.”
- * pN : “N” denotes the YPbPr coefficient table number.
- * pS : The color difference coefficients comply with the SMPTE (ITU-601) standard.
- * pH : The color difference coefficients comply with the ITU-709 standard.
- * 3 : This is a tri-level sync signal output.
- * R : Repetition = 2

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
850	37.861	85.080	31.500	640×400	Prog	N	P	ANALOG	RGB	VESA400-85	Character list 7×9	Character List
851	37.861	72.809	31.500	640×480	Prog	N	N	ANALOG	RGB	VESA480-72	OPT27 (Song of Youth)	Words
852	37.500	75.000	31.500	640×480	Prog	N	N	ANALOG	RGB	VESA480-75	Character 1 (H 5×7 / 10×14)	H Character 1
853	35.156	56.250	36.000	800×600	Prog	P	P	ANALOG	RGB	VESA600-56	Character 1 (H 7×9/14×18)	H Character 2
854	37.879	60.317	40.000	800×600	Prog	P	P	ANALOG	RGB	VESA600-60	Character 1 (H 16×16/32×32)	H Character 3
855	48.077	72.188	50.000	800×600	Prog	P	P	ANALOG	RGB	VESA600-72	Character 2 (H 5×7/10×14)	H Character 4
856	48.363	60.004	65.000	1024×768	Prog	N	N	ANALOG	RGB	VESA768-60	Character 2 (H 7×9/14×18)	H Character 5
857	56.476	70.069	75.000	1024×768	Prog	N	N	ANALOG	RGB	VESA768-70	Character 2 (H 16×16/32×32)	H Character 6
858	60.023	75.029	78.750	1024×768	Prog	P	P	ANALOG	RGB	VESA768-75	Character 1 (@ 7×9/14×18)	@ Character
859	79.976	75.025	135.000	1280×1024	Prog	P	P	ANALOG	RGB	VESA1024-75	Character 1 (Chinese character "KU" 7×9/14×18)	Chinese Chara 1
860	91.146	85.024	157.500	1280×1024	Prog	P	P	ANALOG	RGB	VESA1024-85	Character 1 (Chinese character "BI" 7×9/64×64)	Chinese Chara 2
861	75.000	60.000	162.000	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-60	Character 1 (Chinese character "AI" 7×9/64×64)	Chinese Chara 3
862	81.250	65.000	175.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-65	Character 1 (chessboard 16×16/16×16)	1 dot ON/OFF
863	87.500	70.000	189.000	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-70	Character me (#1 18×18)	me Character 1
864	93.750	75.000	202.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-75	Character me (VESAspecifications 18×18)	me Character 2
865	100.000	80.000	216.000	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-80	OPT0B (character edge H)	H Character Line
866	106.250	85.000	229.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1200-85	OPT0C (character edge O)	O Character Line
867	98.214	70.063	236.500	1800×1350	Prog	N	P	ANALOG	RGB	VESA1350-70		
868	18.435	49.825	16.260	720×350	Prog	N	N	ANALOG	RGB	MDA	1-dot width crosshatch (H=5,V=5)	1 line Cross5×5
869	15.746	60.098	14.360	640×200	Prog	N	N	ANALOG	RGB	CGA	2-dot width crosshatch (H=5,V=5)	2 line Cross5×5
870	21.855	59.713	16.260	640×350	Prog	N	N	ANALOG	RGB	EGA	OPT23 (DDC pattern D-Sub-EDID display)	
871	30.478	59.996	24.870	640×400	Prog	N	N	ANALOG	RGB	PGA	2-dot width crosshatch (H=8,V=8)	2 line Cross8×8
872	31.467	50.026	28.320	720×350	Prog	N	N	ANALOG	RGB	VGA-TEXT350-50	1-dot width crosshatch (H=10,V=8)	1 line Cross10×8
873	31.467	59.937	28.320	720×350	Prog	N	N	ANALOG	RGB	VGA-TEXT350-60	2-dot width crosshatch (H=10,V=8)	2 line Cross10×8
874	31.467	70.082	28.320	720×350	Prog	N	N	ANALOG	RGB	VGA-TEXT350-70	1-dot width crosshatch (H=16,V=12)	1 line Cross16×12
875	31.467	50.026	28.320	720×400	Prog	N	N	ANALOG	RGB	VGA-TEXT400-50	2-dot width crosshatch (H=16,V=12)	2 line Cross16×12
876	31.467	59.937	28.320	720×400	Prog	N	N	ANALOG	RGB	VGA-TEXT400-60		
877	31.467	70.082	28.320	720×400	Prog	N	N	ANALOG	RGB	VGA-TEXT400-70	Burst (Format 0)	Burst 1
878	31.469	50.030	25.175	640×350	Prog	N	N	ANALOG	RGB	VGA350-50	Burst (Format 1)	Burst 2
879	31.469	59.940	25.175	640×350	Prog	N	N	ANALOG	RGB	VGA350-60	Burst (Format 2)	Burst 3

PG1 program No.880-909

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
880	31.469	70.086	25.175	640×350	Prog	N	N	ANALOG	RGB	VGA350-70	Burst (Format 3)	Burst 4
881	31.469	50.030	25.175	640×400	Prog	N	N	ANALOG	RGB	VGA400-50		
882	31.469	59.940	25.175	640×400	Prog	N	N	ANALOG	RGB	VGA400-60	OPT10 (sine wave scroll)	Sign Wave Scroll
883	31.469	70.086	25.175	640×400	Prog	N	N	ANALOG	RGB	VGA400-70	OPT11 (multi burst)	Multi Burst
884	31.469	50.030	25.175	640×480	Prog	N	N	ANALOG	RGB	VGA480-50	OPT12 (10 steps & 1/10 MHz)	1/10MHz × 10step
885	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	VGA480-60	Circle (Format 0)	Circle 1
886	35.156	56.160	36.000	800×600	Prog	N	N	ANALOG	RGB	S-VGA-56	Circle (Format 1)	Circle 2
887	48.077	72.188	50.000	800×600	Prog	N	N	ANALOG	RGB	S-VGA-72	Circle (Format 2)	Circle 3
888	46.875	75.000	49.500	800×600	Prog	N	N	ANALOG	RGB	S-VGA-75	Circle (Format 3)	Circle 4
889	48.077	59.797	65.000	1024×768	Prog	N	N	ANALOG	RGB	XGA-60	Circle (Format 4)	Circle 5
890	53.946	66.110	71.640	1024×768	Prog	N	N	ANALOG	RGB	XGA-66	Circle (Format 5)	Circle 6
891	56.476	70.069	75.000	1024×768	Prog	N	N	ANALOG	RGB	XGA-70	Circle (Format 6)	Circle 7
892	60.680	57.030	100.000	1280×1024	Prog	N	N	ANALOG	RGB	SXGA-57		
893	63.498	59.678	106.930	1280×1024	Prog	N	N	ANALOG	RGB	SXGA-60A	Window (Format 0, Flicker 0)	Window 1
894	63.750	59.747	110.160	1280×1024	Prog	N	N	ANALOG	RGB	SXGA-60B	Window (Format 1, Flicker 0)	Window 2
895	63.719	59.999	109.470	1280×1024	Prog	N	N	ANALOG	RGB	SXGA-60C	Window (Format 2, Flicker 0)	Window 3
896	78.907	74.161	132.880	1280×1024	Prog	N	N	ANALOG	RGB	SXGA-70	Window (Format 3, Flicker 0)	Window 4
897	74.627	59.941	160.000	1600×1200	Prog	N	N	ANALOG	RGB	UXGA1200-60	Window (Format 4, Flicker 0)	Window 5
898	107.422	85.053	220.000	1600×1200	Prog	N	N	ANALOG	RGB	UXGA1200-85A	Window (Format 5, Flicker 0)	Window 6
899	106.481	85.049	230.000	1600×1200	Prog	N	N	ANALOG	RGB	UXGA1200-85B	Window (Format 6, Flicker 7)	Moving Window 1
900	107.422	80.046	220.000	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80A	Window (Format 7, Flicker 7)	Moving Window 2
901	106.481	80.061	230.000	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80B	Window (Format 8, Flicker 7)	Moving Window 3
902	106.402	80.001	238.340	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80C	Window (Format 9, Flicker 0)	Window Level
903	109.821	80.396	246.000	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-82	Window (Format 0, Flicker 1)	Flicker Window 1
904	35.522	86.958	44.900	1024×768	Int	N	N	ANALOG	RGB	IBM 8514A	Window (Format 0, Flicker 3)	Flicker Window 2
905	63.359	59.999	89.120	1024×1024	Prog	N	N	ANALOG	RGB	IBM 5080	Window (Format 0, Flicker 5)	Flicker Window 3
906	29.581	73.130	24.020	640×754	Int	N	N	ANALOG	RGB	IBM 5550	Window (Format 0, Flicker 7)	Flicker Window 4
907	63.364	60.003	111.520	1280×1024	Prog	N	N	ANALOG	RGB	IBM 6000		
908	15.714	59.978	6.380	323×246	Prog	N	N	ANALOG	RGB	NAVIGATION	Color bar (horizontal, 8 colors × 1)	Color Bar 1
909	35.000	66.667	30.240	640×480	Prog	N	N	ANALOG	RGB	Mac-480-66A	Color bar (horizontal, 8 colors × 2)	Color Bar 2

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
910	34.967	66.603	31.330	640×480	Prog	N	N	ANALOG	RGB	Mac 480-66B	Color bar (vertical, 8 colors × 1)	Color Bar 3
911	48.828	66.888	50.000	800×600	Prog	N	N	ANALOG	RGB	Mac 600-66	Color bar (vertical, 8 colors × 2)	Color Bar 4
912	49.722	74.546	57.280	832×624	Prog	N	N	ANALOG	RGB	Mac 624-57	Color bar (horizontal, H=0.1%)	Color Bar 5
913	48.780	59.561	64.000	1024×768	Prog	N	N	ANALOG	RGB	Mac 768-60	Color bar (vertical, V=0.1%)	Color Bar 6
914	60.241	74.927	80.000	1024×768	Prog	N	N	ANALOG	RGB	Mac 768-75	OPT06 (color temperature)	Color Temp.
915	68.681	75.062	100.000	1152×870	Prog	N	N	ANALOG	RGB	Mac 870-75	OPT2D (random 256 colors)	Random 256 Color
916	24.823	56.416	21.050	640×400	Prog	N	N	ANALOG	RGB	NEC PC9801	OPT2A (256-color character)	256 Color Chara
917	32.857	79.847	47.840	1120×750	Int	N	N	ANALOG	RGB	NEC PC9801XL	OPT00 (256-block color)	256 Block Color
918	50.019	60.047	78.430	1120×750	Prog	N	N	ANALOG	RGB	NEC 768-60A	OPT03 (8 colors & 16 gray)	8Color & 16Gray
919	56.476	70.069	75.000	1024×768	Prog	N	N	ANALOG	RGB	NEC 768-70	Gray scale (4 steps)	Gray 4 step
920	64.603	59.929	107.500	1280×1024	Prog	N	N	ANALOG	RGB	NEC 1024-60	Gray scale (horizontal 8 gradations)	Gray 8 step (H)
921	74.882	69.853	127.000	1280×1024	Prog	N	N	ANALOG	RGB	NEC 1024-70	Gray scale (horizontal 16 gradations)	Gray 16 step (H)
922	78.855	74.112	135.000	1280×1024	Prog	N	N	ANALOG	RGB	NEC 1024-75	OPT1B (horizontal 32 gradations of gray)	Gray 32 step (H)
923	48.363	60.078	65.000	1024×768	Prog	N	N	ANALOG	RGB	NEC 768-60B	OPT1C (horizontal 64 gradations of gray)	Gray 64 step (H)
924	61.795	65.950	92.940	1152×900	Prog	N	N	ANALOG	RGB	SUN 900-66	OPT2B (horizontal linear gradation ramp)	Gray 256 step (H)
925	71.732	76.068	105.590	1152×900	Prog	N	N	ANALOG	RGB	SUN 900-76	Gray scale (vertical 8 gradations)	Gray 8 step (V)
926	70.838	84.031	92.940	1024×800	Prog	N	N	ANALOG	RGB	SUN 800-84	Gray scale (vertical 16 gradations)	Gray 16 step (V)
927	81.130	76.107	135.000	1280×1024	Prog	N	N	ANALOG	RGB	SUN 1024-76	OPT36 (vertical 32 gradations of gray)	Gray 32 step (V)
928	63.384	60.023	107.500	1280×1024	Prog	N	N	ANALOG	RGB	SONY NEWS	OPT37 (vertical 64 gradations of gray)	Gray 64 step (V)
929	78.855	74.112	135.000	1280×1024	Prog	N	N	ANALOG	RGB	SONY 1024-74	OPT2C (vertical linear gradation ramp)	Gray 256 step (V)
930	78.855	74.112	135.000	1280×1024	Prog	N	N	ANALOG	RGB	SONY 1024-74	OPT01 (64-gradation block gray/white → black)	Gray 64 Block 1
931	48.485	59.637	64.000	1024×768	Prog	N	N	ANALOG	RGB	SGI Indigo768-60	OPT02 (64-gradation block gray/black → white)	Gray 64 Block 2
932	77.014	72.382	130.000	1280×1024	Prog	N	N	ANALOG	RGB	SGI Indigo 1024-70	OPT34 (circle & crosshatch)	Circle & Cross
933	63.899	59.999	107.350	1280×1024	Prog	N	N	ANALOG	RGB	SGI IRIS4D	OPT0D (crosstalk width 90%)	Cross Talk 90%
934	63.331	59.973	108.170	1280×1024	Prog	N	N	ANALOG	RGB	HP 900011	OPT21 (crosstalk width 60%)	Cross Talk 60%
935	78.125	72.005	135.000	1280×1024	Prog	N	N	ANALOG	RGB	HP 900012	Black solid	Black
936	54.000	60.000	69.120	1024×864	Prog	N	N	ANALOG	RGB	VAX 768-60	White solid	RGB
937	70.660	66.473	119.840	1280×1024	Prog	N	N	ANALOG	RGB	VAX 1024-66	Red solid	R
938	60.046	75.057	78.780	1024×768	Prog	N	N	ANALOG	RGB	Fujitsu FMV 1024-75	Green solid	G
939	80.662	100.828	108.410	1024×768	Prog	N	N	ANALOG	RGB	Fujitsu FMV 1024-100	Blue solid	B

PG1 program No.940-969

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
940	79.698	74.833	134.370	1280×1024	Prog	N	N	ANALOG	RGB	Fujitsu FMV5166	Magenta solid	R-B
941	80.381	75.122	135.040	1280×1024	Prog	N	N	ANALOG	RGB	Fujitsu FMV5133	Yellow solid	R-G
942	63.738	60.017	108.100	1280×1024	Prog	N	N	ANALOG	RGB	Fujitsu SIGMA	Cyan solid	G-B
943	78.160	71.640	135.060	1280×1024	Prog	N	N	ANALOG	RGB	HITACHI SXGA	Dot (H=20, V=20)	Dot H20 / V20
944	26.354	59.896	22.770	640×400	Prog	N	N	ANALOG	RGB	Panasonic M550	Dot (H=60, V=60)	Dot H60 / V60
945	46.875	75.000	49.500	800×600	Prog	P	P	ANALOG	RGB	VESA600-75	OPT00 (256-block color)	256 Block Color
946					Prog	N	N	ANALOG	RGB		OPT09 (crosshatch & circle & character)	Total Test
947	31.473	59.948	28.640	746×471	Prog	N	N	ANALOG	RGB	ASTRO SC-2025	OPT26 (SMPTE color version)	SMPTE RP133 COL
948	64.000	59.981	115.210	1400×1050	Prog	N	N	ANALOG	RGB	SXGA+	OPT30 (window & edge)	Window & Edge
949	94.643	59.599	265.010	2048×1536	Prog	N	N	ANALOG	RGB	QXGA	OPT0A (circle & line)	Circle & Line
950	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YPbPr	NTSC (*p3)	Window (Format0, Flicker0, 2-3 pulldown)	Flicker Window 1
951	33.750	60.000	74.250	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1080i (*3,*p0)	Window (Format0, Flicker0, 2-3 pulldown)	Flicker Window 1
952					Prog	N	N	ANALOG	RGB		Black solid	Black
953					Prog	N	N	ANALOG	RGB		White solid	RGB
954					Prog	N	N	ANALOG	RGB		Red solid	R
955					Prog	N	N	ANALOG	RGB		Green solid	G
956	31.216	49.986	46.200	1170×1168	Int	N	N	ANALOG	RGB	MEDICAL-1I	Blue solid	B
957	31.216	50.026	46.200	1170×584	Prog	N	N	ANALOG	RGB	MEDICAL-1N	Magenta solid	R-B
958	30.692	60.003	36.830	947×946	Int	N	N	ANALOG	RGB	MEDICAL-2I	Yellow solid	R-G
959	30.692	60.062	36.830	947×473	Prog	N	N	ANALOG	RGB	MEDICAL-2N	Cyan solid	G-B
960	37.927	85.039	35.500	720×400	Prog	N	P	ANALOG	RGB	VESA400-88	OPT00 (256-block color)	256 Block Color
961	112.500	90.000	243.000	1600×1200	Prog	N	N	ANALOG	RGB	1200-90	OPT1A (ITC pattern H character)	ITC H Character
962					Prog	N	N	ANALOG	RGB		OPT30 (window & edge)	Window & Edge
963	63.981	60.020	108.000	1280×1024	Prog	P	P	ANALOG	RGB	VESA1024-60	OPT19 (ITC pattern crosshatch & marker)	ITC Cross & Marker
964	15.625	50.000	13.500	702×574	Int	N	N	SECAM (*p2)	YPbPr	SECAM (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
965	31.471	59.944	34.240	864×480	Prog	N	N	ANALOG	RGB	W-VGA	OPT05 (color bar & crosshatch)	Color & Cross
966	37.879	60.317	53.940	1072×600	Prog	N	N	ANALOG	RGB	W-SVGA	OPT07 (pairing)	Pairing
967	48.363	60.004	87.440	1376×768	Prog	N	N	ANALOG	RGB	W-XGA	OPT08 (crosshatch & circle & gray)	Cross & Circle
968	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YPbPr	NTSC (*p3)	OPT0F (NTSC color bar)	NTSC Color Bar
969	15.625	50.000	13.500	702×574	Int	N	N	PAL	YPbPr	PAL (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int/Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
970	67.500	60.000	148.500	1920×1080	Prog	P	P	Tri-Sync (1080)	YPbPr	1080P (*3,*p0)	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
971	67.433	59.940	148.352	1920×1080	Prog	P	P	Tri-Sync (1080)	YPbPr	1080P (*3,*p0)	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
972	33.750	60.000	74.250	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1080i (*3,*p0)	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
973	33.716	59.940	74.176	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1080i (*3,*p0)	OPT17 (SMPTE RP27.1)	SMPTE PR27.1
974	33.750	60.000	74.250	1920×1035	Int	P	P	Tri-Sync (1035)	YPbPr	1035i (*3,*p1)	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
975	33.716	59.940	74.176	1920×1035	Int	P	P	Tri-Sync (1035)	YPbPr	1035i (*3,*p1)	OPT26 (SMPTE color version)	SMPTE RP133 COL
976	45.000	60.000	74.250	1280×720	Prog	P	P	Tri-Sync (720)	YPbPr	720P (*3,*p0)	OPT1D (64 gray + RGBW color)	64 Gray & Color
977	44.955	59.940	74.176	1280×720	Prog	P	P	Tri-Sync (720)	YPbPr	720P (*3,*p0)	OPT1E (gray scale + circle)	Gray & Circle
978	31.469	59.940	27.000	720×483	Prog	N	N	ANALOG	YPbPr	483P (*p2) (NTSC PROG.)	OPT29 (crosshatch & marker)	Cross & Marker
979	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	YPbPr	PAL *2 (*p2) (PAL PROG.)	OPT26 (SMPTE color version)	SMPTE RP133 COL
980	83.640	60.000	204.750	1792×1344	Prog	N	P	ANALOG	RGB	VESA1344-60	OPT35 (chessboard & window)	1dot.ON/OFF
981	83.640	60.000	204.750	1792×1344	Prog	N	P	ANALOG	RGB	VESA1344-60	OPT22 (DDC pattern DVI-EDID display)	
982	86.333	59.995	218.250	1856×1392	Prog	N	P	ANALOG	RGB	VESA1392-60	OPT33 (19×15 crosshatch & marker)	D.Y.Test
983	86.333	59.995	218.250	1856×1392	Prog	N	N	ANALOG	RGB	VESA1392-60	OPT32 (3 gradation window)	TTL test
984	90.000	60.000	234.000	1920×1440	Prog	P	P	ANALOG	RGB	VESA1440-60	OPT16 (SMPTE color bar)	SMPTE Color Bar
985	90.000	60.000	234.000	1920×1440	Prog	N	P	ANALOG	RGB	VESA1440-60	OPT28 (timing chart)	Timing Chart
986					Prog	N	N	ANALOG	RGB			
987					Prog	N	N	ANALOG	RGB		Center & edge	Center & Edge
988					Prog	N	N	ANALOG	RGB		Edge & diagonal line	Diagonal & Edge 1
989					Prog	N	N	ANALOG	RGB		Edge & diagonal line & center	Diagonal & Edge 2
990					Prog	N	N	ANALOG	RGB		OPT24 (display position adjuster)	Display Position
991					Prog	N	N	ANALOG	RGB		OPT00 (256-block color)	256 Block Color
992					Prog	N	N	ANALOG	RGB			
993					Prog	N	N	ANALOG	RGB		Moving bar	Moving Bar
994	15.734	59.940	13.500	712×484	Int	N	N	NTSC-M (*p3)	YPbPr	NTSC-M (*p3)	OPT0F (NTSC color bar)	NTSC Color Bar
995	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	VGA480-60		
996	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	VGA480-60	OPT80 (image data #1 display)	IMG Disp #1
997	48.077	72.188	50.000	800×600	Prog	P	P	ANALOG	RGB	VESA600-72	OPT81 (image data #2 display)	IMG Disp #2
998	56.476	70.069	75.000	1024×768	Prog	N	N	ANALOG	RGB	VESA768-70	OPT82 (image data #3 display)	IMG Disp #3
999	79.976	75.025	135.000	1280×1024	Prog	P	P	ANALOG	RGB	VESA1024-75	OPT83 (image data #4 display)	IMG Disp #4

PG2 program No.850-879

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
850	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	EIA640×480p@59.94	OPT13 (gamma correction ramp w=2.5)	Gamma Ramp 1
851	31.500	60.000	25.200	640×480	Prog	N	N	ANALOG	RGB	EIA640×480p@60	OPT13 (gamma correction ramp w=2.5)	Gamma Ramp 1
852	31.469	59.940	27.000	720×480	Prog	N	N	ANALOG	RGB	EIA720×480p@59.94	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
853	31.500	60.000	27.027	720×480	Prog	N	N	ANALOG	RGB	EIA720×480p@60	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
854	31.469	59.940	27.000	720×480	Prog	N	N	ANALOG	RGB	EIA720×480pW@59.94	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
855	31.500	60.000	27.027	720×480	Prog	N	N	ANALOG	RGB	EIA720×480pW@60	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
856	44.955	59.939	74.175	1280×720	Prog	P	P	ANALOG	RGB	EIA1280×720p@59.94	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
857	45.000	60.000	74.250	1280×720	Prog	P	P	ANALOG	RGB	EIA1280×720p@60	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
858	33.716	59.939	74.175	1920×1080	Int	P	P	ANALOG	RGB	EIA1920×1080i@59.94	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
859	33.750	60.000	74.250	1920×1080	Int	P	P	ANALOG	RGB	EIA1920×1080i@60	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
860	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	RGB	EIA1440×480i@59.94	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
861	15.751	60.002	27.027	1440×480 *R	Int	N	N	ANALOG	RGB	EIA1440×480i@60	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
862	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	RGB	EIA1440×480iW@59.94	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
863	15.751	60.002	27.027	1440×480 *R	Int	N	N	ANALOG	RGB	EIA1440×480iW@60	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
864	15.734	60.054	27.000	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240p@59.94	OPT26 (SMPTE color version)	SMPTE RP133 COL
865	15.750	60.115	27.027	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240p@60	OPT26 (SMPTE color version)	SMPTE RP133 COL
866	15.734	60.054	27.000	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240pW@59.94	OPT26 (SMPTE color version)	SMPTE RP133 COL
867	15.750	59.886	27.027	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240pW@60	OPT26 (SMPTE color version)	SMPTE RP133 COL
868	15.734	59.826	27.000	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240p@59.94	OPT26 (SMPTE color version)	SMPTE RP133 COL
869	15.750	59.886	27.027	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240p@60	OPT26 (SMPTE color version)	SMPTE RP133 COL
870	15.734	59.826	27.000	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240pW@59.94	OPT26 (SMPTE color version)	SMPTE RP133 COL
871	15.750	59.886	27.027	1440×240 *R	Prog	N	N	ANALOG	RGB	EIA1440×240pW@60	OPT26 (SMPTE color version)	SMPTE RP133 COL
872	15.734	59.940	54.000	2880×480	Int	N	N	ANALOG	RGB	EIA2880×480i@59.94	OPT1D (64 gray + RGBW color)	64 Gray & Color
873	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	RGB	EIA2880×480i@60	OPT1D (64 gray + RGBW color)	64 Gray & Color
874	15.734	59.940	54.000	2880×480	Int	N	N	ANALOG	RGB	EIA2880×480iW@59.94	OPT1D (64 gray + RGBW color)	64 Gray & Color
875	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	RGB	EIA2880×480iW@60	OPT1D (64 gray + RGBW color)	64 Gray & Color
876	15.734	60.054	54.000	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240p@59.94	OPT1E (gray scale + circle)	Gray & Circle
877	15.750	60.115	54.054	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240p@60	OPT1E (gray scale + circle)	Gray & Circle
878	15.734	60.054	54.000	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240pW@59.94	OPT1E (gray scale + circle)	Gray & Circle
879	15.750	60.115	54.054	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240pW@60	OPT1E (gray scale + circle)	Gray & Circle

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
880	15.734	59.826	54.000	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240p@59.94	OPT1E (gray scale + circle)	Gray & Circle
881	15.750	59.886	54.054	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240p@59.94	OPT1E (gray scale + circle)	Gray & Circle
882	15.734	59.826	54.000	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240pW@59.94	OPT1E (gray scale + circle)	Gray & Circle
883	15.750	59.886	54.054	2880×240	Prog	N	N	ANALOG	RGB	EIA2880×240pW@60	OPT1E (gray scale + circle)	Gray & Circle
884	31.469	59.940	54.000	1440×480	Prog	N	N	ANALOG	RGB	EIA1440×480p@59.94	OPT29 (crosshatch & marker)	Cross & Marker
885	31.500	60.000	54.054	1440×480	Prog	N	N	ANALOG	RGB	EIA1440×480p@60	OPT29 (crosshatch & marker)	Cross & Marker
886	31.469	59.940	54.000	1440×480	Prog	N	N	ANALOG	RGB	EIA1440×480pW@59.94	OPT29 (crosshatch & marker)	Cross & Marker
887	31.500	60.000	54.054	1440×480	Prog	N	N	ANALOG	RGB	EIA1440×480pW@60	OPT29 (crosshatch & marker)	Cross & Marker
888	67.432	59.939	148.350	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@59.94	OPT26 (SMPTE color version)	SMPTE RP133 COL
889	67.500	60.000	148.500	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@60	OPT26 (SMPTE color version)	SMPTE RP133 COL
890	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	RGB	EIA720×576p@50	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
891	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	RGB	EIA720×576pW@50	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
892	37.500	50.000	74.250	1280×720	Prog	P	P	ANALOG	RGB	EIA1280×720p@50	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
893	28.125	50.000	74.250	1920×1080	Int	P	P	ANALOG	RGB	EIA1920×1080@50	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
894	15.625	50.000	27.000	1440×576 *R	Int	N	N	ANALOG	RGB	EIA1440×576@50	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
895	15.625	50.000	27.000	1440×576 *R	Int	N	N	ANALOG	RGB	EIA1440×576W@50	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
896	15.625	50.080	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288p@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
897	15.625	50.080	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288pW@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
898	15.625	49.920	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288p@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
899	15.625	49.920	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288pW@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
900	15.625	49.761	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288p@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
901	15.625	49.761	27.000	1440×288 *R	Prog	N	N	ANALOG	RGB	EIA1440×288pW@50	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
902	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	RGB	EIA2880×576@50	OPT26 (SMPTE color version)	SMPTE RP133 COL
903	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	RGB	EIA2880×576W@50	OPT26 (SMPTE color version)	SMPTE RP133 COL
904	15.625	50.080	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288p@50	OPT1D (64 gray + RGBW color)	64 Gray & Color
905	15.625	50.080	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288pW@50	OPT1D (64 gray + RGBW color)	64 Gray & Color
906	15.625	49.920	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288p@50	OPT1D (64 gray + RGBW color)	64 Gray & Color
907	15.625	49.920	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288pW@50	OPT1D (64 gray + RGBW color)	64 Gray & Color
908	15.625	49.761	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288p@50	OPT1D (64 gray + RGBW color)	64 Gray & Color
909	15.625	49.761	54.000	2880×288	Prog	N	N	ANALOG	RGB	EIA2880×288pW@50	OPT1D (64 gray + RGBW color)	64 Gray & Color

PG2 program No.910-939

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
910	31.250	50.000	54.000	1440×576	Prog	P	P	ANALOG	RGB	EIA1440×576p@50	OPT1E (gray scale + circle)	Gray & Circle
911	31.250	50.000	54.000	1440×576	Prog	P	P	ANALOG	RGB	EIA1440×576pW@50	OPT1E (gray scale + circle)	Gray & Circle
912	56.250	50.000	148.500	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@50	OPT1E (gray scale + circle)	Gray & Circle
913	26.973	23.976	74.175	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@23.97	OPT29 (crosshatch & marker)	Cross & Marker
914	27.000	24.000	74.250	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@24	OPT29 (crosshatch & marker)	Cross & Marker
915	28.125	25.000	74.250	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@25	OPT26 (SMPTTE color version)	SMPTTE RP133 COL
916	33.716	24.970	74.175	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@29.97	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
917	33.750	30.000	74.250	1920×1080	Prog	P	P	ANALOG	RGB	EIA1920×1080p@30	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
918	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YPbPr	NTSC-J 16.9 (*p3)	OPT34 (circle & crosshatch)	Cross & Circle
919	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YPbPr	NTSC-J LB (*p3)	OPT34 (circle & crosshatch)	Cross & Circle
920	15.625	50.000	13.500	702×574	Int	N	N	PAL	YPbPr	PAL 16.9 (*p2)	OPT34 (circle & crosshatch)	Cross & Circle
921	15.625	50.000	13.500	702×574	Int	N	N	PAL	YPbPr	PAL LB (*p2)	OPT34 (circle & crosshatch)	Cross & Circle
922	15.625	50.000	13.500	702×574	Int	N	N	SECAM	YPbPr	SECAM 16.9 (*p2)	OPT34 (circle & crosshatch)	Cross & Circle
923	15.625	50.000	13.500	702×574	Int	N	N	SECAM	YPbPr	SECAM LB (*p2)	OPT34 (circle & crosshatch)	Cross & Circle
924	15.734	59.940	13.500	712×484	Int	N	N	NTSC-M	YPbPr	NTSC-M (*p3)	100%, 100% color bar	100%, 100% Color Bar
925	15.734	59.940	13.500	712×484	Int	N	N	NTSC-443	YPbPr	NTSC-443 (*p3)	100%, 100% color bar	100%, 100% Color Bar
926	15.734	59.940	13.500	712×484	Int	N	N	PAL-M	YPbPr	PAL-M (*p2)	75%, 75% color bar	75%, 75% Color Bar
927	15.734	59.940	13.500	712×484	Int	N	N	PAL-60	YPbPr	PAL-60 (*p2)	75%, 75% color bar	75%, 75% Color Bar
928	15.625	50.000	13.500	702×574	Int	N	N	PAL-N	YPbPr	PAL-N (*p2)	100%, 75% color bar (OPT0F)	NTSC Color Bar
929	15.625	50.000	13.500	702×574	Int	N	N	PAL-Nc	YPbPr	PAL-Nc (*p2)	100%, 75% color bar (OPT0F)	NTSC Color Bar
930	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YPbPr	NTSC-J 4:3 (*p3)	OPT0F (NTSC color bar)	NTSC Color Bar
931	15.625	50.000	13.500	702×574	Int	N	N	PAL	YPbPr	PAL 4:3 (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
932	15.625	50.000	13.500	702×574	Int	N	N	SECAM	YPbPr	SECAM 4:3 (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
933	33.716	59.940	74.176	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1080i (*3*p0)	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
934	33.716	59.940	74.176	1920×1035	Int	P	P	Tri-Sync (1035)	YPbPr	1035i (*3*p1)	OPT25 (SMPTTE RP-133)	SMPTTE RP133 MONO
935	67.500	60.000	148.500	1920×1080	Prog	P	P	Tri-Sync (1080)	YPbPr	1920×1080@60p (*3*p0)	OPT80 (image data #1 display)	IMG Disp #1
936	67.433	59.940	148.352	1920×1080	Prog	P	P	Tri-Sync (1080)	YPbPr	1920×1080@59.94p (*3*p0)	OPT81 (image data #2 display)	IMG Disp #2
937	56.250	50.000	148.500	1920×1080	Prog	P	P	Tri-Sync (1080)	YPbPr	1920×1080@50p (*3*p0)	OPT82 (image data #3 display)	IMG Disp #3
938	33.716	59.940	74.176	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1920×1080@59.94i (*3*p0)	OPT83 (image data #4 display)	IMG Disp #4
939	28.125	50.000	74.250	1920×1080	Int	P	P	Tri-Sync (1080)	YPbPr	1920×1080@50i (*3*p0)	256-step gray scale	Gray 256 step

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
940	45.000	60.000	74.250	1280×720	Prog	P	P	Tri-Sync(720)	YPbPr	1280×720@60p (*3*P0)	64-step gray scale	Gray 64 step
941	44.955	59.940	74.176	1280×720	Prog	P	P	Tri-Sync(720)	YPbPr	1280×720@59.94p (*3*P0)	32-step gray scale	Gray 32 step
942	37.500	50.000	74.250	1280×720	Prog	P	P	Tri-Sync(720)	YPbPr	1280×720@50p (*3*P0)	16-step gray scale	Gray 16 step
943					Prog	N	N	ANALOG	RGB		8-step gray scale	Gray 8 step
944	31.250	50.000	48.000	1280×1152	Int	P	P	BI 1152	YPbPr	AUS 1152(*P0)	4-step gray scale	Gray 4 step
945	31.250	50.000	72.000	1920×1080	Int	P	N	BI 1250	YPbPr	AUS 1080(*P0)	OPT1F (AFD pattern)	AFD Pattern
946	31.469	59.940	27.000	720×483	Prog	N	N	ANALOG	YPbPr	NTSC PROG. (*P2)	OPT1F (AFD pattern)	AFD Pattern
947	31.469	59.940	27.000	720×483	Prog	N	N	ANALOG	YPbPr	NTSC PROG. W. (*P2)	OPT1F (AFD pattern)	AFD Pattern
948	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	YPbPr	PAL PROG. (*P2)	OPT1F (AFD pattern)	AFD Pattern
949	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	YPbPr	PAL PROG. W. (*P2)	OPT1F (AFD pattern)	AFD Pattern
950	37.861	85.080	31.500	640×350	Prog	P	N	ANALOG	RGB	VESA640×350@85	64-step gray scale V (OPT37)	Gray 64 step (V)
951	37.861	85.080	31.500	640×400	Prog	N	P	ANALOG	RGB	VESA640×400@85	32-step gray scale V (OPT36)	Gray 32 step (V)
952	37.927	85.039	35.500	720×400	Prog	N	P	ANALOG	RGB	VESA720×400@85	16-step gray scale V	Gray 16 step (V)
953	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	VESA640×480@60	8-step gray scale V	Gray 8 step (V)
954	37.861	72.809	31.500	640×480	Prog	N	N	ANALOG	RGB	VESA640×480@72	4-step gray scale V	Gray 4 step (V)
955	37.500	75.000	31.500	640×480	Prog	N	N	ANALOG	RGB	VESA640×480@75	Black solid	Black
956	43.269	85.008	36.000	640×480	Prog	N	N	ANALOG	RGB	VESA640×480@85	White solid	RGB
957	35.156	56.250	36.000	800×600	Prog	P	P	ANALOG	RGB	VESA800×600@56	Red solid	R
958	37.879	60.317	40.000	800×600	Prog	P	P	ANALOG	RGB	VESA800×600@60	Green solid	G
959	48.077	72.188	50.000	800×600	Prog	P	P	ANALOG	RGB	VESA800×600@72	Blue solid	B
960	46.875	75.000	49.500	800×600	Prog	P	P	ANALOG	RGB	VESA800×600@75	Magenta solid	RB
961	53.674	85.061	56.250	800×600	Prog	P	P	ANALOG	RGB	VESA800×600@85	Yellow solid	RG
962	35.522	86.958	44.900	1024×768	Int	P	P	ANALOG	RGB	VESA1024×768@43	Cyan solid	GB
963	48.363	60.004	65.000	1024×768	Prog	N	N	ANALOG	RGB	VESA1024×768@60	1-dot checker	1dot Checker
964	56.476	70.069	75.000	1024×768	Prog	N	N	ANALOG	RGB	VESA1024×768@70	Checker	Checker
965	60.023	75.029	78.750	1024×768	Prog	P	P	ANALOG	RGB	VESA1024×768@75	Sub-pixel checker	Sub-pixel Checker
966	68.677	84.997	94.500	1024×768	Prog	P	P	ANALOG	RGB	VESA1024×768@85	OPT00 (256-block color)	256 Block Color
967	67.500	75.000	108.000	1152×864	Prog	P	P	ANALOG	RGB	VESA1152×864@75	Moving window 1	Moving Window 1
968	60.000	60.000	108.000	1280×960	Prog	P	P	ANALOG	RGB	VESA1280×960@60	Moving window 2	Moving Window 2
969	85.938	85.002	148.500	1280×960	Prog	P	P	ANALOG	RGB	VESA1280×960@85	Moving window 3	Moving Window 3

PG2 program No.970-999

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
970	63.981	60.020	108.000	1280×1024	Prog	P	P	ANALOG	RGB	VESA1280×1024@60	OPT1F (AFD pattern)	AFD Pattern
971	79.976	75.025	135.000	1280×1024	Prog	P	P	ANALOG	RGB	VESA1280×1024@75	Window (Format 0, Flicher 0)	Window 1
972	91.146	85.024	157.500	1280×1024	Prog	P	P	ANALOG	RGB	VESA1280×1024@85	Window (Format 1, Flicher 0)	Window 2
973	75.000	60.000	162.000	1600×1200	Prog	P	P	ANALOG	RGB	VESA1600×1200@60	Window (Format 2, Flicher 0)	Window 3
974	81.250	65.000	175.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1600×1200@65	Window (Format 3, Flicher 0)	Window 4
975	87.500	70.000	189.000	1600×1200	Prog	P	P	ANALOG	RGB	VESA1600×1200@70	Window (Format 4, Flicher 0)	Window 5
976	93.750	75.000	202.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1600×1200@75	Window (Format 5, Flicher 0)	Window 6
977	106.250	85.000	229.500	1600×1200	Prog	P	P	ANALOG	RGB	VESA1600×1200@85	Window (Format 8, Flicher 7)	Moving Window 1
978	83.640	60.000	204.750	1792×1344	Prog	N	P	ANALOG	RGB	VESA1792×1344@60	Window (Format 9, Flicher 7)	Moving Window 2
979	106.270	74.997	261.000	1792×1344	Prog	N	P	ANALOG	RGB	VESA1792×1344@75	Window (Format E, Flicher 7)	Moving Window 3
980	86.333	59.995	218.250	1856×1392	Prog	N	P	ANALOG	RGB	VESA1856×1392@60	Window (Format F, Flicher 0)	Window Level
981	112.500	75.000	288.000	1856×1392	Prog	N	P	ANALOG	RGB	VESA1856×1392@75	Window (Format 0, Flicher 1)	Flicker Window 1
982	90.000	60.000	234.000	1920×1440	Prog	N	P	ANALOG	RGB	VESA1920×1440@60	Window (Format 0, Flicher 3)	Flicker Window 2
983	112.500	75.000	297.000	1920×1440	Prog	N	P	ANALOG	RGB	VESA1920×1440@75	Window (Format 0, Flicher 5)	Flicker Window 3
984	31.020	60.000	33.750	844×480	Prog	P	P	ANALOG	RGB	VESA848×480@60	Window (Format 0, Flicher 7)	Flicker Window 4
985	47.396	59.995	68.250	1280×768	Prog	P	N	ANALOG	RGB	VESA1280×768@60	Window (Format 0, Flicher 0, 2-3 pulldown)	2-3 pull-down Window 1
986	47.776	59.870	79.500	1280×768	Prog	N	P	ANALOG	RGB	VESA1280×768@60	Dot (H=20, V=20)	Dot H20/V20
987	60.289	74.893	102.250	1280×768	Prog	N	P	ANALOG	RGB	VESA1280×768@75	Dot (H=60, V=60)	Dot H60/V60
988	68.633	84.837	117.500	1280×768	Prog	N	P	ANALOG	RGB	VESA1280×768@85	0% window	0% Window
989	47.712	60.015	85.500	1360×768	Prog	P	P	ANALOG	RGB	VESA1360×768@60	5% window	5% Window
990	64.744	59.948	101.000	1400×1050	Prog	P	N	ANALOG	RGB	VESA1400×1050@60	10% window	10% Window
991	65.317	59.978	121.750	1400×1050	Prog	N	P	ANALOG	RGB	VESA1400×1050@60	20% window	20% Window
992	82.278	74.867	156.000	1400×1050	Prog	N	P	ANALOG	RGB	VESA1400×1050@75	30% window	30% Window
993	93.881	84.960	179.500	1400×1050	Prog	N	P	ANALOG	RGB	VESA1400×1050@85	40% window	40% Window
994	74.038	59.950	154.000	1920×1200	Prog	P	N	ANALOG	RGB	VESA1920×1200@60	50% window	50% Window
995	74.556	59.885	183.250	1920×1200	Prog	N	P	ANALOG	RGB	VESA1920×1200@60	60% window	60% Window
996	94.038	74.930	245.250	1920×1200	Prog	N	P	ANALOG	RGB	VESA1920×1200@75	70% window	70% Window
997	107.184	84.932	281.250	1920×1200	Prog	N	P	ANALOG	RGB	VESA1920×1200@85	80% window	80% Window
998	31.250	50.000	74.250	1920×1080	Int	N	N	TRI-1250	YPbPr	SMPT295M(*p0)	90% window	90% Window
999	62.500	50.000	148.500	1920×1080	Prog	N	N	TRI-1250	YPbPr	SMPT295M(*p0)	100% window	100% Window

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
850	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	YC444*ps	EIA640×480p@59.94	OPT0F (NTSC color bar)	NTSC Color Bar
851	31.500	60.000	25.200	640×480	Prog	N	N	ANALOG	YC444*ps	EIA640×480p@60	75%, 75% color bar	75%, 75% Color Bar
852	31.469	59.940	27.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@59.94	100%, 100% color bar	100%, 100% Color Bar
853	31.500	60.000	27.027	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@60	OPT16 (SMPTE color bar)	SMPTE Color Bar
854	31.469	59.940	27.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@59.94	OPT03 (8 colors & 16 gray)	8Color & 16Gray
855	31.500	60.000	27.027	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@60	OPT28 (timing chart)	Timing Chart
856	44.955	59.939	74.175	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@59.94	OPT0E (DDC pattern-EDID display)	DDC Pattern
857	45.000	60.000	74.250	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@60	OPT2E (DDC pattern-EDID display)	DDC Pattern
858	33.716	59.939	74.175	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080@59.94	OPT27 (HDMI speaker check)	Audio Select
859	33.750	60.000	74.250	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080@60	OPT35 (HDMI CEC pattern)	CEC Monitor
860	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×480@59.94	OPT1F (AFD pattern)	AFD Pattern
861	15.751	60.002	27.028	1440×480 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×480@60	256-step gray scale	Gray 256 step
862	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@59.94	64-step gray scale	Gray 64 step
863	15.751	60.002	27.028	1440×480 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@60	32-step gray scale	Gray32 step
864	15.734	60.054	27.000	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240p@59.94	16-step gray scale	Gray 16 step
865	15.751	60.002	27.028	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240p@60	8-step gray scale	Gray 8 step
866	15.734	60.054	27.000	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240pW@59.94	4-step gray scale	Gray 4 step
867	15.751	60.002	27.028	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240pW@60	256-step gray scale V	Gray 256 step (V)
868	15.734	59.826	27.000	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240p@59.94	64-step gray scale V	Gray 64 step (V)
869	15.751	59.888	27.028	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240p@60	32-step gray scale V	Gray 32 step (V)
870	15.734	59.826	27.000	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240pW@59.94	256-step gray scale & RGBW color bar	256 Gray & Color
871	15.751	59.888	27.028	1440×240 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×240pW@60	64-step gray scale & RGBW color bar	64 Gray & Color
872	15.734	59.940	54.000	2880×480	Int	N	N	ANALOG	YC444*ps	EIA2880×480@59.94	OPT38 (H ramp scroll)	Ramp scroll (H)
873	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	YC444*ps	EIA2880×480@60	OPT39 (V ramp scroll)	Ramp scroll (V)
874	15.734	59.940	54.000	2880×480	Int	N	N	ANALOG	YC444*ps	EIA2880×480W@59.94	OPT3A (Diagonal ramp scroll)	Ramp scroll (Diagonal)
875	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	YC444*ps	EIA2880×480W@60	OPT13 (gamma correction ramp w/r=2.5)	Gamma Ramp 1
876	15.734	60.054	54.000	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240p@59.94	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
877	15.750	60.115	54.054	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240p@60	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
878	15.734	60.054	54.000	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240pW@59.94	100% window (white)	Window (255,255,255)
879	15.750	60.115	54.054	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240pW@60	100% window (red)	Window (255,0,0)

PG3 program No.880-909

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
880	15.734	59.826	54.000	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240p@59.94	100% Window (green)	Window (0, 255,0)
881	15.750	59.886	54.054	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240p@59.94	100% Window (blue)	Window (0, 0, 255)
882	15.734	59.826	54.000	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240pW@59.94	100% Window (yellow)	Window (255, 255, 0)
883	15.750	59.886	54.054	2880×240	Prog	N	N	ANALOG	YC444*ps	EIA2880×240pW@60	100% Window (magenta)	Window (255, 0, 255)
884	31.469	59.940	54.000	1440×480	Prog	N	N	ANALOG	YC444*ps	EIA1440×480p@59.94	100% Window (cyan)	Window (0, 255,255)
885	31.500	60.000	54.054	1440×480	Prog	N	N	ANALOG	YC444*ps	EIA1440×480p@60	100% Window (black)	Window (0, 0, 0)
886	31.469	59.940	54.000	1440×480	Prog	N	N	ANALOG	YC444*ps	EIA1440×480pW@59.94	Character list 7×9	Character List
887	31.500	60.000	54.054	1440×480	Prog	N	N	ANALOG	YC444*ps	EIA1440×480pW@60	Character 1 (H 5×7 / 10×14)	H Character 1
888	67.432	59.939	148.350	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@59.94	Character 1 (H 7×9 / 14×18)	H Character 2
889	67.500	60.000	148.500	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@60	Character 1 (H 16×16 / 32×32)	H Character 3
890	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576p@50	Character 2 (H 5×7 / 10×14)	H Character 4
891	31.250	50.000	27.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576pW@50	Character 2 (H 7×9 / 14×18)	H Character 5
892	37.500	50.000	74.250	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@50	Character 2 (H 16×16 / 32×32)	H Character 6
893	28.125	50.000	74.250	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080@50	Character 1 (Chinese character "BI" 7×9 / 64×64)	Chinese Chara 1
894	15.625	50.000	27.000	1440×576 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×576@50	Character me (#1 18×18)	Me Character 1
895	15.625	50.000	27.000	1440×576 *R	Int	N	N	ANALOG	YC444*ps	EIA1440×576W@50	Character me (VESA specifications 18×18)	Me Character 2
896	15.625	50.080	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288p@50	Burst (Format 0)	Burst 1
897	15.625	50.080	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288pW@50	Burst (Format 1)	Burst 2
898	15.625	49.920	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288p@50	Burst (Format 2)	Burst 3
899	15.625	49.920	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288pW@50	Burst (Format 3)	Burst 4
900	15.625	49.761	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288p@50	Circle (Format 0)	Circle 1
901	15.625	49.761	27.000	1440×288 *R	Prog	N	N	ANALOG	YC444*ps	EIA1440×288pW@50	Circle (Format 1)	Circle 2
902	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	YC444*ps	EIA2880×576@50	Circle (Format 2)	Circle 3
903	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	YC444*ps	EIA2880×576W@50	Circle (Format 3)	Circle 4
904	15.625	50.080	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288p@50	Circle (Format 4)	Circle 5
905	15.625	50.080	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288pW@50	Circle (Format 5)	Circle 6
906	15.625	49.920	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288p@50	Circle (Format 6)	Circle 7
907	15.625	49.920	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288pW@50	Window (Format 0, Flicker 0)	Window 1
908	15.625	49.761	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288p@50	Window (Format 1, Flicker 0)	Window 2
909	15.625	49.761	54.000	2880×288	Prog	N	N	ANALOG	YC444*ps	EIA2880×288pW@50	Window (Format 2, Flicker 0)	Window 3

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
910	31.250	50.000	54.000	1440×576	Prog	N	P	ANALOG	YC444*ps	EIA1440×576p@50	Window (Format 3, Flicker 0)	Window 4
911	31.250	50.000	54.000	1440×576	Prog	N	P	ANALOG	YC444*ps	EIA1440×576pW@50	Window (Format 4, Flicker 0)	Window 5
912	56.250	50.000	148.500	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@50	Window (Format 5, Flicker 0)	Window 6
913	26.973	23.976	74.175	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@23.97	Window (Format 8, Flicker 7)	Moving Window 1
914	27.000	24.000	74.250	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@24	Window (Format 9, Flicker 7)	Moving Window 2
915	28.125	25.000	74.250	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@25	Window (Format E, Flicker 7)	Moving Window 3
916	33.716	24.970	74.175	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@29.97	Window (Format F, Flicker 0)	Window Level
917	33.750	30.000	74.250	1920×1080	Prog	P	P	ANALOG	YC444*ph	EIA1920×1080p@30	Window (Format 0, Flicker 1)	FlickerWindow 1
918	31.469	59.940	108.000	2880×480	Prog	N	N	ANALOG	YC444*ps	EIA2880×480p@59.94	Window (Format 0, Flicker 3)	FlickerWindow 2
919	31.500	60.000	108.108	2880×480	Prog	N	N	ANALOG	YC444*ps	EIA2880×480p@60	Window (Format 0, Flicker 5)	FlickerWindow 3
920	31.469	59.940	108.000	2880×480	Prog	N	N	ANALOG	YC444*ps	EIA2880×480pW@59.94	Window (Format 0, Flicker 7)	FlickerWindow 4
921	31.500	60.000	108.108	2880×480	Prog	N	N	ANALOG	YC444*ps	EIA2880×480pW@60	Window (Format 0, Flicker 0, 2-3 pulldown)	2-3 pull-down Window 1
922	31.250	50.000	108.000	2880×576	Prog	N	N	ANALOG	YC444*ps	EIA2880×576p@50	Dot (H=20, V=20)	Dot H20/V20
923	31.250	50.000	108.000	2880×576	Prog	N	N	ANALOG	YC444*ps	EIA2880×576pW@50	Dot (H=60, V=60)	Dot H60/V60
924	31.250	50.000	72.000	1920×1080	Int	P	N	BI1250	YC444*ph	EIA1920×1080i@50	0% window	0% Window
925	56.250	100.000	148.500	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080i@100	5% window	5% Window
926	75.000	100.000	148.500	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@100	10% window	10% Window
927	62.500	100.000	54.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576p@100	20% window	20% Window
928	62.500	100.000	54.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576pW@100	30% window	30% Window
929	31.250	100.000	54.000	1440×576*R	Int	N	N	ANALOG	YC444*ps	EIA1440×576i@100	40% window	40% Window
930	31.250	100.000	54.000	1440×576*R	Int	N	N	ANALOG	YC444*ps	EIA1440×576iW@100	50% window	50% Window
931	67.433	119.880	148.352	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080i@119.88	60% window	60% Window
932	67.500	120.000	148.500	1920×1080	Int	P	P	ANALOG	YC444*ph	EIA1920×1080i@120	70% window	70% Window
933	89.910	119.880	148.352	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@119.88	80% window	80% Window
934	90.000	120.000	148.500	1280×720	Prog	P	P	ANALOG	YC444*ph	EIA1280×720p@120	90% window	90% Window
935	62.937	119.880	54.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@119.88	100% window	100% Window
936	63.000	120.000	54.054	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@120	100% window (red)	Window (255,0,0)
937	62.937	119.880	54.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@119.88	100% window (green)	Window (0, 255,0)
938	63.000	120.000	54.054	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@120	100% window (blue)	Window (0, 0, 255)
939	31.469	119.880	54.000	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480i@119.88	100% window (white 0%)	Window (0, 0, 0)

PG3 program No.940-969


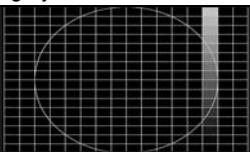
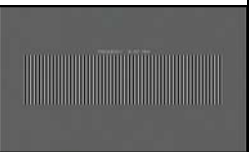

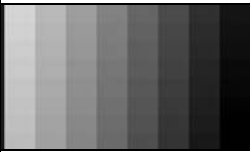
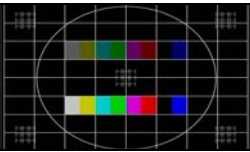

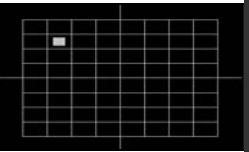
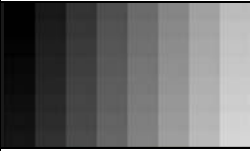
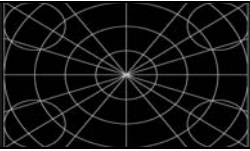
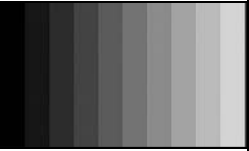


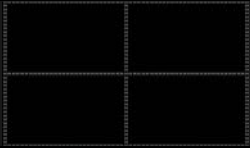


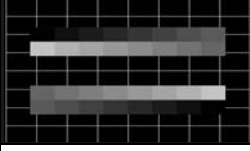



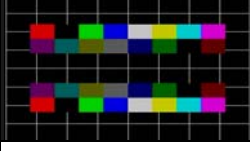
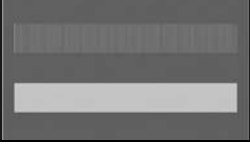



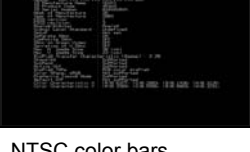


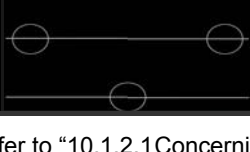

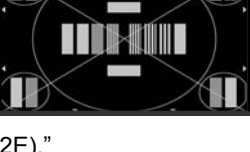

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
940	31.500	120.000	54.054	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480@120	100% window (white 3%)	Window (7, 7)
941	31.469	119.880	54.000	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@119.88	100% window (white 6%)	Window (15, 15, 15)
942	31.500	120.000	54.054	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@120	100% window (white 12%)	Window (31, 31, 31)
943	125.000	200.000	108.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576p@200	100% window (white 25%)	Window (63, 63, 63)
944	125.000	200.000	108.000	720×576	Prog	N	N	ANALOG	YC444*ps	EIA720×576W@200	100% window (white 50%)	Window (127, 127, 127)
945	62.500	200.000	108.000	1440×576*R	Int	N	N	ANALOG	YC444*ps	EIA1440×576@200	100% window (white 75%)	Window (191, 191, 191)
946	62.500	200.000	108.000	1440×576*R	Int	N	N	ANALOG	YC444*ps	EIA1440×576W@200	100% window (white 100%)	Window (255, 255, 255)
947	125.874	239.760	108.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@239.76	4-level flicker	Window 4 Level
948	126.000	240.000	108.108	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480p@240	1 dot Burst	1 dot Burst
949	125.874	239.760	108.000	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@239.76	Character 1 (chessboard 16×16/16×16)	1 dot ON/OFF
950	126.000	240.000	108.108	720×480	Prog	N	N	ANALOG	YC444*ps	EIA720×480pW@240	Sub-pixel checker	Sub-pixel Checker
951	62.937	239.760	108.000	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480@239.76	OPT0B (character edge H)	H Character Line
952	63.000	240.000	108.108	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480@240	OPT0C (character edge O)	O Character Line
953	62.937	239.760	108.000	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@239.76	OPT21 (crosstalk width 60%)	Cross Talk 60%
954	63.000	240.000	108.108	1440×480*R	Int	N	N	ANALOG	YC444*ps	EIA1440×480W@240	OPT0D (crosstalk width 90%)	Cross Talk 90%
955											OPT00 (256-block color)	256 Block Color
956											OPT01 (64-gradation block gray/white → black)	Gray 64 Block 1
957											OPT02 (64-gradation block gray/black → white)	Gray 64 Block 2
958											OPT04 (gray scale & crosshatch)	Gray & Cross
959											OPT05 (color bar & crosshatch)	Color & Cross
960											OPT06 (color temperature)	Color Temp.
961											OPT07 (pairing)	Pairing
962											OPT08 (crosshatch & circle & gray)	Cross & Circle
963											OPT09 (crosshatch & circle & character)	Total Test
964											OPT0A (circle & line)	Circle & Line
965											OPT10 (sine wave scroll)	Sign Wave Scroll
966											OPT11 (multi burst)	Multi Burst
967											OPT12 (10 steps & 1/10 MHz)	1/10MHz×10step
968											OPT18 (ITC pattern 9 window)	ITC9 Window
969											OPT19 (ITC pattern crosshatch & marker)	ITC Cross & Marker

Program No.	Horizontal frequency [kHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (HxV)	Int / Prog	Sync polarity		Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
						H	V					
970											OPT1A (ITC pattern H character)	ITC H Character
971											OPT1E (gray scale + circle)	Gray & Circle
972											OPT20 (corner & center point marker)	Corner & Center
973											OPT27 (HDMI speaker check)	Speaker Check or Words
974											OPT29 (crosshatch & marker)	Cross & Marker
975											OPT2A (256-color block color "Color" letters)	256 Color Chara
976											OPT2D (random 256-color color bar)	Random 256 Color
977											OPT30 (window & edge)	Window & Edge
978											OPT32 (3 gradation window)	TTL test
979											OPT33 (19x15 crosshatch & marker)	D.Y.Test
980	15.734	59.940	13.500	712x484	Int	N	N	NTSC	YpbPr*P3	NTSC	OPT34 (circle & crosshatch)	Circle & Cross
981	25.625	50.000	13.500	702x574	Int	N	N	PAL	YPbPr*P2	PAL	OPT3C (ANSI pattern contrast)	ANSI Pattern (C)
982	25.625	50.000	13.500	702x574	Int	N	N	SECAM	YPbPr*P2	SECAM	OPT3D (ANSI pattern 9Point)	ANSI Pattern (9)
983	67.433	59.940	148.352	1980x1080	Prog	P	P	TR1080	YPbPr*P0	1920x1080@59.94p	OPT3E (ANSI pattern Hor Reso)	ANSI Pattern (H)
984	56.250	50.000	148.500	1980x1080	Prog	P	P	TR1080	YpbPr*P0	1920x1080@50p	OPT3F (ANSI pattern Ver Reso)	ANSI Pattern (V)
985	33.716	59.940	74.176	1920x1080	Int	P	P	TR1080	YPbPr*P0	1920x1080@59.94i	OPT17 (SMPTE RP27.1)	SMPTE RP27.1
986	28.125	50.000	74.250	1920x1080	Int	P	P	TR1080	YPbPr*P0	1920x1080@50i	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO.
987	44.955	59.940	74.176	1280x720	Prog	P	P	TR720	YPbPr*P0	1280x720@59.94p	OPT26 (SMPTE color version)	SMPTE RP133 COL
988	37.500	50.000	74.250	1280x720	Prog	P	P	TR720	YPbPr*P0	1280x720@50p	OPT24 (display position adjuster)	Display Position
989											OPT23 (DDC pattern D-Sub-EDID display)	DDC Dsub
990											OPT22 (DDC pattern DVI-EDID display)	DDC DVI
991											OPT80 (image data #1 display)	IMG Disp #1
992											OPT81 (image data #2 display)	IMG Disp #2
993											OPT82 (image data #3 display)	IMG Disp #3
994											OPT83 (image data #4 display)	IMG Disp #4
995											OPT84 (image data #5 display)	IMG Disp #5
996											OPT85 (image data #6 display)	IMG Disp #6
997											OPT86 (image data #7 display)	IMG Disp #7
998											OPT87 (image data #8 display)	IMG Disp #8
999											OPT88 (image data #9 display)	IMG Disp #9

10.1.2 Optional pattern data

Internal optional pattern data






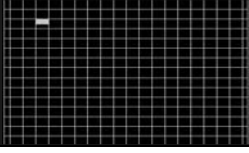

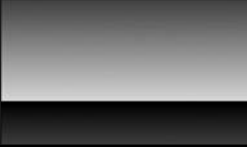

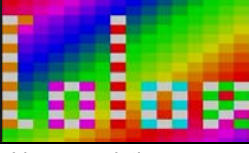
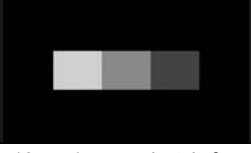
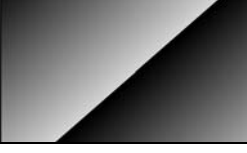




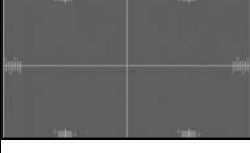

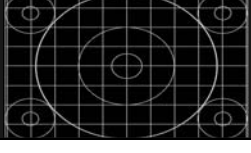
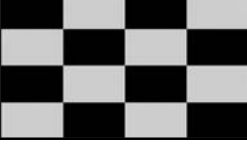



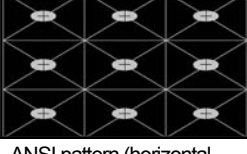
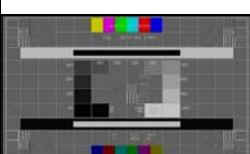


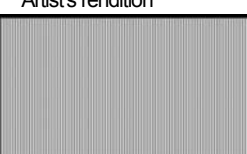
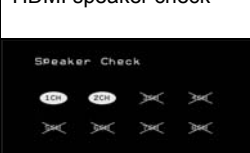


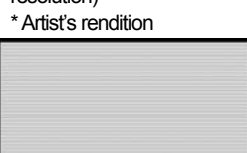
■ Optional patterns 00H to 1FH (page 1 of 2)

No.	Pattern	No.	Pattern	No.	Pattern	No.	Pattern
00	256-color block color 	08	Crosshatch & circle & gray 	10	Sine wave scroll 	18	ITC pattern 9 windows 
01	64-gradation block gray (from white to black) 	09	Crosshatch & circle & character 	11	Multi burst 	19	ITC pattern crosshatch & marker 
02	64-gradation block gray (from black to white) 	0A	Circle & line 	12	10 steps & 1/10 MHz 	1A	ITC pattern H character 
03	8 color bars & 16 gray scale 	0B	Character edge (H) 	13	Gamma correction ramp wr=2.5 	1B	32-gradation gray scale (H) 
04	Gray scale & crosshatch 	0C	Character edge (0) 	14	Gamma correction ramp r=2.0 	1C	64-gradation gray scale (H) 
05	Color bar & crosshatch 	0D	Crosstalk (width 90%) 	15	Gamma correction ramp r=0.5 	1D	64-gray & RGBW color bar superimposed 
06	Color temperature 	0E	DDC pattern *1 	16	SMPTE color bars 	1E	Gray scale & circle 
07	Pairing 	0F	NTSC color bars 	17	SMPTE PR27.1 	1F	AFD pattern *2 

*1: Refer to "10.1.2.1 Concerning the DDC patterns (No.0E, 22, 23, 2E)."

*2: Refer to "10.1.2.2 Concerning the AFD pattern (No.1F)."

■ Optional patterns 20H to 3FH (page 2 of 2)

No.	Pattern	No.	Pattern	No.	Pattern	No.	Pattern
20	Corner & center point marker 	28	Timing chart 	30	Center, corner window & edge marker 	38	Ramp scroll (H) 
21	Crosstalk (width 60%) 	29	Crosshatch & marker 	31	32-gradation gray scale (H) 	39	Ramp scroll (V) 
22	DDC pattern DVI *1 	2A	256-color block color "Color" letters 	32	3-gradation window 	3A	Ramp scroll (diagonal) 
23	DDC pattern D-Sub *1 	2B	Linear gradation ramp H direction 	33	19 × 15 crosshatch & marker 	3B	ANSI pattern (setup) 
24	Display position adjuster 	2C	Linear gradation ramp V direction 	34	Crosshatch & circle 	3C	ANSI pattern (contrast) 
25	SMPTE RP-133 	2D	Random 256-color color bar 	35	HDMI CEC pattern *3 	3D	ANSI pattern (9 points) 
26	SMPTE color version 	2E	DDC pattern *1 (binary) 	36	32-gradation gray scale (V) 	3E	ANSI pattern (horizontal resolution) * Artist's rendition 
27	HDMI speaker check *2 	2F	256 gray & RGBW color bar superimposed (full color) 	37	64-gradation gray scale (V) 	3F	ANSI pattern (vertical resolution) * Artist's rendition 

Internal optional pattern data

*1: Refer to "10.1.2.1 Concerning the DDC patterns (No.0E, 22, 23, 2E)."

*2: Refer to "10.1.2.3 Concerning the HDMI speaker check (No.27)."

*3: Refer to "10.1.2.4 Concerning the HDMI CEC pattern (No.35)."

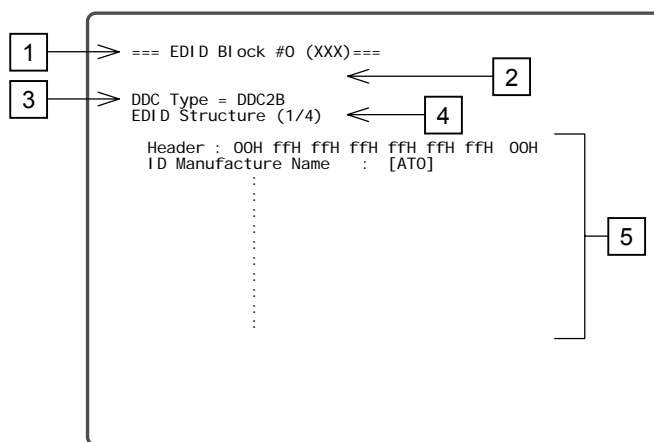
10.1.2.1 Concerning the DDC patterns (No.0E, 22, 23, 2E)

When a DDC pattern is executed, the EDID is obtained from the receiver (such as a display) connected to the VG-849C, and displayed. DDC patterns include optional patterns No.0E, 22, 23 and 2E, and the differences in what appears on the display and the port where the EDID is obtained are shown in the table below.

Optional pattern No.	What appears on the display	Port where EDID is obtained
0E	GUI display	Set using “[10] Setting the DDC pattern” of config edit FUNC5
2E	Hexadecimal display	
22	GUI display	Fixed at DVI port
23	GUI display	Fixed at D-Sub port

The contents of the GUI display and hexadecimal display are as shown below.

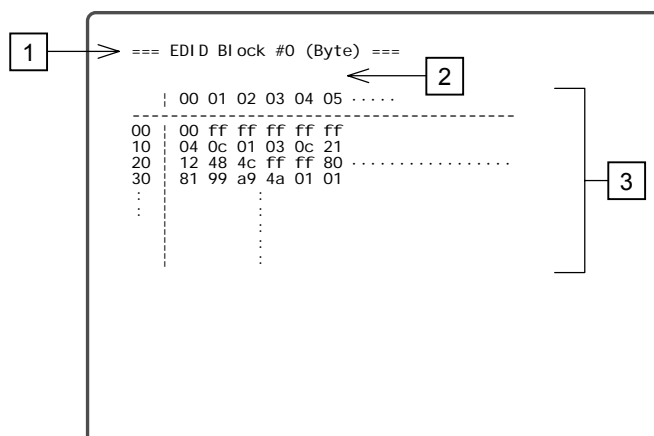
● GUI display of EDID (optional pattern No.0E, 22, 23)



No.	Display contents
1	Block number of EDID
2	Details of EDID error (appears only when an error has occurred)
3	DDC type
4	Number of pages in block indicated at [1]
5	Contents of EDID (GUI display)

* Switch between the pages using the [▶] and [◀] keys.

● Hexadecimal display of EDID (optional pattern No.2E)



No.	Display contents
1	Block number of EDID
2	Details of EDID error (appears only when an error has occurred)
3	Contents of EDID (hexadecimal display)

* Switch between the pages using the [▶] and [◀] keys.

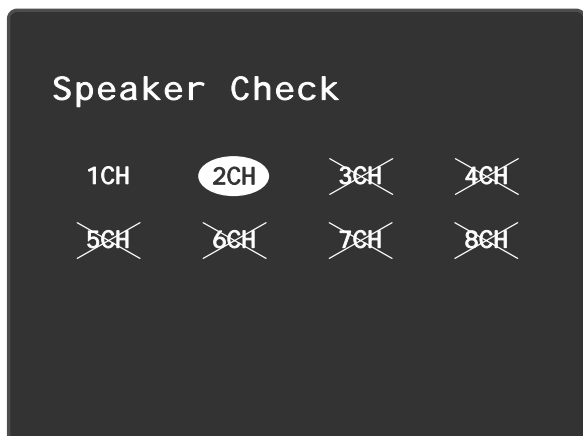
* If it is not possible to obtain the EDID because the receiver was not connected to the specified port or for some other reason, the above displays do not appear, and “EDID Read Error” is indicated at the top left of the display instead.

10.1.2.2 Concerning the AFD pattern (No.1F)

Optional pattern No.1F is the AFD pattern for evaluating the aspect ratio of the EIA/CEA-861B standard. Switching between the various AFD patterns is possible using the [▶] and [◀] keys. For details, refer to “■ Concerning the AFD pattern for evaluating the aspect ratio” in “5.4 Setting the output condition data.”

10.1.2.3 Concerning the HDMI speaker check (No.27)

Optional pattern No.27 shows the status of the HDMI audio channels. Switching between ON and OFF is possible for each channel.



<Example of what appears on the display>

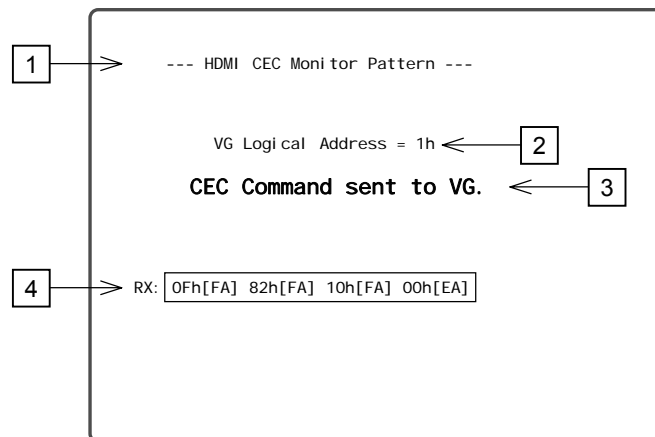
What appears on the display	Display content
CH	Audio output ON (Channel 2 in the figure at left)
CH	Audio output OFF (Channel 1 in the figure at left)
CH	Audio output OFF Channel ON/OFF control cannot be exercised. (Channel 3 to 8 in the figure at left)

Switching the audio output between ON and OFF for each channel is accomplished by pressing the number key corresponding to the channel number. (Each time the key is pressed, the output is switched between ON and OFF.)

Audio output ON/OFF control can be exercised only with those channels for which “analog input” or “internal audio” has been selected as the “audio signals” setting in “[4] Setting the audio signals and sampling frequency” of “5.6 Setting the HDMI output” and for which ON has been selected in “[5] Setting the audio output channels of “5.6 Setting the HDMI output.”

10.1.2.4 Concerning the HDMI CEC pattern (No.35)

Optional pattern No.35 is the HDMI CEC pattern. Operations are performed in accordance with the CEC function settings. For details on these settings, refer to “6.16 CEC function.”



<Example of what appears on the display (monitoring mode)>

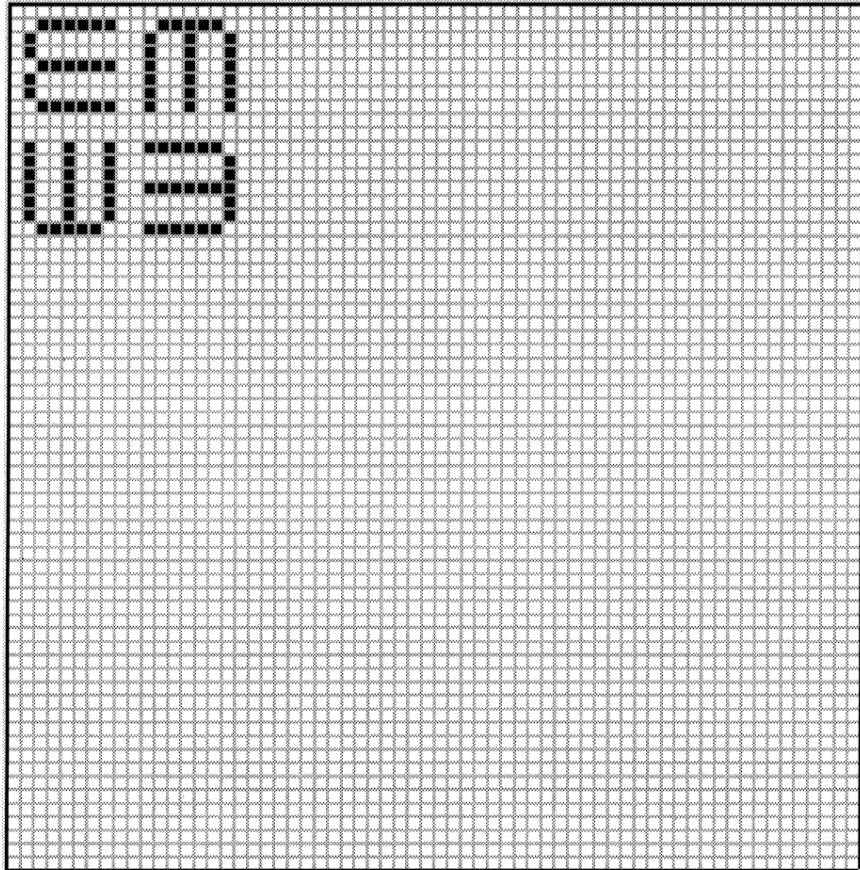
No.	Display contents	
1	CEC mode	“HDMI CEC Monitor Pattern”: Monitoring mode “HDMI CEC Transmission Pattern”: Command transmission mode “HDMI CEC Response Pattern”: Command response mode
2	Logical address	VG logical address which has been set
3	Display of CEC command transmission or reception status	“CEC Command send to Device Xh”: A command was sent to the device set (destination logical address Xh). “CEC Command sent to VG”: The VG-849C received a command. (Command to the VG logical address which was set) “CEC Command sent to Other Devices”: A command was transferred to a unit other than the VG-849C. (Command to an address other than the VG logical address which was set) “Waiting Command ...”: Status in which command is awaited (when a command is not sent or received for 5 or more seconds)
4	Command display	When a supported command has been received, that command is displayed here. <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;"> XXh [FA] XXh [FA] XXh [FA] XXh [EA] </div> <ul style="list-style-type: none"> Acknowledge <ul style="list-style-type: none"> A: Acknowledged (the VG-849C responds) N: Not acknowledged (a command other than a command for the logical address set has been received) End of Message <ul style="list-style-type: none"> E: End of message F: No end of message Command received “TX” is a command sent by the VG-849C; “RX” is a command received by the VG-849C. * Commands which are sent to the destination address of FH are deemed to be broadcast messages and displayed as acknowledged.

10.1.3 User character pattern data

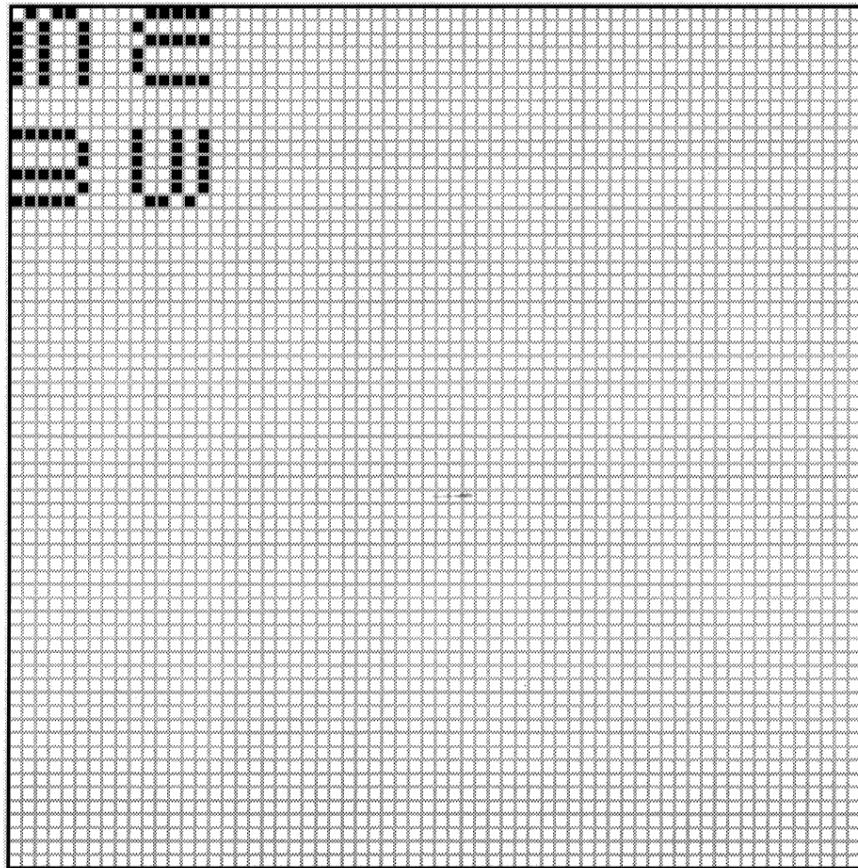
Code (H)	Description	Cell size	Reference page
F0	Letters "me" #1	18 × 18	p.251
F1	Letters "me" #2 (VESA specifications)	18 × 18	p.251
F2	Chinese character "AI"	64 × 64	p.252
F3	Chinese character "BI"	64 × 64	p.252
F4	Chinese character "TAKA"	32 × 32	p.253
F5	Chinese character "KIRI"	32 × 32	p.253
F6	Chinese character "KEN"	32 × 32	p.254
F7	Burst	64 × 64	p.254
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

■ F0H [letters “me” #1]/F1H [letters “me” #2 (VESA specifications)]

F0H

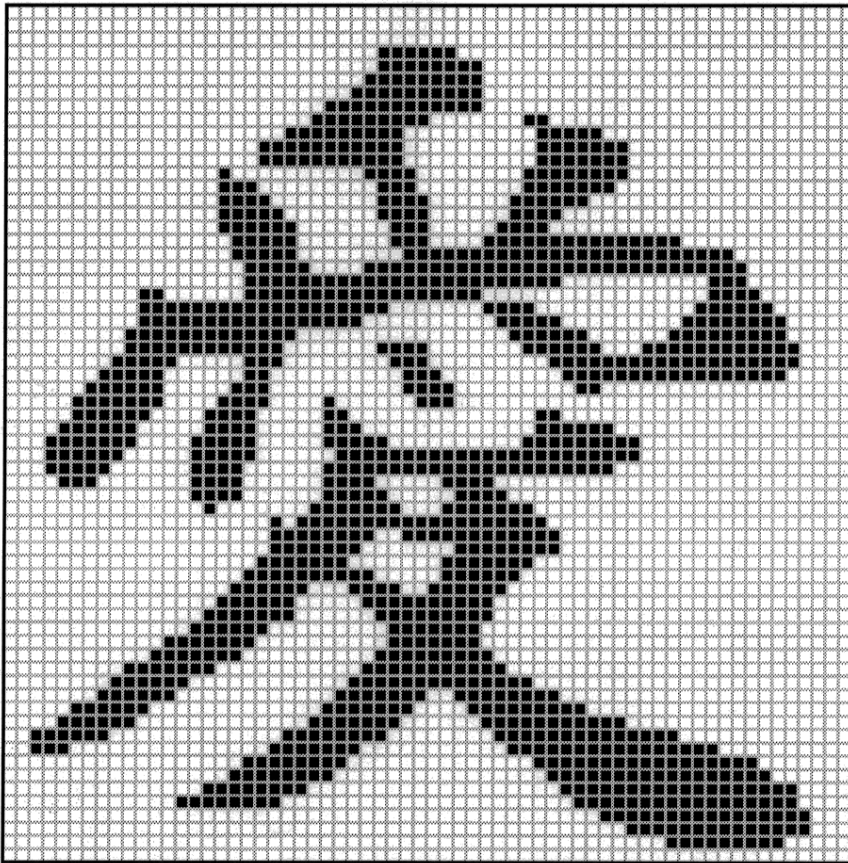


F1H

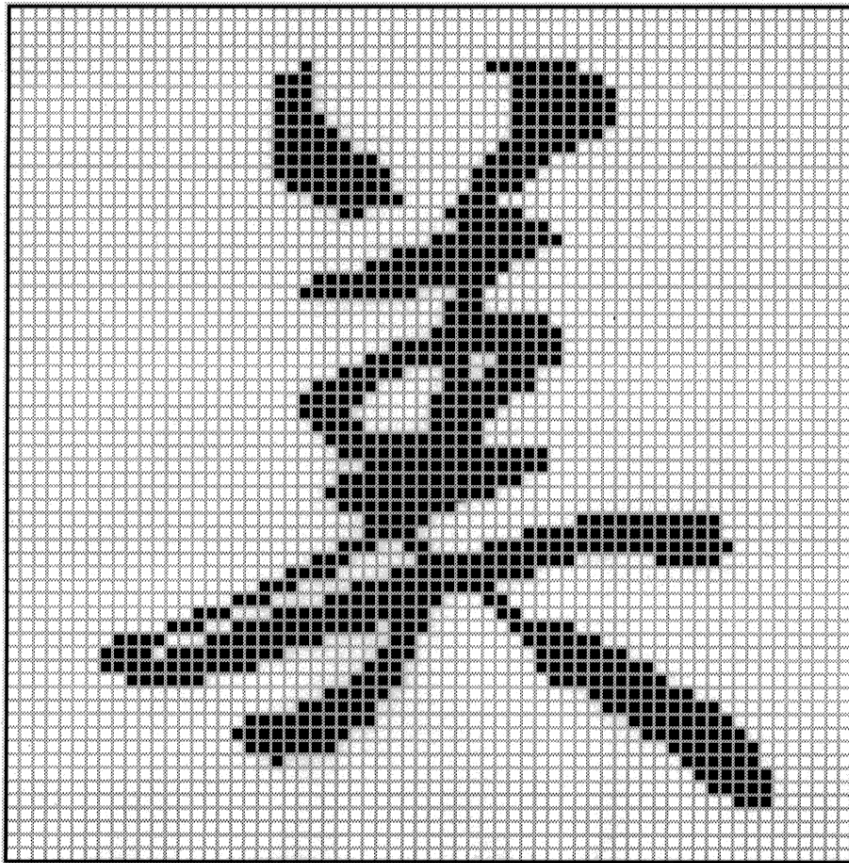


■ F2H [Chinese character "AI"]/F3H [Chinese character "BI"]

F2H

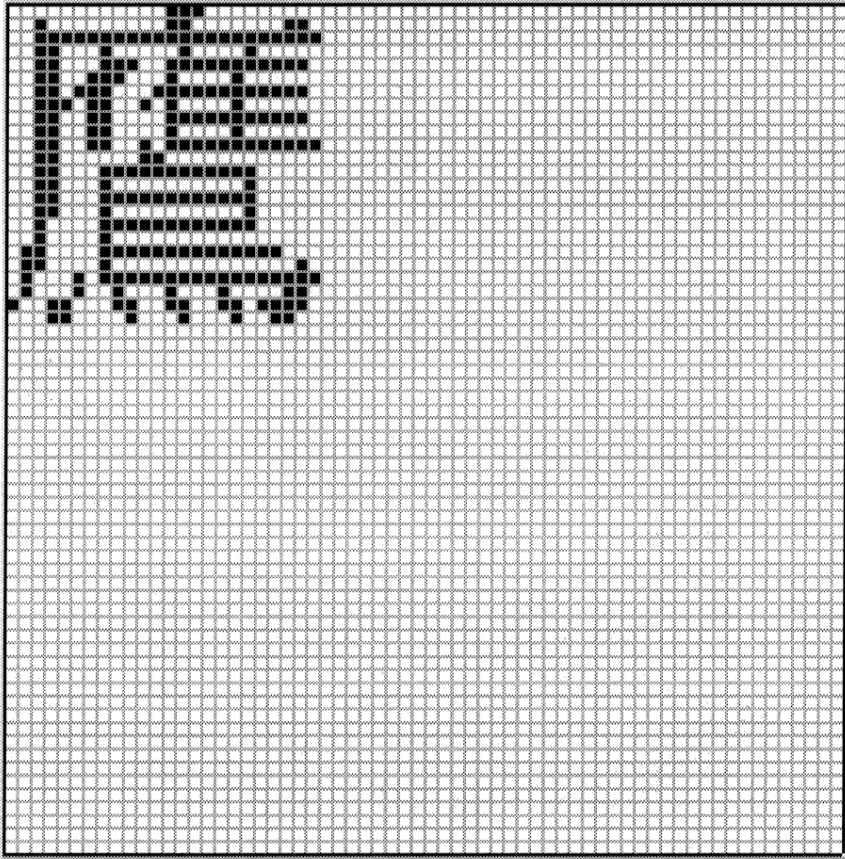


F3H

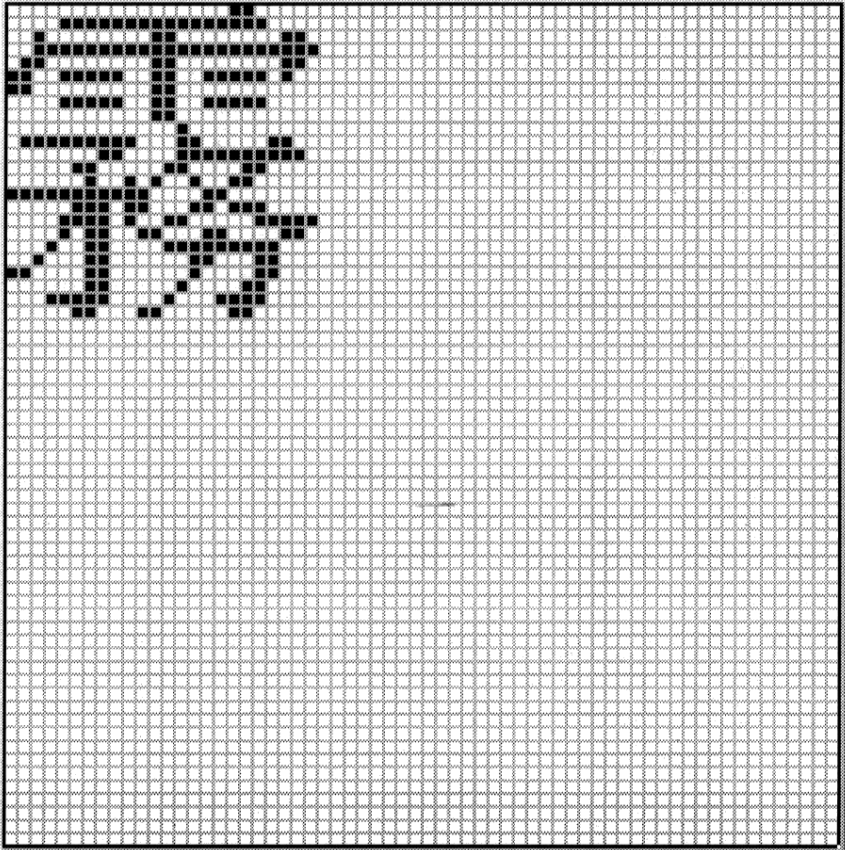


■ F4H [Chinese character "TAKA"]/F5H [Chinese character "KIRI"]

F4H

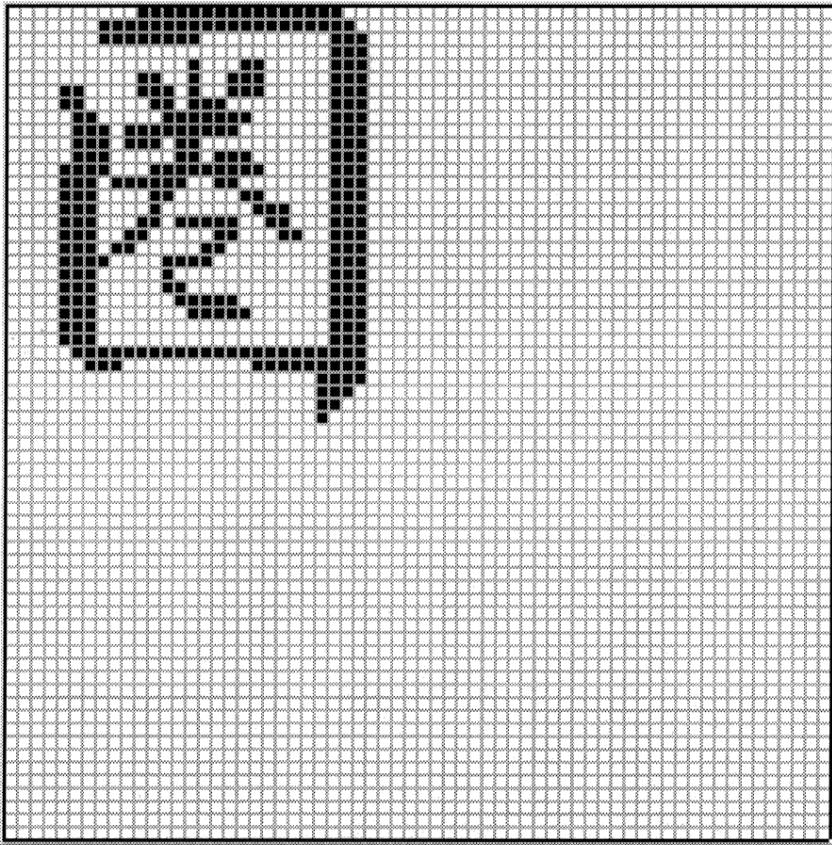


F5H

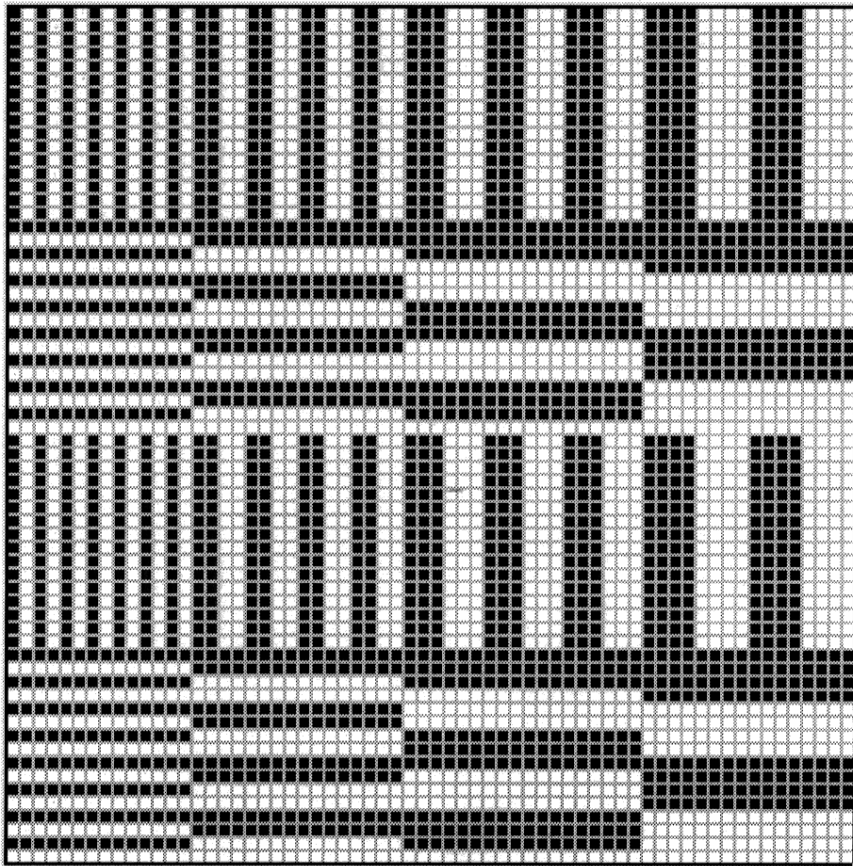


■ F6H [Chinese character "KEN"]/F7H [Burst]

F6H



F7H



10.1.4 Character pattern data

■ 5 × 7 character pattern table (1 of 2)

20H	21H	22H	23H	24H	25H	26H	27H
28H	29H	2AH	2BH	2CH	2DH	2EH	2FH
30H	31H	32H	33H	34H	35H	36H	37H
38H	39H	3AH	3BH	3CH	3DH	3EH	3FH
40H	41H	42H	43H	44H	45H	46H	47H
48H	49H	4AH	4BH	4CH	4DH	4EH	4FH
50H	51H	52H	53H	54H	55H	56H	57H
58H	59H	5AH	5BH	5CH	5DH	5EH	5FH
60H	61H	62H	63H	64H	65H	66H	67H
68H	69H	6AH	6BH	6CH	6DH	6EH	6FH
70H	71H	72H	73H	74H	75H	76H	77H
78H	79H	7AH	7BH	7CH	7DH	7EH	7FH

■ 5 × 7 character pattern table (2 of 2)

80H	81H	82H	83H	84H	85H	86H	87H
88H	89H	8AH	8BH	8CH	8DH	8EH	8FH
90H	91H	92H	93H	94H	95H	96H	97H
98H	99H	9AH	9BH	9CH	9DH	9EH	9FH
A0H	A1H	A2H	A3H	A4H	A5H	A6H	A7H
A8H	A9H	AAH	ABH	ACH	ADH	AEH	AFH
B0H	B1H	B2H	B3H	B4H	B5H	B6H	B7H
B8H	B9H	BAH	BBH	BCH	BDH	BEH	BFH
C0H	C1H	C2H	C3H	C4H	C5H	C6H	C7H
C8H	C9H	CAH	CBH	CCH	CDH	CEH	CFH
D0H	D1H	D2H	D3H	D4H	D5H	D6H	D7H
D8H	D9H	DAH	DBH	DCH	DDH	DEH	DFH

■ 7 × 9 character pattern table (1 of 2)

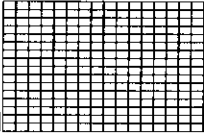
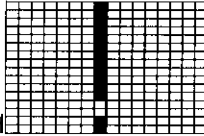
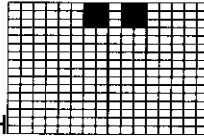
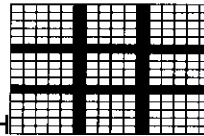
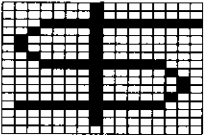
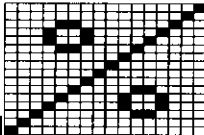
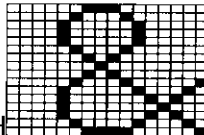
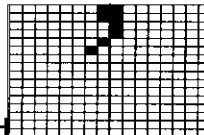
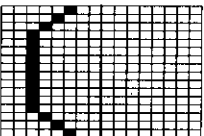
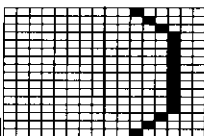
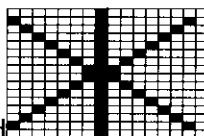
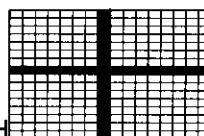
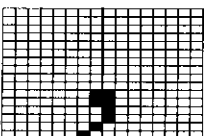
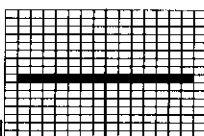
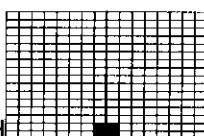
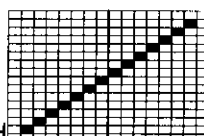
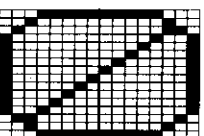
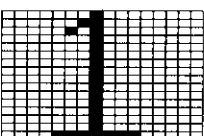
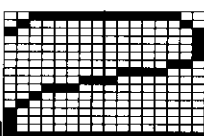
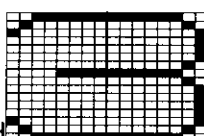
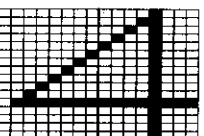
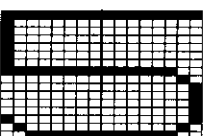
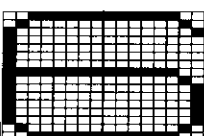
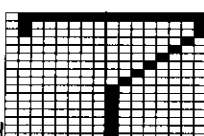
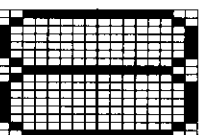
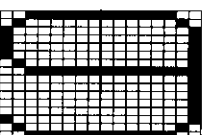
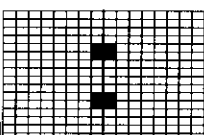
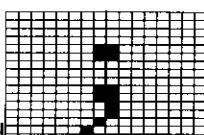
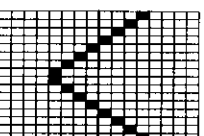
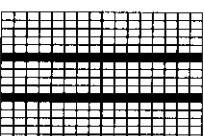
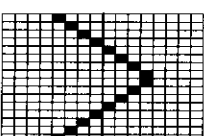
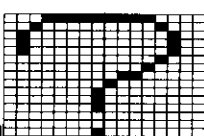
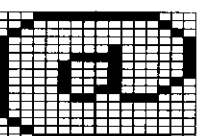
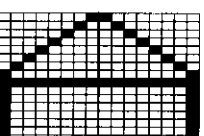
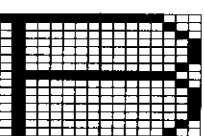
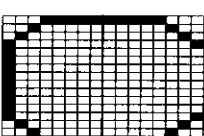
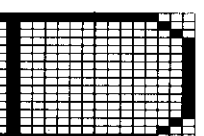
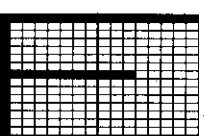
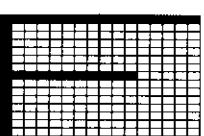
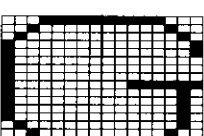
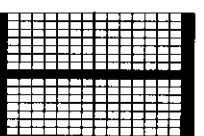
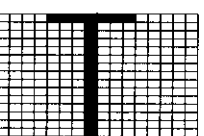
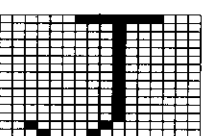
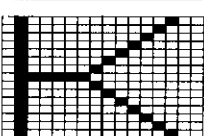
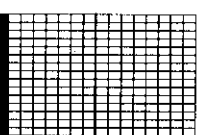
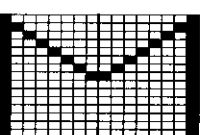
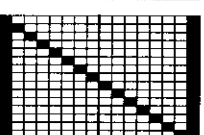
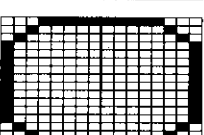
20H 	21H 	22H 	23H 	24H 	25H 	26H 	27H
28H 	29H 	2AH 	2BH 	2CH 	2DH 	2EH 	2FH
30H 	31H 	32H 	33H 	34H 	35H 	36H 	37H
38H 	39H 	3AH 	3BH 	3CH 	3DH 	3EH 	3FH
40H 	41H 	42H 	43H 	44H 	45H 	46H 	47H
48H 	49H 	4AH 	4BH 	4CH 	4DH 	4EH 	4FH
50H 	51H 	52H 	53H 	54H 	55H 	56H 	57H
58H 	59H 	5AH 	5BH 	5CH 	5DH 	5EH 	5FH
60H 	61H 	62H 	63H 	64H 	65H 	66H 	67H
68H 	69H 	6AH 	6BH 	6CH 	6DH 	6EH 	6FH
70H 	71H 	72H 	73H 	74H 	75H 	76H 	77H
78H 	79H 	7AH 	7BH 	7CH 	7DH 	7EH 	7FH

7 × 9 character pattern table (2 of 2)

* 8 × 9 dots are used for 80H to 8FH.

80H	81H	82H	83H	84H	85H	86H	87H
88H	89H	8AH	8BH	8CH	8DH	8EH	8FH
90H	91H	92H	93H	94H	95H	96H	97H
98H	99H	9AH	9BH	9CH	9DH	9EH	9FH
A0H	A1H	A2H	A3H	A4H	A5H	A6H	A7H
A8H	A9H	AAH	ABH	ACH	ADH	AEH	AFH
B0H	B1H	B2H	B3H	B4H	B5H	B6H	B7H
B8H	B9H	BAH	BBH	BCH	BDH	BEH	BFH
C0H	C1H	C2H	C3H	C4H	C5H	C6H	C7H
C8H	C9H	CAH	CBH	CCH	CDH	CEH	CFH
D0H	D1H	D2H	D3H	D4H	D5H	D6H	D7H
D8H	D9H	DAH	DBH	DCH	DDH	DEH	DFH

■ 16 × 16 character pattern table (1 of 4)

20H		21H		22H		23H	
24H		25H		26H		27H	
28H		29H		2AH		2BH	
2CH		2DH		2EH		2FH	
30H		31H		32H		33H	
34H		35H		36H		37H	
38H		39H		3AH		3BH	
3CH		3DH		3EH		3FH	
40H		41H		42H		43H	
44H		45H		46H		47H	
48H		49H		4AH		4BH	
4CH		4DH		4EH		4FH	

■ 16 × 16 character pattern table (2 of 4)

50H		51H		52H		53H	
54H		55H		56H		57H	
58H		59H		5AH		5BH	
5CH		5DH		5EH		5FH	
60H		61H		62H		63H	
64H		65H		66H		67H	
68H		69H		6AH		6BH	
6CH		6DH		6EH		6FH	
70H		71H		72H		73H	
74H		75H		76H		77H	
78H		79H		7AH		7BH	
7CH		7DH		7EH		7FH	

■ 16 × 16 character pattern table (3 of 4)

80H		81H		82H		83H	
84H		85H		86H		87H	
88H		89H		8AH		8BH	
8CH		8DH		8EH		8FH	
90H		91H		92H		93H	
94H		95H		96H		97H	
98H		99H		9AH		9BH	
9CH		9DH		9EH		9FH	
A0H		A1H		A2H		A3H	
A4H		A5H		A6H		A7H	
A8H		A9H		AAH		ABH	
ACH		ADH		AEH		AFH	

■ 16 × 16 character pattern table (4 of 4)

B0H		B1H		B2H		B3H	
B4H		B5H		B6H		B7H	
B8H		B9H		BAH		BBH	
BCH		BDH		BEH		BFH	
C0H		C1H		C2H		C3H	
C4H		C5H		C6H		C7H	
C8H		C9H		CAH		CBH	
CCH		CDH		CEH		CFH	
D0H		D1H		D2H		D3H	
D4H		D5H		D6H		D7H	
D8H		D9H		DAH		DBH	
DCH		DDH		DEH		DFH	

10.2 Concerning PC cards

10.2.1 PC cards which can be used

Use the CF card provided with the VG-849C as the PC card, and use the PC card adapter which is also provided. Any trouble or malfunctioning in operation caused by the use of any other cards is not covered by the warranty.


CAUTION

PC cards come with many different specifications. Use of a PC card whose operation has not been verified, therefore, may result in a failure or instability in read/write operations.

10.2.2 Data registration formats

The format used for registering data on a PC card differs from data to data as indicated below.

■ Program data

- When edited program data is registered on a PC card, a “prg” folder is created, and the data files are created inside this folder.
- Data files are created in sequence with the following filenames: prg001.vgd, prg002.vgd, prg003.vgd, and so on.
- In addition to a file with the prg001.vgd filename, a file with the filename of prgext001.vgd is also created as an extension data file.

■ Character data

- When edited character data is registered on a PC card, a file is created on its own.
- Data files are created in sequence with the following filenames: uchardata0E0.vgd, uchardata0E1.vgd, uchardata0E2.vgd, and so on.

■ Group data

- When edited group data is registered on a PC card, a file is created on its own.
- Data files are created in sequence with the following filenames: group001.vgd, group002.vgd, group003.vgd, and so on.

■ Auto display data

- When edited auto display data is registered on a PC card, a file is created on its own.
- Data files are created with the filename of autodisp.vgd.

■ Bitmap data

- When edited bitmap data is registered on a PC card, a “bmp” folder is created, and the data files are created inside this folder.
- Data files are created in sequence with the following filenames: bitmap001.vgd, bitmap002.vgd, bitmap003.vgd, and so on.
- Every time a data file is created, a name file (such as bitmapname001.vgd) is simultaneously created for the file created.

■ Optional pattern data

- When edited optional pattern data is registered on a PC card, a file is created on its own.
- Data files are created in sequence with the following filenames: opt001.vgd, opt002.vgd, opt003.vgd, and so on.
- Every time a data file is created, a name file (such as optname001.vgd) is simultaneously created for the file created.
- When files are registered, the opt-ptb code display starts from 40, and when files are created, the display changes to start from 0. If data is registered with opt-ptb code 40, a file with the opt000.vgd filename is created. The hexadecimal format is used for the display so when data is registered with opt-ptb 50, the file which is created will have the filename of opt016.vgd.

10.2.3 Examples of the data registered on a PC card

PC card

— bmp (folder)	: Bitmap data folder
— bitmap001.vgd	: Bitmap data
— bitmap002.vgd	: Bitmap data
— bitmap003.vgd	: Bitmap data
— bitmapname001.vgd	: Bitmap name data
— bitmapname002.vgd	: Bitmap name data
— bitmapname003.vgd	: Bitmap name data
— prg (folder)	: Program data folder
— prg001.vgd	: Program data
— prg002.vgd	: Program data
— prg003.vgd	: Program data
— prgext001.vgd	: Extension program data
— prgext002.vgd	: Extension program data
— prgext003.vgd	: Extension program data
— autodisp.vgd	: Auto display data
— group001.vgd	: Group data
— group002.vgd	: Group data
— group003.vgd	: Group data
— opt001.vgd	: Optional pattern data
— opt002.vgd	: Optional pattern data
— opt003.vgd	: Optional pattern data
— opt016.vgd	: Optional pattern data
— optname001.vgd	: Optional pattern name data
— optname002.vgd	: Optional pattern name data
— optname003.vgd	: Optional pattern name data
— optname016.vgd	: Optional pattern name data
— uchardata0E0.vgd	: Character data
— uchardata0E1.vgd	: Character data
— uchardata0E2.vgd	: Character data

10.2.4 Copying and deleting registered data

Data registered on PC card can be copied or deleted using Explorer in Windows 98 SE, Windows 2000 or Windows XP in a PC equipped with a PC card slot.

* If a PC card is rendered unusable in the VG-849C because some of its data has been deleted by the PC in error, proceed to initialize the card (page 59) using PC card copy **FUNC4**. (If this is done, however, all the data remaining on the card will be erased.)

10.3 List of error messages

■ Error codes 00H to 1DH

Code (H)	Error message	Description	Remedial action
00	Panel ROM Unsetted	The PC card has not been inserted.	Insert the PC card correctly.
01	Prog No Disabled	The number of the program which was input turns out to have been set to "Disable" when the program was executed.	Input the number of the program which is set to "Enable."
02	DotClik over	Dot clock in the horizontal timing data is outside the setting range.	Check the setting range.
03	Hfp over	Hfrontp in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod \geq Hsync + Hbackp + Hdisp)
05	HD over	HDstart + HDwidth in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod \geq HDstart + HDwidth)
07	Hperiod over	HPeriod in the horizontal timing data is outside the setting range.	Check the setting range.
08	Hdisp over	Hdisp in the horizontal timing data is outside the setting range.	
09	Hsync over	Hsync in the horizontal timing data is outside the setting range.	
0A	Hbp over	Hbackp in the horizontal timing data is outside the setting range.	
0B	Hblank over	Hblanking in the horizontal timing data is outside the setting range.	
0C	Hfreq over	The horizontal sync frequency in the horizontal timing data is outside the setting range.	
0D	H-TIM data NG	Error other than those described above in the horizontal timing data.	
10	OUTPUT data error	Error in the output condition data.	Check the data.
11	CHR data error	Error in the character pattern data.	
12	CROSS data error	Error in the crosshatch pattern data.	
13	DOTS data error	Error in the dot pattern data.	
14	CRCL data error	Error in the circle pattern data.	
15	BRST data error	Error in the burst pattern data.	
16	WIND data error	Error in the window pattern data.	
17	COLBAR data error	Error in the color bar pattern data.	
18	PARAMETER error	Error in a parameter in the terminal mode.	
19	DATA error	Error in the data in the terminal mode.	
1A	SYNC data error	The sync signal has not been set.	Set the sync signal.
1B	Video&Sync&Setup error	The video output level (Video), setup level (Set-up.) and/or sync signal level (Sync) are outside the setting range.	Check the setting range. ([Video \geq Setup] and [Video \geq Sync] and [Video \geq (Setup + Sync)])

■ Error codes 1EH to 3FH

Code (H)	Error message	Description	Remedial action
1E	COMM. Timeout	Time-out has occurred in the data during communication in the terminal mode.	
1F	Undef Command	An undefined command was received in the terminal mode.	
20	VSync Timeout	Time-out has occurred during V sync interrupt wait.	
21	Prog-NO. error	Error in the program number.	Check the program number.
22	Group-NO. error	Error in the group number.	Check the group number.
23	User-CHR code error	Error in a user character code.	Check the user character code.
24	EEPROM write error	An EEPROM write error has occurred.	
26	M-Card Access error	A write or read error has occurred on the PC card.	
28	M-Card Not Set	The PC card has not been installed.	Install the PC card.
29	M-Card UnFormatted	The PC card is not formatted.	Format the PC card on a personal computer which can use the card.
2A	M-Card Full	There is no free space on the PC card.	Delete the files no longer required on the PC card.
2B	OPT PTN No error	Error in the optional pattern number.	Check the number of the optional pattern.
2D	OPT PTN Not Registered	No user-generated optional patterns have been registered.	
2E	BMP data No error	Error in the image data number.	Check the number of the image data.
30	BMP data Not Registered	The image data has not been registered.	
32	Key Not Available	The function cannot be used because the key lock function is activated.	
33	CURSOR Not Selected	The cursor pattern has not been selected (when SP-8848 CurTool is used).	
34	OPT-0E (DDC) Disabled	"Disable" has been set for the "DDC pattern" item of config edit.	
35	Flash ROM write error	A write error has occurred on the flash ROM.	
38	GRAY data error	Error in the gray scale pattern data.	Check the data.
39	OPT-PTN data error	Error in the optional pattern data.	
3B	CURSOR data error	Error in cursor pattern data.	
3C	PrgName data error	Error in the program name data.	
3D	GCOLOR data error	Error in the graphic color data.	
3E	ACTION data error	Error in the pattern action data.	

Error messages 40H to 66H

■ Error codes 40H to 66H

Code (H)	Error message	Description	Remedial action
40	Vtotal over	Vtotal in the vertical timing data is outside the setting range.	Check the setting range.
41	Vdisp over	Vdisp in the vertical timing data is outside the setting range.	
42	Vsync over	Vsync in the vertical timing data is outside the setting range.	
43	Vbp over	Vbackp in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal \geq Vsync + Vbackp + Vdisp)
44	Vfp over	Vfrontp in the vertical timing data is outside the setting range.	
45	Vblank over	Vblanking in the vertical timing data is outside the setting range.	Check the setting range.
46	Vfreq over	The vertical sync frequency in the vertical timing data is outside the setting range.	
47	VD over	VDstart + VDline in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal \geq VDstart + VDline)
48	EQPfp over	EQPfp in the vertical timing data is outside the setting range.	Check the setting range.
49	EQPbp over	EQPbp in the vertical timing data is outside the setting range.	
4A	V-TIM data NG	Error other than those described above in the vertical timing data.	
4B	DDC1 Timeout	A data timeout has occurred in DDC1.	
4C	DDC1 ACK error	ACK was not received in DDC1.	
4D	EDID Tim error	A response from EDID was not received.	
4E	DDC2 ACK error	ACK was not received in DDC2.	
50	Macrovision error	An IC supporting Macrovision has not been installed.	
51	Move Action Not Exe	The value of Hdisp or Vdisp in the timing data does not match the frame size setting in the simple moving pictures.	Check the setting.
52	EDID Header error	Error in the EDID header.	
53	EDID Check Sum error	EDID checksum error.	
54	EDID Headr & Chk Sum err	Errors in both the EDID header and checksum.	
60 to 62	File system err	Reserved	
63	Not free area	The data to be copied onto the PC card is over 16 Mbytes.	
64	DMA Error	An error occurred during pattern output.	A failure may have occurred. Contact the manufacturer.
65	Data Not Registered	An attempt was made to copy PC card data but the copy source file was not found.	
66	Video Board Busy	An error occurred on the video output board.	A failure may have occurred. Contact the manufacturer.

■ Error codes 67H and up

Code (H)	Error message	Description	Remedial action	
67	M-CARD Size Over	An attempt was made to copy all the data on a PC card data but the card capacity was exceeded.	Use a card with a capacity of 128MB or less.	
68	M-CARD Size Differ	An attempt was made to copy all the data on a PC card but the capacities of the copy source and copy destination cards were different.	Use cards with the same capacity.	
69	BMP Size Over	The bitmap size is too large.	Use a bitmap of 4000 × 4000 or less.	
81	OPT-Prog. not Exist	Errors which occur when user-generated optional patterns are executed	The user-generated optional pattern does not exist.	
82	Variables Stack Err	Variable stack error.		
83	Register Stack Err	Register stack error.		
84	Call Stack Error	Function stack error.		
85	Illegal Instruction	Illegal instruction code.		
86	Divide by Zero	An attempt was made to divide a number by zero.		
87	Math Error	An error has occurred in a floating decimal point calculation.		
	STOP : ClosedCaption	Closed caption was stopped during its execution.		
	STOP : VChip	V-chip was stopped during its execution.	Messages displayed when the function currently being executed stopped because the execution of another function has priority	
	STOP : CC & VChip	Closed caption and V-chip were stopped during their execution.		
	STOP : TeleText	Teletext was stopped during its execution.		
	STOP : Macrovision	Macrovision was stopped during its execution.		
	STOP : Audio	Audio sweep was stopped during its execution.		
	STOP : Action	Pattern action was stopped during its execution.		
151 to 16A		HDCP-related error. (Refer to "4.10.3.4 When HDCP authentication has failed/error codes.")		

10.4 Standard signal timing signal specifications

Internal program standard timing signal tables (analog TV standard timing signals)

The following settings are used for the D5 connector signal.

Line signal setting	Output level		
	0V	2.2V	5.0V
Line signal 1	Number of scanning lines	480	1080
Line signal 2	Scanning system	Interlace	Progressive
Line signal 3	Aspect ratio	4:3	16:9

1) Composite output timing signals

* Only the following timing signals are output for VBS and Y/C outputs.

Signal format	Reference standard	Resolution	Total no. of samples	V period [Hz] frame (field)	Subcarrier frequency [MHz]	Aspect ratio	D5 connector line signal [V]			SETUP	Program number			Remarks (main countries where used)
							1	2	3		PG1	PG2	PG3	
NTSC (Japan)	NTSC (RS-170A)	712×484	858×525	59.94 (29.97)	3.579545	4:3	0	0	0	OFF	950, 968	930	980	Japan
							0	0	5.0	OFF	-	918	-	
							0	0	2.2	OFF	-	919	-	
NTSC-M	NTSC	712×484	858×525	59.94 (29.97)	3.579545	4:3	0	0	0	ON	994	924	-	USA
NTSC-443	NTSC	712×484	858×525	59.94 (29.97)	4.433619	4:3	0	0	0	ON	-	925	-	
PAL (B/D/G/H/I/K) (BT.470-6)	PAL	702×574	864×625	50 (25)	4.433619	4:3	0	0	0	OFF	969	931	981	U.K, Germany
							0	0	5.0	OFF	-	920	-	
							0	0	2.2	OFF	-	921	-	
PAL-M	PAL	712×484	858×525	59.94 (29.97)	3.575612	4:3	0	0	0	ON	-	926	-	Brazil
PAL-60	PAL	712×484	858×525	59.94 (29.97)	4.433619	4:3	0	0	0	OFF	-	927	-	
PAL-N	PAL	718×574	864×625	50 (25)	4.433619	4:3	0	0	0	ON	-	928	-	Uruguay
PAL-Nc	PAL	702×574	864×625	50 (25)	3.582056	4:3	0	0	0	OFF	-	929	-	Argentina
SECAM	SECAM	702×574	864×625	50 (25)	for=4.406250 fob=4.250000	4:3	0	0	0	OFF	964	932	982	France, Russia
							0	0	5.0	OFF	-	922	-	
							0	0	2.2	OFF	-	923	-	

2) Component output timing signals

Reference standard	Resolution	Total no. of samples	V period [Hz] frame (field)	Subcarrier frequency [MHz]	Aspect ratio	D5 connector line signal [V]			Program number		
						1	2	3	PG1	PG2	PG3
1080i	SMPTE 274M	1920 × 1080	2200 × 1125	60 (30)	16:9	5.0	0	5.0	951, 972	-	-
			2200 × 1125	59.94 (29.97)	16:9	5.0	0	5.0	973	933, 938	985
			2640 × 1125	50 (25)	16:9	5.0	0	5.0	-	939	986
1080p	SMPTE 274M	1920 × 1080	2200 × 1125	60	16:9	5.0	5.0	5.0	970	935	-
			2200 × 1125	59.94	16:9	5.0	5.0	5.0	971	936	983
			2640 × 1125	50	16:9	5.0	5.0	5.0	-	937	984
1035i	BTA S-001A	1920 × 1035	2200 × 1125	60 (30)	16:9	5.0	0	5.0	974	934	-
				59.94 (29.97)	16:9	5.0	0	5.0	975	-	-
720p	SMPTE 296M	1280 × 720	1650 × 750	60	16:9	2.2	5.0	5.0	976	940	-
			1650 × 750	59.94	16:9	2.2	5.0	5.0	977	941	987
			1980 × 750	50	16:9	2.2	5.0	5.0	-	942	988
720 × 483p (NTSC-PROG)	SMPTE 293M	720 × 483	858 × 525	59.94	4:3	0	5.0	0	978	946	-
					16:9	0	5.0	5.0	-	947	-
720 × 576p (PAL-PROG)	BT.1358	720 × 574	864 × 625	50.00	4:3	0	5.0	0	979	948	-
					16:9	0	5.0	5.0	-	949	-

■ Standard signal timing signal waveforms

Signal	Sync signal waveform	Active line	Vertical blanking period $T_{1-dotwidth}$
NTSC-J PG1-950,968 PG2-918,919,930 PG3-980			
NTSC-M PG1-994 PG2-924			
PAL-B/D/G/H/I/K PG1-969 PG2-920,921,931 PG3-981			
PAL-NC PG2-929			
SECAM PG1-964 PG2-922,923,932 PG3-982			
PAL-N PG2-928			

Signal	Sync signal waveform	Active line	Vertical blanking period T: 1-dotwidth												
1080i PG1:951,972,973 PG2:933,938,939 PG3:985,986 1035i PG1:974,975 PG2:934	<p>Note: No video signal in 1920 x 1035i line 40.</p>	<p>1/T = 74.25MHz or 74.138MHz</p> <table border="1"> <tr><td>Frame Rate</td><td>AT</td></tr> <tr><td>60/59.94</td><td>44T</td></tr> <tr><td>50</td><td>484T</td></tr> </table>	Frame Rate	AT	60/59.94	44T	50	484T							
Frame Rate	AT														
60/59.94	44T														
50	484T														
1080p PG1:970,971 PG2:935,936,937 PG3:983,984 720p PG1:976,977 PG2:940,941,942 PG3:987,988	<p>Note: Figures in parentheses are the 1280 x 720p line numbers.</p>	<p>1/T = 74.25MHz or 74.138MHz</p> <table border="1"> <tr><td>Frame Rate</td><td>AT</td></tr> <tr><td>60/59.94</td><td>1080p</td></tr> <tr><td>50</td><td>44T</td></tr> <tr><td></td><td>484T</td></tr> <tr><td></td><td>70T</td></tr> <tr><td></td><td>400T</td></tr> </table>	Frame Rate	AT	60/59.94	1080p	50	44T		484T		70T		400T	
Frame Rate	AT														
60/59.94	1080p														
50	44T														
	484T														
	70T														
	400T														
720x483p (NTSC-P) PG1:978 PG2:946,947		<p>1/T = 27MHz</p>													
720x576p (PAL-P) PG1:979 PG2:948,949	<p>Note: Figures in parentheses are the 1920 x 1035i line numbers.</p>	<p>1/T = 27MHz</p>													

Signal	Sync signal waveform	Active line	Vertical blanking period
1080i SMPT-E-295M (China) PG2-998			
1080p SMPT-E-295M PG2-999 Only analog output signals supported			
1152i (Australian) PG2-944			
1080i (1250) (Australian) PG2-945			

11

SPECIFICATIONS AND CHECKPOINTS

11.1 Main specifications

11.1.1 Output

Dot clock frequency	Analog		5.00 to 300.00MHz	
	Digital	DVI	Single Link: 25 to 165 MHz, serial output (Panel Link)	
		HDMI	Single Link: 8-bit or 10-bit output	25 to 165MHz
			Single Link: 12-bit output	25 to 150MHz
Horizontal frequency			10 to 300 kHz, max. 8192 dots	
Number of vertical scanning lines			Max. 8192 lines	
Video memory			4096 dots × 4096 dots	
Video signal output level			0.30 to 1.20V (75Ω)	
Setup level			0 to 0.25V (75Ω)	
Sync signal output level (HS, CS, VS)			HS, VS: More than 2V (75Ω) CS: 0.3V for binary output; ±0.3V for tri-level output (75Ω)	
Composite video sync signal			Level: 0 to 0.60V (0 to ±0.6V for tri-level output) (75Ω) ON/OFF selectable separately for R, G and B	
Serration pulse			OFF, 0.5H, 1H or EXOR selectable	
Scanning			Non-interlaced, interlace & sync, interlace & video	
Analog output connectors (BNC)			RGB, HS, VS, CS	
Fine adjustment of analog output levels			Offset level (RGB coupled), video level (separate for R, G and B)	
DVI output			DVI 1.0 HDCP: Ver.1.0 complied with	
Output control	Analog		RGB, ON/OFF and inverse ON/OFF and negative/positive for HS, VS, CS	
Audio output connectors (RCA × 2 channels)			Output frequency: 100 to 20000 Hz (in 100 Hz increments) Output level: 0 to 2000mV (in 50mV increments)	
HDMI output			HDMI 1.1 HDCP: Ver.1.1 complied with Color mode: RGB, YCbCr 4:4:4 8 bits; YCbCr 4:2:2 8, 10 or 12 bits Internal audio: 8 channels (sine-wave single tone, sweep) External audio input: Analog × 2 channels, digital COAX, TOSLINK Audio sampling frequency: 32 kHz to 192 kHz (max. 8 channels)	

* HS: horizontal sync signal, VS: vertical sync signal, CS: composite sync signal

11.1.2 External interfaces

Remote connector (25-pin)
RS-232C (9pin)
LAN (10/100BASE-TX)

11.1.3 General ratings

Supply voltage	AC100 to 120V, AC200 to 240V
Power line frequency	50Hz / 60Hz
Power consumption	70VA MAX
Dimensions	430 (W) × 88 (H) × 320 (D) mm (excluding protrusions)
Weight	Approx. 6 kg
Operating temperature	5 to 40°C
Storage temperature	-10 to 60°C
Humidity	30 to 85%RH (no condensation)

11.2 Concerning the DDC power supply

The supply voltage (5V) from the DDC power supply is supplied to the analog D-Sub output, DVI output and HDMI outputs of the VG-849C.

The maximum current supplied by the DDC power supply is 0.5A for the D-Sub and DVI outputs. For the HDMI output, refer to the HDMI standard sheet.

The DDC supply voltage is output as shown in the figure below.

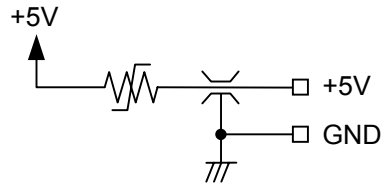


Fig. 11.2.1 DDC power supply output circuit

CAUTION

- The DDC power supply incorporates an overcurrent protection device, but do not use a current which exceeds the rating.
- Do NOT supply power to the DDC power supply from the device connected to the VG-849C. If such the voltage of such a power supply is connected, both the VG-849C and the connected device may fail.

11.3 Connector pin layouts

11.3.1 DVI digital serial output connector

- Connector: Morex, DVI-I (74320-1000), 24 pins + 5 pins (analog)
DVI-D (74320-4000), 24 pins
- Output: TMDS

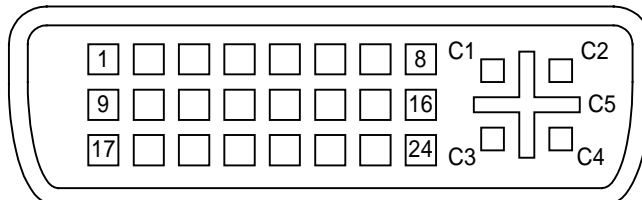


Fig. 11.3.1 Pin layout

Table 11.3.1 Pin numbers

Pin No.	Signal	Pin No.	Signal
1	TMDS DATA2-	16	SENSE
2	TMDS DATA2+	17	TMDS DATA0-
3	TMDS DATA2/4 G	18	TMDS DATA0+
4	TMDS DATA4-	19	TMDS DATA0/5 G
5	TMDS DATA4+	20	TMDS DATA5-
6	DDC CLK	21	TMDS DATA5+
7	DDC DATA	22	TMDS CLK G
8	Analog Vsync	23	TMDS CLK+
9	TMDS DATA1-	24	TMDS CLK-
10	TMDS DATA1+	C1	Analog Red
11	TMDS DATA1/3 G	C2	Analog Green
12	TMDS DATA3-	C3	Analog Blue
13	TMDS DATA3+	C4	Analog Horizontal Sync
14	+5V (DDC power supply)	C5	Analog Ground (analogR,G,B,return)
15	Ground		

*1: The 1:1 Panel Link data is output from a single connector. Only EVEN data is output with the 1:2 Panel Link.

*2: The DVI-D (74320-4000) connector does not have the C1 to C5 pins shown in the above figure.

*3: For details on the DDC power supply, refer to "11.2 Concerning the DDC power supply."

11.3.2 HDMI connector

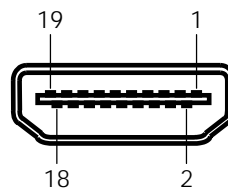


Fig. 11.3.2 Pin layout

Table 11.3.2 Pin numbers

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
15	DDC CLK
16	DDC DATA
17	GROUND (for +5V)
18	+5V (DDC supply voltage)
19	HOT PLUG DETECT
Shell	FG

* For details on the DDC power supply, refer to “11.2 Concerning the DDC power supply.”

11.3.3 Analog D-Sub connector

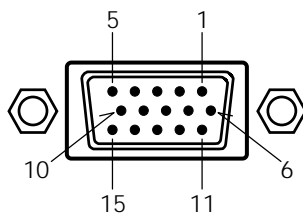


Fig. 11.3.3 Pin layout

Table 11.3.3 Pin numbers

Pin No.	Signal	Pin No.	Signal
1	R	9	+5V (DDC power supply)
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)		

* For details on the DDC power supply, refer to “11.2 Concerning the DDC power supply.”

11.3.4 D5 connector

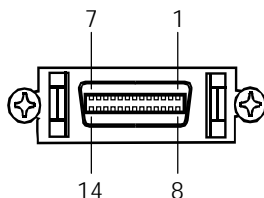


Fig. 11.3.4 Pin layout

Table 11.3.4 Pin numbers

Pin No.	Signal	Pin No.	Signal
1	Y	8	Line 1
2	GND (Y)	9	Line 2
3	Pb	10	NC
4	GND (Pb)	11	Line 3
5	Pr	12	NC
6	GND (Pr)	13	NC
7	NC	14	NC

11.3.5 Y/C (S) connector

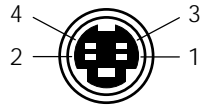


Fig. 11.3.5 Pin layout

Table 11.3.5 Pin numbers

Pin No.	Signal
1	GND
2	GND
3	Y
4	C

11.3.6 Remote (D-Sub 25-pin female) connector

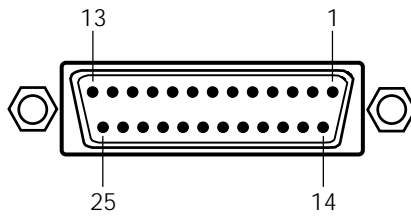


Fig. 11.3.6 Pin layout

Table 11.3.6 Pin numbers

Pin No.	I/O ^{*1}	Signal	Pin No.	I/O ^{*1}	Signal
1	I	KX7	14	I	KX6
2	O	KY2	15	O	KY3
3	O	KY4	16	O	KY1
4	O	KY5	17	I	KX4
5	I	KX5	18	O	KY0
6	I	KX3	19	I	KX2
7	I	KX1	20	I	KX0
8	-	GND	21	-	ID ^{*3}
9	O	RMT_RST ^{*2}	22	O	RMT_CLK ^{*2}
10	O	RMT_LAT ^{*2}	23	O	+5V
11	-	GND	24	-	GND
12	O	RMT_DIN ^{*2}	25	O	+5V
13	O	RMT_EN ^{*2}			

*1: "I" or "O" is as input to or output from the VG-849C.

*2: The control signals of these pins are used by Astrodesign. Under no circumstances must any connections be made to these pins.

*3: When fabricating a remote control unit, ground pin 21, and use the key matrix of the RB-614C.

As shown on the next page, the signals and remote control box (RB-1848, RB-614C, RB-649: optional accessory) key contacts are arranged in the form of a matrix.

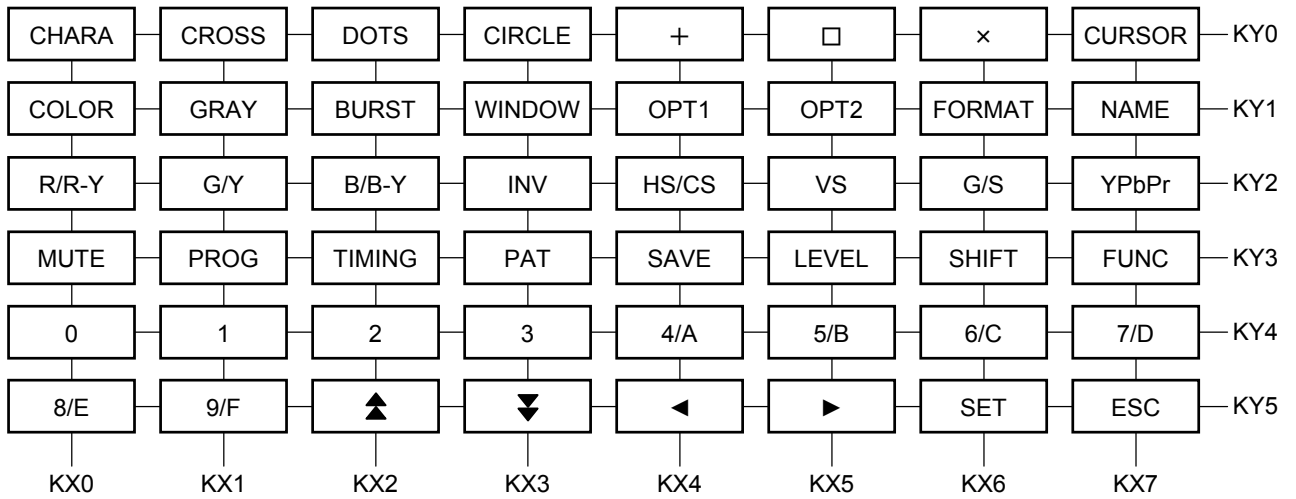


Fig. 11.3.7 RB-1848 key matrix

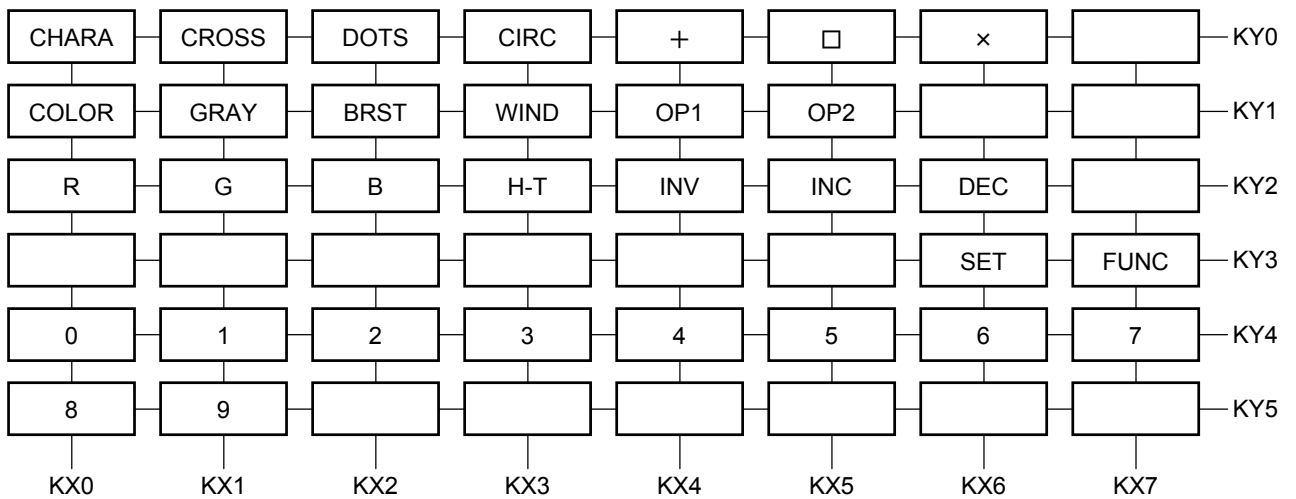


Fig. 11.3.8 RB-614C key matrix

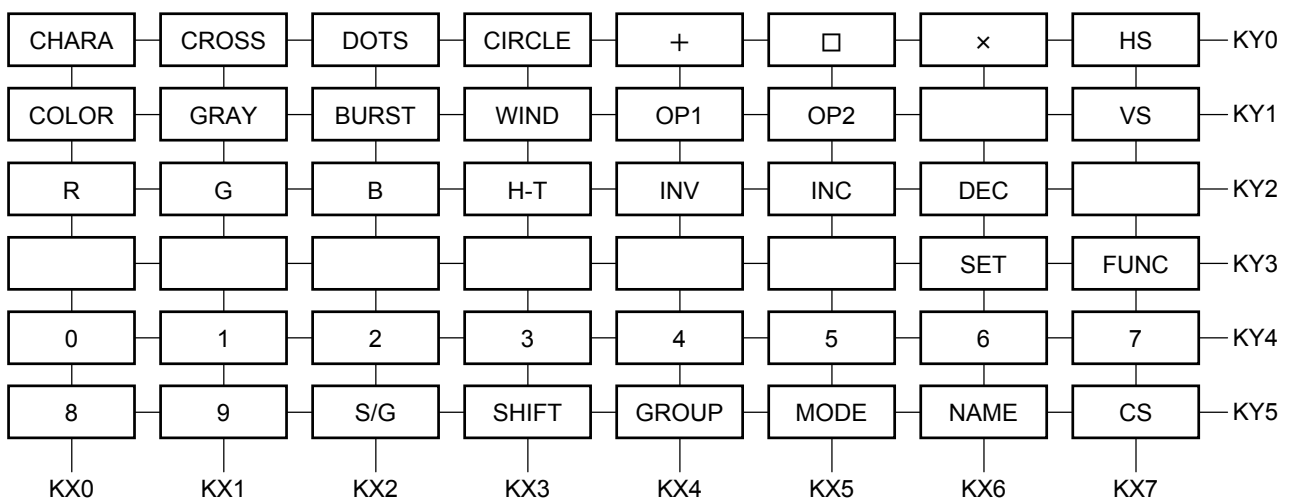


Fig. 11.3.9 RB-649 key matrix

11.3.7 RS-232C (D-Sub 9-pin male) connector

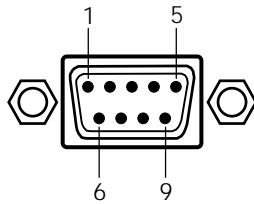


Fig. 11.3.10 Pin layout

Table 11.3.7 Pin numbers

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

11.4 Checkpoints

This instruction manual has been drawn up on the basis of firmware version 5.00 for the VG-849C (VG849/VG-849A/VG-849B). If the firmware version of the generator used is older or if it is a newer version and there are functions not described in this instruction manual, contact an Astrodesign sales representative. For the steps to take in order to check the version, refer to "7.1 Concerning the self-check."

11.4.1 Differences between individual models (in the VG-849 series)

This instruction manual has been drawn up on the basis of the VG-849C. It supports all the models in the VG-849 series, but some of its details may not be supported by older firmware versions. The table below shows the main differences between the models.

Table 11.4.1 Differences between models in VG-849 series (1)

Item		VG-849	VG-849A	VG-849B	VG-849C	
HDMI-related items ^{*2}	HDMI version ^{*2}	1.0	1.1	1.2	1.3	
	CEC function	Not supported	Not supported	Supported	Supported	
	Video format ^{*3}	RGB	24bit	24bit	24bit	24/30/36bit
		YCbCr444	24bit	24bit	24bit	24/30/36bit
		YCbCr422	24/30/36bit	24/30/36bit	24/30/36bit	24/30/36bit
	Multi-bit mode (10-/12-bit patterns supported)	Not supported	Not supported	Supported	Option ^{*1}	
	Output frequency (with 12-bit output)	25 to 81MHz	25 to 165MHz	25 to 165MHz	25 to 165MHz (to 150MHz) ^{*4}	
	Frequencies which can be output simultaneously with analog/DVI priority ^{*5}	Always OFF	100.001 to 165MHz	100.001 to 165MHz	25 to 165MHz	
	Output audio sampling	32 to 48kHz	32 to 192kHz	32 to 192kHz	32 to 192kHz	
	Output audio channels	Max. 2 channels	Max. 8 channels	Max. 8 channels	Max. 8 channels	
	ACP Packet	Not supported	DVD Audio	DVD Audio Super Audio CD	DVD Audio Super Audio CD	
ISRC Packet	Not supported	Supported	Supported	Supported		
VBS, Y/C outputs	Closed caption, V-chip	Option ^{*1}	Supported as standard feature	Supported as standard feature	Supported as standard feature	
	Teletext					
	Macrovision	Option ^{*1}	Option ^{*1}	Option ^{*1}	Option ^{*1}	

Table 11.4.2 Differences between models in VG-849 series (2)

Item		VG-849	VG-849A	VG-849B	VG-849C	
Internal programs	Internal program tables	PG1, 2	PG1, 2	PG1, 2, 3	PG1, 2, 3	
	Optional patterns	No.27	“Song of Youth”	“Song of Youth”	HDMI speaker check	HDMI speaker check
		No.35	Checkerboard & window	Checkerboard & window	HDMI CEC pattern	HDMI CEC pattern
		No.3E	ANSI pattern (Hor Reso)	ANSI pattern (Hor Reso)	ANSI pattern (Hor Reso)	ANSI pattern (Hor Reso) or full-step & 256-gradation gray scale H direction ramp ^{*6}
		No.3F	ANSI pattern (Ver Reso)	ANSI pattern (Ver Reso)	ANSI pattern (Ver Reso)	ANSI pattern (Ver Reso) or full-step H direction ramp ^{*6}

*1: For details on the options supported, contact an Astrodesign sales representative.

*2: What HDMI-related items are supported differs depending on the HDMI version. In addition to what is listed in the tables, the following items apply to the InfoFrame settings. For further details, refer to the “High-Definition Multimedia Interface Specifications” of the HDMI standard.

Table 11.4.3 Differences in InfoFrame settings by model

General	Setting item	VG-849 HDMI1.0	VG-849A HDMI1.1	VG-849B HDMI1.2	VG-849C HDMI1.3
New items added in VG-849C (HDMI1.3)	AVI InfoFrame RGB Quantization Range	Not supported			0-2
	AVI InfoFrame Extended Colorimetry	Not supported			0/1
	AVI InfoFrame IT Content	Not supported			0/1
Setting items which differ depending on model (HDMI version)	AVI InfoFrame Colorimetry	0-2			0-3
	AVI InfoFrame Video Code	0-34		0-59	
	SPD InfoFrame Source Device	0-9		0-B	
	Audio InfoFrame Coding Type	0-8		0-C	0-E

The numbers given in the table refer to the items which can be set by each model. For further details, refer to “5.7 Setting InfoFrame.”

*3: Older versions of the VG-849C supported up to 24 bits for RGB and YCbCr 4:2:2. The video format settings for these versions are given below.

Table 11.4.4 VG849/VG-849A/VG-849B video format settings

Setting item	Key	LCD display	Description
Video format (VideoFormat)	0	RGB	Output with RGB 24 bits (8 bits for each signal).
	1	Y444	Output with YCbCr 4:2:2 24 bits (8 bits for each signal).
	2	Y422_16	Output with YCbCr 4:2:2 16 bits (8 bits for each signal).
	3	Y422_20	Output with YCbCr 4:2:2 20 bits (10 bits for each signal).
	4	Y422_24	Output with YCbCr 4:2:2 24 bits (12 bits for each signal).

*4: When the video format is RGB 24 bits or YCbCr 444, the maximum frequency is 150 MHz.

*5: The “frequencies which can be output simultaneously” are the frequencies which can be output by HDMI when the **FUNC2**/**FUNC3** priority output port (refer to “[11] Setting the DVI output mode and priority output port”) has been set to analog or DVI. For further details, refer to “(4) Concerning the HDMI outputs” in “11.4.5 Concerning the video output connectors.”

*6: When the **FUNC5** HDMI output bit mode is 8 bits, the same ANSI patterns as for older models are output, but ramp patterns are output in the multi-bit mode (optional).

11.4.2 Restrictions on functions used by SP-8848, RB-614C and RB-649

The functions which can be used by the SP-8848 and by the RB-614C and RB-649 remote control boxes are subject to some restrictions.

Function		●: Function which can be used			
		RB-1848	SP-8848	RB-614C ^{*2}	RB-649 ^{*2}
Direct display	FUNC0	●	●	●	●
Auto display	FUNC1	●	●		
Program edit	FUNC2	●	●		
PC card edit	FUNC3	●	●		
PC card copy	FUNC4	●	●	●	●
Config edit	FUNC5	●	△ (*1)		
Group data edit	FUNC6	●	●		
Character edit	FUNC8	●	●		
List display	FUNC9	●		●	●
YPbPr coefficient table edit	FUNCA	●	●		
Panel ROM copy	FUNCB	●			
HDCP set	FUNCC	●			
Calibration	FUNCD	●			
IA-5XX	FUNCE	●			
Self-check		●			

*1: The only function of config edit FUNC5 which can be set by the SP-8848 is “[18] Setting the internal program table.” However, the data which has been set cannot be saved.

*2: In the case of the RB-614C and RB-649, the keys corresponding to some of the functions which can be used are not featured on these remote control boxes, and so these items are not supported. (For instance, the boxes do not have a [LEVEL] key so the video output level cannot be changed using direct display FUNC0.) For the differences between the keys on these two boxes and the keys on the RB-1848 remote control box, refer to “ 9.1.3 Concerning the key operations.”

11.4.3 Concerning the optional functions

The following two functions are options. They are not supported by the VG-849C standard model.

- Macrovision “5.11 Setting Macrovision (❖ optional function)”
- Scroll trigger “3.3 [31] Setting the scroll trigger (❖ optional function)”
- Window 16 levels “6.11 Setting the window pattern”
- HDMI output multi-bit mode “3.3 [32] Setting the HDMI output bit mode (❖ optional function)”

Contact Astrodesign separately concerning support for these optional functions.

11.4.4 Concerning functions which cannot be executed simultaneously

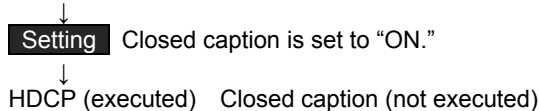
The HDCP, pattern action ^{*1}, audio sweep, closed caption/V-chip ^{*2}, Teletext and Macrovision functions as well as the scrolling operations using direct display **FUNC0** cannot be executed simultaneously. If "ON" has been set for a multiple number of these functions, operation will be as described below.

*1: The pattern action function is used to set scrolling, flicker and other operations using the pattern action data. As such, these operations differ from the scrolling operations (initiated by the [FORMAT] key + [+] + [1] key, etc.) using direct display **FUNC0**.

*2: The closed caption and V-chip functions can be executed simultaneously.

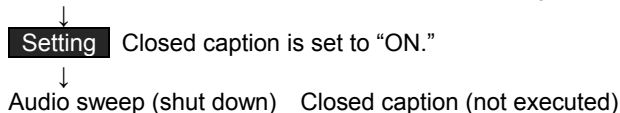
● **While the HDCP function is being executed, the HDCP function has priority, and no other functions can be executed.**

<Example> While the HDCP function (executed) is being executed



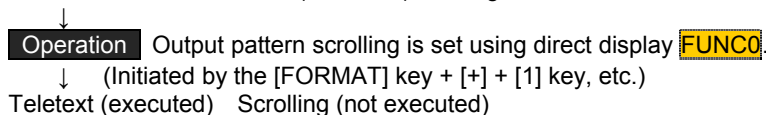
● **If, when a function other than HDCP is set to "ON," another function is already being executed that function will be shut down, and the function just set will be executed later.** (Excluding scrolling operations using direct display **FUNC0**)

<Example> While the audio sweep function (executed) is being executed



● **Scrolling using direct display **FUNC0** cannot be operated while another function is being executed.**

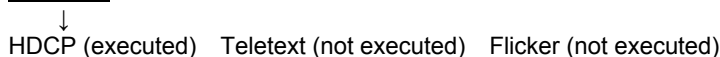
<Example> While the Teletext function (executed) is being executed



● **If a multiple number of functions have been set simultaneously by the SP-8848 and a program has been executed, the functions with the highest priority alone will be executed. The order of priority is as follows.**

- (1) HDCP
- (2) Closed caption/V-chip
- (3) Macrovision
- (4) Teletext
- (5) Audio sweep
- (6) Pattern action

<Example> **Setting** HDCP, Teletext and flicker (pattern action) are set to "ON."



11.4.5 Concerning the video output connectors

Signals are output from the video output connector under the following conditions.

(1) Priority output port setting (refer to “5.4 [11] Setting the DVI output mode and priority output port”)

The signals are output based on the output connector which has been set as the priority output port. The signals will be output from output connectors which have not been set as the priority output port if the conditions are met.

(2) Output connector conditions

Signals are output from the output connectors when the conditions inherent to those connectors are met.

[1] Concerning the priority output port

The output is subject to the following restrictions imposed by the “priority output port” setting

Table 11.4.5 Restrictions on output imposed by priority output port

			Priority output port		
			Analog	DVI	HDMI
Output	Analog	5 to 24.999 MHz	○	○	○
		25 to 100 MHz		○	○ (2-dot increments)
		100.001 to 200 MHz		○ (2-dot increments)	○ (2-dot increments)
		200.001 to 300 MHz		○ (4-dot increments)	○ (4-dot increments)
	DVI	25 to 100 MHz	○	○	○ (2-dot increments)
		100.001 to 165 MHz	○ (2-dot increments)	○ (2-dot increments)	○ (2-dot increments)
HDMI	25 to 165 MHz	Refer to “(4) Concerning the HDMI output” in “[2] Concerning the output connectors.”			
Output connector for executing HDCP function			OFF	DVI	HDMI
Other			HDMI output OFF with YPbPr output		RGB output always ON, VBS output always OFF with outputs other than HDMI
Dot clock frequency			×: Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

[2] Concerning the output connectors

(1) VBS, Y/C output connectors

- 1) Only NTSC, PAL or SECAM timing signals can be output from the VBS and Y/C output connectors.
- 2) With internal programs, only composite output timing signals (see “1) Composite output timing signals” in “10.4 Standard signal timing signal specifications”) are output.
- 3) When changes are made to the following settings from the settings of the timing signals which can be output, the VBS and Y/C outputs are turned off.
 - Dot clock frequency
 - Scanning mode
 - Hperiod
 - Vtotal
 - Hsync
 - Vsync
- 4) When “16-235” has been set for the DVI level mode (see “[15] Setting the digital level mode” of config edit FUNC5), the VBS and Y/C outputs are turned off.
- 5) When the multi-bit mode has been set as the FUNC5 HDMI output bit mode (refer to “3.3 [32] Setting the HDMI output bit mode (❖optional function)”), the VBS output is always OFF.
- 6) The Y, Pb and Pr component signals cannot be set to ON or OFF. They are always ON. (The RGB component signals can be set to ON or OFF.)

(2) D connector output

- 1) With internal programs, the initial setting is “ON” only for RGB/YPbPr output signals which have been set to YPbPr.
- 2) When the scroll trigger function (see “[31] Setting the scroll trigger (❖optional function)” of config edit FUNC5) is set to ON, no line signals are output regardless of the scroll setting.

(3) DVI output

- 1) The timing signal settings of the DVI output are subject to the following restrictions.

Mode	Setting item	Setting range and restriction
Single Link	Dot clock frequency	25 to 165MHz
	All horizontal timing signals ^{*1}	When the dot clock frequency is 25 to 100 MHz: 1-dot increments When the dot clock frequency is 100.001 to 165 MHz: 2-dot increments
Dual Link ^{*2}	Dot clock frequency	50 to 300MHz
	All horizontal timing signals ^{*1}	4-dot increments

*1: Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking

*2: Only Single Link is supported by the VG-849C standard model. Contact Astrodesign separately concerning Dual Link.

- 2) With internal programs, OFF is set as the initial setting for all the DVI analog outputs.

(4) HDMI output

- 1) Only 'ACP Packet' is supported for the Super Audio CD.
- 2) Ver.1.2 is also included in "HDMI 1.1" of "[1] HDMI output mode" in "5.6 Setting the HDMI output" depending on whether the ACP, ISRC1 and ISRC2 packets are sent.
- 3) The [YPbPr] key does not work when "HDMI" has been selected as the "[11] Priority output port" in "5.4 Setting the output condition data."
- 4) The output restrictions differ from model to model as follows due to differences in the **FUNC2/FUNC3** priority output port (refer to "5.4 [11] Setting the DVI output mode and priority output port").
The HDMI output is set OFF when analog or DVI and no RGB output has been set as the priority output port.

Table 11.4.6 HDMI output restrictions when analog or DVI has been set as the priority output port

		HDMI output restrictions when analog or DVI has been set as the priority output port		
		VG-849	VG-849A VG-849B	VG-849C
Output	HDMI	25 to 100 MHz	×	○ 1-dot increment
		100.001 to 165 MHz		○ 2-dot increments
Dot clock frequency		×: Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

Table 11.4.7 HDMI output restrictions when HDMI has been set as the priority output port

		HDMI output restrictions when HDMI has been set as the priority output port		
		VG-849	VG-849A VG-849B	VG-849C
Output	HDMI	25 to 81 MHz	○ 2-dot increments	○ 1-dot increment
		81.001 to 100 MHz	×	
		100.001 to 165 MHz	×	○ 2-dot increments
Dot clock frequency		×: Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

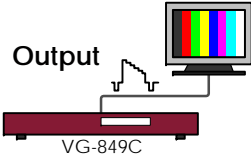
11.4.6 Concerning the multi-bit mode (❖ optional function)

For details on the precautions to be observed in the multi-bit mode, refer to "Chapter 8 MULTI-BIT MODE (❖OPTION)."

Main functions

FUNC 0 SET

Direct display



Output
VG-849C

(Group No.0)
8 5 0 (Number keys, 3 digits)
Number of program selected and executed
Direct display mode

(Group No.1 to 99)
0 1 (Number keys, 2 digits)
Number of group selected and executed
Group display mode

ESC
Group number changed

LEVEL
Video, audio output levels changed

MUTE
Audio output ON/OFF

CHARA **CROSS** **DOTS** **CIRCLE**
+ **x** **CURSOR**
COLOR **GRAY** **BURST** **WINDOW**
OPT1 **OPT2** **NAME**

Output patterns switched

HS/CS **VS** **G/S** **YPbPr**
R/R-Y **G/Y** **B/B-Y** **INV**
SHIFT

Output video signals, sync signal switched

(When cursor is displayed)

0 Screen display method changed
1 Blinking speed changed
2 Cursor moved (↓)
3 Cursor shape, mode changed
4 Cursor moved (←)
5 Movement step changed
6 Cursor moved (→)
8 Cursor moved (↑)

Cursor operations

(When a window is displayed)

A Auto up **E** 1 level up
B Auto down **F** 1 level down
C Changes stopped

Window RGB levels changed

FORMAT **+**

7 ↖ **8** ↑ **9** ↗
4 ← **5** Stop **6** →
1 ↙ **2** ↓ **3** ↘

Scrolling

Signal output

FORMAT

TIMING ↻

Horizontal timing data
Vertical timing data
CEC function

Timing data settings performed

FORMAT

CHARA **CROSS** **DOTS** **CIRCLE** **CURSOR**
COLOR **GRAY** **BURST** **WINDOW**
OPT1 **OPT2** **NAME** **CURSOR**

Character patterns to cursor patterns

Pattern action **x**
Graphic color

Pattern data settings performed

↑ or ↓
or → or ←

Setting item of each data selected or changed

SET

Settings reflected (signals output)

FUNC 2 SET

Program edit

8 5 0 (Number keys, 3 digits)
Number of program selected

▶ or ◀

Program enable/disable
Program name
HDCP enable/disable **HDCP**

Settings performed

TIMING 0~9 **SET**

0 Horizontal timing data
Vertical timing data
9 Macrovision

Timing data settings performed

PAT 0~E **SET**

0 Pattern select
Graphic color
F CEC function

Pattern data settings performed

↑ or ↓
or → or ←

Setting item of each data selected or changed

SET


Settings reflected (signals output)

SAVE (LED blinks)
SAVE (LED off)
Settings saved

FUNC 3 SET

PC card edit

Edit




Save

FUNC 5 SET

Config edit

Set Up



VG-859B

↑ or ↓ or → or ←

System setting item selected

SET

Settings reflected

SAVE (LEDblinks) **SAVE** (LED off)

Settings saved

 Timing data

- 0** Horizontal timing data
- 1** Vertical timing data
- 2** Output conditions
- 3** Audio output
- 4** HDMI output
- 5** InfoFrame
- 6** ACP/ISRC packets
- 7** Closed caption/V-chip
- 8** Teletext
- 9** Macrovision

Optional function

 Pattern data

- 0** Pattern select
- 1** Graphic color
- 2** or **CHARA** Character pattern
- 3** or **CROSS** Crosshatch pattern
- 4** or **DOTS** Dot pattern
- 5** or **CIRCLE** Circle pattern
- 6** or **COLOR** Color bar pattern
- 7** or **GRAY** Gray scale pattern
- 8** or **BURST** Burst pattern
- 9** or **WINDOW** Window pattern
- A** or **OPT1** Optional pattern 1
- B** or **OPT2** Optional pattern 2
- C** or **CURSOR** Cursor pattern
- D** or **NAME** Program name
- E** Pattern action
- F** CEC function

FUNC C SET

HDCP set

HDCP Set Up

↑ or ↓ or → or ←

Execution mode/display mode
Execution interval/version
Automatic resetting when authentication is NG/FIFO Ready time restriction

HDCP setting performed

SET Settings reflected

SAVE (LEDblinks) **SAVE** (LED off)
Settings saved

Other functions

FUNC 1 SET

Auto display

FUNC 9 SET

List display

FUNC 4 SET

PC card copy

FUNC A SET

YPbPr coefficient table edit

FUNC 6 SET

Group data edit

FUNC B SET

Panel ROM copy

FUNC 8 SET

Character edit

FUNC D SET

Calibration

FUNC E SET

IA-5XX

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