Programmable-Video Signal Generator for DigitalTV

VG-859C

Instruction Manual

Ver.2.00

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for DigitalTV

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2007.9

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ASTRODESIGN,Inc

Contents

BEFORE OPERATION

Introduction

Thank you very much for purchasing this model VG-859C video signal generator.

This manual contains details on the operation procedures to be followed when the VG-859C (RB-1848) is used, the checkpoints and precautions to be observed, and so on. Improper handling may result in malfunctioning. Before using the VG-859C, 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.**

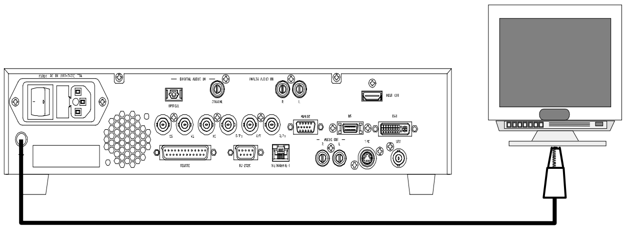
Concerning foreign matter

- **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-859C to a display unit, use the FG cable provided to connect the frame ground (FG) terminal on the VG-859C 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-859C 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-859C.

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

■ **When disconnecting the VG-859C 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-859C and allow it to warm up for about 10 to 15 minutes before use so as to ensure that the VG-859C 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-859C (RB-1848 *1). 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.

*1: The keys on the RB-1848 are used as the function keys.

● Read this first!

Before operating the generator

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-859C (RB -1848)

A general description of the VG-859C 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-859C system settings

The system settings (FUNC5) of the VG-859C 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 CONCERNING THE xvYCC FEATURES

This chapter provides details on the xvYCC features.

Chapter 10 REMOTE CONTROL

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

Chapter 11 REFERENCE

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

Chapter 12 Specifications and checkpoints

The VG-859C's specifications and checkpoints are contained in this chapter.

Appendix

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-859C main unit
- VG-859C (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-859C.

■ 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-859C, 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 though the RS-232C interface or LAN.

1 CONCERNING THE VG-859C (RB-1848)

1.1 General description

This programmable video signal generator designed for digital TV applications (hereafter referred to simply as the "VG-859C") 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-859C are the 5 to 250 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 859 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-859C 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-859C 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-859C 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 “11.1 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	

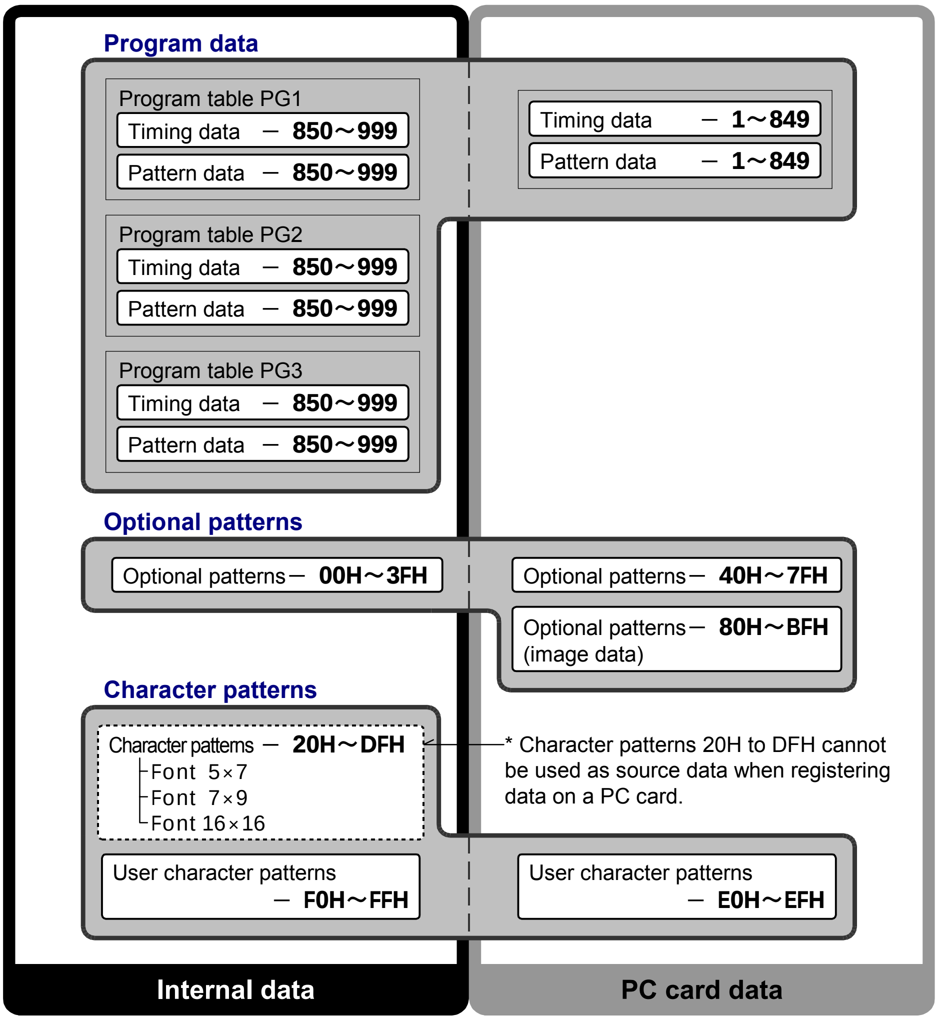


Fig. 1.3.1 Internal data and PC card data

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.

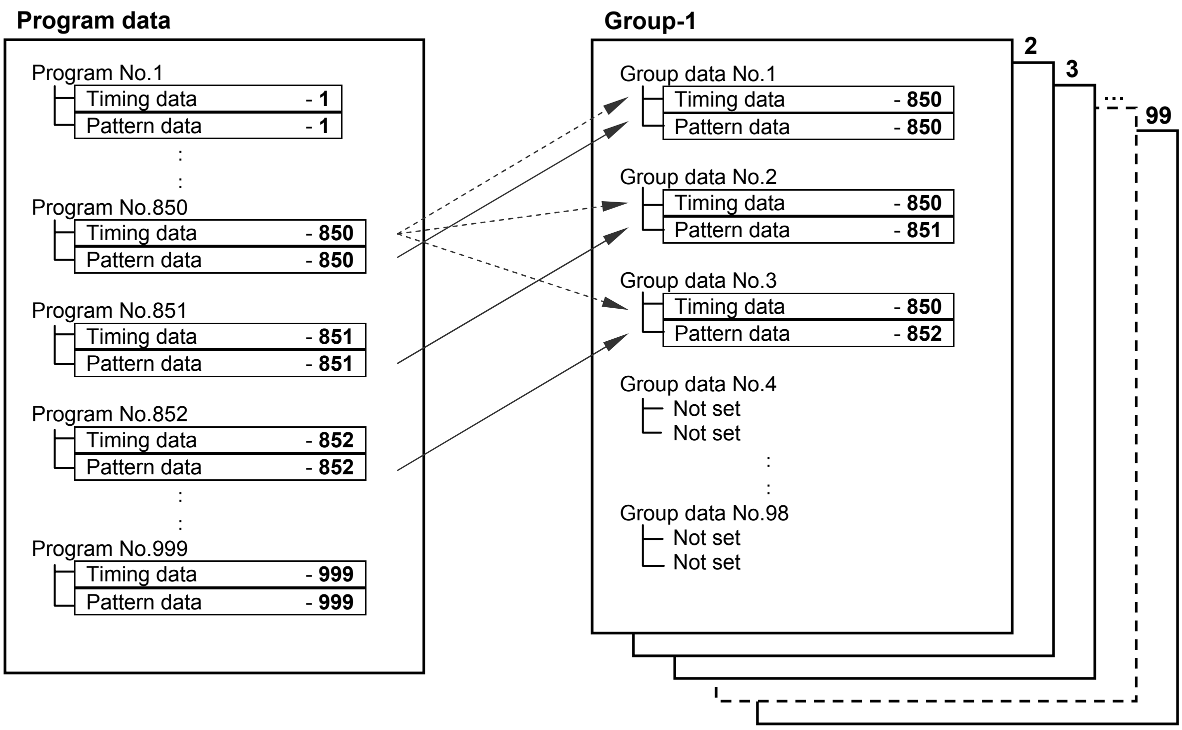


Fig. 1.4.1 Configuration of a group

1.5 Concerning the operating modes

The VG-859C has four operating modes, each of which is outlined below.

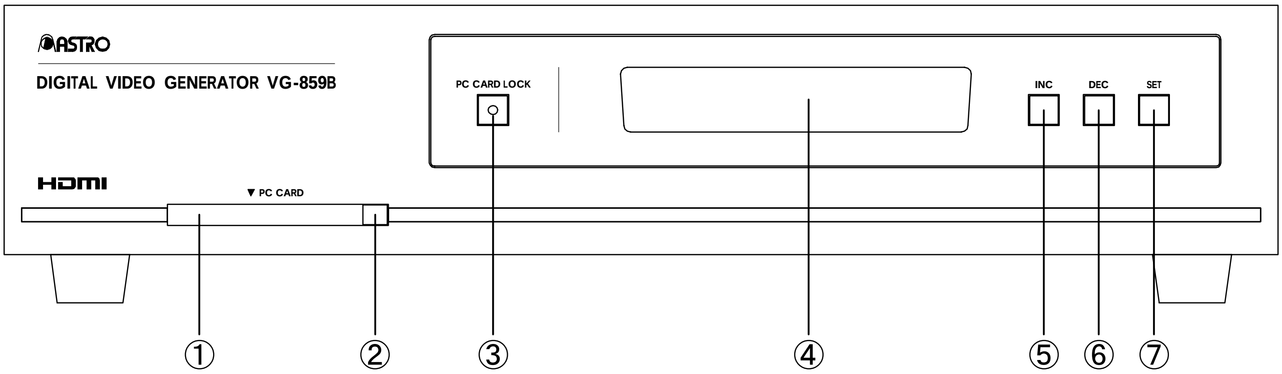
Table 1.5.1 List of operating modes

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

The key functions may differ from function to function and from one mode to another. For details, refer to the operation instructions provided in the chapters concerned.

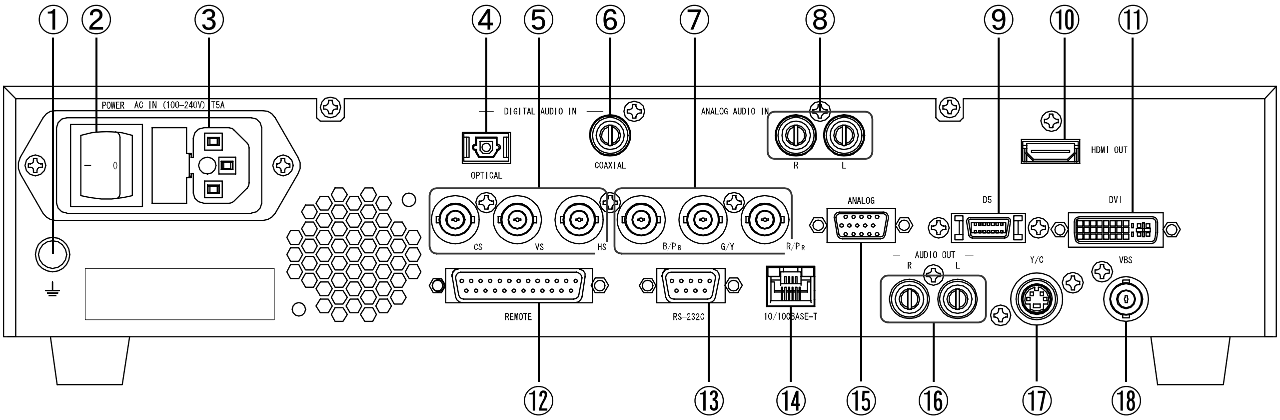
1.6.1 VG-859C front panel



(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 "How to insert and eject the PC card" in 2.5. 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)	[▲] key	This increments the program numbers by 1 (+1). It is also used to display the previous page on the LCD. * “INC” appears on the panel for this key, but it is referred to as “▲” (which appears on the RB-1848) in this manual.
(6)	[▼] key	This decrements the program numbers by 1 (-1). It is also used to display the next page on the LCD. * “DEC” appears on the panel for this key, but it is referred to as “▼” (which appears on the RB-1848) in this manual.
(7)	[SET] key	This is used to execute the functions and program data.

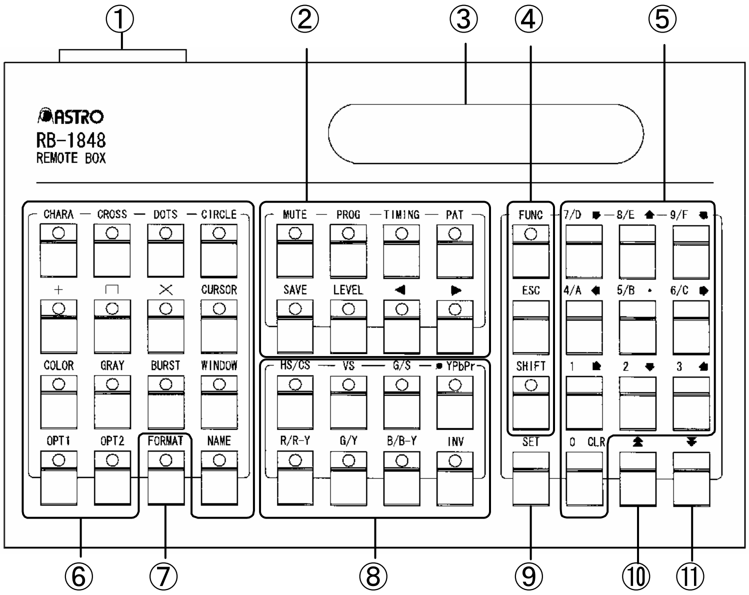
* When the RB-1848, RB-614C or RB-649 remote control box is used, programs are executed instantly by pressing the [▲] or [▼] key. However, If the [▲] key or [▼] key on the front panel of the VG-859C is used, the programs are not executed until the [SET] key is pressed after pressing the [▲] or [▼] key.

1.6.2 VG-859C rear panel



(1)	Frame ground (FG)	Connect this frame ground terminal to the frame ground terminal of the unit which is connected to the VG-859C.
(2)	POWER switch	This is used to turn the generator's power ON and OFF.
	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.	
(3)	AC input socket	One end of the power cable is connected here. A voltage from 100V to 120V or 200V to 240V is supported.
(4)	TOSLINK input connector (coaxial)	Digital audio input connector
(5)	BNC analog output connectors	HS = Horizontal sync signal, VS = vertical sync signal, CS = composite sync signal.
(6)	COAX input connector (coaxial)	Digital audio input connector
(7)	BNC analog output connectors	The RGB or YPbPr video signals are output from these connectors.
(8)	AUDIO input connectors	The audio signals are input to these connectors
(9)	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.)
(10)	HDMI connector	
(11)	DVI digital serial connector (CH1)	(The analog rated value is OFF.)
(12)	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.
(13)	RS-232C connector (9-pin male)	This is used to connect a personal computer using an RS-232C cable.
(14)	Ethernet port (10/100BaseTX)	This port is used for connection to a LAN using the Ethernet cable.
(15)	D-SUB 15-pin (mini)	Analog output connector.
(16)	AUDIO output connectors	These are the audio output connectors. Frequencies ranging from 100 Hz to 20 kHz can be set.
(17)	S connector	NTSC/PAL/SECAM Y/C video output connector
(18)	VBS output connector	NTSC/PAL/SECAM VBS composite video output connector

1.6.3 RB-1848



(1)	VG series connector	This is used to connect the RB-1848 to the generator in the VG series.
(2)	These keys are used to execute or edit the program data. When a key is selected, its LED lights.	
	[MUTE] key	This is used to set the audio output to ON or OFF while the program data is being executed.
	[PROG] key	This is used to select the program data.
	[TIMING] key	This is used to select the timing data.
	[PAT] key	This is used to select the pattern data.
	[SAVE] key	This is used to save the data.
	[LEVEL] key	This is used to adjust the output level, display the screen on which to input characters from the display unit, etc.
	[◀] key	This is used to move to the previous item (on the LCD screen).
	[▶] key	This is used to move to the next item (on the LCD screen).
(3)	LCD	The menu settings, program numbers, timing data, etc. appear here. (Two lines each containing 24 characters are displayed.)
(4)	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.
(5)	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.
(6)	Pattern keys	These keys are used to select the patterns and output signals. When a key is selected, its LED lights.
(7)	[FORMAT] key	This is used to edit data while the program data is being executed. When it is selected, its LED lights.
(8)	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"
(9)	[SET] key	This key is used to execute the functions and program data.
(10)	[▲] key	This is used to increment the program numbers (+1) and also to display the previous page on the LCD.
(11)	[▼] key	This is used to decrement the program numbers (-1) and also to display the next page on the LCD.

* When the [▲] key or [▼] key on the front panel of the VG-859C is used, the programs are not executed until the [SET] key is pressed after pressing the [▲] or [▼] key. However, when the RB-1848 is used, programs are executed instantly by pressing the [▲] or [▼] key.

2 OPERATING PROCEDURES

2.1 Concerning the VG-859C's functions

The VG-859C 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 the direct display mode (for outputting the video signals of the data in the program whose number has been selected) or the group display mode (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 the auto display mode (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-859C 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 FUNC5, 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-859C 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-859C 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-859C starts up in the auto display mode.
When the POWER switch is set to ON while the [▲] key is held down (*2)	The VG-859C 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.

2.4 How to input characters from the display

There are two ways to input the characters for program names using PC card edit FUNC3 and group names using group data edit FUNC6: <1> input the character codes “20 to DF” directly or <2> select the characters from the display.

The procedure for selecting the characters from the display is described here.

(1) Connect the display device to the VG-859C, and check that the display appears correctly.

(2) On the LCD screen, move the cursor to the position where the characters are to be input (for a program name, for instance), and press the [LEVEL] key.

The LED of the [LEVEL] key lights, and the characters appear on the display.

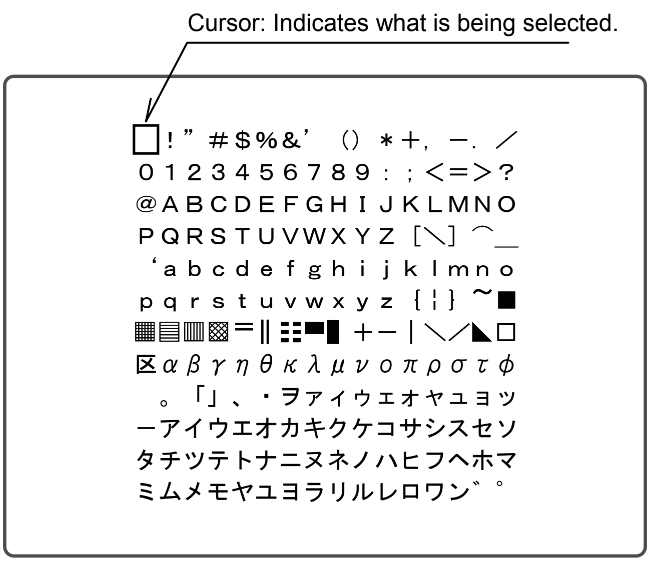


Fig. 2.4.1 What is displayed on the screen

(3) While referring the table below, input the characters.

Table 2.4.1 Function keys

Key	Function
1 to 4, 6 to 9	Used to move the cursor over the display in the direction of the arrows of the number keys.
5	Used to enter one character which has been input. The entered character appears on the display.
0 / CLR	Used to move the cursor on the display to the top left.

(4) Press the [LEVEL] key.

The LED of the [LEVEL] key goes off, and operation returns to the status in which the character codes are input directly.

2.5 How to insert and eject the PC cards

2.5.1 How to insert the PC card

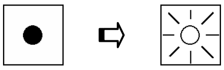
(1) Insert the PC card into the slot in the direction indicated by the arrow on the card's top surface.

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.

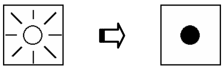
(2) Lightly press the EJECT button to the right of the card slot.

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 3)



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-859C 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
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. 28
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	Closed caption extended character mode	For selecting the extended character mode in closed caption	p. 38
33	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-859C. 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 "Direct output (direct display mode)" in 4.1.1.)

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

[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	Sinple (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-859C is set to RS-232C. (Factory setting)
1	LAN	The external control interface of the VG-859C is set to LAN.

* When the VG-859C 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 up.)

[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)

CAUTION

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-859C, 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-859C. 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-859C 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-859C requires the same network address as the IP address of the VG-859C.
- The VG-859C 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.”)

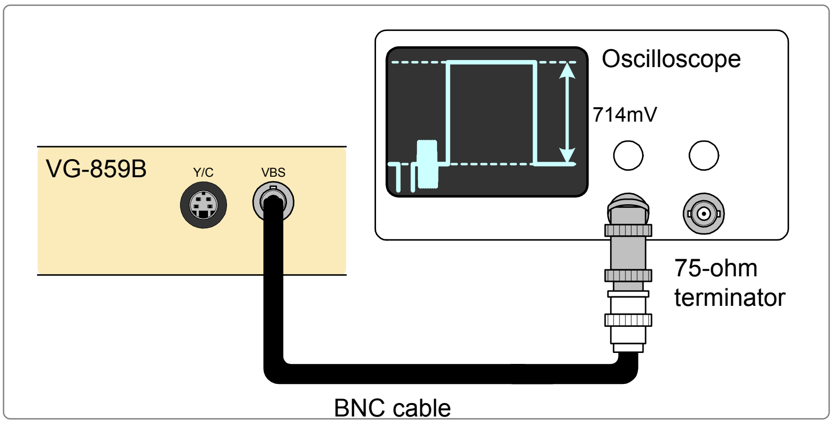
```
Cfg:VBSLevelAdjustment
```

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 [▲] key and reduced using the [▼] 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.

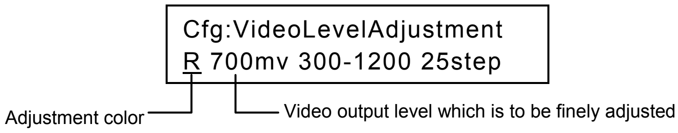


Fig. 3.3.14 Video output level fine adjustment

● 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

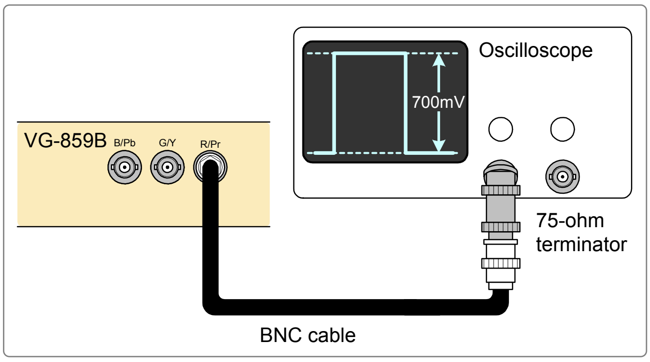
The video output level to be finely adjusted can be selected in the range of 300mV to 1200mV, and it can be set in 25mV increments. Use the number keys to input the level directly. Fractions which are not divisible by 25 (which is not an increment of 25mV) are ignored. (Example: 724mV ⇒ 700mV)

● 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 FUNCD)”).
- 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

<table>
<tr><th>Key</th><th>LCD display</th><th colspan="2">Description</th></tr>
<tr><td>1</td><td>PG1 Table</td><td colspan="2">Table PG1 which is compatible with existing generators is selected. (Factory setting)</td></tr>
<tr><td>2</td><td>PG2 Table</td><td>Table PG2 which was created based on the EIA/CEA-861-B standard is selected.</td><td rowspan="2">Tables consisting of standard timing data for systems such as EIA, VESA and NTSC and PAL which support analog TV sets</td></tr>
<tr><td>3</td><td>PG3 Table</td><td>Table PG3 which was created based on the EIA/CEA-861-C standard is selected.</td></tr>
</table>

CAUTION

Table PG3 contains timing data added at the release of EIA/CEA-861-C, an upgrade from Table PG2 (EIA/CEA-861-B). Note that Table PG3 completely supports EIA/CEA-861-D, because no additional timing data has been added at the release of EIA/CEA-861-D.

[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.

```
Cfg:VBS Filter Level : 0
                   (0-5)
```

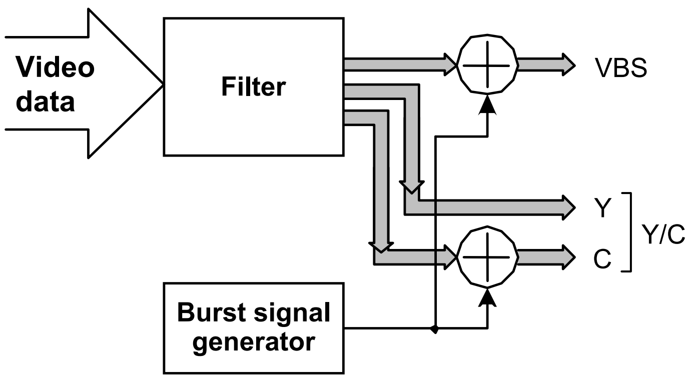
Fig. 3.3.19 Selecting the VBS output filter level

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.

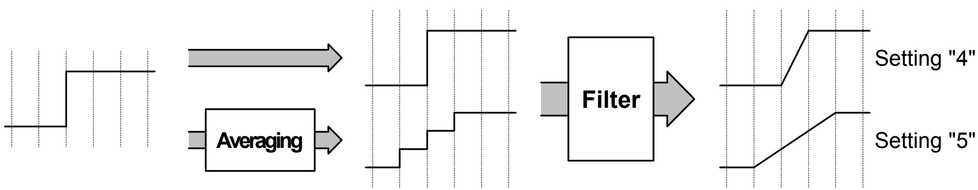


Fig. 3.3.20 Figure showing settings “4” and “5”

[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.

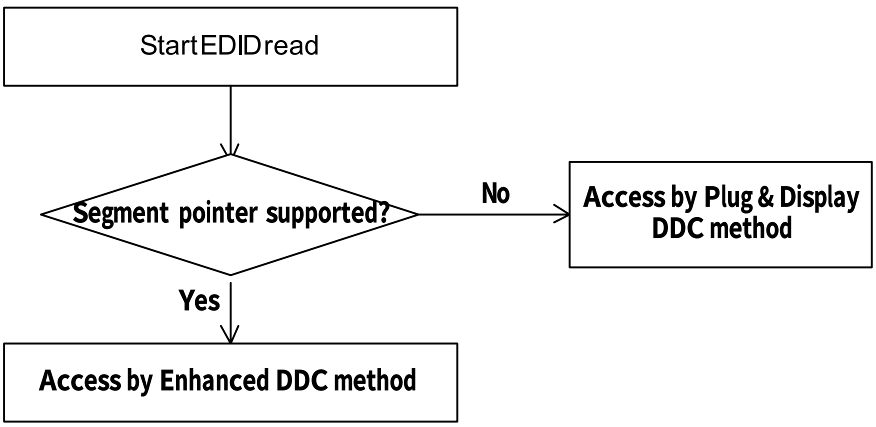


Fig. 3.3.23 Auto Select DDC mode operations

[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.

CAUTION

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
HDMI output	Video Format		RGB or YCbCr		
		RGB	RGB		
		Y444	YC422		
		Y422-16, Y422-20, Y422-24	YC444		
	Repetition		Repetition		
		1 to 10	Same setting as left		
AVI InfoFrame	Video Code		Picture Aspect Ratio		
		Set in accordance with the EIA/CEA-861 setting.	Set in accordance with the set Video Code setting.		

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 (InternalAudio Width) in “5.6 HDMI output settings”

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.

```
Cfg:Tri Sync mode
        :NORMAL      (0/1)
```

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. 3.3.23 shows the relationship between the tri-level sync signals and horizontal sync signals (HS) for the VG-859C when 1080i system or other tri-level sync signals (refer to [1] Setting the sync signal output mode in “5.4 Output condition settings”) are output. (Normal mode)
For an existing VG generator (VG-828 or VG-828-D), this relationship is shown in Fig. 3.3.24. When the shift mode is established, the timing data from the existing VG generator can be output in the same way from the VG-859C, and the data is output as shown in Fig. 3.3.25.

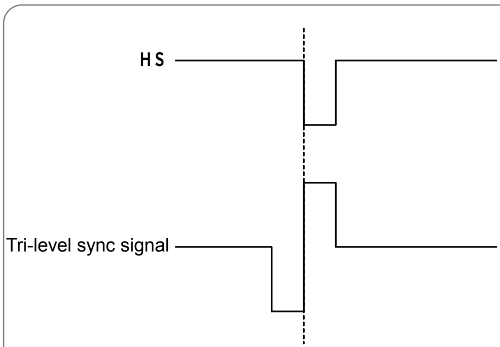


Fig. 3.3.23 Sync signals of VG-859C (normal mode)

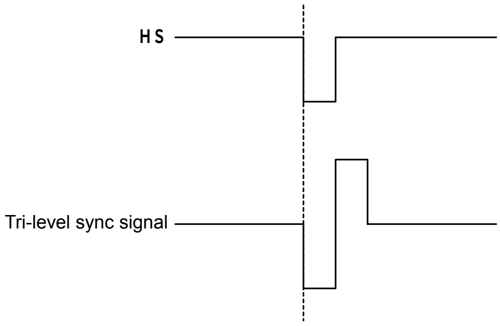


Fig. 3.3.24 Sync signals of existing VG generator

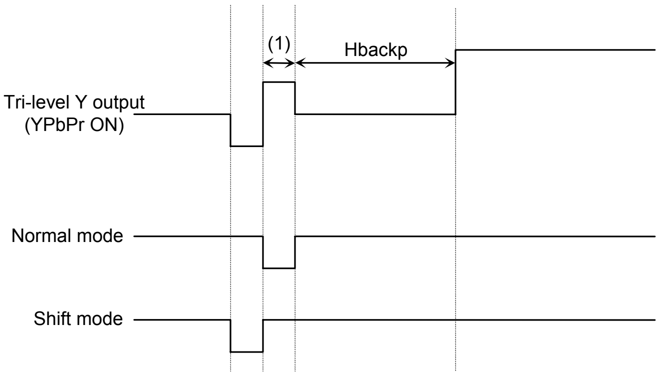


Fig. 3.3.25 Comparison between normal mode and shift mode

CAUTION

- 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 muting, 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.

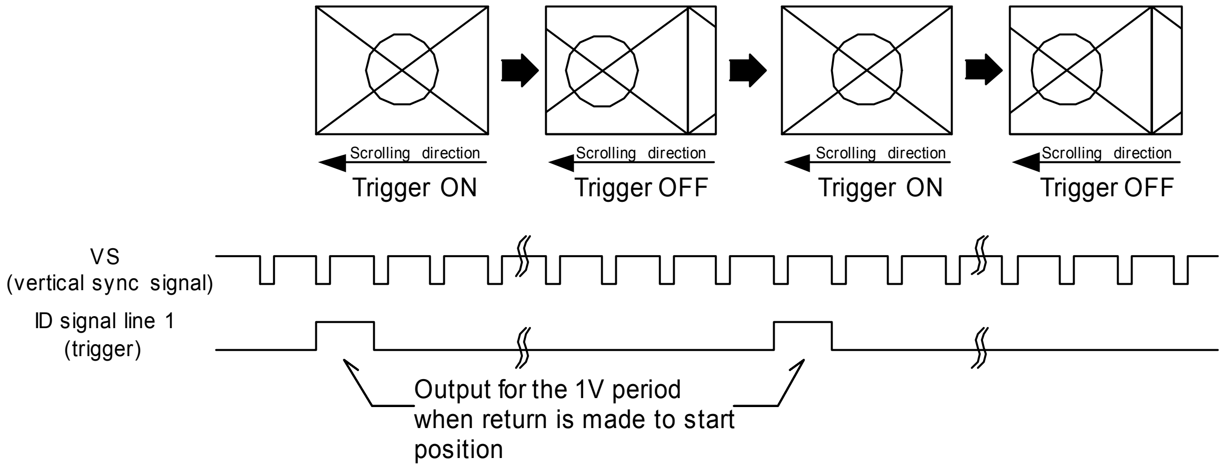
```
Cfg:Output ScrollTrigger
                  :OFF(0/1)
```

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. ● 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.

Scroll trigger output cables are available at Astrodesign as well. For details on the cable, contact an Astrodesign sales representative.

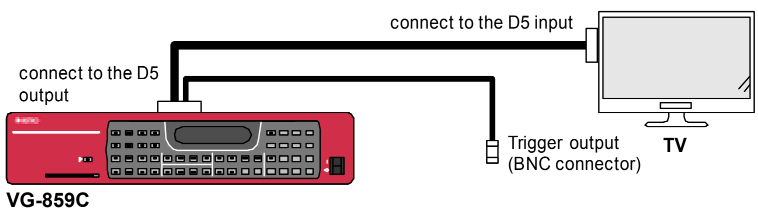


Fig. 3.3.37 Connection diagram for the scroll trigger output cable

[32] Setting the extended character for closed caption

Set the extended character for closed caption.

```
Cfg:Closed Caption
     Ext.Chara Mode:0(0/1)
```

Fig. 3.3.38 Selecting extended character mode

Table 3.3.35 Extended character mode selection method

Key	LCD display	Description
0	0	Space mode is selected.
1	1	Substitute character mode is selected.

For details on extended character mode, refer to “5.9.2 [5] Treating extended character”

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

Select the HDMI output bit mode.

```
Cfg:Bits Output Mode:
    8bit              (0/1)
```

Fig. 3.3.39 Selecting the output bit mode

Table 3.3.36 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] Group no. setting” 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 making changes to the group numbers as described in section 4.1.3.)

(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 "Program data" in 11.1.1.
- 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.

(With the RB-1848, RB-614C or RB-649, the program is executed immediately when the [▲] or [▼] key is pressed. When the controls on the front panel of the VG-859C are used, however, the [SET] key must be pressed after pressing the [▲] or [▼] key.)

```
PG1:   0:
```

Fig. 4.1.2 Inputting the program number

* Normally, this screen appears when the VG-848 starts up as well. (Refer to "2.2 Operating mode when the generator's power is turned on.")

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

Program number

Internal program table

```
PG1:850:VESA-400-85
31.50MHz37.86KHz85.08Hz
```

Program name (up to first 16 characters displayed)

Dot clock frequency
Horizontal sync frequency
Vertical sync frequency

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.34) 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 [▲] key (+1) and [▼] (-1) key. Numbers for group data which has not been registered are ignored.

(With the RB-1848, RB-614C or RB-649, the program is executed immediately when the [▲] or [▼] key is pressed. When the controls on the front panel of the VG-859C are used, the [SET] key must be pressed after pressing the [▲] or [▼] key.)

```
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.

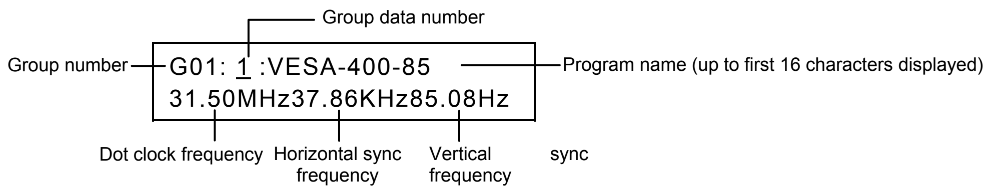


Fig. 4.1.6 Outputting the video signals

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.

```
Group No.:XX      (00-99)
```

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.

CAUTION

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 the pattern display mode setting in [3] 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 names" 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.

Cursor coordinates (H, V)

```
PG1:  1:  H= 442 V= 512
74.97MHz63.69KHz60.03Hz
```

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.

7	**8**	**9**
4	**5**	**6**
1	**2**	**3**
0		

⇨

	↑	
←	To change the movement step	→
To change the blinking speed	↓	To change the pattern shape
To change the screen display		

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 pattern 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 pattern to the left.
5	This changes the movement step. (100dots → 10dots → 1dot)
6	This moves the pattern to the right.
8	This moves the pattern upward.

CAUTION

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 degrees 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.

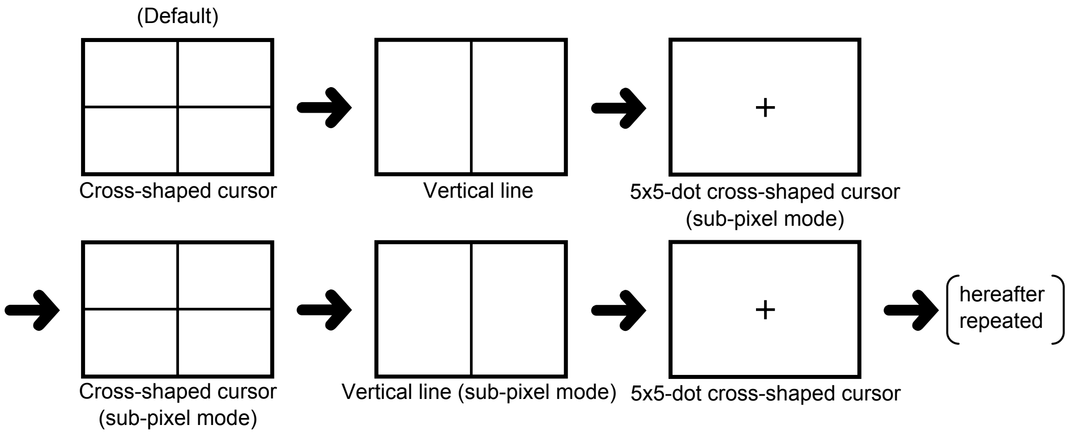


Fig. 4.1.10 Cursor shapes

■ 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.	

CAUTION

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 the MUTE key setting in [27] 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 vide 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.

Press the [LEVEL] key.

○ Normal status

```
PG1:850:VESA400-85
31.50MHz37.86KHz85.08Hz
```

☼ Analog/digital video output level operation

Analog video output level / Digital video output level

```
PG1:850: LEVEL=0.70V:255
31.50MHz37.86KHz85.08Hz
```

Analog video output level

Variable range: 0.30 to 1.20 [V]

The changes are reflected in the analog output only.

Digital video output level

Variable range: 0 to 255

The changes are reflected in both the analog and digital outputs.

CAUTION

When “0-255” (factory setting) is selected as “[15] Setting the digital level mode” of config edit FUNC5, the analog video output level is continuously reduced, and when it drops below the minimum value of 0.30V, it is automatically switched to the digital video output level, and the analog output value calculated on the basis of the digital level is output.

☼ Analog audio output level operation

```
PG1:850:AAd:L    0R    0 S
31.50MHz37.86KHz85.08Hz
```

Variable range: 0 to 2000 [mV]

* When the cursor is aligned with ‘S’, the levels for the left and right channels can be varied simultaneously using the [▲] key or [▼] key.

☼ HDMI audio output level operation

```
PG1:850:HAd:L20R20(dB) S
31.50MHz37.86KHz85.08Hz
```

Variable range: -90 to 0 [dB]

* When the cursor is aligned with ‘S’, the levels for the left and right channels can be varied simultaneously using the [▲] key or [▼] key.

4.1.10 Scrolling the output patterns

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

The screen on which to select the scrolling appears.

```
Scroll Dir: Stop          (1-9)
```

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 the pattern action.")

(3) Press the [FORMAT] key.

The original display is restored.

CAUTION

Scrolling operations cannot be performed when the HDCP, audio sweep, closed caption/V-chip, Teletext or Macrovision function is being used.
(Refer to "12.4.4 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 [X] 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.: XXX - YYY
- 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 "9.1.1 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-859C 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.

CAUTION

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-859C'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-859C'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-859C'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-859C'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-859C'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-859C'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-859C'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)

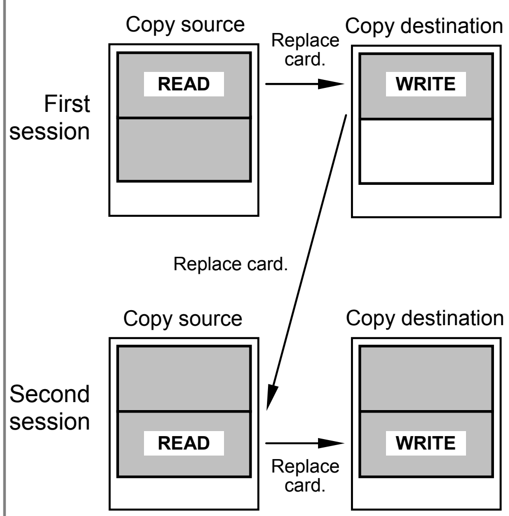
When using this function

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-859C 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.

<Graphical outline of All Copy function for all the data on a PC card>



(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 [▲] key or [▼] 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   →   GEdit 03:Tim=850 Pat=902   →
(01)  02:Tim=851 Pat=901   ←   (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 [▲] key or [▼] 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	TIMING/PAT key lights.	The timing data and pattern data are set separately.
PAT		

(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
XXXXXXX
```

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-859B, and check that the patterns are displayed properly.
- The VG-859B'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

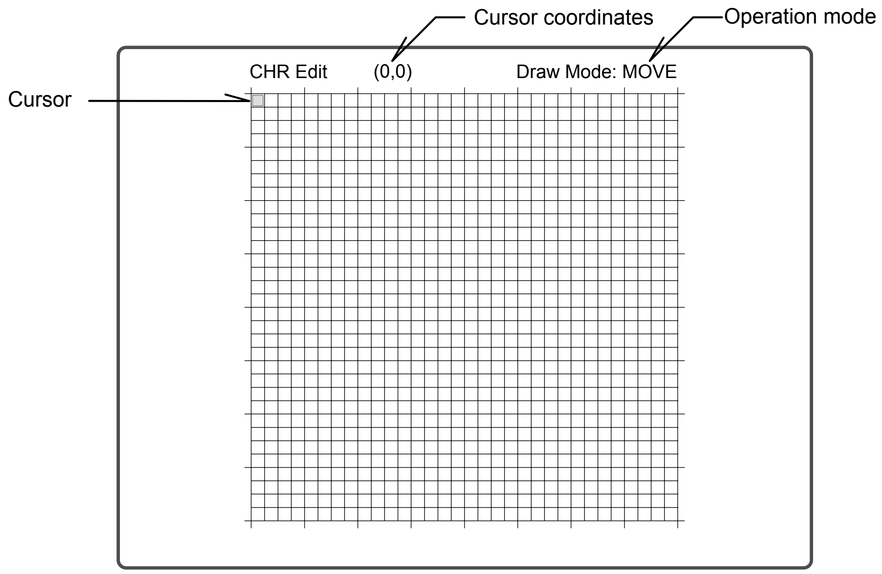


Fig. 4.6.4 What is displayed

(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	● 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. ● 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-859B, 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.57
1	Program Name List	Used to display a list of the program names.	p.58
2	Group Name List	Used to display a list of the group names.	p.58
3	OPT Name List	Used to display a list of the optional pattern names.	p.59
4	IMG Name List	Used to display a list of the image data names.	p.59
5	Group Data List	Used to display the group data (*1) registered in the group.	p.60

*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.

```
Select Prg. No      (850)
Program Data List
```

Fig. 4.7.3 LCD display

Program No. / Program name / Horizontal sync frequency / Vertical sync frequency / Program data enable/disable

Horizontal timing / Vertical timing / Output condition / Audio output

```
PROG-NO.850  NAME=VESA400-85  H= 37.86KHz  V= 85.08Hz  ENABLE
MODE      : dot                    MODE      : H
CLOCK     :  31.500MHz             VTOTAL    : 11.754ms     445H
HPERIOD   :  26.41us    832dot     VDISP1    : 10.565ms     400H
HDISP     :  20.32us    640dot     VSYNC1    :  0.079ms     3.0H
HSYNC     :   2.03us     64dot     VBACKP1   :  1.083ms      41H
HBACKP    :   3.05us     96dot     EQP FP1   :  0.000ms     0.0H
HDSTART   :   0.00us      0dot     EQP BP1   :  0.000ms     0.0H
HDWIDTH   :   0.00us      0dot     SERRATION : OFF
                                   EQP       : OFF
                                   VDSTART   :  0.000ms     0.0H
ANA/TTL   : ANALOG                 VDLINE    :  0.000ms     0.0H
HS        : NEGA                   SCAN      : NON INTER
VS        : POSI
CS        : NEGA
SYNC ON   :

VIDEO     : 0.70 V
SYNC      : 0.30 V
SETUP     : 0.00 V
                                   Freq L    : 100 Hz
RGB/YPbPr : RGB                    Freq R    : 100 Hz
YPbPr No. : 0                      Level L   : 0 mV
                                   Level R   : 0 mV
D-Connecter                        SWEEP     : OFF
          : 480                    Step      : 40 msec
          : Interlace              Times     : 0
          : 4:3                    Freq Min  : 200 Hz
                                   Freq Max  : 20000 Hz
Ana  BNC  : ON                     FreqStep  : 200 Hz
Ana  Dsub : ON
Digi DVI  : ON
Ana  DVI  : OFF
D-Con     : OFF

S-Connecter
          : NORMAL
DVI Mode  : SINGLE
```

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

HDMI output / ACP/ISRC Packet / InfoFrame

```
PROG-NO.850  NAME=VESA400-85

HDMI DATA                          InfoFrame DATA

Mode                : HDMI1.0      [AVI]
VideoFormat         : RGB          Type : 2  Ver : 2
LevelMode           : FULL         Scan Info          : No Data
UserLevel                          Bar Info           : not valied
Min : 000  Max : 255               Act Format Info    : not Data
Y  : R:0.2126 G:0.7152 B:0.0722    RGB or YCbCr       : RGB
Cb : R:0.1146 G:0.3854 B:0.5000    Act Aspect         : Picture
Cr : R:0.5000 G:0.4542 B:0.0458    Picture Aspect     : No Data
RePetition          : 1            Scaling            : unknown
AudioSource         : OFF          Colorimetry        : No Data
AudioSample         : 48kHz        Video Code         : 1
Audio LPCM Channel:1ch+2ch         Repetition         : 1
InternalAudioWidth: 16Bit          Bar
InternalAudioLevel                 Top  : 00000  Bottom : 00000
Bit : L:000ccd  R:000ccd           Left : 00000  Right  : 00000
dB  : L:-19.999  R:-19.999
InternalAudioFreq.                 [SPD]
Hz   :  L:00100   R:0010           Type : 3  Ver : 1
InternalAudioSweep: OFF            Vendor Name        : VENDOR
                                   Product            : PRODUCT
ACP DATA                           Source Device      : unknown

[ACP]                              [AUDIO]
Type                : Generic Audio Type : 4  Ver : 1
DVD Type            : 0            Channel Count      : Refer
Copy Permission     : 0            Coding Type        : Refer
Copy Number         : 0            Sample Size        : Refer
Quality : 0   Transaction : 0      Sample Freq.       : Refer
                                   Channel Alloc      : 0
[ISRC1]                            Level Shift        : 0
Cont : 0      Valid : 0            Down-mix           : Permitted
Status              : Starting
Validity info.      : No Validity  [MPEG]
Catalogue code      : 0000000000000 Type : 5  Ver : 1
Country code        : 00           Bit Rate           : 0
Country code        : 000          Frame              : unknown
Year of rec. code   : 00           Field Repeat       : New
Recording code      : 00000
```

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
850   E  31.50MHz  37.86KHz 85.08Hz VESA400-85       :Character List
851   E  31.50MHz  37.86KHz 72.81Hz VESA480-72       :Words
852   E  31.50MHz  37.50KHz 75.00Hz VESA480-75       :H Character 1
                                    :
                                    :
                                    :
```

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 List  Block(Used=XXXXX,Unused=XXXXX)
 NO  SIZE   NAME
 40   506  256 Block Color
 41   255  64B-GRAY
 42   317  Cross&Circle&Gray
        :
        :
        :
```

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 List Block(Used=XXXXX,Unused=XXXXX)
 NO  OPT-NO    SIZE     NAME
  1    80   (1024, 768) Image#1
  2    81   ( 640, 480) Image#2
  3    82   (1920,1440) Image#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.

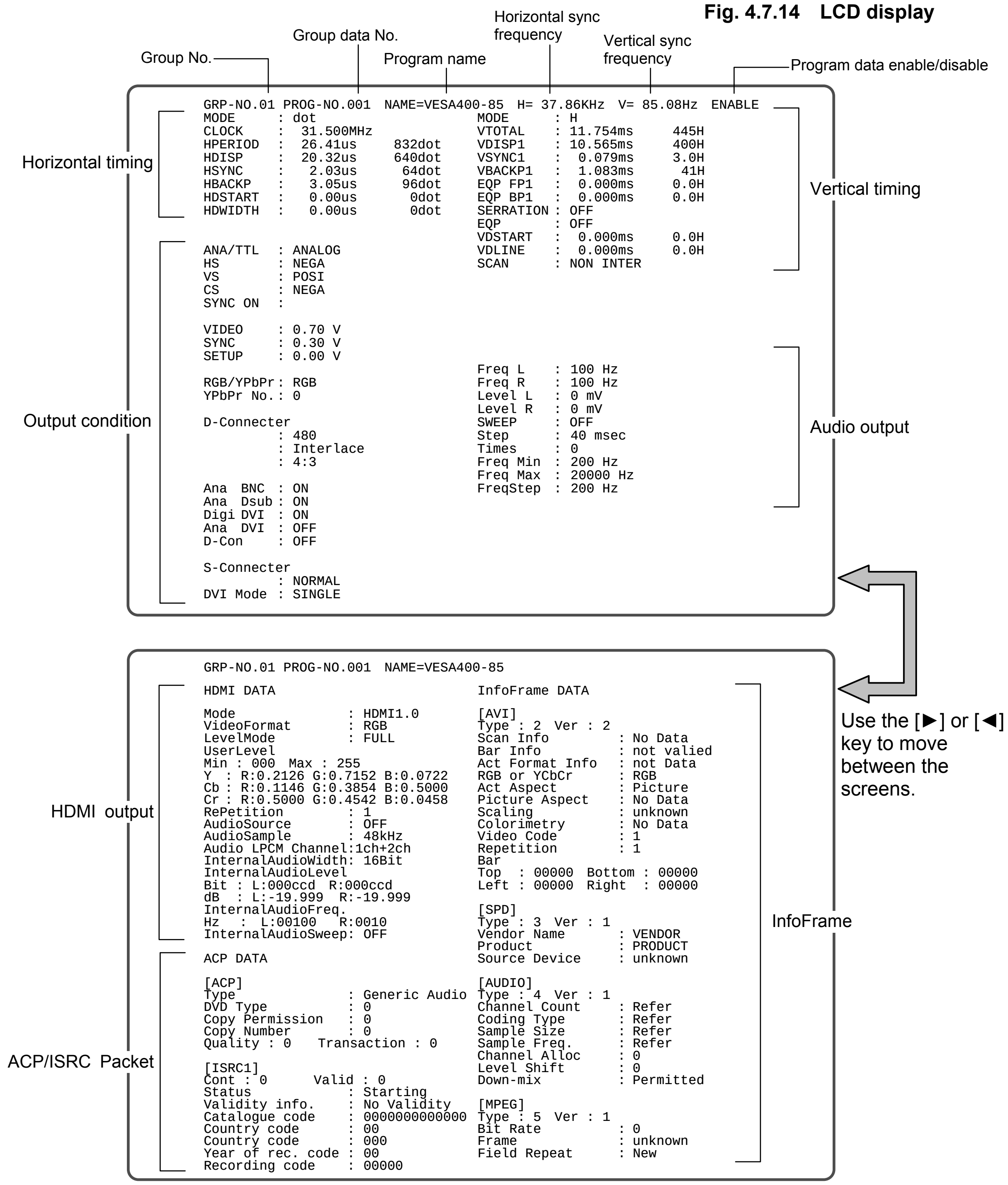
```
GroupDataListNo
          :  1 (1-99)
```

Fig. 4.7.13 Selecting the group number

(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.

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

Fig. 4.7.14 LCD display




```
GRP-NO.01 PROG-NO.001  NAME=VESA400-85  H= 37.86KHz  V= 85.08Hz  ENABLE
MODE      : dot                        MODE      : H
CLOCK     :  31.500MHz                 VTOTAL    : 11.754ms     445H
HPERIOD   :  26.41us     832dot        VDISP1    : 10.565ms     400H
HDISP     :  20.32us     640dot        VSYNC1    :  0.079ms     3.0H
HSYNC     :   2.03us      64dot        VBACKP1   :  1.083ms      41H
HBACKP    :   3.05us      96dot        EQP FP1   :  0.000ms     0.0H
HDSTART   :   0.00us       0dot        EQP BP1   :  0.000ms     0.0H
HDWIDTH   :   0.00us       0dot        SERRATION : OFF
                                       EQP       : OFF
                                       VDSTART   :  0.000ms     0.0H
ANA/TTL   : ANALOG                     VDLINE    :  0.000ms     0.0H
HS        : NEGA                       SCAN      : NON INTER
VS        : POSI
CS        : NEGA
SYNC ON   :

VIDEO     : 0.70 V
SYNC      : 0.30 V
SETUP     : 0.00 V
                                       Freq L    : 100 Hz
RGB/YPbPr : RGB                        Freq R    : 100 Hz
YPbPr No. : 0                          Level L   : 0 mV
                                       Level R   : 0 mV
D-Connecter                            SWEEP     : OFF
          : 480                        Step      : 40 msec
          : Interlace                  Times     : 0
          : 4:3                        Freq Min  : 200 Hz
                                       Freq Max  : 20000 Hz
Ana  BNC  : ON                         FreqStep  : 200 Hz
Ana  Dsub : ON
Digi DVI  : ON
Ana  DVI  : OFF
D-Con     : OFF

S-Connecter
          : NORMAL
DVI Mode  : SINGLE
```

```
GRP-NO.01 PROG-NO.001  NAME=VESA400-85

HDMI DATA                              InfoFrame DATA

Mode               : HDMI1.0           [AVI]
VideoFormat        : RGB               Type : 2  Ver : 2
LevelMode          : FULL              Scan Info          : No Data
UserLevel                              Bar Info           : not valied
Min : 000  Max : 255                   Act Format Info    : not Data
Y  : R:0.2126 G:0.7152 B:0.0722        RGB or YCbCr       : RGB
Cb : R:0.1146 G:0.3854 B:0.5000        Act Aspect         : Picture
Cr : R:0.5000 G:0.4542 B:0.0458        Picture Aspect     : No Data
RePetition         : 1                 Scaling            : unknown
AudioSource        : OFF               Colorimetry        : No Data
AudioSample        : 48kHz             Video Code         : 1
Audio LPCM Channel:1ch+2ch             Repetition         : 1
InternalAudioWidth: 16Bit              Bar
InternalAudioLevel                     Top  : 00000  Bottom : 00000
Bit : L:000ccd  R:000ccd               Left : 00000  Right  : 00000
dB  : L:-19.999  R:-19.999
InternalAudioFreq.                     [SPD]
Hz   :  L:00100   R:0010               Type : 3  Ver : 1
InternalAudioSweep: OFF                Vendor Name        : VENDOR
                                       Product            : PRODUCT
ACP DATA                               Source Device      : unknown

[ACP]                                  [AUDIO]
Type               : Generic Audio     Type : 4  Ver : 1
DVD Type           : 0                 Channel Count      : Refer
Copy Permission    : 0                 Coding Type        : Refer
Copy Number        : 0                 Sample Size        : Refer
Quality : 0   Transaction : 0          Sample Freq.       : Refer
                                       Channel Alloc      : 0
[ISRC1]                                Level Shift        : 0
Cont : 0     Valid : 0                 Down-mix           : Permitted
Status             : Starting
Validity info.     : No Validity       [MPEG]
Catalogue code     : 0000000000000     Type : 5  Ver : 1
Country code       : 00                Bit Rate           : 0
Country code       : 000               Frame              : unknown
Year of rec. code  : 00                Field Repeat       : New
Recording code     : 00000
```

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 the [4] RGB/YPbPr setting in “5.4 Setting the output conditions.” The number of the table to be used is selected in [5] Setting the YPbPr coefficient table number in “5.4 Setting the output conditions.”

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/Repetition in “5.6 Setting the HMDI 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 [▲] key or [▼] key.

Name corresponding to coefficient

```
YPbPr No.:          0   (0-9)
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: 0.2126  0.7152  0.0722
```

→
←

```
Pb: 0.1146  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.

CAUTION

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. 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 FUNCB

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-859C, and saved on PC cards.

(1) Use an RS-232C (crossover) cable to connect the VG-859C 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.

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

Fig. 4.9.3 Selecting the data to be copied

Table 4.9.2 Data copy selection method

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-859B)

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.

CAUTION

If data outside the setting range of the VG-859C is included in the copied program data, the program data concerned will be disabled.

4.10 Setting and executing HDCP (HDCP set FUNCC)

The first step to take to execute HDCP is to set the conditions using HDCP set FUNCC.
☞ "4.10.1 HDCP settings."

Depending on what has been set by HDCP set FUNCC, 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 FUNC0.
☞ "4.10.3 HDCP execution."

4.10.1 HDCP settings

Using HDCP set FUNCC, 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.

CAUTION

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.
When HDMI output mode is switched from HDMI to DVI (and vice versa), or the video format (output gray scale) is changed, HDCP Version 1.0 is set automatically.

(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	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.
	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	
	8	5000ms	5000 ms	

CAUTION

"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 FUNCC, 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 “5.1.13 DVI and HDMI output timing restrictions.”)
- When the receiver connected to the VG-859C 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 “12.4.4 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: $\boxed{*}$ → $\boxed{-}$ → $\boxed{*}$.

PG1: 1:XXXXXXX 31.50MHz37.86KHz83.40Hz*	→ ←	PG1: 1:XXXXXXX 31.50MHz37.86KHz83.40Hz-

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.

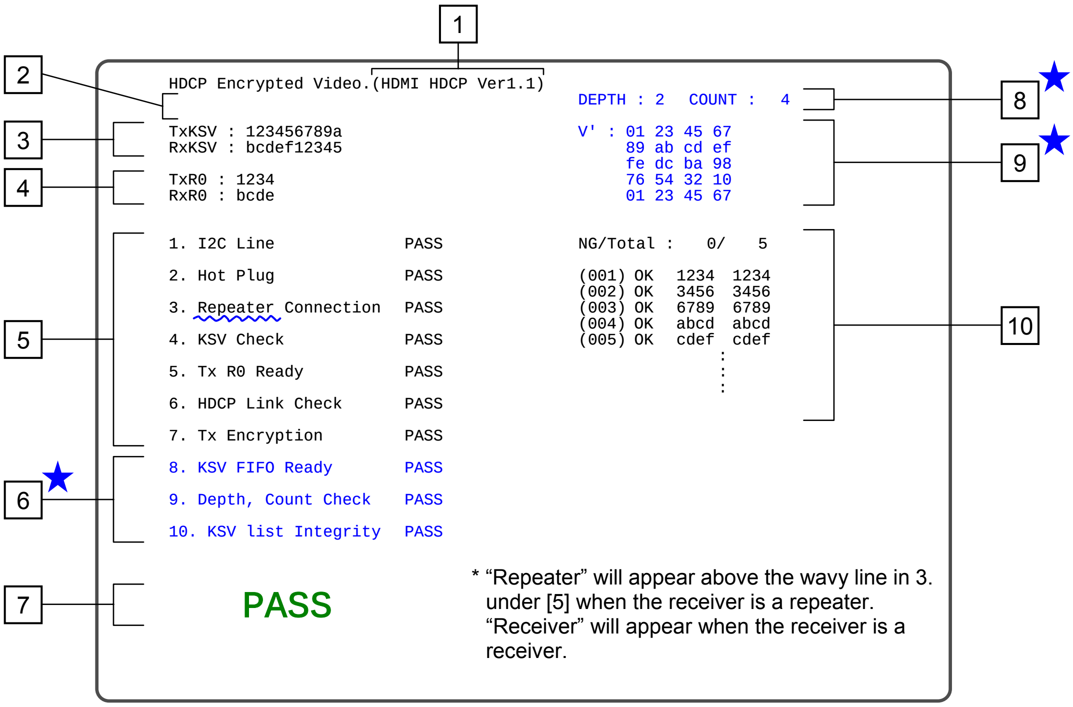


Fig. 4.10.10 What appears on the display during HDCP execution (NG Only/All/SM&All)

Details of what is displayed are given below.
The numbers marked with a blue asterisk (★) appear only when the receiver connected to the VG-859C 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. “TxR0” is the value calculated for the transmitter end, and “RxR0” 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-859C are displayed here.	
★ 9	The values (V’) for checking the adequacy of the KSV list beyond the receiver connected to the VG-859C 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.

This is always displayed here.

Name of the port (HDMI or DVI) used for HDCP execution

HDCP version (Ver1.1 or 1.0)

When the HDCP authentication was successful → PASS. When it has failed → NG

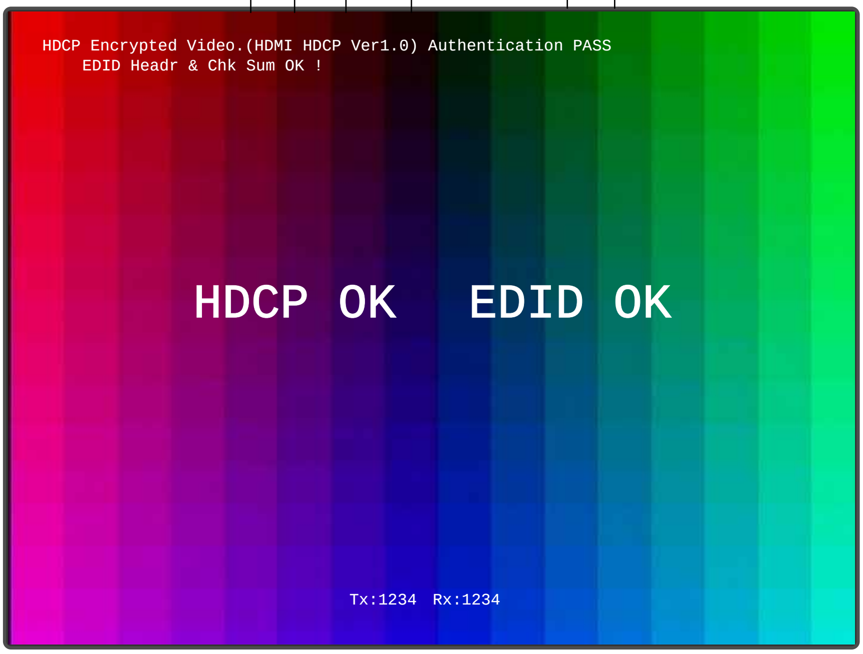


Fig. 4.10.11 What appears on the display during HDCP execution (Pattern)

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 encryption is completed.

★: 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 conditions,” 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.” *3
154H	HDCP Rx KSV Error	The KSV of the receiver does not contain twenty “0” and “1.”
155H	HDCP Link Check Error	The “TxR0” value on the transmitter end (VG-859C) and the “RxR0” value on the receiver end do not match during the initial authentication.
156H	HDCP Encrypt Error	Encryption was not completed.
157H	HDCP Hot Plug Error	The HDCP 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 Vfp 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. *3
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 “8” 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.
*3: A failure may have occurred on the VG-859C. Contact the manufacturer.

● 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-859C 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-859C 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-859C 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-859C and the HDCP version of the sink device do not match.

Depending on the combination of the VG-859C 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-859C 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	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-859C setting		Error status	Remarks
HDCP (Bcaps)	**EDID setting**	**HDCP version** FUNCC	**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-859C is connected, but the HDCP itself functions in the HDCP version which was set by HDCP setting FUNCC.

4.11 How to execute calibration (calibration FUNCD)

This section describes how the video output levels are calibrated.

Since the VG-859C'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 +/-0.5% rdg. +/-5 dgt or less is recommended.
● 75-ohm terminator A model with V.S.W.R. characteristics of less than 1.1 is recommended.
● BNC cable Cable used for connecting the VG-859C with the display.

● Execution procedure

Follow the steps below for calibration.

Calibration procedure

Reference voltage level adjustments
- Output the reference voltage for RGB each.
- Measure the output voltage using the multimeter.

↓

Set and save the measured reference voltage values.

↓

Execute automatic calibration.

↓

Finely adjust the video levels.

↓

End

(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-859C 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.

```
DACOutput:MIN         (0/1)

```

Fig. 4.11.3 Selecting the reference voltage level

Table 4.11.1 Reference voltage level selection method

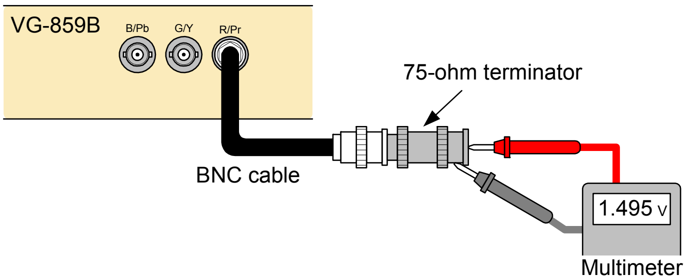
Key	LCD display	Description
0	MIN	Reference voltage level 1) (approx. -1000mV) is output.
1	MAX	Reference voltage level 2) (approx. 1500mV) is output.

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

```
DACOutput:MIN         (0/1)
DAC MIN OUT
```

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.

```
MinR: -1000G: -1000B: -1000
MaxR:+1500G:+1500B:+1500
```

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.

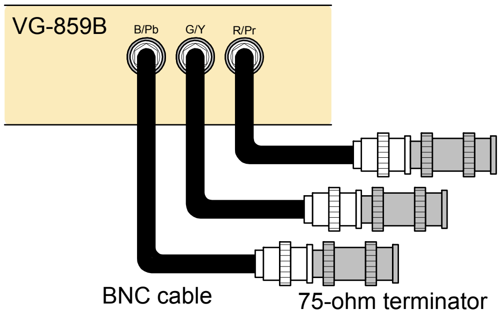
```
MinR: -1000G: -1000B: -1000
DACOUT VOLT DATA SAVE
```

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.

```
AutoCalibration:ON(0/1)
```

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

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

```
AutoCalibration:ON (0/1)
      *
```

Fig. 4.11.8 When automatic calibration is underway

* During automatic calibration “*” moves continuously from left to right.

```
AutoCalibration:ON (0/1)
Calibration End
```

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

```
AutoCalibration:ON (0/1)
Calibration Error
```

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-859C. 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.

```
AutoCalibration:ON (0/1)
CAL Compulsory Stop
```

Fig. 4.11.11 When automatic calibration is forcibly terminated

CAUTION

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 [13] video level fine adjustments of config edit FUNC5.

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.

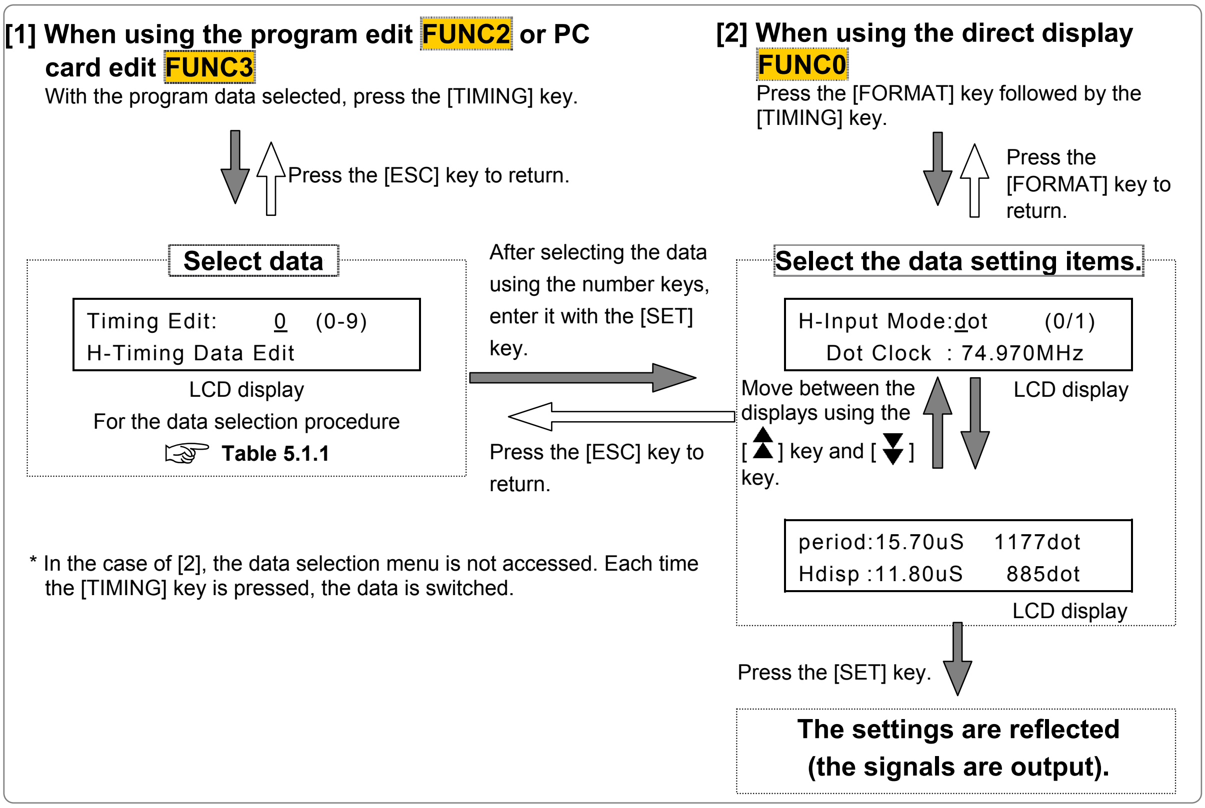
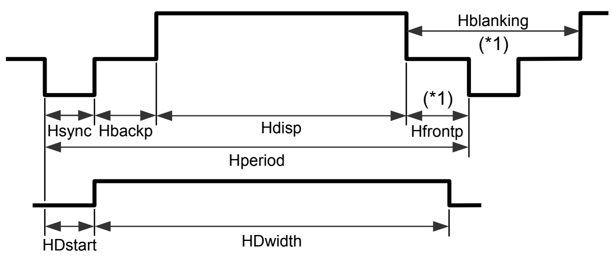


Fig. 5.1.1 Basic operations for setting the timing data

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.100
1	V-Timing Data Edit	Vertical timing		p.90	p.104
2	Output Data Edit	Output condition		p.91	p.114
3	Audio Data Edit	Audio output		p.92	p.126
4	HDMI Data Edit	HDMI output		p.92	p.130
5	InfoFrame Data Edit	InfoFrame		p.93	p.137
6	ACP Data Edit	ACP/ISRC Packet		p.93	p.148
7	Caption Data Edit	Closed caption/V-chip		p.96	p.155
8	TeleText Edit	Teletext		p.96	p.170
9	Macrovision Edit	Macrovision	Optional function	p.96	p.175
A	Gamut Meta Data Edit	Gamut Meta Data Packet		p.97	p.178

5.1.2 Horizontal timing data configuration list



Horizontal sync frequency: 10 kHz and up

Timing data	Setting item	Setting range		Remarks	
Horizontal timing	Input mode	us or dots			
	Dot clock frequency	5.000 to 250.000 MHz		1 kHz increments	*6
	Hperiod	0.00 to 99.99 µs	128 to 8192 dot	1-dot increments	
	Hdisp	0.00 to 99.99 µs	48 to 4096 dot		
	Hsync	0.00 to 99.99 µs	0 to 4096 dot	(Dot lock frequency) 5 to 100 MHz: 1-dot increments Up to 200 MHz: 2-dot increments Up to 250 MHz: 4-dot increments	*2
	Hbackp	0.00 to 99.99 µs	0 to 4096 dot	1-dot increments	
	Hfrontp	(0.00 to 99.99 µs)	(0 to 4096 dot)		*1, 3, 4
	HDstart	0.00 to 99.99 µs	0 to 4096 dot		*5
	HDwidth				
	Hblanking	(40 to 4096 dot)			*1

*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 100.001to 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-859C.)
Set the sum within the following range: [(HDstart + HDwidth) ≤ Hperiod]

*6: The setting range of the dot clock frequency for the VG-859/859A is 5.000 to 200.000 MHz.

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

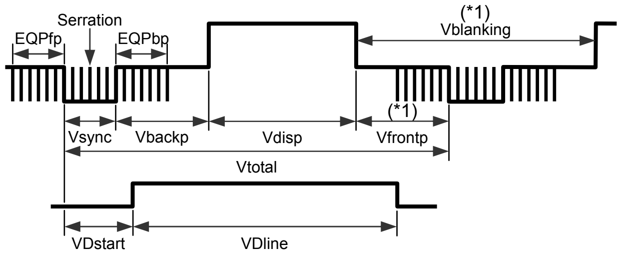
☞ 5.1.13 Timing restrictions on DVI and HDMI outputs (p.98)

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

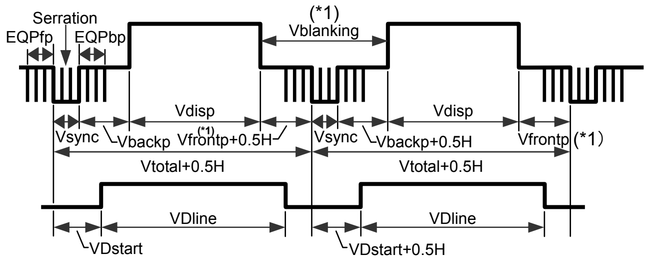
☞ Chapter 8 MULTI-BIT MODE (❖OPTION) (p.243)

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 4096 H	Non-interlace (progressive)	1H increments	
			4 to 2048 H	Interlace scanning	1H(/0.5) increments	*6
	Vdisp (1, 2)	0.000 to 99.999 ms	1 to 2048 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
	VDline					
	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) ≤ 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-859C.)
Set the sum within the following range: [(VDstart + VDline) ≤ 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.243)

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

<table>
<tr><th>Timing data</th><th colspan="2">Setting item</th><th>Setting range</th></tr>
<tr><td rowspan="11">Audio output</td><td rowspan="2">Output frequency</td><td>L</td><td rowspan="2">100 to 20000 Hz (in 100 Hz increments)</td></tr>
<tr><td>R</td></tr>
<tr><td rowspan="2">Output level</td><td>L</td><td rowspan="2">0 to 2000 mV (in 50 mV increments)</td></tr>
<tr><td>R</td></tr>
<tr><td colspan="2">SWEEP</td><td>OFF, frequency sweep, level sweep L → R, level sweep R → L</td></tr>
<tr><td rowspan="5">Frequency sweep</td><td>Time step</td><td>40 to 340ms (in 20ms increments)</td></tr>
<tr><td>Number of repetitions</td><td>Infinity, 1 to 15 times</td></tr>
<tr><td>Minimum frequency</td><td rowspan="2">200 to 20000 Hz (in 100 Hz increments)</td></tr>
<tr><td>Maximum frequency</td></tr>
<tr><td>Frequency step</td><td>200 to 19800 Hz (in 100 Hz increments)</td></tr>
</table>

5.1.6 HDMI output data configuration list

<table>
<tr><th>Timing data</th><th colspan="3">Setting item</th><th>Setting range</th></tr>
<tr><td rowspan="18">HDMI output</td><td colspan="3">HDMI output mode</td><td>OFF / DVI / HDMI / AUTO</td></tr>
<tr><td colspan="3">Video format</td><td>RGB 24bit / 30bit / 36bit /
YCbCr 4:4:4 24bit / 30bit / 36bit /
YCbCr 4:2:2 16bit / 20bit / 24bit</td></tr>
<tr><td rowspan="3">Video level</td><td colspan="2">Level mode</td><td>Full range, limited range, user setting</td></tr>
<tr><td rowspan="2">Level, user setting</td><td>Min</td><td rowspan="2">Video format:
RGB, YCbCr 4:4:4, YCbCr 4:2:2 16bit width: 0 to 255
YCbCr 4:2:2 20bit width: 0 to 1023
YCbCr 4:2:2 24bit width: 0 to 4095</td></tr>
<tr><td>Max</td></tr>
<tr><td rowspan="3">Color difference coefficients</td><td colspan="2">Y (a, b, c)</td><td>0 to 1.000</td></tr>
<tr><td colspan="2">Cb (d, e, f)</td><td rowspan="2">0 to 0.500</td></tr>
<tr><td colspan="2">Cr (g, h, i)</td></tr>
<tr><td colspan="3">Repetition</td><td>1 to 10</td></tr>
<tr><td colspan="3">Audio signal</td><td>OFF / TOSLINK / COAX / ANALOG / INTERNAL</td></tr>
<tr><td colspan="3">Audio sampling frequency</td><td>32 / 44.1 / 48 / 88.2 / 96 / 176.4 / 192 kHz</td></tr>
<tr><td colspan="3">Audio output channels
1+2ch, 3+4ch, 5+6ch, 7+8ch</td><td>OFF / ON</td></tr>
<tr><td rowspan="7">Internal sound</td><td colspan="2">Bit width</td><td>16bit / 20bit / 24bit</td></tr>
<tr><td colspan="2">Output level mode</td><td>dB mode, bit mode</td></tr>
<tr><td rowspan="2">Output level</td><td>L</td><td rowspan="2">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 7FFFFF -138.48 to 0 dB</td></tr>
<tr><td>R</td></tr>
<tr><td rowspan="2">Output frequency</td><td>L</td><td rowspan="2">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)</td></tr>
<tr><td>R</td></tr>
<tr><td colspan="2">SWEEP</td><td>Off, frequency sweep</td></tr>
</table>

5.1.7 InfoFrame data configuration list

<table>
<tr><th>Timing data</th><th colspan="3">Setting item</th><th>Setting range</th></tr>
<tr><td rowspan="23">InfoFrame</td><td colspan="3">InfoFrame ON/OFF
AVI, SPD, Audio, MPEG</td><td>OFF / ON</td></tr>
<tr><td rowspan="17">AVI
InfoFrame</td><td colspan="2">Type</td><td>2</td></tr>
<tr><td colspan="2">Version</td><td>1 / 2</td></tr>
<tr><td colspan="2">Scan Information</td><td>No Data / overscan / underscan</td></tr>
<tr><td colspan="2">Bar Information</td><td>No setting, vertical, horizontal, vertical/horizontal</td></tr>
<tr><td colspan="2">Active Format Information</td><td>Enabled, disabled</td></tr>
<tr><td colspan="2">RGB or YCbCr</td><td>RGB / YCbCr 4:4:4 / YCbCr 4:2:2</td></tr>
<tr><td colspan="2">Active Aspect Ratio</td><td>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)</td></tr>
<tr><td colspan="2">Picture Aspect Ratio</td><td>No setting / 4:3 / 16:9</td></tr>
<tr><td colspan="2">Scaling</td><td>No setting, vertical, horizontal, vertical/horizontal</td></tr>
<tr><td colspan="2">Colorimetry</td><td>No setting / SMPTE / ITU709 / Extend</td></tr>
<tr><td colspan="2">Video Code</td><td>0 to 59</td></tr>
<tr><td colspan="2">Repetition</td><td>1 to 10</td></tr>
<tr><td>Top Bar</td><td>Bottom Bar</td><td rowspan="2">0 to 65535</td></tr>
<tr><td>Left Bar</td><td>Right Bar</td></tr>
<tr><td colspan="2">RGB Quantization Range</td><td>Default / Limited / Full</td></tr>
<tr><td colspan="2">Extended Colorimetry</td><td>xvYCC601 / xvYCC709</td></tr>
<tr><td colspan="2">IT Content</td><td>No Data / IT Content</td></tr>
<tr><td rowspan="5">SPD
InfoFrame</td><td colspan="2">Type</td><td>3</td></tr>
<tr><td colspan="2">Version</td><td>1</td></tr>
<tr><td colspan="2">Vendor Name</td><td>Max. 8 characters</td></tr>
<tr><td colspan="2">Product</td><td>Max. 16 characters</td></tr>
<tr><td colspan="2">Source Device</td><td>No setting / DigiSTB / DVD / DVHS / HDD / DVC / DSC
/ CD / Game / PC / Blu-Ray Disc / Super Audio CD</td></tr>
</table>

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

<table>
<tr><th>Timing data</th><th colspan="2">Setting item</th><th>Setting range</th></tr>
<tr><td rowspan="25">ACP/ISRC Packet</td><td colspan="2">Packet ON/OFF
ACP, ISRC1, ISRC2</td><td>OFF / ON</td></tr>
<tr><td rowspan="16">ACP Packet</td><td>ACP Type</td><td>Generic Audio / IEC60958 Audio / DVD Audio / Super Audio CD</td></tr>
<tr><td>DVD-Audio Type</td><td>0 / 1</td></tr>
<tr><td>Copy Permission</td><td>Granted by “Copy Freely,” “Reserved” or depends on number of copies (“Copy Number” or prohibited)</td></tr>
<tr><td>Copy Number</td><td>1 to 4, 6, 8, 10 times or Unlimited (Copy One Generation)</td></tr>
<tr><td>Quality</td><td>0 to 3</td></tr>
<tr><td>Transaction</td><td>Not present / Reserve</td></tr>
<tr><td>Count_A</td><td rowspan="3">Prohibited (0) or Permitted 1 to 254 times or Unlimited (255)</td></tr>
<tr><td>Count_S</td></tr>
<tr><td>Count_U</td></tr>
<tr><td>Q_A</td><td rowspan="3">CD Quality / DSD Quality</td></tr>
<tr><td>Q_S</td></tr>
<tr><td>Q_U</td></tr>
<tr><td>Move_A</td><td rowspan="3">Movement prohibited/Movement permitted</td></tr>
<tr><td>Move_S</td></tr>
<tr><td>Move_U</td></tr>
<tr><td rowspan="9">ISRC1 Packet</td><td>ISRC Continued</td><td>ISRC2 packet provided/not provided</td></tr>
<tr><td>ISRC Valid</td><td>ISRC2 packet valid/invalid</td></tr>
<tr><td>ISRC Status</td><td>Starting / Intermediate / Ending</td></tr>
<tr><td>Validity Information</td><td>No Validity / ISRC / UPC/EAN / UPC/EAN and ISRC</td></tr>
<tr><td>Catalogue Code</td><td>13-digit number</td></tr>
<tr><td>Country Code</td><td>2 letters of English alphabet</td></tr>
<tr><td>First Owner Code</td><td>3 alphanumerics</td></tr>
<tr><td>Year of recording Code</td><td>2-digit number</td></tr>
<tr><td>Recording (item) Code</td><td>5-digit number</td></tr>
</table>

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	OFF / CC1 to 4 / TXT1 to 4
		Style	PopOn / RollUp / PaintOn
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 Gamut MetaData Packet data configuration list

Timing data	Setting item		Setting range
Gamut MetaDataPacket	Packet ON/OFFGamut MetaData		OFF / ON
	Next Field		0 / 1
	No Current GBD		0 / 1
	GBD profile		P0 to P3
	Affected Gamut Seq Num		0 to 15
	Current Gamut Seq Num		0 to 15
	Packet Seq		Intermediate / First packet / Last packet / Only packet
	Format Flag		(Vertices, Facets) / Range
	GBD ColorPrecision		8bit / 10bit / 12bit
	GBD ColorSpace (Vertices)		ITU_R BT.709 / xvYCC601 / xvYCC709 / XYZ
	Number Vertices		4 to 8
	Packeted GBD Vertices Data		DATA1 to 8
	Vertices Data	Y	8bit：0 to 255 10bit：0 to 1023 12bit：0 to 409
		Cb	
		Cr	
	GBD ColorSpace (Range)		Reserve / xvYCC601 / xvYCC709 / Reserve
	Packet Range Data	MinR	8bit：–3.96875 to +3.96875 10bit：–3.9921875 to +3.9921875 12bit：–3.998046875 to +3. 998046875
		MaxR	
		MinG	
		MaxG	
		MinB	
		MaxB	

5.1.13 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.

CAUTION

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 250 MHz
	All horizontal timing pulses *1	4-dot increments

*1: Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking
*2: The standard VG-859C 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 Setting the HDMI output”).

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.

<table>
<tr><th></th><th></th><th>HDCP execution</th><th>1 Data Island*1</th><th>2 Data Island*1</th><th colspan="2">Hblanking setting range</th><th></th></tr>
<tr><td rowspan="6">HMDI output mode</td><td rowspan="2">DVI</td><td></td><td></td><td></td><td>40</td><td rowspan="6">to 4096 dot</td><td>Restriction on VG-859C</td></tr>
<tr><td>○</td><td></td><td></td><td>56</td><td>Restriction on HDCP</td></tr>
<tr><td rowspan="4">HDMI</td><td></td><td></td><td></td><td>40</td><td>Restriction on VG-859C</td></tr>
<tr><td>○</td><td></td><td></td><td>56</td><td>*2</td></tr>
<tr><td>○</td><td>○</td><td></td><td>106</td><td></td></tr>
<tr><td>○</td><td>○</td><td>○</td><td>138</td><td>*3</td></tr>
</table>

*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: (Hblanking - 74 [dots]) $\geq 32 \times (Fs \times Nch)/4$
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-859C (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.

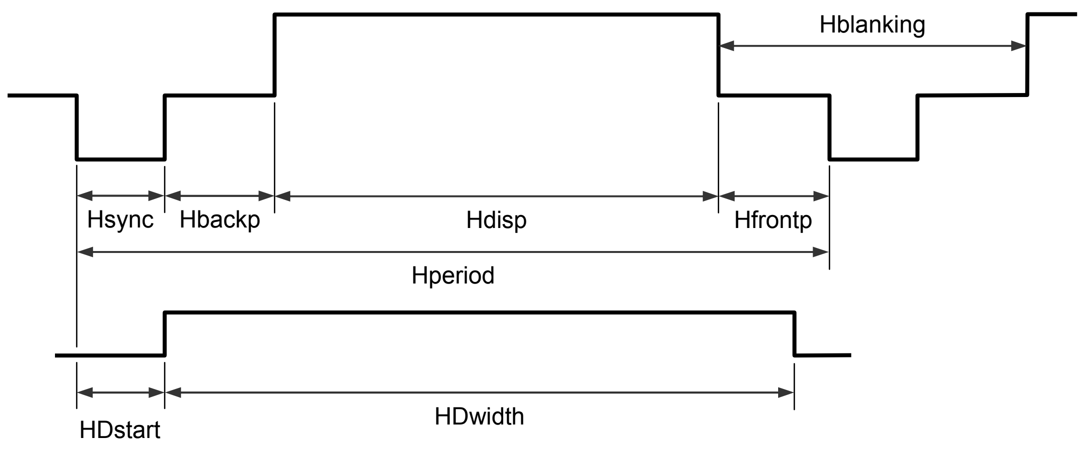


Fig. 5.2.1 Horizontal timing data

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 “5.1.13 DVI and HDMI output timing restrictions.”

Table 5.2.1 Reference pages for setting details

No.	Setting item	Reference page
1	Input mode	p.101
	Dot clock frequency	
2	Hperiod	p.102
	Hdisp	
	Hblanking	
3	Hsync	p.103
	Hbackp	
	Hfrontp	
4	HDstart	p.103
	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

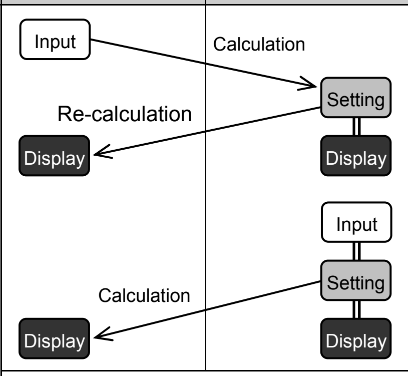
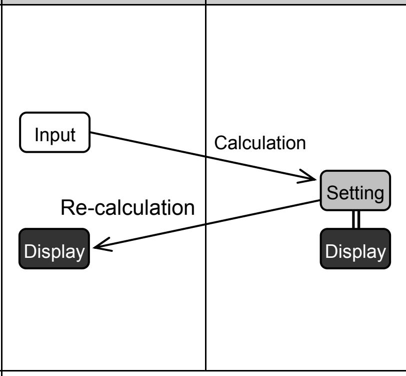
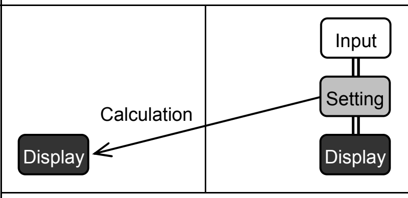
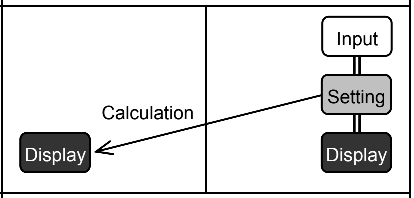
Table 5.2.2 Input mode and dot clock frequency setting method

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 250.000 MHz*1 ● When the "C" ([SHIFT] + [6]) key is pressed, "*" appears on the LCD display, and the setting is fixed.

*1: This range is 5.000 to 200.000 MHz for the VG-859/859A.

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

<table>
<tr><td colspan="2" rowspan="3"></td><td colspan="5">Setting item</td></tr>
<tr><td colspan="2">Hperiod / Hdisp</td><td colspan="2">Hsync / Hbackp / HDstart / HDwidth</td><td>Hfrontp / Hblanking</td></tr>
<tr><td>μs setting</td><td>Dot setting</td><td>μs setting</td><td>Dot setting</td><td>μs／dot setting</td></tr>
<tr><td rowspan="4">Mode</td><td rowspan="2">μs</td><td colspan="2">
</td><td colspan="2">
</td><td rowspan="4">Data calculated from the values of other items regardless of the mode.</td></tr>
<tr><td colspan="2">* Values can be input in either microseconds or dots.</td><td colspan="2">* Values cannot be input in dots.</td></tr>
<tr><td rowspan="2">dot</td><td colspan="2">
</td><td colspan="2">
</td></tr>
<tr><td colspan="2">* Values cannot be input in microseconds.</td><td colspan="2">* Values cannot be input in microseconds.</td></tr>
</table>

● 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 [μs], 128 to 8192 [dot] ● 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 [μs], 48 to 4096 [dot] ● 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 [μs], 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 250 MHz
Hbackp	Number keys	XX.XXuS XXXXdot	Setting range: 0.00 to 99.99 [μs], 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 [μs], 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 250 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 250 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 250 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.XXμS XXXXdot	Setting range: 0.00 to 99.99 [μs], 0 to 4096 [dot]
HDwidth	Number keys	XX.XXμS XXXXdot	Setting range: 0.00 to 99.99 [μs], 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-859B.)
Set the sum within the following range:
(HDstart + HDwidth) ≤ 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.

● In non-interlace (progressive) scanning mode

● In interlace scanning mode

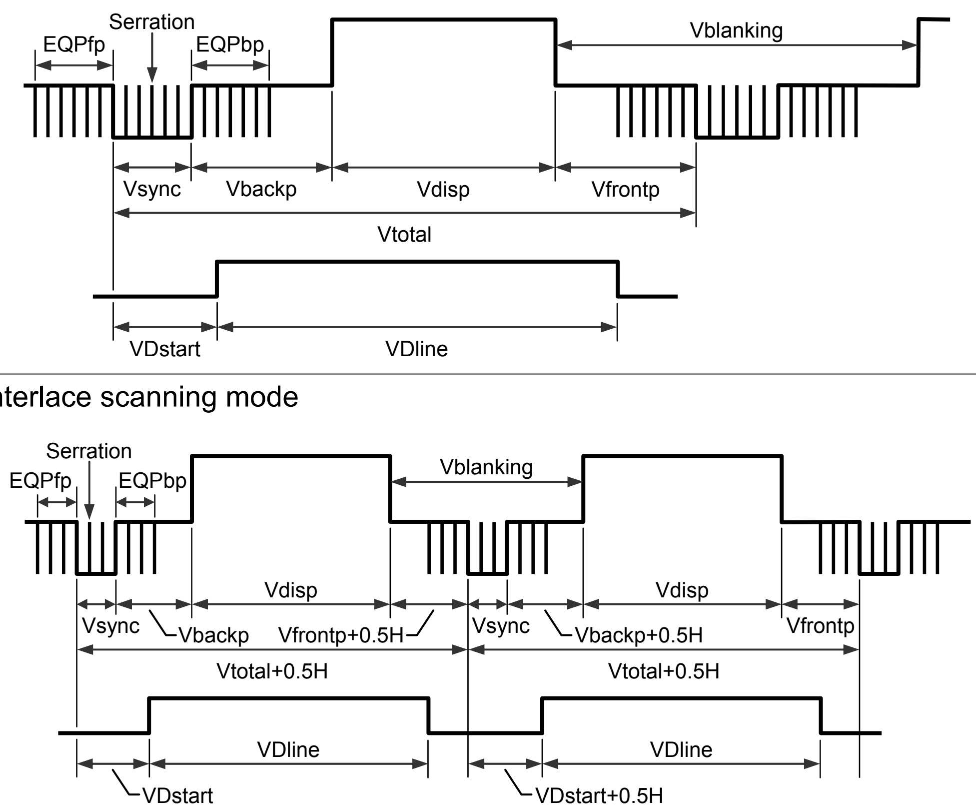


Fig. 5.3.1 Vertical timing data

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

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

- Vfrontp = Vtotal - Vdisp - Vsync - Vbackp
- Vblanking = Vtotal - Vdisp (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
1	Input mode	p.105
	Scanning mode	
2	Field mode	p.106
3	Vtotal	p.107
	Vdisp1	
	Vblanking	
4	Vsync1	p.108
	Vbackp1	
	Vfrontp1	
5	EQPfp1	p.109
	EQPbp1	
6	Serration	p.111
	EQP (on/off)	
7	VDstart	p.112
	VDline	
8	Vdisp2	p.112
9	Vsync2	p.113
	Vbackp2	
	Vfrontp2	
10	EQPfp2	p.113
	EQPbp2	

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

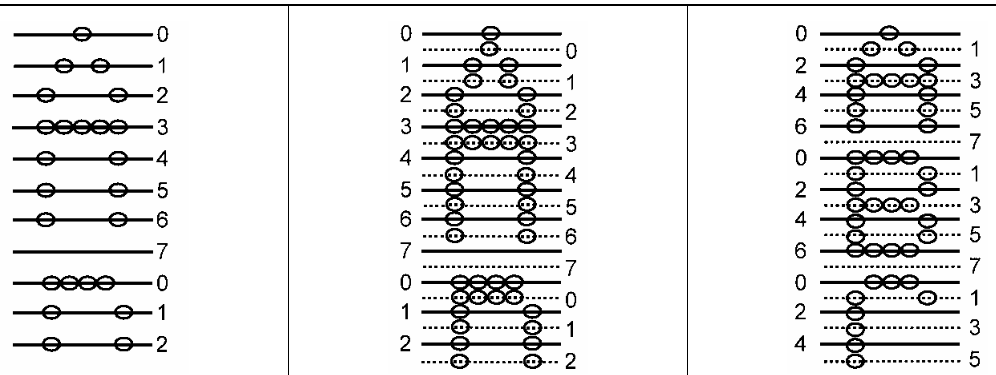
Setting item	Key	LCD display	Description
Input mode (V-Input Mode)	0	H	H mode: The values for the items are input in H units. * When this mode is selected, values cannot be input in microseconds.
	1	mS	ms mode: The values for the items are input in microseconds. * When this mode is selected, values cannot 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.



Non-interlace mode	Interlace & sync mode	Interlace & video mode

Fig. 5.3.3 Differences by scanning mode

CAUTION

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).

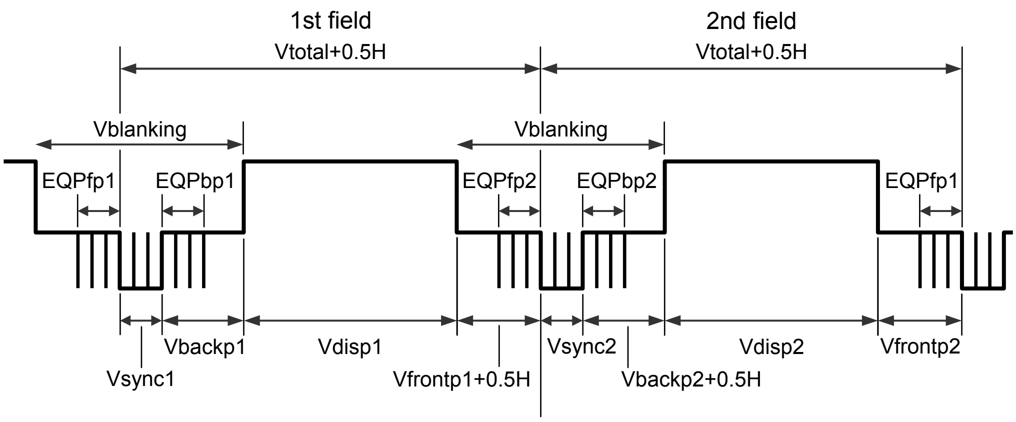
```
V Field Mode:1 Field
                    (1/2)
```

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, Vtotal, Vbackp and Vfrontp can be set in 0.5H increments.
- In the 2-field mode, ensure that the value of (Vfrontp1 + Vsync1 + Vbackp1) or (Vfrontp2 + Vsync2 + Vbackp2) 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	Setting range: In the non-interlace scanning mode 0.000 to 99.999 [ms], 4 to 4096 [H] (in 1H increments) In the interlace scanning/1-field mode 0.000 to 99.999 [ms], 4 to 2048 [H] (in 1H increments) In the interlace scanning/2-field mode 0.000 to 99.999 [ms], 4.0 to 2048.0 [H] (in 0.5H increments) ● 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	Setting range: 0.000 to 99.999 [ms], 1 to 2048 [H](in 1H increments) ● 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			Vblanking is automatically calculated from the values of Vtotal and Vdisp. Calculation formula in non-interlace scanning mode: Vblanking = Vtotal - Vdisp1 For Vblanking in the interlace scanning mode, refer to Fig. 5.3.1. Setting range: 2H or more

CAUTION

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: In the non-interlace or interlace scanning/1-field mode 0.000 to 99.999 [ms], 0 to 4096 [H](in 1H increments) In the interlace scanning/2-field mode 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: In the non-interlace or interlace scanning/1-field mode 0.000 to 99.999 [ms], 0 to 4096 [H] (in 1H increments) In the interlace scanning/2-field mode 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)

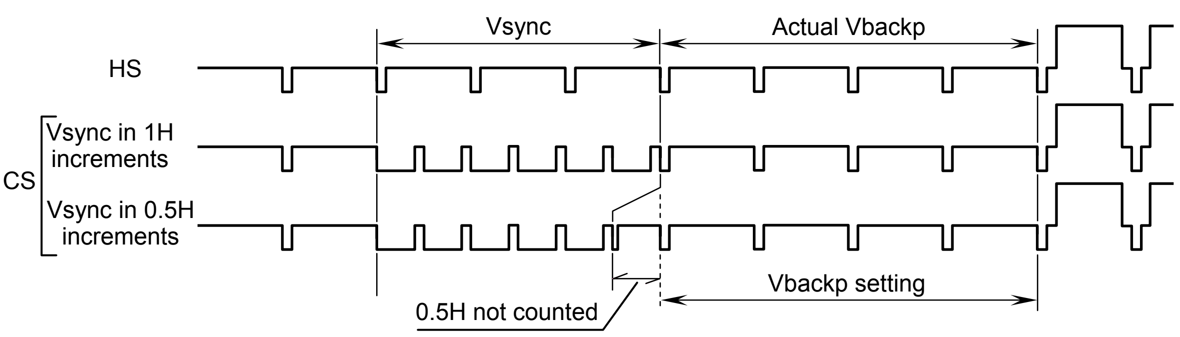


Fig. 5.3.7 How Vbackp is conceived

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: 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) ≤ Hfrontp].

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

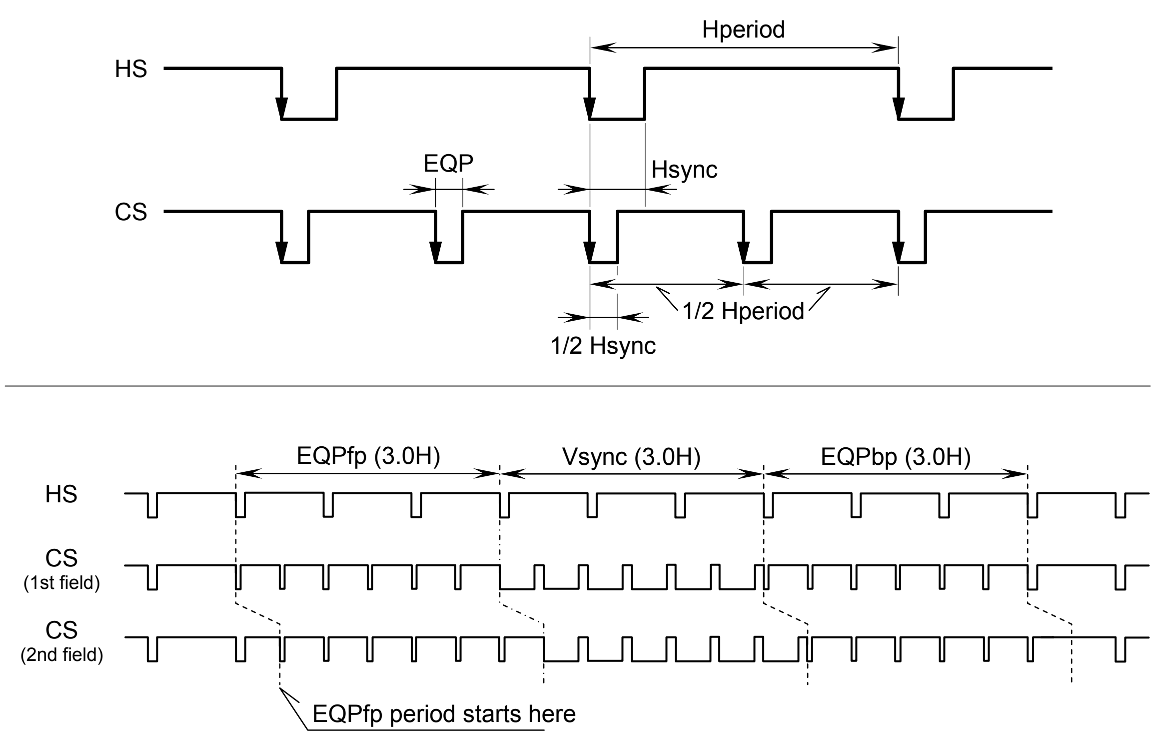


Fig. 5.3.9 How the EQP phase relationship is conceived

Setting examples ☞ Next page

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

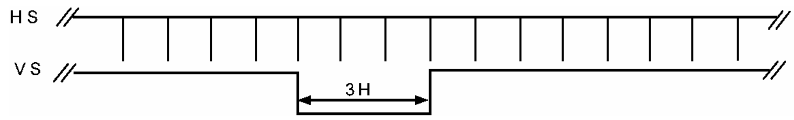


Fig. 5.3.10 EQP

<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

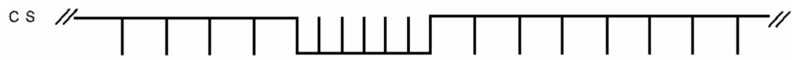


Fig. 5.3.12 Setting example 2

<Example 3>

Table 5.3.9 Setting 3

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

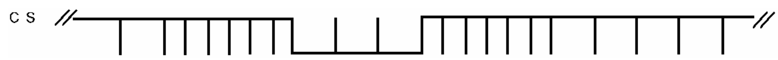


Fig. 5.3.13 Setting example 3

<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

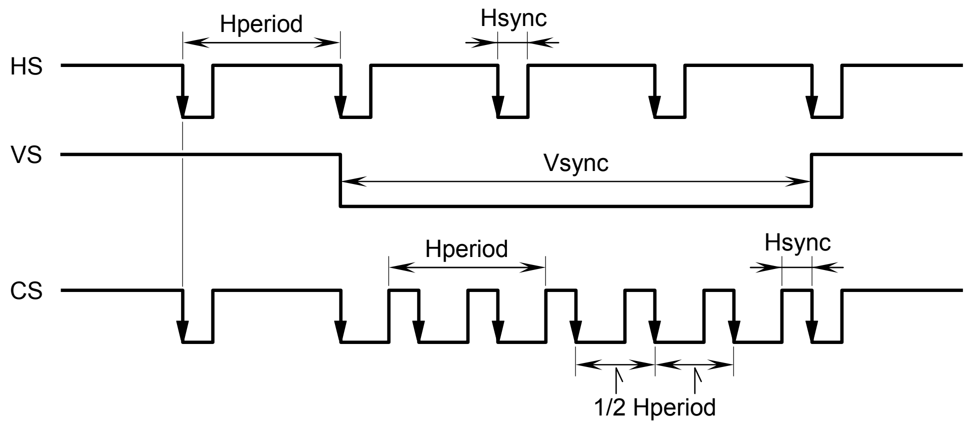
Setting item	Key	LCD display	Description
Serration	0	OFF	The serration pulse is not inserted.
	1	0.5H	The serration pulse is inserted in 0.5H increments.
	2	1H	The serration pulse is inserted in 1H increments.
	3	EXOR	EXOR of HS and VS is inserted as the serration pulse.
EQP	0	OFF	The equalizing pulse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

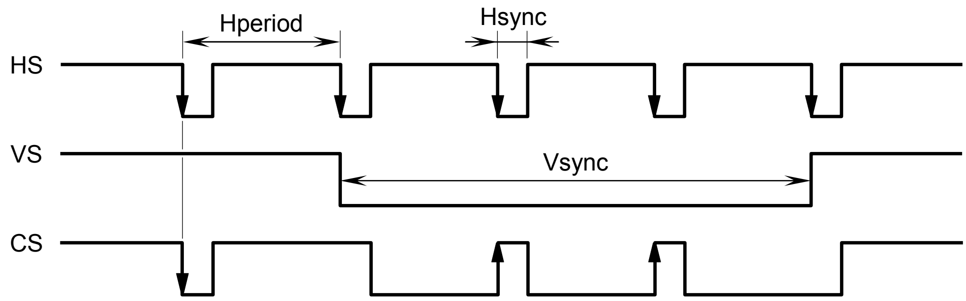


Fig. 5.3.16 Phase correlation of Serration

[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

CAUTION

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-859B.)
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) ● 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) ≤ 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

<table>
<tr><th>No.</th><th colspan="2">Setting item</th><th>Reference page</th></tr>
<tr><td>1</td><td colspan="2">Sync signal output mode</td><td>p.115</td></tr>
<tr><td rowspan="4">2</td><td colspan="2">CV (composite video sync signal)</td><td rowspan="4">p.116</td></tr>
<tr><td colspan="2">CS (composite sync signal)</td></tr>
<tr><td colspan="2">HS (horizontal sync signal)</td></tr>
<tr><td colspan="2">VS (vertical sync signal)</td></tr>
<tr><td rowspan="3">3</td><td colspan="2">Video output level</td><td rowspan="3">p.117</td></tr>
<tr><td colspan="2">Setup level</td></tr>
<tr><td colspan="2">Sync signal level</td></tr>
<tr><td>4</td><td colspan="2">RGB / YPbPr</td><td>p.117</td></tr>
<tr><td>5</td><td colspan="2">YPbPr coefficient table number</td><td>p.117</td></tr>
<tr><td>6</td><td rowspan="3">D connector</td><td>Line1</td><td>p.118</td></tr>
<tr><td rowspan="2">7</td><td>Line2</td><td rowspan="2">p.118</td></tr>
<tr><td>Line3</td></tr>
<tr><td rowspan="2">8</td><td colspan="2">BNC connector output</td><td rowspan="2">p.118</td></tr>
<tr><td colspan="2">D-Sub connector output</td></tr>
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</table>

[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-859C, 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.
	7	RGB	The composite sync signal is carried on R/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
	3	CS	The composite sync signal is set.
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 the RGB/YPbPr setting in [4].

* For details on the YPbPr coefficient tables, refer to “4.8 Setting the color difference coefficients.”

```
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)
```

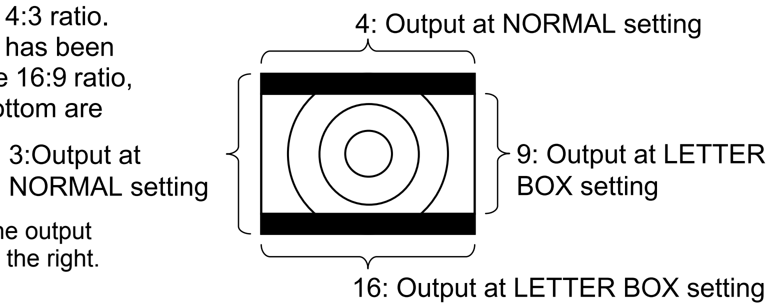
Fig. 5.4.10 Setting the S connector output format

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.



[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	These keys specify the port to which priority to output signals is given due to the restrictions placed on the analog, DVI and HDMI outputs.
	1	DVI	DVI output	
	2	HDMI	HDMI output	

*1: The standard VG-859C 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	HDMI
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-861 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-861 standard.

☞ Refer to "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-861 standard.

☞ Refer to "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-861 standard. The AFD pattern is set in section [13] Setting the AFD Aspect and AFD Type to section [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-861 standard
	AFD Type	Number of AFD defined by EIA/CEA-861 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.

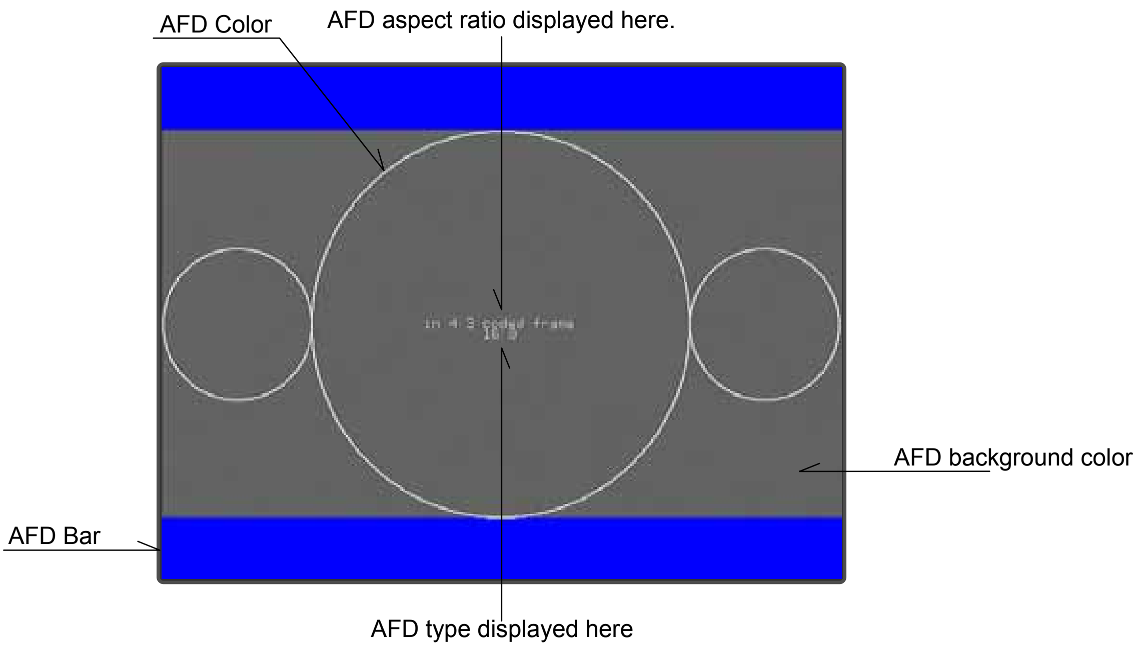
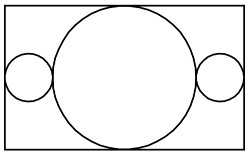
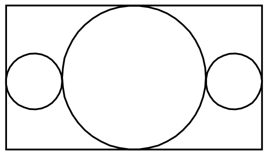
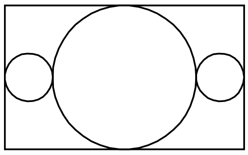
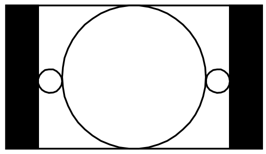
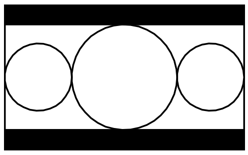
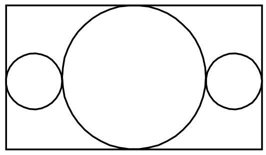
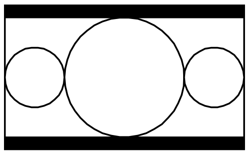
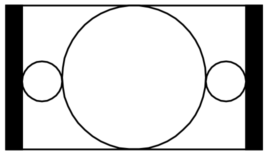
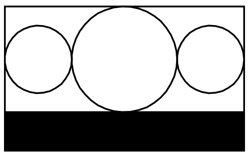
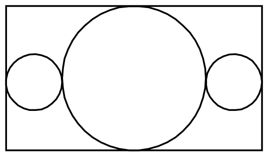
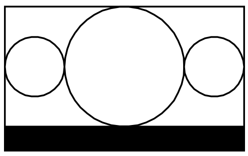
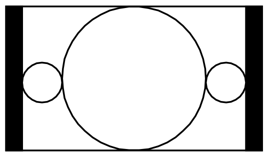
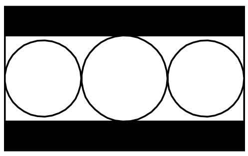
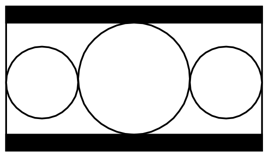
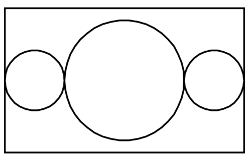
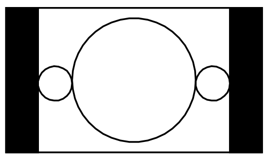
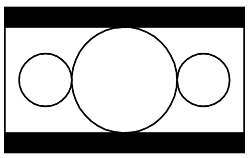
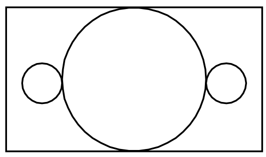
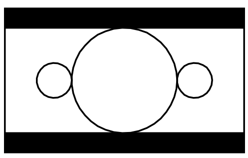
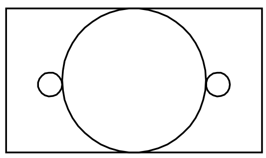


Fig. 5.4.16 Example of optional pattern No.1F display

* If, when “SELECTED” has been set for [20] 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

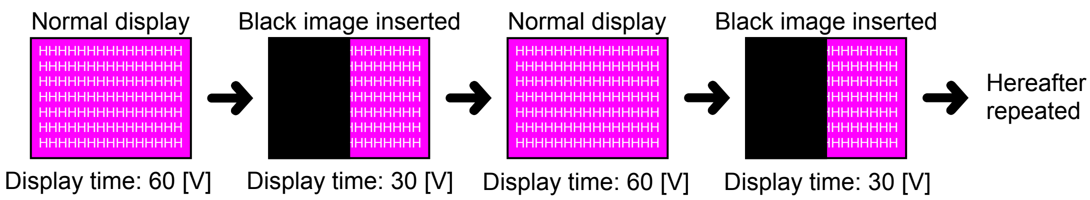
```
Insert Black Frame:OFF
Sel:All     ON:   0 OFF:   0
```

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>



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.126
		R	
2	Output level	L	p.126
		R	
3	SWEEP		p.127
4	Frequency sweep	Time step	p.128
		Number of repetitions	
5	Frequency sweep	Minimum frequency	p.128
		Maximum frequency	
6	Frequency sweep	Frequency step	p.129

[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.

```
SWEEP :OFF              (0-3)
```

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 “12.4.4 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	40 ms	This sets the time interval per step.
	1	60	60 ms	
	2	80	80 ms	
	3	100	100 ms	
	4	120	120 ms	
	5	140	140 ms	
	6	160	160 ms	
	7	180	180 ms	
	8	200	200 ms	
	9	220	220 ms	
	A	240	240 ms	
	B	260	260 ms	
	C	280	280 ms	
	D	300	300 ms	
	E	320	320 ms	
	F	340	340 ms	
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:   200Hz
```

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 Version 1.1.”

Table 5.6.1 Reference pages for setting details

<table>
<tr><th>No.</th><th colspan="3">Setting item</th><th>Reference page</th></tr>
<tr><td rowspan="2">1</td><td colspan="3">HDMI output mode</td><td rowspan="2">p.131</td></tr>
<tr><td colspan="3">Video format</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">Video level</td><td colspan="2">Level mode</td><td rowspan="3">p.131</td></tr>
<tr><td rowspan="2">Level, user setting</td><td>Min</td></tr>
<tr><td>Max</td></tr>
<tr><td rowspan="4">3</td><td rowspan="3">Color difference coefficients</td><td colspan="2">Y (a, b, c)</td><td rowspan="4">p.132</td></tr>
<tr><td colspan="2">Cb (d, e, f)</td></tr>
<tr><td colspan="2">Cr (g, h, i)</td></tr>
<tr><td colspan="3">Repetition</td></tr>
<tr><td rowspan="2">4</td><td colspan="3">Audio signal</td><td rowspan="2">p.133</td></tr>
<tr><td colspan="3">Audio sampling frequency</td></tr>
<tr><td>5</td><td colspan="3">Audio output channel</td><td>p.133</td></tr>
<tr><td>6</td><td rowspan="7">Internal sound</td><td colspan="2">Bit width</td><td>p.134</td></tr>
<tr><td>7</td><td colspan="2">Output level mode</td><td>p.134</td></tr>
<tr><td rowspan="2">8</td><td rowspan="2">Output level</td><td>L</td><td rowspan="2">p.135</td></tr>
<tr><td>R</td></tr>
<tr><td rowspan="2">9</td><td rowspan="2">Output frequency</td><td>L</td><td rowspan="2">p.135</td></tr>
<tr><td>R</td></tr>
<tr><td>10</td><td colspan="2">SWEEP</td><td>p.136</td></tr>
</table>

[1] Setting the HDMI output mode and video format

```
HDMI Mode  :HDMI    (0-3)
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) * Refer to "12.4.5 [2] Concerning the output connectors."	0	OFF	Output OFF
	1	DVI	DVI mode * InfoFrame and Packet are not sent.
	2	HDMI	HDMI 1.0 mode
	3	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 4:4:4 24 bits (8 bits for each signal).
	4	Y444_30	Output with YCbCr 4:4:4 30 bits (10 bits for each signal).
	5	Y444_36	Output with YCbCr 4:4:4 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).

CAUTION

(1) The setting range for Hblanking (horizontal timing) differs depending on the HDMI output mode setting. For details, refer to [3] in "5.1.13 DVI and HDMI output timing restrictions. 3 ")

(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 IT content of AVI InfoFrame" 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) The drawing pattern and setting timing restrictions differ depending on the video format setting and bit mode setting. Refer to "[33] Setting the HDMI output bit mode (❖optional function)" under config edit FUNC5 and "Chapter 8 MULTI-BIT MODE (❖OPTION)."

[2] Setting the video level

```
LvlMode    :FULL     (0-2)
LvlUsr  Min:   0 Max: 255
```

Fig. 5.6.2 Setting the video level

Table 5.6.3 Video level setting method

Setting item	Key	LCD display	Description
Level mode (LvlMode)	0	FULL	The mode is set to full range.
	1	LIMITED	The mode is set to limited range (*1).
	2	USER	The mode is set to the value set by the user.
Level, user setting (LvlUsr) Min, Max	Number keys	XXXX	This setting takes effect when “User setting” has been selected as the level mode. The setting range differs depending on the “Video format” setting. [Video format] [Setting range] RGB, YCbCr 4:4:4, YCbCr 4:2:2, 16-bit width ··· 0 to 255 YCbCr 4:2:2, 20-bit width ··· 0 to 1023 YCbCr 4:2:2, 24-bit width ··· 0 to 4095

* For details on the limited range, refer to “High-Definition Multimedia Interface Specification Version 1.1.”

[3] Setting the color difference coefficients and repetition

```
Y  :   a      b      c          Cr :   g      h      i
Cb :   d      e      f

Y  : 0.2126  0.7152  0.0722  →  Cr : 0.5000  0.4542  0.0458
Cb : 0.1146  0.3854  0.5000  ←  Repetition :   1     (1-10)
```

Fig. 5.6.3 Setting the color difference coefficients and repetition

Table 5.6.4 Color difference coefficient and repetition setting method

Setting item	Key	LCD display	Description
Color difference coefficients Y (a, b, c), Cb (d, e, f), Cr (g, h, i)	Number keys	X.XXXX	The numerical values for the color difference coefficients are set. Setting range: Y (a, b, c) ··· 0 to 1.0000 Cb (d, e, f), Cr (g, h, i) ··· 0 to 0.5000 * Set so that (a+b+c) , (d+e+f) and (g+h+i) are equal to 1. * Y, Cb, Cr calculation formula $Y = a \times R + b \times G + c \times B$ $Cb = -d \times R - e \times G + f \times B$ $Cr = g \times R - h \times G - i \times B$
Repetition	Number keys	XX	This sets all the horizontal timing data (such as the dot clock frequency and Hperiod) to the number multiplied by the number of repetitions. If a number other than “1” is set, all outputs except for the HDMI output are forcibly set to OFF. Setting range: 1 to 10

[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	This specifies the source to be used for the audio data of HDMI.
	2	COAX	COAX digital input	
	3	ANALOG	Analog input	
	4	INTERNAL	Internal sound	
Sampling frequency (AudioSamp)	0	32kHz	32kHz	This specifies the sampling frequency of the audio data.
	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 "5.1.13 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.

```
Audio LPCM Channel                  →   Audio LPCM Channel
 1ch+2ch:ON   3ch+4ch:OFF           ←    5ch+6ch:OFF 7ch+8ch:OFF
```

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 "5.1.13 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 Version 1.1.”

Table 5.7.1 Reference pages for setting details

No.	Setting item		Reference page
1	AVI InfoFrame	ON/OFF	p.138
	SPD InfoFrame		
	Audio InfoFrame		
	MPEG InfoFrame		
2	AVI InfoFrame	Type	p. 138
		Version	
3		Scan Information	p.139
		Bar Information	
4		Active Format Information	p.139
		★RGB or YCbCr	
5		★Active Aspect Ratio	p.140
		★Picture Aspect Ratio	
6		Scaling	p.140
		Colorimetry	
7		Video Code	p.141
		★Repetition	
8		★Top Bar	p.141
		★Bottom Bar	
9		★Left Bar	p.141
		★Right Bar	
10		RGB Quantization Range	p.142
		Extended Colorimetry	
11		IT Content	p.142

No.	Setting item		Reference page
12	SPD InfoFrame	Type	p.143
		Version	
13		Vendor Name	p. 143
14		Product	p. 144
15		Source Device	p.144
16	Audio InfoFrame	Type	p.145
		Version	
17		★Channel Count	p.145
		★Coding Type	
18		★Sample Size	p.146
		★Sample Frequency	
19		Channel Allocation	p.146
		Level Shift Value	
20		Downmix Inhibit	p.146
21	MPEG InfoFrame	Type	p.147
		Version	
22		Bit Rate	p.147
23		Frame	p.147
		Field Repeat	

CAUTION

- 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

InfoFrame ON/OFF AVI:ON SPD:ON (0/1)	→ ←	InfoFrame ON/OFF AUDIO:ON MPEG:ON (0/1)

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 4:2:2
	2	YC444	YCbCr 4:4:4

[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:unknown       (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  : 1          (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 Data0/1)
```

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)	XXXXX···	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 FUNC0.

> * 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)	XXXXX···	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 XXXK 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 Version 1.1”]

Table 5.8.1 Reference pages for setting details

No.	Setting item		Reference page
1	ACP Packet	ON/OFF	p.149
	ISRC1 Packet		
	ISRC2 Packet		
2	ACP Packet	ACP Type	p.149
3		★DVD-Audio Type	p.150
		★Copy Permission	
4		★Copy Number	p.150
		★Quality	
5		★Transaction	p.151
6		Count_A	p.151
		Count_S	
		Count_U	
7		Q_A	p.151
		Q_S	
		Q_U	
8		Move_A	p.152
		Move_S	
		Move_U	

No.	Setting item		Reference page
9	ISRC1 Packet	ISRC Continued	p152.
		ISRC Valid	
10		ISRC Status	p.152
11		Validity Information	p.153
12		Catalogue Code	p.153
13		Country Code	p.153
14		First Owner Code	p.154
15		Year of recording Code	p.154
16		Recording (item) Code	p.154

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

```
Packet ON/OFF                 →   Packet ON/OFF
ACP:ON                (0/1)   ←   ISRC1:ON   ISRC2:ON (0/1)
```

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

```
ACP Type:
      Generic Audio   (0-3)
```

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	○	
	IEC60958 Audio	○	
	DVD-Audio	○	
	Super Audio CD		○

○: 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:
             0000000000000
```

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 FUNC0.

* 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 "12.4.4 Concerning functions which cannot be executed simultaneously."
- An error of +/-5mV 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.157
2	Loop		p.157
	Delay		
3	Internal caption data	Output mode	p.158
		Style	
List of internal caption data			p.159,160

Table 5.9.2 Reference page for details on V-chip settings

No.	Setting item	Reference page
1	Rating systems	p.164
2	MPAA ratings	p.165
	U.S. TV ratings	
3	Extension bits FV, V, S, L and D for U.S. TV rating systems	p.167
4	Canadian English rating	p.168
	Canadian French rating	
5	Interval	p.169

● **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).

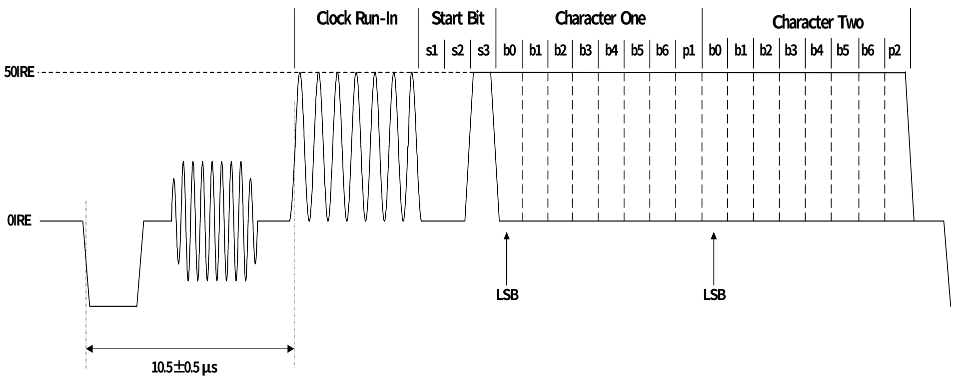


Fig. 5.9.1 Line 21 (284) waveform

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 "[4] 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.

CAUTION

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.

[4] Internal caption data

■ CC1 to 4 (1/2)

<table>
<tr><th colspan="2">Setting</th><th rowspan="2">Row, color, optional setting, etc.</th><th rowspan="2">Characters</th></tr>
<tr><th>CaptionDefMode</th><th>DefStyle</th></tr>
<tr><td rowspan="3">CC1</td><td>Pop-on</td><td>ROW: 13
Background: Black, semi-transparent
Text: White</td><td>Closed Caption Mode 1 Pop-On</td></tr>
<tr><td>Roll-up</td><td>RU2
ROW: 2,3
Background: Blue, non-transparent
Text: Cyan (row 2), White (row 3)</td><td>Closed Caption Mode 1
Roll-up RU2</td></tr>
<tr><td>Paint-on</td><td>ROW: 2,3,4
Background: Red, semi-transparent
Text: Green</td><td>Closed Caption Mode 1
Paint-on
ABCDEFGHIJKLMNOPQRSTUVWXYZ</td></tr>
<tr><td rowspan="3">CC2</td><td>Pop-on</td><td>ROW: 2 - Indent4
3 - Indent4, Tab Offset 2
Background: White, semi-transparent
Text: Cyan, underlined</td><td>Closed Caption Mode 2 PopO
0123456789</td></tr>
<tr><td>Roll-up</td><td>RU3
ROW: 13,14,15 - Indent4
Background: White, non-transparent
Text: Green (row 13), white (rows 14, 15)</td><td>Closed Caption Mode 2
Roll-up RU3
!"#$%&'()ñ+</td></tr>
<tr><td>Paint-on</td><td>ROW: 8 - Indent8、Tab Offset 3
9 - Indent4、Tab Offset 2
Background: Magenta, non-transparent
Text: White, in italics</td><td>ClosedCaptionMode2
Paint-On abcdefg</td></tr>
<tr><td rowspan="3">CC3</td><td>Pop-on</td><td>ROW: 2,13
Background: Cyan, semi-transparent
Text: Yellow, underlined, flashing</td><td>Closed Caption Mode 3 Pop-On
ÁÉÓÚÜü‘¡*.–©SM•□”</td></tr>
<tr><td>Roll-up</td><td>RU4
ROW: 5
Background: Cyan, semi-transparent
Text: Blue</td><td>Closed Caption Mode 3
Roll-up RU4
ÃãÍÌìÒòÕõ{}＼^_|~
® ° ・・・ ¢ £ ∫ â êâêîôû</td></tr>
<tr><td>Paint-on</td><td>ROW: 2
4 - Tab Offset 1
6 - Tab Offset 2
8 - Tab Offset 3
Background: White, non-transparent
Text: Red</td><td>Closed Caption Mode 3 Paint-On
ÀÂÇÈÊËëÎÏïÔÙùÛ«»
ÃãÍÌìÒòÕõ{}＼^_|~
ÄäÖöß¥¤|</td></tr>
<tr><td rowspan="3">CC4</td><td>Pop-on</td><td>ROW: 2
4 - Tab Offset 1
6 - Tab Offset 2
8 - Tab Offset 3
Background: Green, semi-transparent
Text: White, flashing</td><td>Closed Caption Mode 4 Pop-On
ÀÂÇÈÊËëÎÏïÔÙùÛ«»
ÃãÍÌìÒòÕõ{}＼^_|~
ÄäÖöß¥¤|</td></tr>
<tr><td>Roll-up</td><td>RU3
ROW: 11,12,13
Background: Cyan, non-transparent
Text: Green, in italics</td><td>Closed Caption Mode 4
Roll-up RU3
ÄäÖöß¥¤|</td></tr>
<tr><td>Paint-on</td><td>ROW: 5 - Indent4
6 - Indent4、Tab Offset 1
7 - Indent4、Tab Offset 2
8 - Indent4、Tab Offset 3
Background: Black, semi-transparent
Text: White</td><td>Closed Caption Mode 4
Paint-On
ABCDEFGHIJKLM
nopqrstuvwxyz</td></tr>
</table>

■ 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 01234567890123456789O abcdefghijklmnopqrstuvwxyz !"#$%&'()*+,-./ :;<=> ? @[¥]^_‘ ® ° · · · ¢ £ ∫ â êâêîôû ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890123456789O abcdefghijklmnopqrstuvwxyz
TXT2	-	Background: Black Text: White	Text Mode 2 ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890123456789O abcdefghijklmnopqrstuvwxyzU
TXT3	-	Background: Black Text: White	Text Mode 3 ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890123456789O abcdefghijklmnopqrstuvwxyz
TXT4	-	Background: Black Text: White	Text Mode 4 ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890123456789O abcdefghijklmnopqrstuvwxyz

[5] Treating extended character

When an extended character is transmitted as it is, a back space is automatically inserted and the character just before the insertion position is deleted.

In order to resolve this phenomenon, VG-859C provides the following two modes for transmitting extended characters.

(Refer to CEA-608-B standard on the extended character)

Table 5.9.7 Setting extended character mode

Extended Character mode setting	Description	Example of transferring Capital A with acute accent (0x12 0x20)
Space mode	A transparent space is inserted just before the extended character. (Only the inserted space is displayed when a receiver does not support the extended character.)	Transparent space (0x11, 0x39) → Extended Character (0x12, 0x20)
Substitute character mode	A standard character that resembles the extended character is inserted just before the extended character. (The transmitted characters can be determined by the inserted substitute character when a receiver does not support the extended character.)	“A” + NULL (0x41, 0x00) → Extended Character (0x12, 0x20)

The extended character mode is set with system settings. For details, refer to “3.3 [32] Setting the extended character for closed caption.”

The substitute standard characters that are prepared for extended characters to be inserted in substitute character mode are the following;
(Refer to CEA-608-B standard on the extended character)

Table 5.9.8 Substitute Standard Character ①

Data Channel 1	Data Channel 2	Description	Substitute Standard Character
12 20	1A 20	capital A with acute accent	A
12 21	1A 21	capital E with acute accent	E
12 22	1A 22	capital O with acute accent	O
12 23	1A 23	capital U with acute accent	U
12 24	1A 24	capital U with diaeresis or umlaut	U
12 25	1A 25	small u with diaeresis or umlaut	u
12 26	1A 26	opening single quote	’
12 27	1A 27	inverted exclamation mark	i
12 28	1A 28	Asterisk	*
12 29	1A 29	plain single quote	’
12 2A	1A 2A	em dash	—
12 2B	1A 2B	Copyright	c
12 2C	1A 2C	Servicemark	s
12 2D	1A 2D	round bullet	.
12 2E	1A 2E	opening double quotes	”
12 2F	1A 2F	closing double quotes	”
12 30	1A 30	capital A with grave accent	A
12 31	1A 31	capital A with circumflex accent	A
12 32	1A 32	capital C with cedilla	C
12 33	1A 33	capital E with grave accent	E
12 34	1A 34	capital E with circumflex accent	E
12 35	1A 35	capital E with diaeresis or umlaut mark	E
12 36	1A 36	small e with diaeresis or umlaut mark	e
12 37	1A 37	capital I with circumflex accent	I
12 38	1A 38	capital I with diaelesis or umlaut mark	I
12 39	1A 39	small i with diaeresis or umlaut mark	i
12 3A	1A 3A	capital O with circumflex	O
12 3B	1A 3B	capital U with grave accent	U
12 3C	1A 3C	small u with grave accent	u
12 3D	1A 3D	capital U with circumflex accent	U
12 3E	1A 3E	opening guillemets	<
12 3F	1A 3F	closing guillemets	>

Table 5.9.9 Substitute Standard Character ②

Data Channel 1	Data Channel 2	Description	Substitute Standard Character
13 20	1B 20	capital A with tilde	A
13 21	1B 21	small a with tilde	a
13 22	1B 22	capital I with acute accent	I
13 23	1B 23	capital I with rave accent	I
13 24	1B 24	small i with grave accent	i
13 25	1B 25	capital O with grave accent	O
13 26	1B 26	small o with grave accent	o
13 27	1B 27	capital O with tilde	O
13 28	1B 28	small o with tilde	o
13 29	1B 29	opening brace	(
13 2A	1B 2A	closing brace	)
13 2B	1B 2B	backslash	/
13 2C	1B 2C	caret	-
13 2D	1B 2D	Underbar	-
13 2E	1B 2E	pipe	|
13 2F	1B 2F	tilde	-
13 30	1B 30	Capital A with dieresis or umlaut mark	A
13 31	1B 31	small a with diaeresis or umlaut mark	a
13 32	1B 32	Capital O with diaeresis or umlaut mark	O
13 33	1B 33	small o with diaeresis or umlaut mark	o
13 34	1B 34	small sharp s	S
13 35	1B 35	yen	Y
13 36	1B 36	non-specific currency sign	o
13 37	1B 37	Vertical bar	|
13 38	1B 38	capital A with ring	A
13 39	1B 39	small a with ring	a
13 3A	1B 3A	capital O with slash	O
13 3B	1B 3B	small o with slash	o
13 3C	1B 3C	upper left corner	+
13 3D	1B 3D	upper right corner	+
13 3E	1B 3E	lower left corner	+
13 3F	1B 3F	lower right corner	+

5.9.3 Details of V-chip item settings

[1] Setting the rating system

```
VChipSystem:OFF      (0-4)
```

Fig. 5.9.5 Setting the rating system

Table 5.9.10 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 5.9.11 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 5.9.12 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: Direced to older chileren
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 5.9.14

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 5.9.13 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: Adutl Language
Foul language
D: Sexually Suggestive Dialog
Sexually suggestive dialog

Table 5.9.14 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 5.9.15 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

E: Exempt
No age restrictions apply.
C: Children
Programming may be viewed by all children.
C8+: Children eight years and older
Programming may be viewed by children aged 8 and above.
G: General Programming, suitable for all audiences
General programming
PG: Parental Guidance
Permission of a parent required to view programming.
14+: Viewers 14 years and older
Programming may be viewed by children 14 years and older.
18+: Adult Programming
Programming for adults only.

Table 5.9.16 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

E: Exempt
No age restrictions apply.
G: General
General programming.
8ans+: Not recommended for young children
Programming unsuitable for young children
13ans+: Programming may not be suitable for children under 13
Programming unsuitable for children aged 13 and under
16ans+: Programming is not suitable for children under 16
Programming unsuitable for children aged 16 and under
18ans+: Programming restricted to adults
Programming for adults only.

[5] Setting the interval

```
VChipInterval:    1V
               (1-1023)
```

Fig. 5.9.9 Setting the interval

Table 5.9.17 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 “12.4.4 Concerning functions which cannot be executed simultaneously.”
- An error of +/-5mV 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.172
	Data transfer mode	
2	Page	p.172
List of internal Teletext data		p.173,174

● 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.

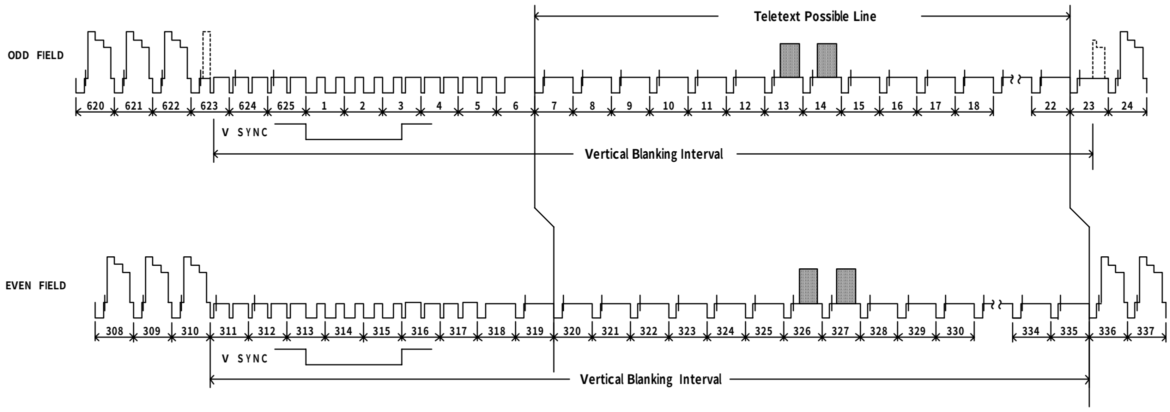


Fig. 5.10.1 VBI waveforms

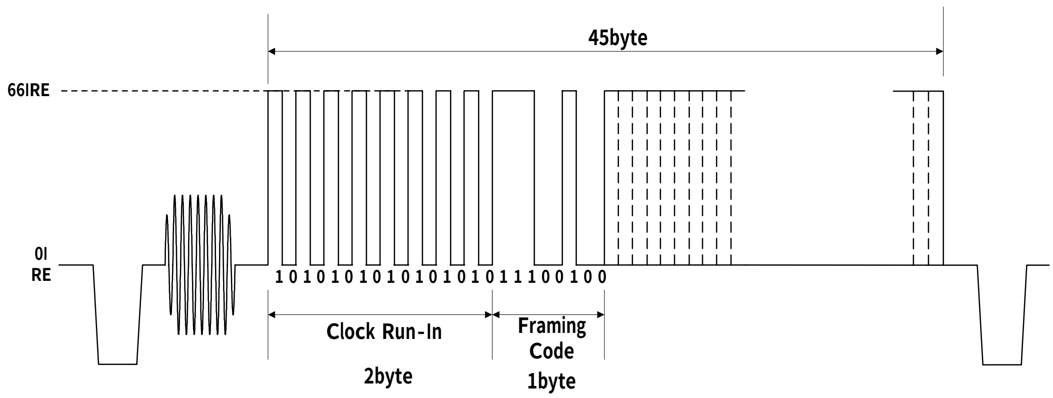


Fig. 5.10.2 Teletext waveforms

* 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 Filed2 = 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-859C 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)   →    4:103   5:200   6:201   →   …
  1:100   2:101   3:102     ←    7:202   8:203   9:204   ←
```

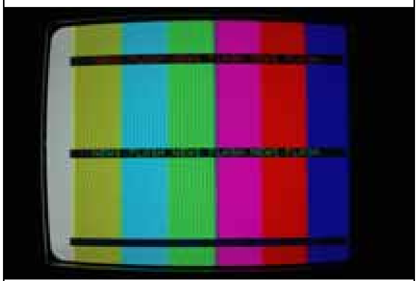
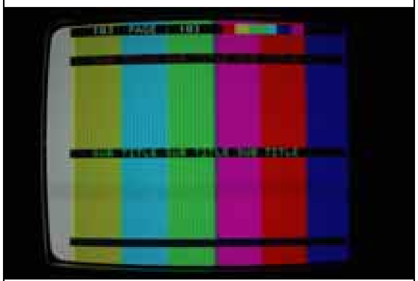
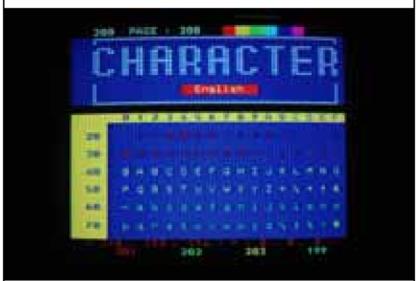
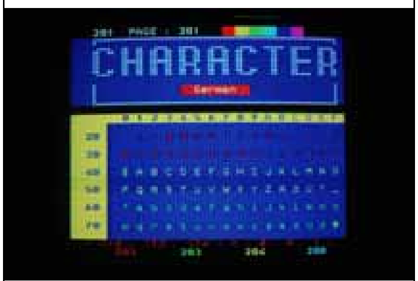
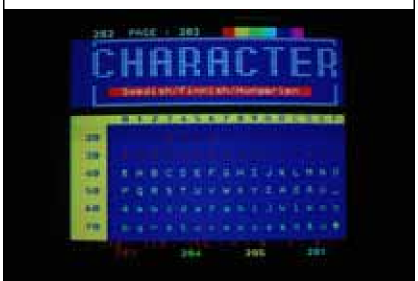
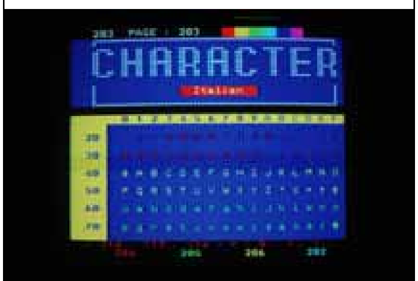
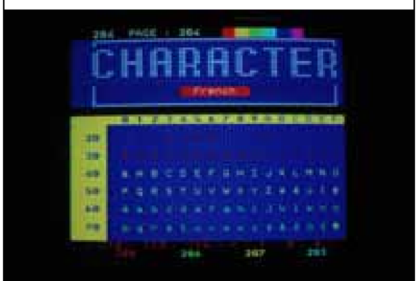
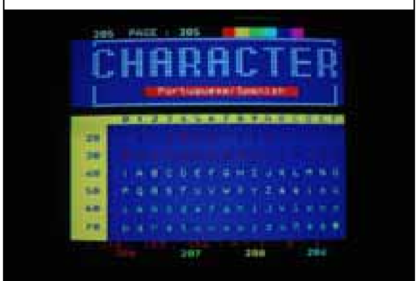
Fig. 5.10.4 Setting the pages to be output

Table 5.10.3 Output page setting method

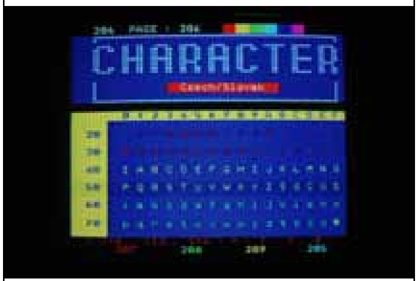
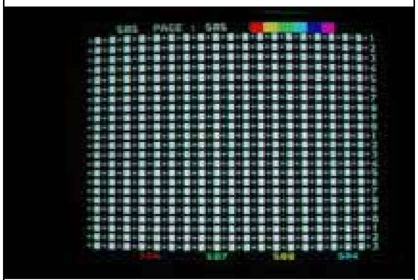
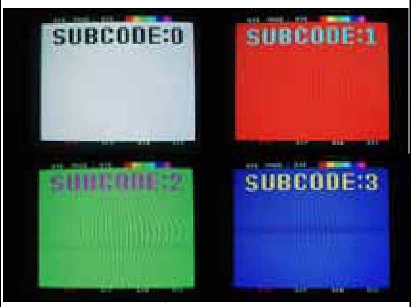
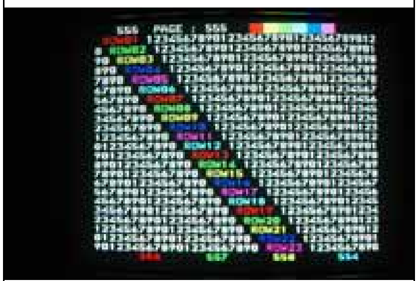
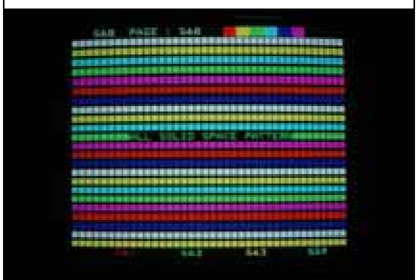
Setting item	Key	LCD display	Setting range
Page (TeleTextPage)	Number keys	XXX	100 to 899

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 “12.4.4 Concerning functions which cannot be executed simultaneously.”
- An error of +/-5mV 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.159

This product incorporates copyright-protected technology which is protected by a multiple number of U.S. patents and other intellectual property rights.
Permission to use this copyright-protected technology must be obtained from Macrovision Corporation. Unless consent is obtained from Macrovision, the technology can be used for commercial test purposes only.
Reverse engineering (*1) or disassembly is prohibited.

*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	

5.12 Setting Gamut Meta Data Packet

This section provides details on the settings of Gamut Meta Data Packet.

* For details on Gamut Meta Data Packet, refer to HDMI standard ("High-Definition Multimedia Interface Specification").

Table 5.12.1 Reference pages for setting details

<table>
<tr><th>No.</th><th colspan="2">Setting item</th><th>Reference page</th></tr>
<tr><td>1</td><td colspan="2">Gamut Meta Data Packet ON/OFF</td><td>p.179</td></tr>
<tr><td rowspan="2">2</td><td colspan="2">Next Field</td><td rowspan="2">p.179</td></tr>
<tr><td colspan="2">No Current GBD</td></tr>
<tr><td>3</td><td colspan="2">GBD profile</td><td>p.179</td></tr>
<tr><td>4</td><td colspan="2">Affected Gamut Seq Num</td><td>p.180</td></tr>
<tr><td>5</td><td colspan="2">Current Gamut Seq Num</td><td>p.180</td></tr>
<tr><td>6</td><td colspan="2">Packet Seq</td><td>p.180</td></tr>
<tr><td>7</td><td colspan="2">Format Flag</td><td>p.181</td></tr>
<tr><td>8</td><td colspan="2">GBD ColorPrecision</td><td>p.182</td></tr>
<tr><td>9</td><td colspan="2">GBD ColorSpace(Vertices)</td><td>p.182</td></tr>
<tr><td>10</td><td colspan="2">Number Vertices</td><td>p.182</td></tr>
<tr><td rowspan="4">11</td><td colspan="2">Packeted GBD Vertices Data</td><td rowspan="4">p.183</td></tr>
<tr><td rowspan="3">Vertices Data</td><td>Y</td></tr>
<tr><td>Cb</td></tr>
<tr><td>Cr</td></tr>
<tr><td>12</td><td colspan="2">GBD ColorSpace(Range)</td><td>p.183</td></tr>
<tr><td rowspan="6">13</td><td rowspan="6">Packeted Range Data</td><td>MinR</td><td rowspan="6">p.184</td></tr>
<tr><td>MaxR</td></tr>
<tr><td>MinG</td></tr>
<tr><td>MaxG</td></tr>
<tr><td>MinB</td></tr>
<tr><td>MaxB</td></tr>
</table>

[1] Setting the gamut meta data packet ON/OFF

```
Packet ON/OFF
Gamut Meta Data:ON   (0/1)
```

Fig.5.12.1 Setting the gamut meta data packet ON/OFF

Table 5.12.2 Packet (ACP/ISRC1/ISRC2) ON/OFF setting method

Setting item	Key	LCD display	Description
Packet ON/OFF Gamut Meta Data	0	OFF	The packets concerned are not sent.
	1	ON	The packets concerned are sent.

[2] Setting the next field / no current GBD

```
Next Field :1        (0/1)
No Current GBD :0    (0/1)
```

Fig.5.12.2 Setting next field / no current GBD

Table 5.12.3 Next field / no current GBD setting method

Setting item	Key/LCD display	Description
Next Field	0	The GBD is not applied to the next field.
	1	The GBD is applied to the next field.
No Current GBD	0	The Current_Gamut_Seq_Num setting is valid.
	1	The Current_Gamut_Seq_Num setting is not valid.

[3] Setting the GBD profile

```
GBDprofile :P0      (0-3)
```

Fig.5.12.3 Setting the GBD profile

Table 5.12.4 GBD profile setting method

Setting item	Key	LCD display	Description
GBD profile	0	P0	The GBD profile is set to P0.
	1	P1	The GBD profile is set to P1.
	2	P2	The GBD profile is set to P2.
	3	P3	The GBD profile is set to P3.

[4] Setting the affected gamut seq num

```
Affected Gamut Seq Num
:1          (0-15)
```

Fig.5.12.4 Setting the affected gamut seq num

Table 5.12.5 Affected gamut seq num setting method

Setting item	Key	LCD display	Description
Affected Gamut Seq Num	Number keys	XX	Set the GBD Sequence number of the packet concerned. Setting range: 0 to 15

[5] Setting the current gamut seq num

```
Current Gamut Seq Num
:1          (0-15)
```

Fig.5.12.5 Setting the current gamut seq num

Table 5.12.6 Current gamut seq num setting method

Setting item	Key	LCD display	Description
Current Gamut Seq Num	Number keys	XX	Set the GBD Sequence number to be applied to the video field currently transmitted. Setting range: 0 to 15

[6] Setting the packet seq

```
Packet Seq :3       (0-3)
```

Fig.5.12.6 Setting the packet seq

Table 5.12.7 Packet seq setting method

Setting item	Key	LCD display	Description	
Packet Seq	0	0	Intermediate	Specify the packet concerned in the packet sequence.
	1	1	First packet	
	2	2	Last packet	
	3	3	Only packet	

[7] Setting the format flag

```
FormatFlag
:Range     (0/1)
```

Fig.5.12.7 Setting the format flag

Table 5.12.8 Format flag setting method

Setting item	Key	LCD display	Description	
Format Flag	0	0	Vertices / Facets	Set the format flag.
	1	1	Range	

The following settings become valid or invalid depending on the format flag setting.

Table 5.12.9 Configuration depending on the format flag setting

Setting item	Format flag setting	
	0 (Vertices / Facets)	1 (Range)
GBD ColorPrecision	○	○
GBD ColorSpace (Vertices)	○	×
Number Vertices	○	×
Packeted GBD Vertices Data	○	×
GBD ColorSpace (Range)	×	○
Packeted Range Data	×	○

[8] Setting the GBD ColorPrecision

```
GBD ColorPrecision
:8bit        (0-2)
```

Fig.5.12.8 Setting the GBD ColorPrecision

Table 5.12.10 GBD ColorPrecision setting method

Setting item	Key	LCD display	Description	
GBD ColorPrecision	0	8bit	8bit	Set the GBD ColorPrecision (by the bit width) of the Vertex and Range data.
	1	10bit	10bit	
	2	12bit	12bit	

[9] Setting the GBD ColorSpace (Vertices)

This setting takes effect only when the format flag is set to 0 (Vertices / Facets).

```
GBD ColorSpace(Vertices)
:xvYCC709          (0-3)
```

Fig.5.12.9 Setting the GBD ColorSpace (Vertices)

Table 5.12.11 GBD ColorSpace (Vertices) setting method

Setting item	Key	LCD display	Description	
GBD ColorSpace (Vertices)	0	ITU_R BT.709	ITU_R BT.709 (using RGB)	Set the GBD ColorSpace (Vertices).
	1	xvYCC601	xvYCC601(IEC 61966-2-4-SD) (using YCbCr)	
	2	xvYCC709	xvYCC709(IEC 61966-2-4-HD) (using YCbCr)	
	3	XYZ	XYZ	

[10] Setting the number vertices

This setting takes effect only when the format flag is set to 0 (Vertices / Facets).

```
Number Vertices
:4           (4-8)
```

Fig.5.12.10 Setting the number vertices

Table 5.12.12 Current gamut seq num setting method

Setting item	Key	LCD display	Description
Number Vertices	Number keys	X	Set the number of the Vertex. Setting range: 4 to 8

[11] Setting the packeted GBD vertices data

This setting takes effect only when the format flag is set to 0 (Vertices / Facets).

```
Packeted GBD Vertices Data        DATA1
:DATA1                (1-8)   →   Y:  0   Cb:  0   Cr:  0
```

Fig.5.12.11 Setting the packeted GBD vertices data

Table 5.12.13 Packeted GBD vertices data setting method

Setting item	Key	LCD display	Description
Packeted GBD Vertices Data	Number keys	DATA1 to DATA8	Select the data that set the Packeted GBD Vertices Data. Only the number specified in Number Vertices can be set.
Vertices Data Y, Cb, Cr	Number keys	XXXX	Set the value of the Vertices Data number specified above. The setting range varies depending on the bit width specified in GBD ColorPrecision. 8bit：0 to 255 10bit：0 to 1023 12bit：0 to 4095

[12] Setting the GBD ColorSpace (Range)

This setting takes effect only when the format flag is set to 1 (Range).

```
GBD ColorSpace(Range)
:xvYCC709          (0-3)
```

Fig.5.12.12 Setting the GBD ColorSpace (Range)

Table 5.12.14 GBD ColorSpace (Range) setting method

Setting item	Key	LCD display	Description	
GBD ColorSpace (Range)	0	Reserve	Reserve	Set the GBD ColorSpace (Range).
	1	xvYCC601	RGB expression of xvYCC601 cordinates	
	2	xvYCC709	RGB expression of xvYCC709 cordinates	
	3	Reserve	Reserve	

[13] Setting the packeted range data

This setting takes effect only when the format flag is set to 1 (Range).

MinR:+0.00000 (00h) MaxR:+0.00000 (00h)	→ ←	MinG:+0.00000 (00h) MaxG:+0.00000 (00h)	→ ←	MinB:+0.00000 (00h) MaxB:+0.00000 (00h)

Fig.5.12.13 Setting the Packeted Range Data

Table 5.12.15 Packeted range data setting method

Setting item	Key	LCD display	Description	
Packeted Range Data MinR MaxR MinG MaxG MinB MaxB	0	+	Positive value	Set the minimum/maximum value of the color of the Packeted Range Data. MinR ：Minimum value of the Red Data MaxR ：Maximum value of the Red Data MinG ：Minimum value of the Green Data MaxG ：Maximum value of the Green Data MinB ：Minimum value of the Blue Data MaxB ：Maximum value of the Blue Data The setting range varies depending on the bit width specified in GBD ColorPrecision. 8bit：-3.96875 to +3.96875 (FFh to 7Fh) 10bit：-3.9921875 to +3.9921875 (3FFh to 1FFh) 12bit：-3.998046875 to +3. 998046875 (FFFh to 7FFh)
	1	-	Negative value	
	Number keys	X.XXXX	Value of each color	

CAUTION

There may be some deviations in the set value of the packeted range data due to limitations in the number of significant figures applied to the data transmission.

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.

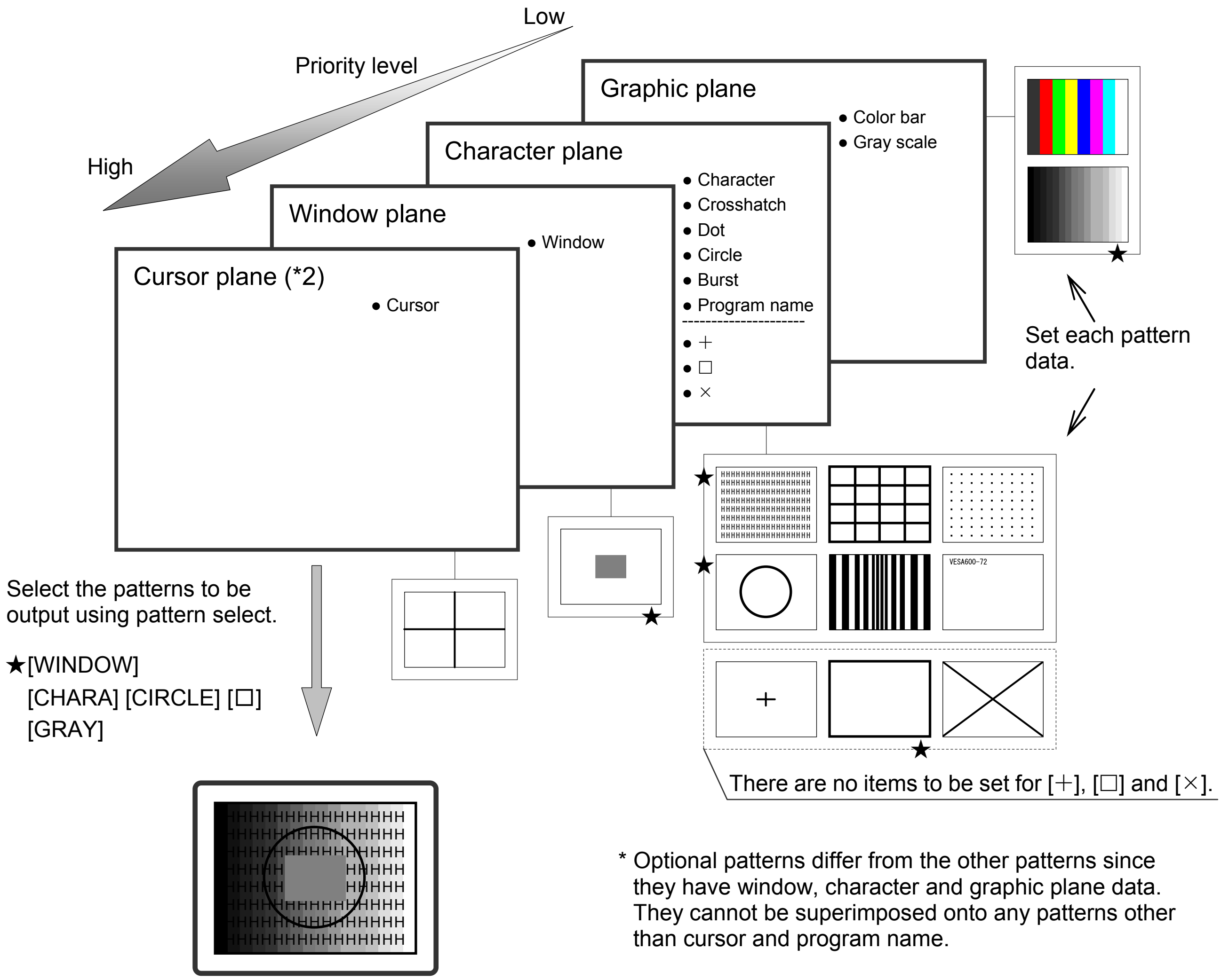


Fig. 6.1.1 Configuration of pattern data

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.

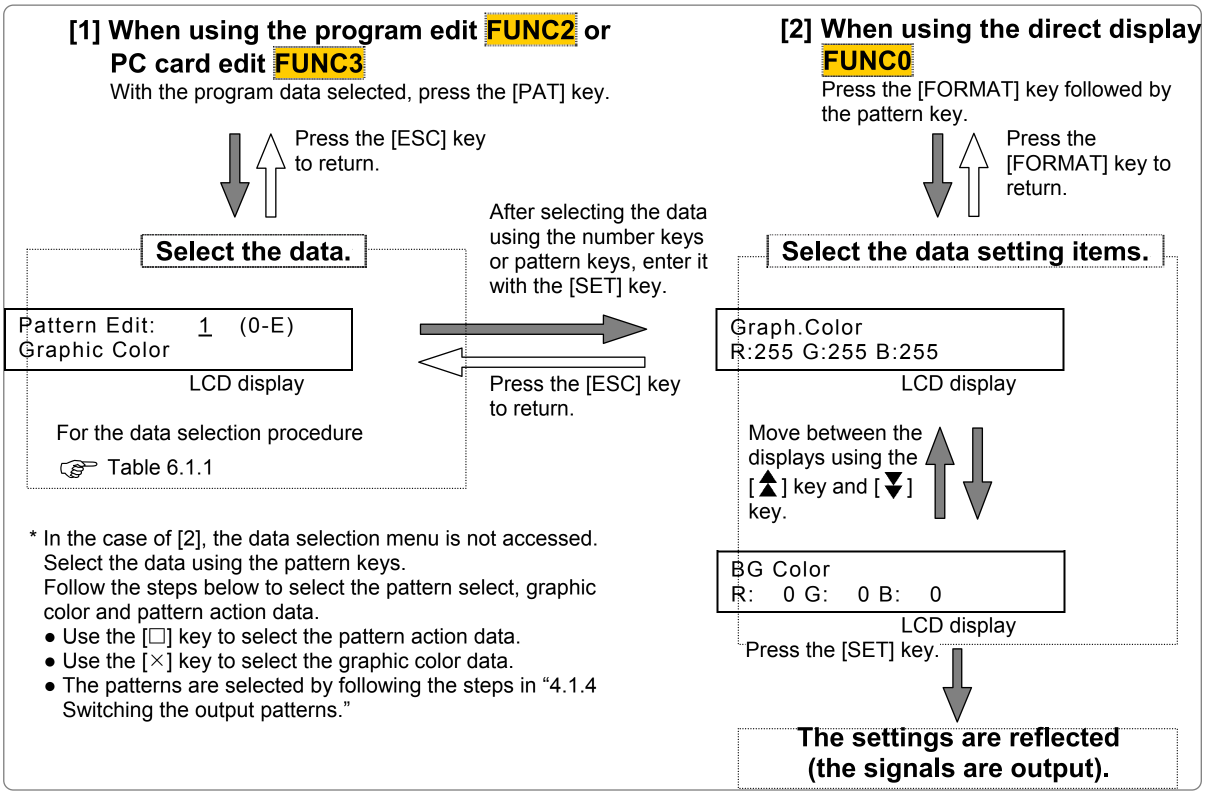


Fig. 6.1.2 Basic operations for setting the pattern data

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.187
1		Graphic Color	Graphic color	p.187
2	CHARA	CHARA Data Edit	Character pattern	p.188
3	CROSS	CROSS Data Edit	Crosshatch pattern	p.190
4	DOTS	DOTS Data Edit	Dot pattern	p.192
5	CIRCLE	CIRCLE Data Edit	Circle pattern	p.194
6	COLOR	COLOR Data Edit	Color bar pattern	p.196
7	GRAY	GRAY Data Edit	Gray scale pattern	p.198
8	BURST	BURST Data Edit	Burst pattern	p.200
9	WINDOW	WINDOW Data Edit	Window pattern	p.201
A	OPT1	OPT1 Data Edit	Optional pattern 1	p.208
B	OPT2	OPT2 Data Edit	Optional pattern 2	
C	CURSOR	CURSOR Data Edit	Cursor pattern	p.209
D	NAME	NAME Data Edit	Program name	p.212
E		Action Edit	Pattern action	p.212
F		CEC, DDC/C1	CEC function, DDC/C1 function (optional)	p.229

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

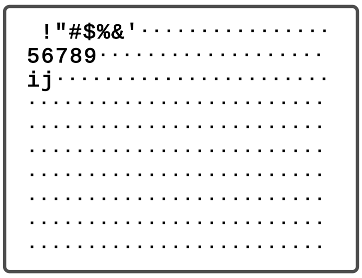
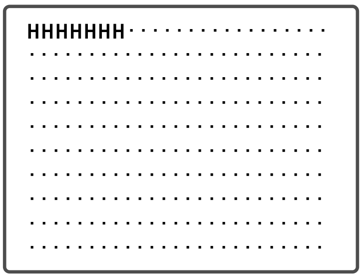
The following items are set for the character pattern data.
(1) Format and font
(2) Character code and cell size
----

(1) Set the format and font.

```
Format:Chara 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	Character list The character pattern (20H to DFH) specified by “Font” is repeatedly displayed.	
	1	All 1 Chara	All one character The character pattern (character pattern or user character pattern) specified by “Character code” is repeatedly displayed.	
	2	Corner&Center	Corner & center 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.	
Font (Font)	0	5*7	5 × 7	The character pattern set (20H to DFH) to be used in selected. ☞ “11.1.4 Character pattern data”
	1	7*9	7 × 9	
	2	16*16	16 × 16	

(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 FUNC0.

● Correlation between the font and cell size

<Example with 7 × 9 font and 16 × 16 cell size>

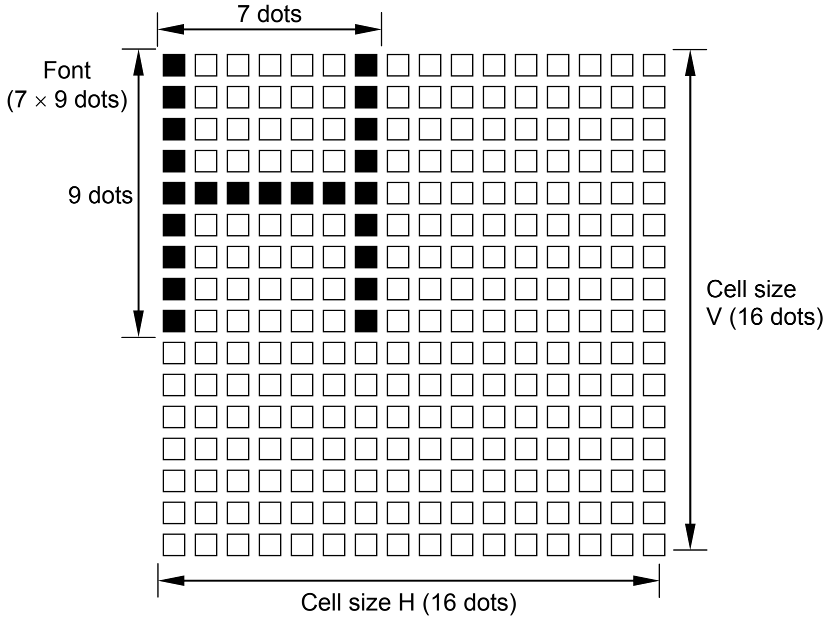


Fig. 6.4.3 Correlation between font and cell size

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: A number of crosshatch lines is used to specify the interval.	
	1	dot	Dot mode: The number of dots between the crosshatch patterns 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 interval and line width.

```
Interval :H=   20  V=   20
Width    :H=    1  V=    1
```

Fig. 6.5.2 Setting the interval and line width

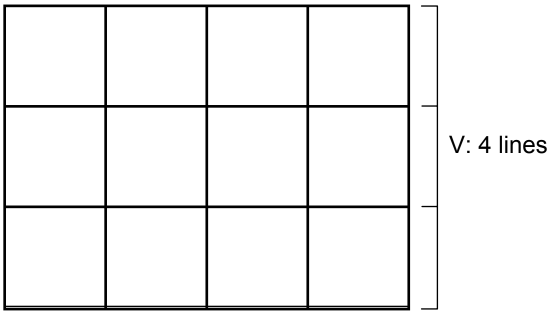
Table 6.5.2 Interval and line width setting method

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 15 [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

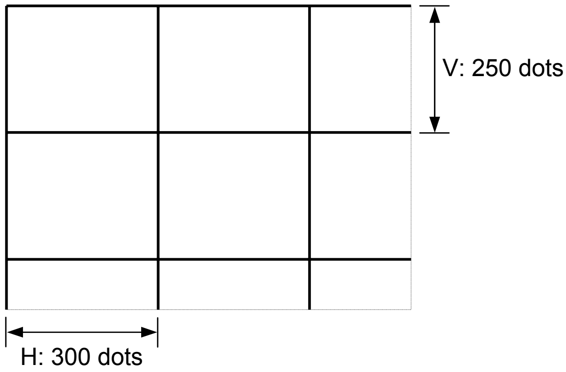


Fig. 6.5.3 Correlation between interval and mode

● When interval H and V are set to "0:1", "1:0" and "1:1"

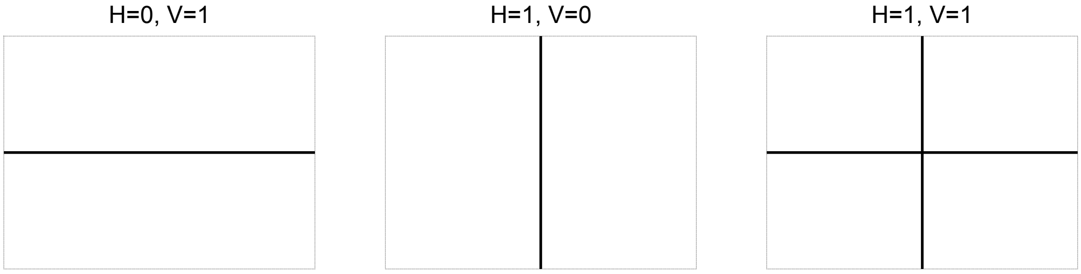


Fig. 6.5.4 Correlation between interval H and V

● 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.

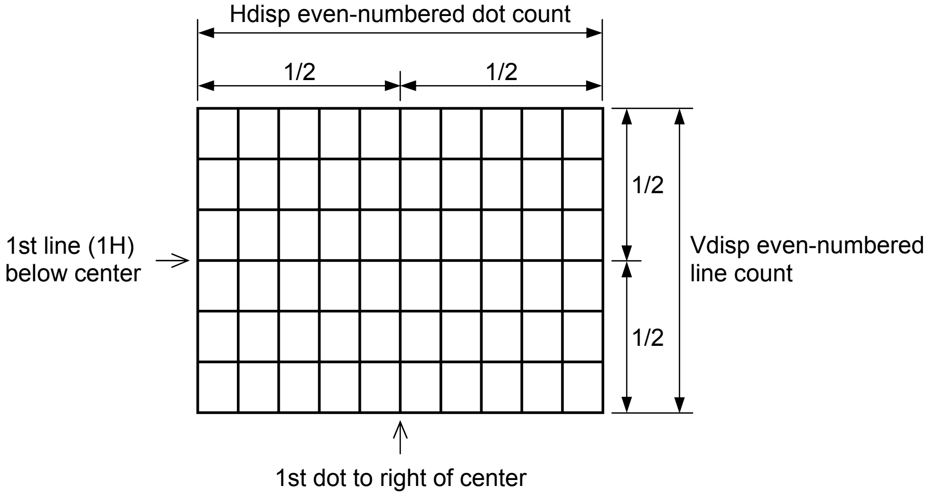


Fig. 6.5.5 Screen center

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: A number of dot pattern lines is used to specify the interval.	
	1	dot	Dot mode: The number of dots between the dots 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

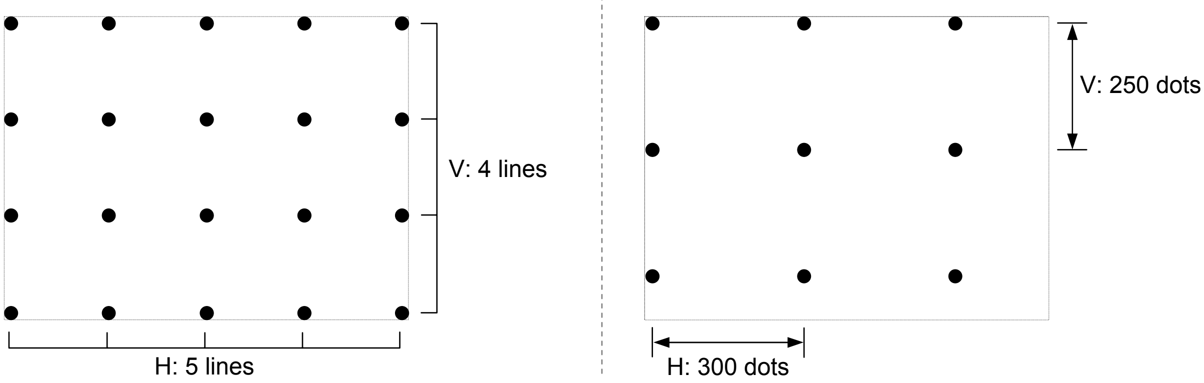


Fig. 6.6.3 Correlation between interval and mode

● When interval H and V are set to "1:1"

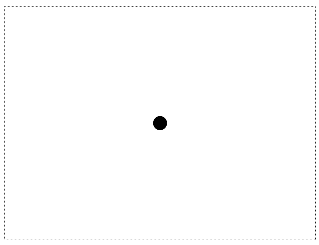


Fig. 6.6.4 Correlation between interval H and V

● 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 is used as the actual screen center.

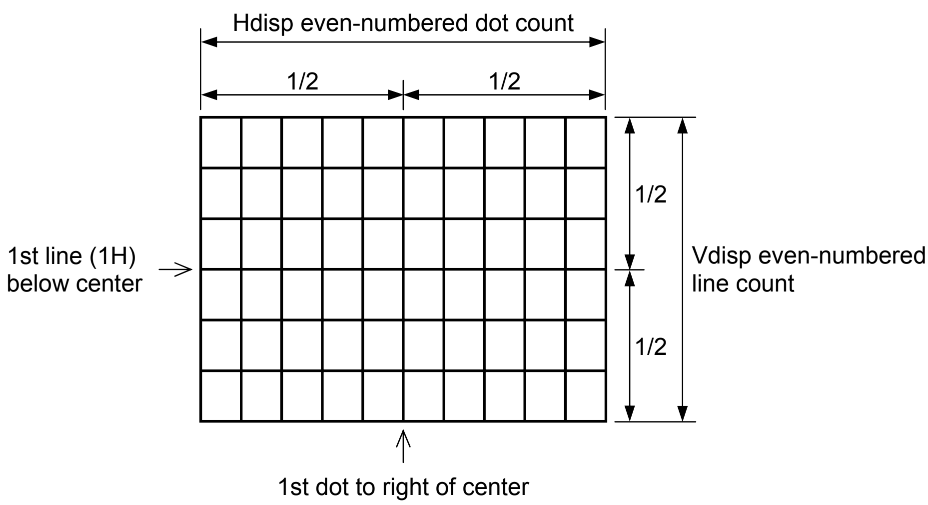


Fig. 6.6.5 Screen center

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 ● Single circle ● Center: 1/2H, 1/2V ● Radius: 1/3V
	1		Format 1 ● Concentric circles 1 ● Center: 1/2H, 1/2V ● Radius (from center): 1/6V, 1/3V, 1/2V, 1/2H
	2		Format 2 ● Format 1 + (4 circles with 1/6V radius)
	3		Format 3 ● 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 ● 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 ● Single circle painted out ● Center: 1/2H, 1/2V ● Radius: 1/3V
	6		Format 6 ● 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.)

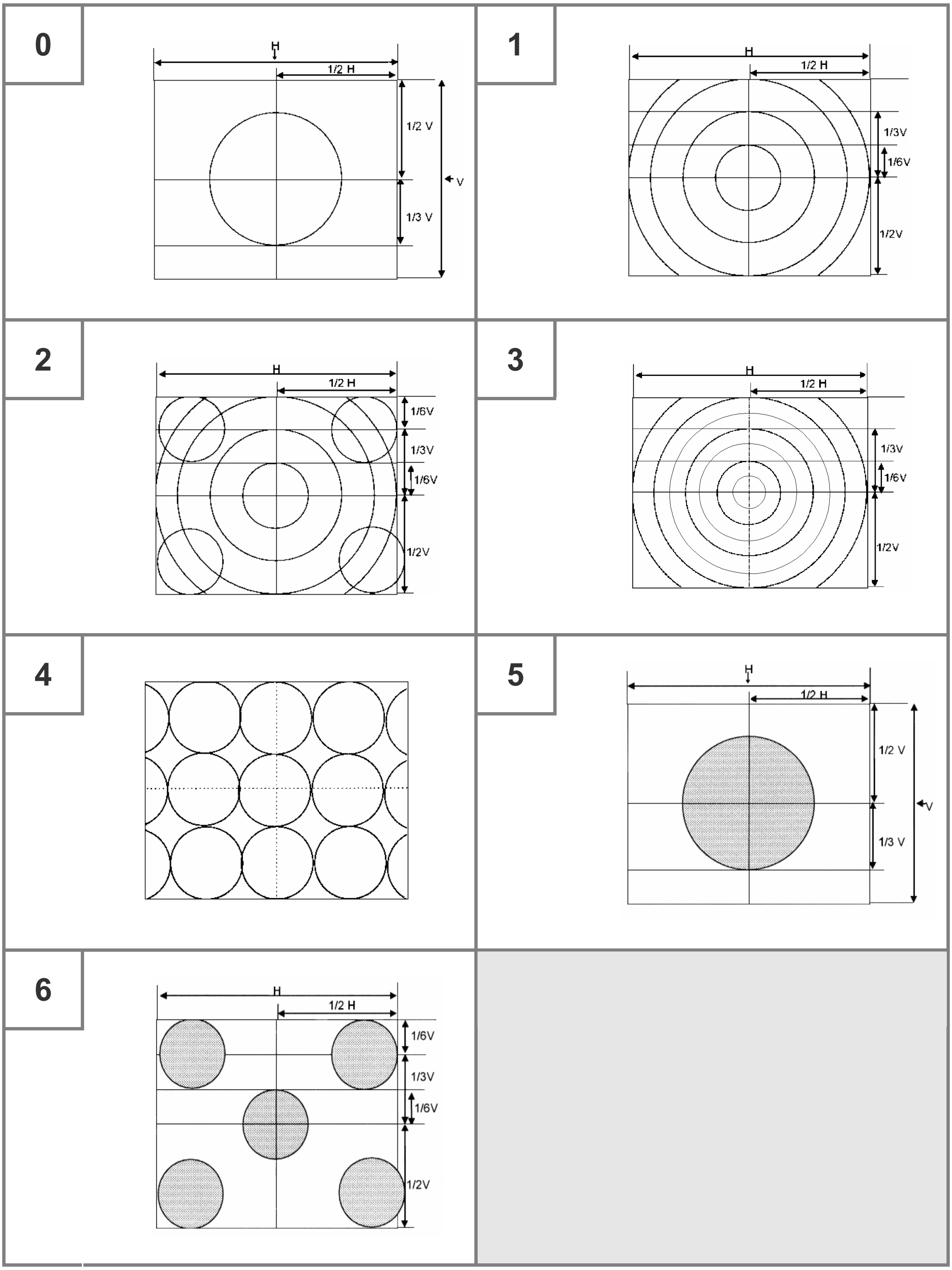


Fig. 6.7.2 Formats

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: A percentage is specified for the interval.
	1	dot	Dot mode: A number of dots 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. Horizontal direction C0 | 1 | 2 | ~ | F | C0
	1	Ver	Vertical direction * The H interval is ignored. C0 1 2 ≀ F C0 Vertical direction
	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. Horizontal direction C0 | 1 | 2 | ~ | E | F | C0 1 | 2 | 3 | ~ | F | C0 | 1 2 | 3 | 4 | ~ | C0 | 1 | 2
	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. C0 | 1 | 2 1 | 2 | 3 2 | 3 | 4 ≀ | ≀ | ≀ E | F | C0 F | C0 | 1 C0 | 1 | 2 Vertical direction

(2) Set the number of repetitions and the H and V intervals.

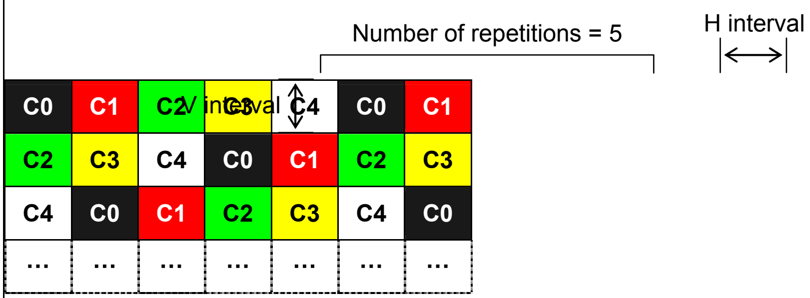
```
Repeat  :16          (1-16)
Interval :H=   6.3 V=   6.3
```

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	In the % mode Setting range: 0.0 to 100.0 [%]
		XXXX	In the dot mode 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
C4:  B 5:R B 6: GB 7:RGB
```

```
C8:_   9:R   A: G   B:RG
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 percentage.
	1	dot	Dot mode: The intervals are designated as a number of dots.
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  :16           (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	In the % mode Setting range: 0.0 to 100.0 [%]
		XXXX	In the dot mode 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
L4: 68   5: 85   6:102  7:119
```

```
L8:136  9:153  A:170  B:187
LC:204  D:221  E:238  F:255
```

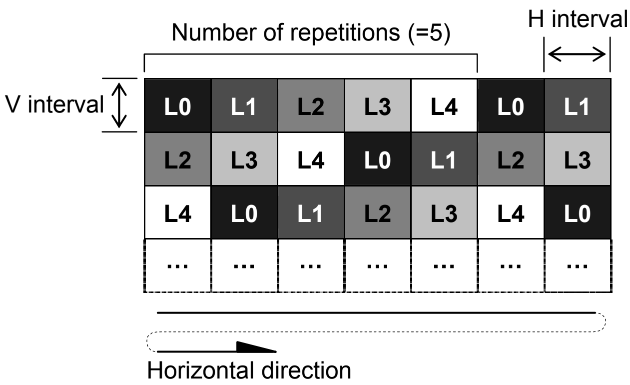
Fig. 6.9.3 Setting the level layout

Table 6.9.3 Level layout setting method

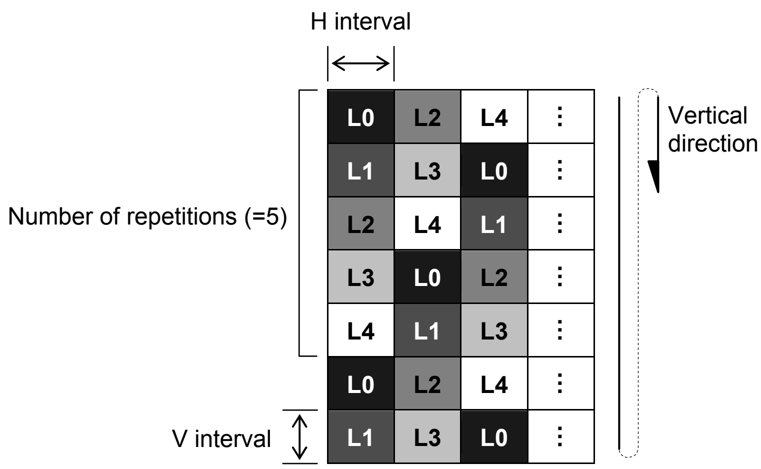
Setting item	Key	LCD display	Setting range
Level layout L0 to LF	Number keys	XXX	0 to 255

● **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: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>

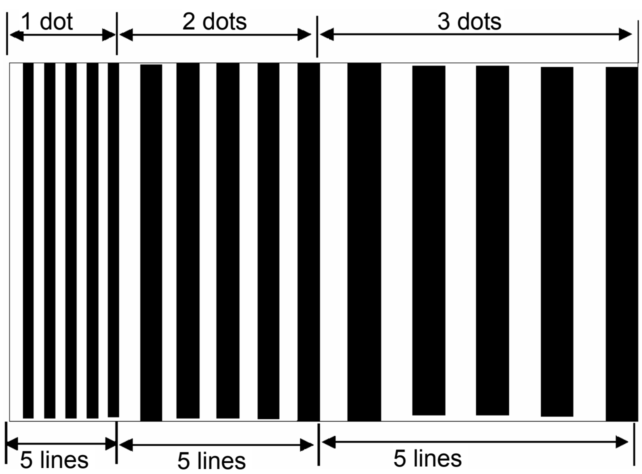


Fig. 6.10.2 Example of burst pattern setting

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 a percentage.
	1	dot	Dot mode: The widths (horizontal, vertical) are set as a number of dots.
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

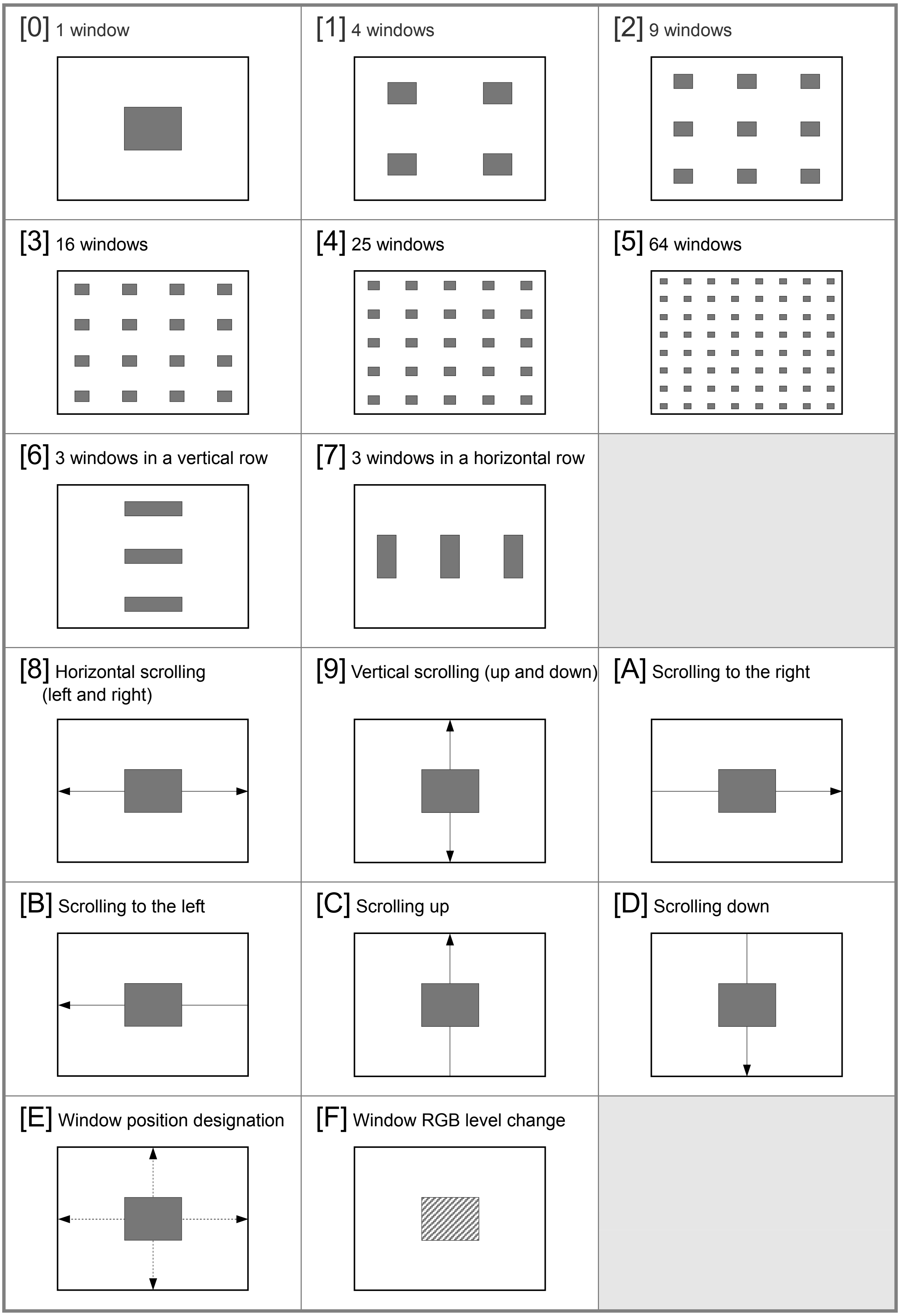


Fig. 6.11.2 Formats

(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
```

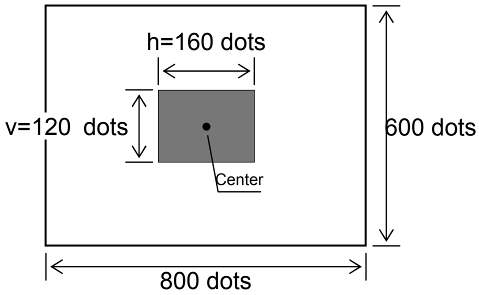
Fig. 6.11.3 Setting the horizontal and vertical widths and the window color

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%)

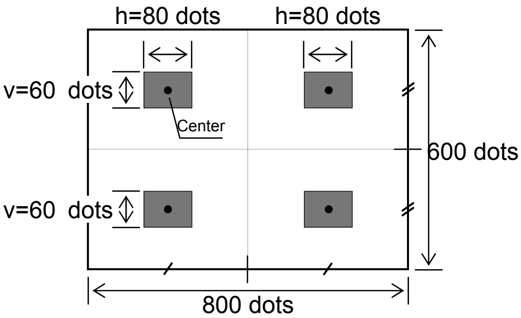
<Example 1: When format 0 (1 window) is used>



In the dot mode
H width = h = 160 [dot]
V width = v = 120 [dot]

In the % mode
H width = (h / 800) × 100 = 20 [%]
V width = (v / 600) × 100 = 20 [%]

<Example 2: When format 1 (4 windows) is used>



In the dot mode
H width = h × 2 = 160 [dot]
V width = v × 2 = 120 [dot]

In the % mode
H width = (h × 2 / 800) × 100 = 20 [%]
V width = (v × 2 / 600) × 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

<table>
<tr><th colspan="5">Formats 0 to 7 or E</th></tr>
<tr><th>Setting item</th><th>Key</th><th>LCD display</th><th colspan="2">Description</th></tr>
<tr><td rowspan="10">Flicker interval
(Flicker)</td><td>0</td><td>0 (None)</td><td colspan="2">No flicker</td></tr>
<tr><td>1</td><td>1 (1V)</td><td>1V (once per V period)</td><td rowspan="7">Flicker occurs at the designated interval.</td></tr>
<tr><td>2</td><td>2 (2V)</td><td>2V</td></tr>
<tr><td>3</td><td>3 (4V)</td><td>4V</td></tr>
<tr><td>4</td><td>4 (8V)</td><td>8V</td></tr>
<tr><td>5</td><td>5 (16V)</td><td>16V</td></tr>
<tr><td>6</td><td>6 (32V)</td><td>32V</td></tr>
<tr><td>7</td><td>7 (64V)</td><td>64V</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td>8</td><td>8 (4LEVEL)</td><td colspan="2">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).</td></tr>
<tr><td></td><td>9</td><td>9
(16LEVEL)</td><td colspan="2">(❖Optional function)
The 4 levels have been extended to 16 levels. The window RGB level is set to one of 16 levels.</td></tr>
</table>

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)
```

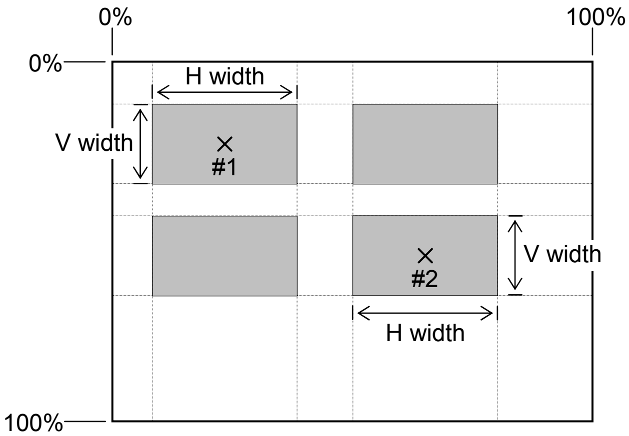
Fig. 6.11.5 Setting the window center position

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 [%] *1: When (0,0) has been set for #2, one window with #1 serving as the center position is displayed.

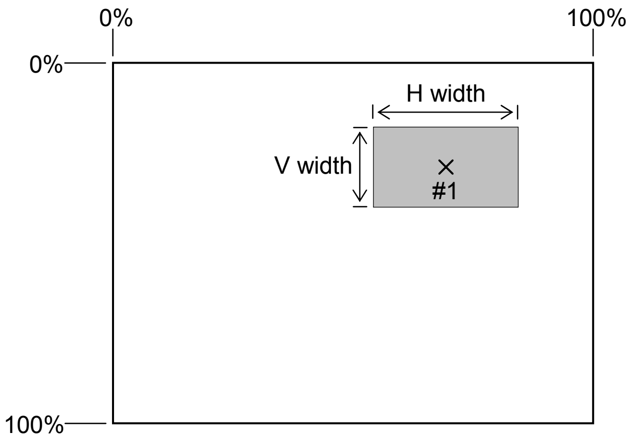
● When #2 is not (0,0)

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

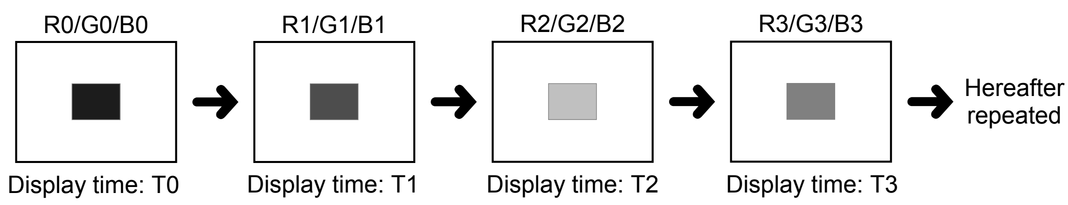
```
R0:  255 G0:  255 B0:  255
R1:  240 G1:  240 B1:  240
```

```
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: 0 (00-BF)	OPT2-NO:25 (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 “9.1.2 Optional pattern data” list (p.219).

* 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)
```

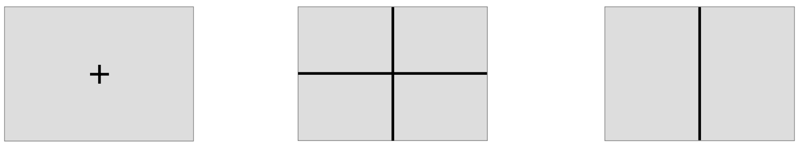
Fig. 6.13.1 Setting the format and position display mode

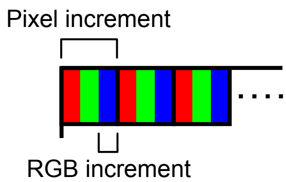
Table 6.13.1 Format setting method

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.	
	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

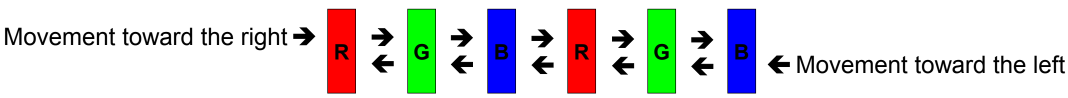
<5*5> <Cross> <V-Line>





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

Table 6.13.2 Position display mode setting method

Setting item	Key	LCD display	Description
Position display mode (Pos.Disp)	0	OFF	The cursor position does not appear on the display.
			The cursor position is displayed on the display.
	1	Normal1	Normal 1 mode: The coordinates (H, V) in pixel increments and the movement step are displayed. Vertical (V) coordinate (0 and up) **(400, 300:STEP10)** Horizontal (H) coordinate (0 and up) Movement step (1, 10 or 100)
	2	Normal2	Normal 2 mode: The coordinates (GATE, R, G, B) in RGB increments and the movement step are displayed. Vertical gate coordinate (1 and up) Movement step (1, 10 or 100) **(GATE=301 :STEP10)** **(R=1201 G=1202 B=1203)** R color horizontal coordinate (1 and up) G color horizontal coordinate (2 and up) B color horizontal coordinate (3 and up)
	3	Reverse1	Reverse 1 mode: The coordinates (H, V) in pixel increments and the movement step are displayed. The characters in the Normal 1 mode are rotated by 180 degrees. If the display is placed upside down, what will appear will be the same as in the Normal 1 mode. **(400, 300:STEP10)**
	4	Reverse2	Reverse 2 mode: The coordinates (GATE, R, G, B) in RGB increments and the movement step are displayed. The characters in the Normal 2 mode are rotated by 180 degrees. If the display is placed upside down, what will appear will be the same as in the Normal 2 mode. **(GATE=301 :STEP10)** **(R=1201 G=1202 B=1203)**

● Home point coordinates

The top left of the display serves as the home point.
Normal 1, Reverse 1 mode: (H=0, V=0)
Normal 2, Reverse 2 mode: (GATE=1, R=1, G=2, B=3)

● Concerning the gate, R, G, B coordinates in RGB increments

The horizontal coordinates (R, G, B) are obtained by multiplying the coordinate (H) in pixel increments by 3 and adding a further 1 for R, 2 for G and 3 for B.
The vertical coordinate (gate) is obtained by adding 1 to the vertical coordinate (V) in pixel units.

● Concerning the cursor movement in the Reverse 1 and 2 modes

In these modes, it is assumed that a display whose top and bottom are reversed will be used. Under normal circumstances, therefore, the direction in which the cursor moves will be reversed. (Cursor movement keys: [2] for [🡅], [4] for [🡆], [6] for [🡄] and [8] for [🡇])

(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)	Flicker occurs at the designated interval.
	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	The cursor moves in increments of the designated number of dots.
	1	10 dots	10 dots	
	2	100 dots	100 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. ☞ “9.1.4 Character pattern data”
	1	7*9	7 × 9	
	2	16*16	16 × 16	
Program name	Input using number keys (+ [SHIFT] key) or input from display (*1)	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

CAUTION

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 “12.4.4 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.

● Concerning Planes

Patterns created with VG-859C are made up of graphics, character, and window planes. Pattern action settings are used to make settings for each of these planes. For details, refer to “Configuration of pattern data.” The action functions corresponding to each plane are as follows.

Table 6.15.1 Action Function Correspondence

Setting item	Scrolling	Flicker	Palette scrolling	Simple image Movement	Half-pixel scroll	Lip Sync
Graphic plane	○	–	○	○*1	○*2	–
Character plane	○	–	–	–	–	–
Window plane	○	○	–	–	–	○

*1 Created image data is used for simple image movement.
*2 Half-pixel scroll is an optional function. Created image data is used.

6.15.1 Setting the scrolling function

The following items are set for each plane with regard to the scroll function.

Table 6.15.2 Scrolling setting method

Setting item	Plane to be Set			Description
	Graphic plane	Character plane	Window plane	
Scrolling ON/OFF	G-SCR	C-SCR	W-SCR	Scroll execution for each plane ON/OFF
Direction	G-Dir	C-Dir	W-Dir	Scroll direction
Execution interval	Action Interval 1 to 4 (used for each plane)			Specifies the action interval (how many V to move the step amount once)
Step	G&C-Step1 to 4 (used for graphics and character planes)		W-Step1 to 4	The amount of movement per action interval

[1] Setting the pattern execution interval

```
Action Interval1:    1V
                  (1-255)
```

Fig. 6.15.1 Setting the execution interval

Table 6.15.3 Execution interval setting method

Setting item		Key	LCD display	Setting range
Execution interval	Action Interval 1	Number keys	XXX V	1 to 255
	Action Interval 2, 3, 4	Number keys	XXX V	0 to 255 (0: when no interval is going to be used)

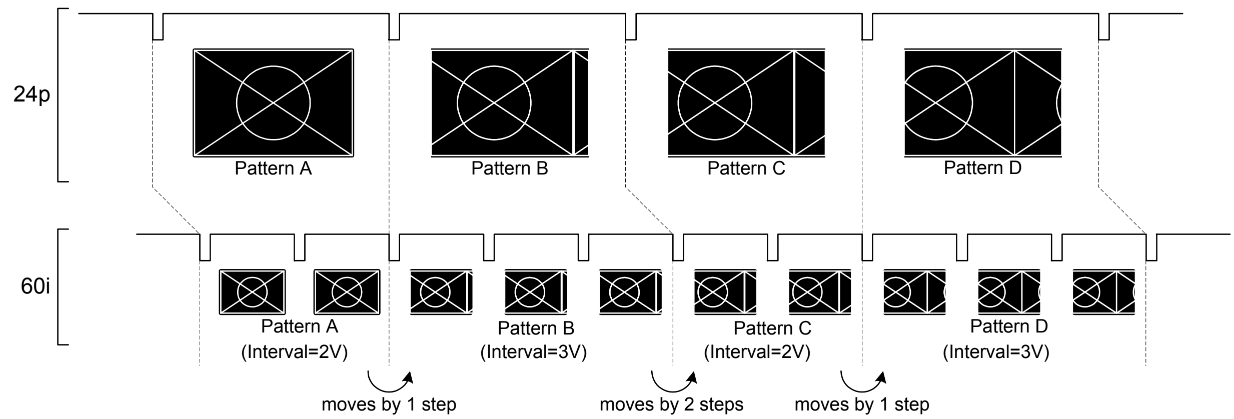
* When Action Interval 2, 3 or 4 is used, the conditions set will be repeated in sequence from 1.
(Example: When a value other than "0" has been set for Action Interval 2 or 3 , the following will be repeated: Active Interval 1 → 2 → 3 → 1 → 2 → 3 ....)
By means of this setting, a number of different 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.

Converting patterns in 24P format into 60i format



When Action Interval 1 is set to 2V and Action Interval 2 to 3V

Fig. 6.15.2 Example settings for 2-3 pull-down

[2] Setting the graphic plane scrolling and scrolling direction

```
G-SCR:OFF          (0/1)
G-Dir :L-D         (0-9)
```

Fig. 6.15.3 Setting the graphic plane scrolling ON/OFF and direction

Table 6.15.4 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 “6.15.4 Setting the simple moving picture function.”

[3] Setting the character plane scrolling and scrolling direction

```
C-SCR:OFF           (0/1)
C-Dir :L-D          (1-9)
```

Fig. 6.15.4 Setting the character plane scrolling ON/OFF and scrolling direction

Table 6.15.5 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] Setting the graphic plane and character plane scrolling step

The same step is used for the graphic plane and character plane.

```
G&C-Step1
H=    1, V=    1   (1- 255)
```

Fig. 6.15.5 Setting the graphic plane and character plane scrolling step

Table 6.15.6 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] V : 0 to 255 [H]	(0: when no step is going to be used)

* 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] Setting the window plane scrolling function ON/OFF

```
W-SCR :OFF W-FLK:OFF (0/1)
P-SCR  :OFF          (0/1)
```

Fig. 6.15.6 Setting the window plane scrolling function ON/OFF

Table 6.15.7 Window plane scrolling function ON/OFF 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.
(W-FLK)			Refer to “6.15.2 Setting the window pattern flicker function”
(P-SCR)			Refer to “6.15.3 Setting the palette scrolling function”

Other settings used in the same screen display are described in the settings section for each item.

[6] Setting 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

Table. 6.15.8 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.	Scrolling is executed in the designated direction.
		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.

6.15.2 Setting the window pattern flicker function

Set the following items for the window pattern flicker setting.

Table 6.15.9 Window pattern flicker setting method

Setting item	Description
Flicker ON/OFF	Flicker ON/OFF
Execution interval	Specifies the execution interval (how many V to flicker once) This setting uses the same value as "Action Interval1" for the scroll setting. Refer to "6.15.1 Setting the scrolling."

[1] Setting the window flicker function ON/OFF

```
W-SCR :OFF W-FLK:OFF (0/1)
P-SCR  :OFF           (0/1)
```

Fig. 6.15.8 Setting the window flicker function ON/OFF

Table 6.15.10 Window flicker ON/OFF setting method

Setting item	Key	LCD display	Description
(W-SCR)			*Refer to "6.15.1 Setting the scrolling."
Flicker (W-FLK)	0	OFF	Do not execute window flicker.
	1	ON	Execute window flicker.
(P-SCR)			*Refer to "6.15.3 Setting the palette scrolling."

Other settings used in the same screen display are described in the settings section for each item.

6.15.3 Setting the palette scrolling function

Set the following items for the palette scroll setting.
Palette scroll moves to the referent in the LUT (Look Up Table). This is valid only for the graphics plane.

Table 6.15.11 Palette scrolling setting method

Setting item	Description
Palette scrolling ON/OFF	Execute palette scrolling ON/OFF
Execution interval	Specifies the execution interval (how many V to vary the step amount once) This setting uses the same value as "Action Interval1" for the scroll setting. Refer to "6.15.1 Setting the scrolling."
Step	Palette variation amount per execution and +/- direction setting
Start position	Palette start level
End position	Palette end level (returns to start position)

[1] Setting the palette scrolling function ON/OFF

```
W-SCR :OFF W-FLK:OFF (0/1)
P-SCR :OFF           (0/1)
```

Fig. 6.15.9 Setting the window scrolling and flicker, and palette scrolling function ON/OFF

Table 6.15.12 Window scrolling and flicker, and palette scrolling ON/OFF setting method

Setting item	Key	LCD display	Description
(W-SCR)			*Refer to "6.15.1 Setting the scrolling."
(W-FLK)			*Refer to "6.15.2 Setting the window pattern flicker."
Pallet scrolling (P-SCR)	0	OFF	Do not execute palette scrolling (Factory setting).
	1	ON	Execute palette scrolling.

[2] Setting the palette scrolling step, start position and end position

```
P-Step:+(0/1)   0(0-128)
P-Sta:   0 End:   0(0-255)
```

Fig. 6.15.10 Setting the palette scrolling step, start position and end position

Table 6.15.13 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

6.15.4 Setting the simple moving picture

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 1920 × 1440 images consisting of 640 × 480 9-frame 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 “Configuration of timing data and basic operations” in 5.1.) 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.

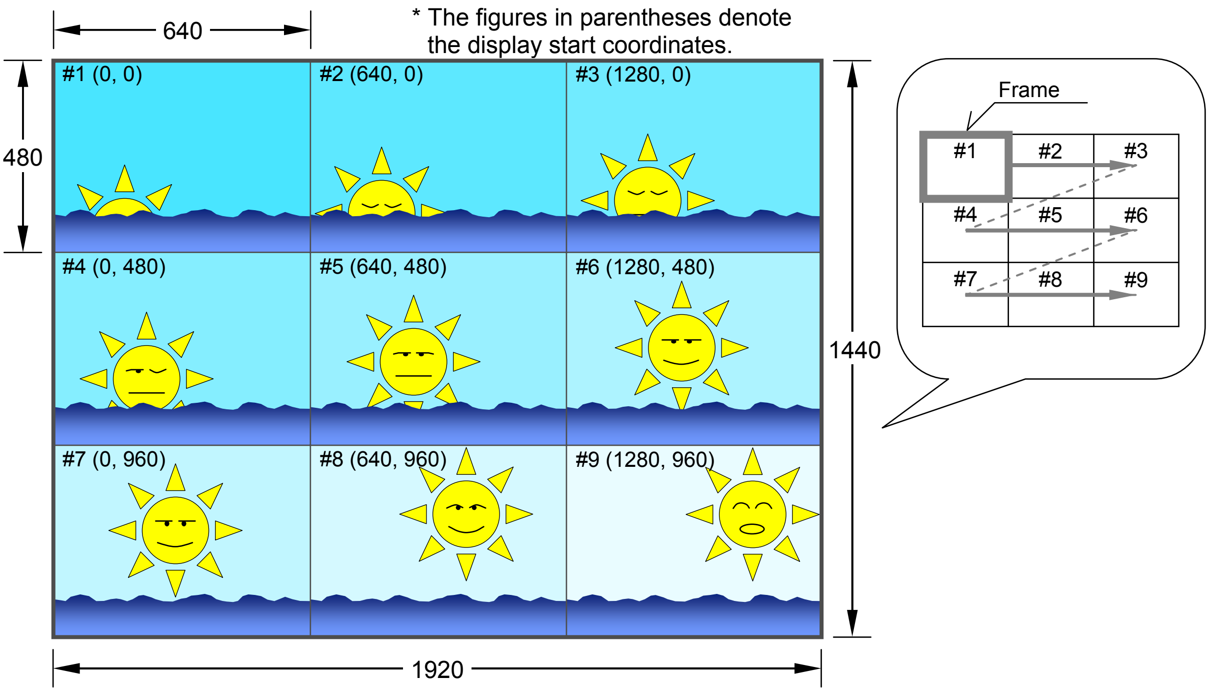


Fig. 6.15.11 Example of images for simple moving pictures

[1] Setting the number of simple moving picture repetitions

```
G-Repeat
H= 1, V= 1            (1-15)
```

Fig. 6.15.12 Setting the number of simple moving picture repetitions

Table 6.15.14 Number of simple moving picture repetition setting method

Setting item	Key	LCD display	Description
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 for the scroll direction (G-Dir) of the graphics plane.

6.15.5 Half-pixel scrolling (❖optional function)

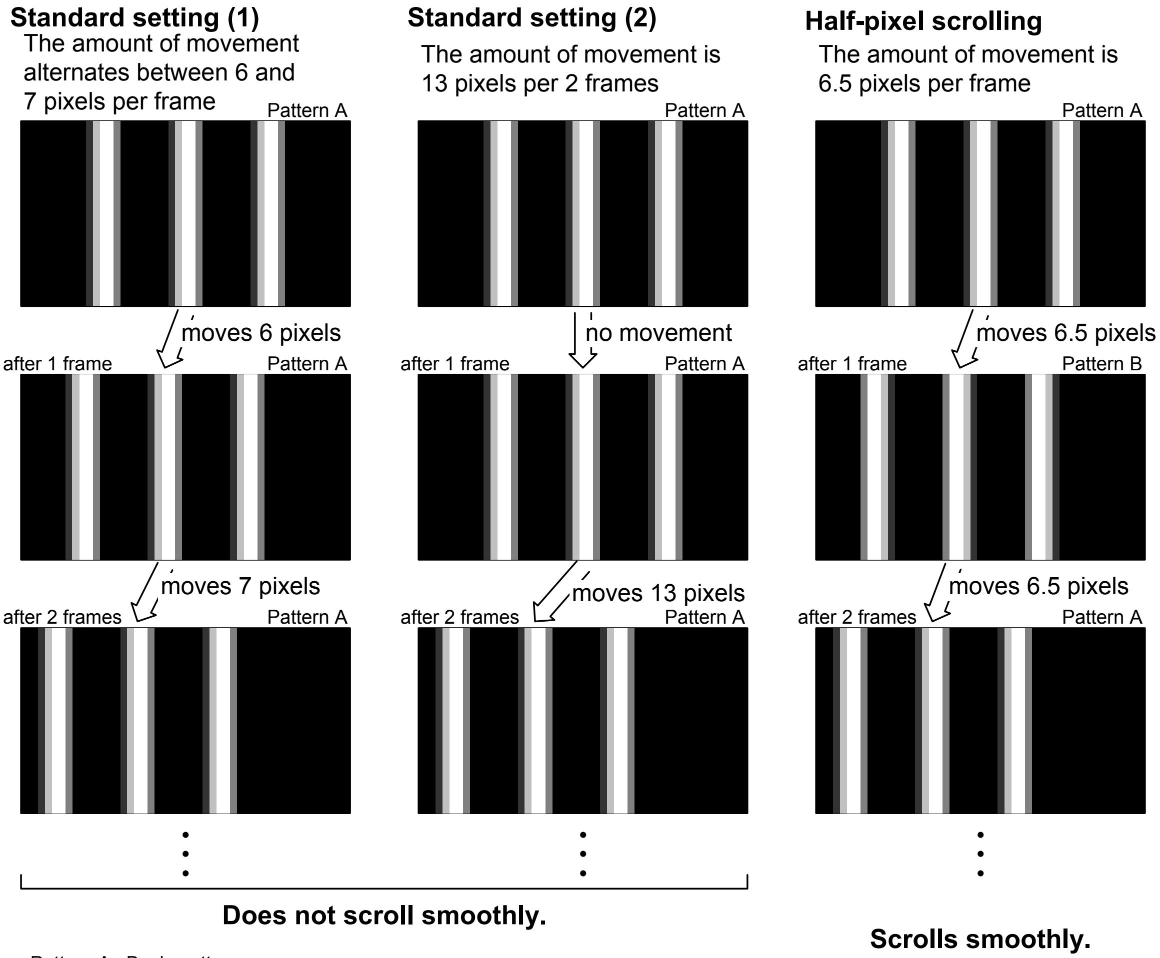
The half-pixel scrolling function is set as follows.

● Concerning half-pixel scrolling

The conventional scrolling function moves a pattern by the interval of 1V (by a frame with progressive scan; a field with interlaced scan) and with the amount of 1-pixel movement.
The VG-859C achieves smoother scrolling by preparing two patterns that are shifted by 0.5 pixels (or four patterns shifted by 0.25 pixels).

<<Example>>
If you want to scroll a video image having a timing of 1920×1080@60p in the horizontal direction for about 5 seconds, 13 pixels per 2V, or 6.5 pixels(*1) per 1V are required.

(*1) The amount of movement per 1V=1920／(60*5) = 6.4≒6.5[pixel]



Pattern A: Basic pattern
Pattern B: A pattern created by moving “pattern A” 0.5 pixels

Fig. 6.15.13 General description of half-pixel scrolling

● Limitations

- Only image data created by the user can be used for half-pixel patterns.
- Half-pixel patterns may only be scrolled right and left. Scrolling up and down Is not possible.
- All other limitations are the same as those for conventional scrolling.

● Setting Items

The following settings can be made for half-pixel scrolling.

Table 6.15.15 Setting items for half-pixel scrolling

Setting item	Description
Output pattern creation	Be sure to prepare a pattern shifted by 0.5 pixels (or 0.25 pixels) to be used for half-pixel scrolling.
Output pattern settings	Register the scroll pattern created for half-pixel scrolling in 80H to BFH of the option pattern for the conventional image data and then specify this as the pattern to use. For details on image data settings, refer to “6.12 Setting the optional patterns.”
Half-pixel scrolling settings	The following settings are related to half-pixel scrolling. (1) Scroll execution Set the scroll execution setting (G-SCR) for the graphics plane to “ON”. For details on the settings, refer to “6.15.1 [2] Setting the graphic plane scrolling and scrolling direction.” (2) Half-pixel scrolling step Refer to “[2] Setting half-pixel scrolling function.” (3) Half-pixel scrolling direction Refer to “[2] Setting half-pixel scrolling function.”

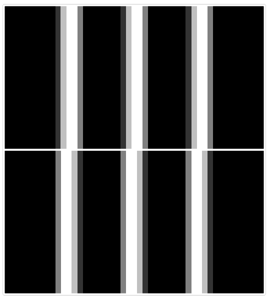
[1] Creating Patterns

For a half-pixel pattern, create a pattern that is moved by 0.5 pixels (or 0.25 pixels) and apply it as follows.
Use the “SP-8848” software provided with the VG-859C to register the half-pixel pattern into 80H to BFH used for the option pattern of the VG-859C.
For information on registering patterns, refer to “6.12 Setting the optional patterns” and the “SP-8848” instruction manual.

0.5 pixel scrolling
Creates 2 patterns with a 0.5-pixel displacement

Pattern A

Pattern B



A pattern created by moving the "patter A" 0.5 pixels toward the left

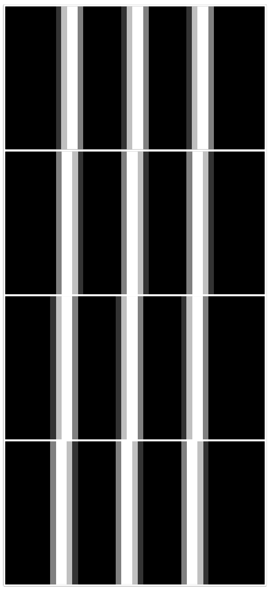
0.25 pixel scrolling
Creates 4 patterns with a 0.25-pixel displacement

Pattern A

Pattern B

Pattern C

Pattern D



A pattern created by moving the "patter A" 0.25 pixels toward the left

A pattern created by moving the "patter B" 0.25 pixels toward the left

A pattern created by moving the "patter C" 0.25 pixels toward the left

Fig. 6.15.14 Creating a half-pixel pattern

* SP-8848 software can also be used to edit one instance of each pattern described above into a single instance of graphics data.

[2] Setting half-pixel scrolling function

```
0.5/0.25 Pixel Scroll
    0.00 pixel LEFT (0/1)
```

Fig. 6.15.15 Setting half-pixel scrolling step and direction

Table 6.15.16 Half-pixel scrolling step and direction setting method

Setting item	Key	LCD display	Description	
Scrolling step	Number keys	XXX.XX	Setting range of 0 to 254.50 (0.25-pixel increment) Always use the form xxx.50 for 0.5-pixel patterns, and xxx.25 for 0.25-pixel patterns.	
Scrolling direction	0	LEFT	Left	Scrolling is executed in the designated direction.
	1	RIGHT	Right	

* This setting is valid only when a half-pixel scroll pattern has been specified. Even if another scroll setting is made, half-pixel scrolling will be used for movement.

6.15.6 Lip Sync function

Lip Sync function is set as follows.

● What is Lip Sync?

The viewer/listener will find it strange if a temporal time lag between the video and the audio occurs due to separate processing of the video and audio signals in the internal circuits of the receiving device. Lip Sync is a function used to adjust this type of time lag so that video and audio are output at the same timing.

The VG-859C evaluates this time lag between video and audio using a Lip Sync pattern.

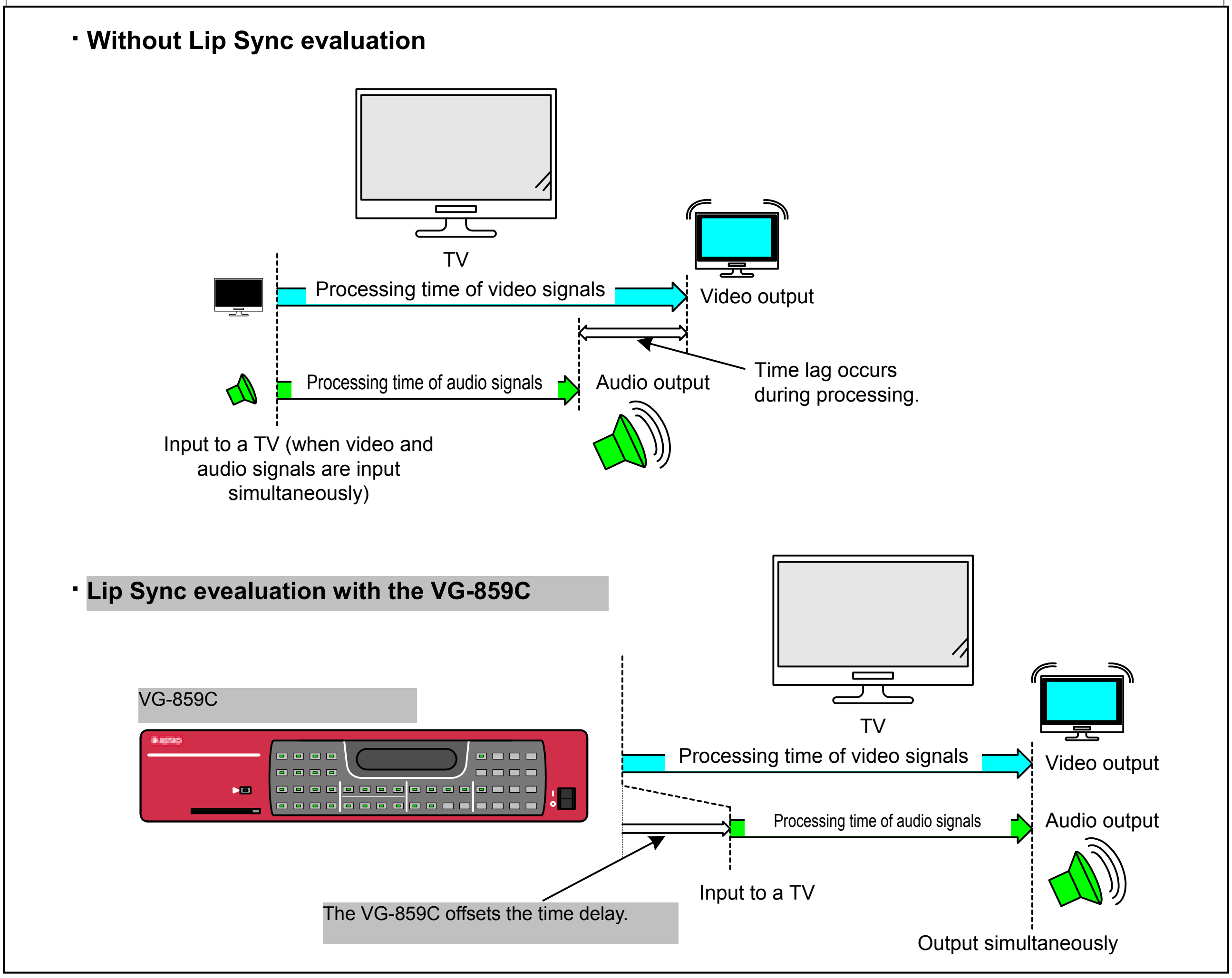


Fig. 6.15.16 Concerning Lip Sync

The VG-859C includes the following modes.

(1) Delay Mode

This mode allows delay times to be freely set for video and audio.

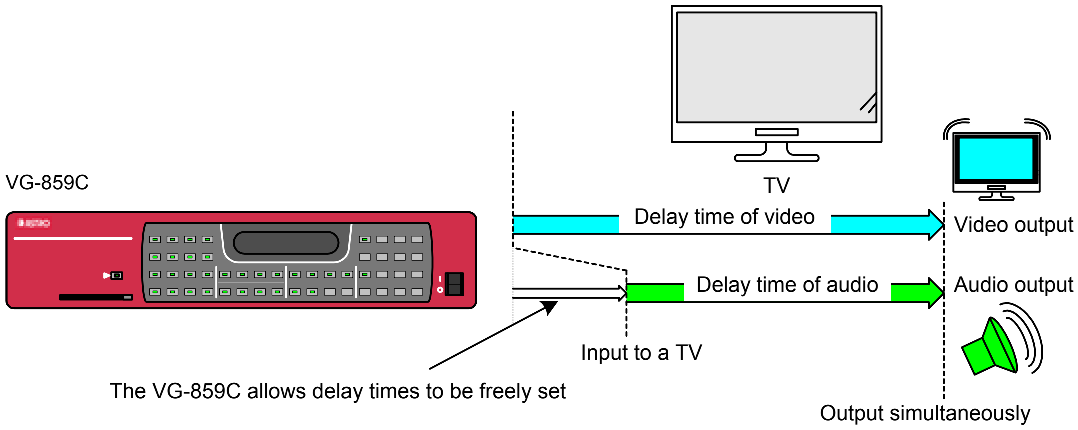
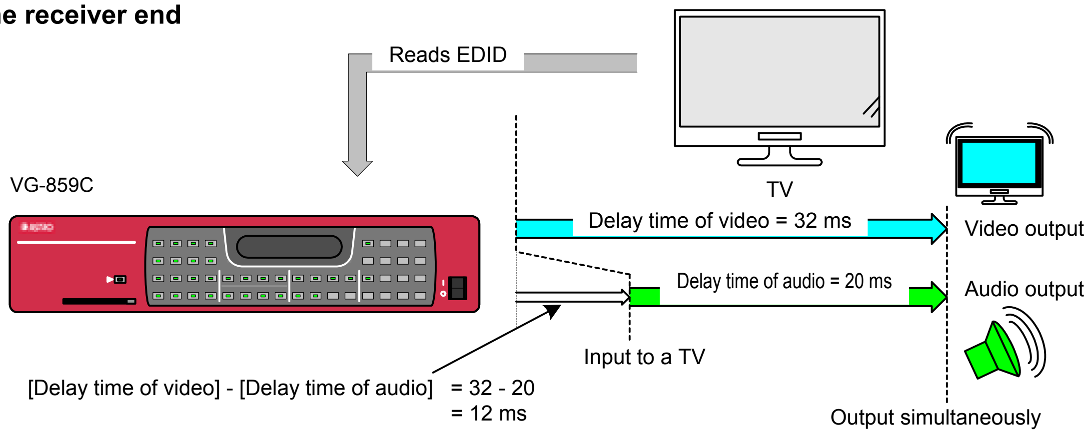


Fig. 6.15.17 General description of Delay mode

(2) EDID Mode

In EDID mode, Video_Latency (video delay time value) and Audio_Latency (audio delay time value) are read from the EDID of the receiving device, and data is output at a delay time conforming to these values. For details on EDID setting, refer to HDMI standard ("High-Definition Multimedia Interface Specification").

Delay time of video = 32 ms
Delay time of audio = 20 ms
on the receiver end



The VG-859C outputs the audio with a 12 ms delay.

Fig. 6.15.18 General description of EDID mode

● Limitations

- Audio output is valid only for internal audio (L-PCM) from the HDMI.
- Delay time settings that exceed the video ON/OFF time cannot be made.
- The Lip Sync function cannot be used while performing HDCP.

● Setting Items

The following settings are used for the Lip Sync pattern.

Table 6.15.17 Lip Sync function setting Items

Setting item	Description
Output pattern setting	Specify Option Pattern No.33 for the pattern. For information on selecting patterns, refer to “6.12 Setting the optional patterns.” The pattern to be displayed conforms to window pattern format 0 (1 window). For details on window pattern settings, refer to “6.11 Setting the window pattern.”
Output audio setting	Audio conforms the internal audio of the HDMI (AudioSrc setting set to ”INTERNAL” with L-PCM output). Data is not input when the setting is other than "INTERNAL”. For details on audio output settings, refer to “5.6 Setting the HDMI output”.
Lip Sync function settings	The following settings are made related to Lip Sync. (1) Lip Sync mode (2) ON/OFF time for the pattern and audio (3) Delay time setting for the video and audio

The setting locations related to the Lip Sync function are as shown below.

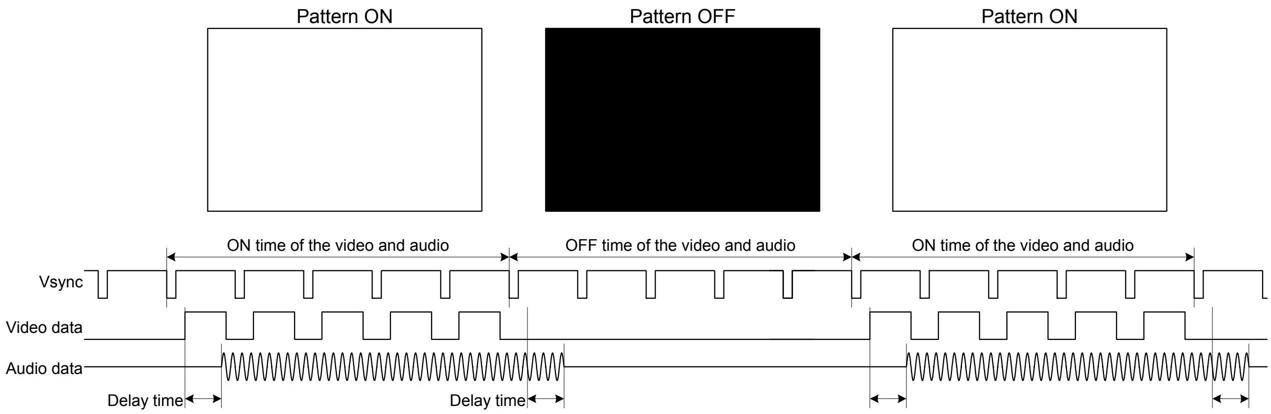


Fig. 6.15.19 Setting Lip Sync

[1] Setting Lip Sync mode

```
Lip Sync Mode
           DELAY (0/1)
```

Fig. 6.15.20 Setting Lip Sync mode

Table 6.15.18 Lip Sync mode setting method

Setting item	Key	LCD display	Description
Lip Sync mode	0	DELAY	Freely sets the delay time.
	1	EDID	Reads the EDID of the Sink device and makes settings according to that value.

[2] Setting the video/audio display time

```
Lip Sync ON/OFF time
 ON:   1 OFF:   1 (1-255V)
```

Fig. 6.15.21 Setting the video/audio display time for Lip Sync

Table 6.15.19 Video/audio display time for Lip Sync setting method

Setting item	Key	LCD display	Description	
ON time	Number keys	XXX	Display ON time for video/audio	Setting range: 0 to 255V
OFF time	Number keys	XXX	Display OFF time for video/audio	

*ON/OFF is repeated for output.
*V: Frame is used as the unit for progressive scans, and field is used for interlaced scans.

[3] Setting the delay time

This setting is valid only when “DELAY” is set for Lip Sync mode.

```
Lip Sync DELAY time
+   0ms   (+/-:0/1, 0-500)
```

Fig. 6.15.22 Setting the delay time for Lip Sync

Table 6.15.20 Delay time for Lip Sync setting method

Setting item		Key	LCD display	Description
Delay time	Sign	0	＋	Delays the audio
		1	－	Delays the video
	Time	Number keys	XXX	Video/audio delay time Setting range：-500 to +500[ms](2 ms increment)

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.

<table>
<tr>
<td>Monitor mode</td>
<td>
The CEC line commands can be monitored and displayed.

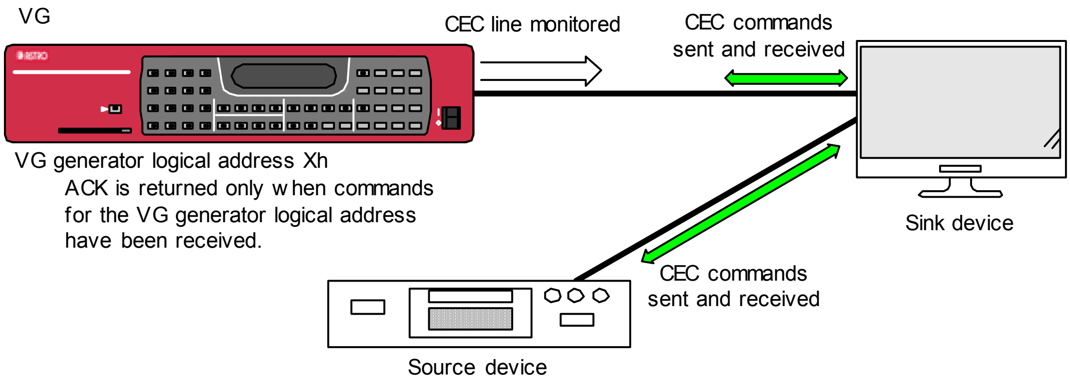


Illustration of the monitoring function
</td>
</tr>
<tr>
<td>Command transmission mode</td>
<td>
Commands can be sent to the specified device.

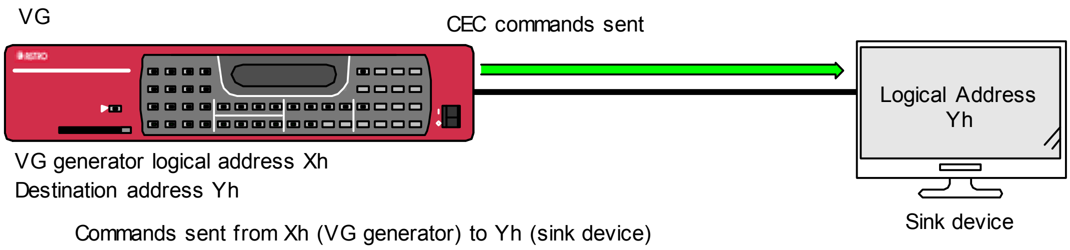


Illustration of command transmission
</td>
</tr>
<tr>
<td>Command response mode</td>
<td>
Data can returned in response to the commands received.

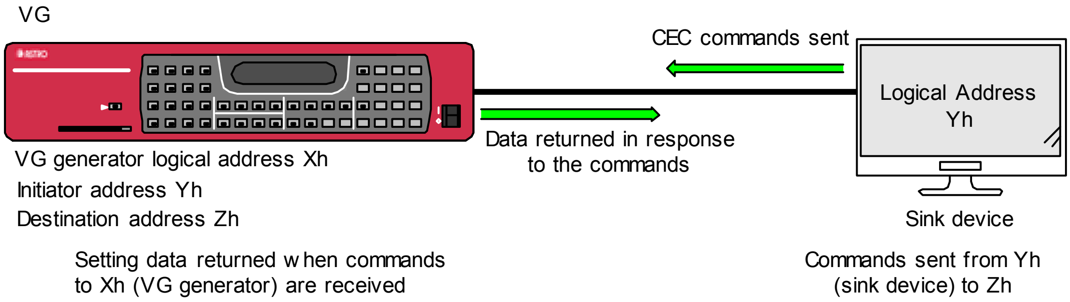


Illustration of command response
</td>
</tr>
</table>

● Execution procedure

The following operations are performed for the HDMI CEC function.

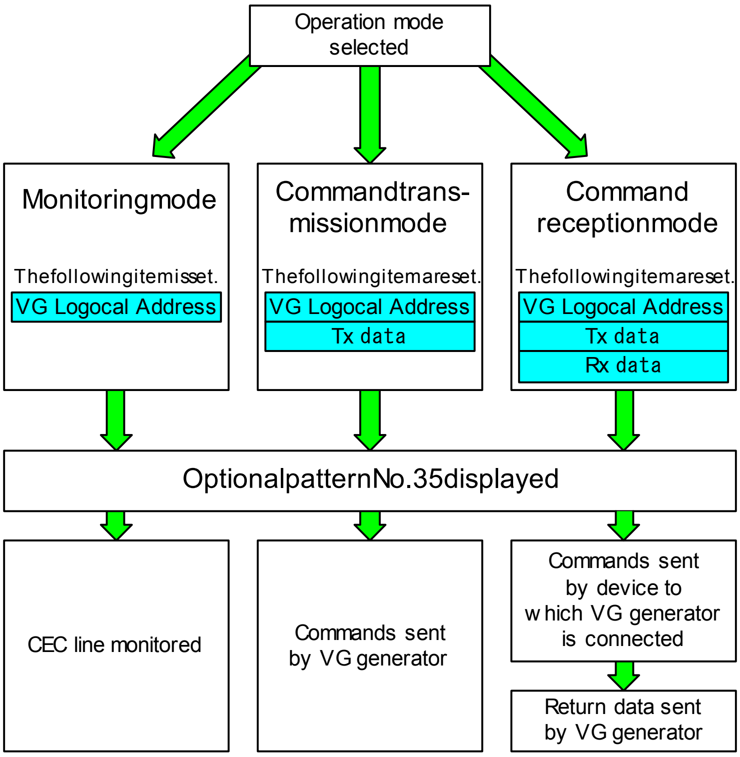


Fig. 6.16.1 CEC operation mode execution procedure

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.

6.17 DDC/CI function (❖optional function)

6.17.1 Overview

- The DDC/CI function is implemented using either DVI or Dsub output.
- The VG-859C allows you to check transmission/reception by setting any command (VCP CODE) supported by the VESA DDC/CI standard.

● What is DDC/CI?

DDC/CI (Display Data Channel Command Interface) is defined by VESA (Video Electronics Standards Association). It allows the display to be controlled through the transmission of control commands using the DDC line. Although standard DDC/2B, etc. are intended primarily for the purpose of reading display information (EDID), DDC/CI supports bi-directional communications and allows you to control the display. This makes it possible to change settings such as brightness by sending a command (VCP code) to the corresponding display.
For details on the DDC/CI function, refer to the “VESA (Video Electronics Standards Association) DDC/CI (Display Data Channel Command Interface)” standard.

6.17.2 Setting details

Set the following items to use DDC/CI.

Table 6.17.1 Setting Items for the DDC/CI Function

Setting item	Description
Output pattern setting	Specify Option Pattern No.3B for the pattern. For information on selecting patterns, refer to “6.12 Setting the optional patterns.”
DDC/CI function settings	Make the following settings related to DDC/CI. (1) Output destination (DVI or Dsub) (2) Transfer mode (command send or receive monitor status) (3) Transfer command and transfer data settings

[1] Setting the port and mode

```
DDC/CI Port   :DVI    (0/1)
         Mode :Get    (0/1)
```

Fig. 6.17.1 Setting the port and mode

Table 6.17.2 Port and mode setting method

Setting item	Key	LCD display	Description
Port	0	DVI	The DDC/CI function is executed from the DVI output.
	1	D-SUB	The DDC/CI function is executed from the D-sub output.
Mode	0	Get	Get VCP Feature Gets the status of the connected device.
	1	Set	Set VCP Feature Sends a control command to the connected device.

[2] Setting VCP codes and transfer parameters

```
DDC/CI VCP :10h   (00-FF)
   Value :      0  (0-65535)
```

Fig. 6.17.2 Setting VCP codes and transfer parameters

Table 6.17.3 VCP codes and transfer parameter setting method

Setting item	Key	LCD display	Description
VCP	Number keys	xx	Sets the transfer command (VCP code) Setting range：0 to FF
Value	Number keys	XXXXX	Sets the parameter value to be sent from the VG-859C to the connected device. Setting range：0 to 65535 (This setting is valid only when “Set VCP Feature” is selected in the Mode setting.)

6.17.3 Overview of DDC/CI pattern

The DDC/CI pattern (Option Pattern No.3B) is displayed as shown below.

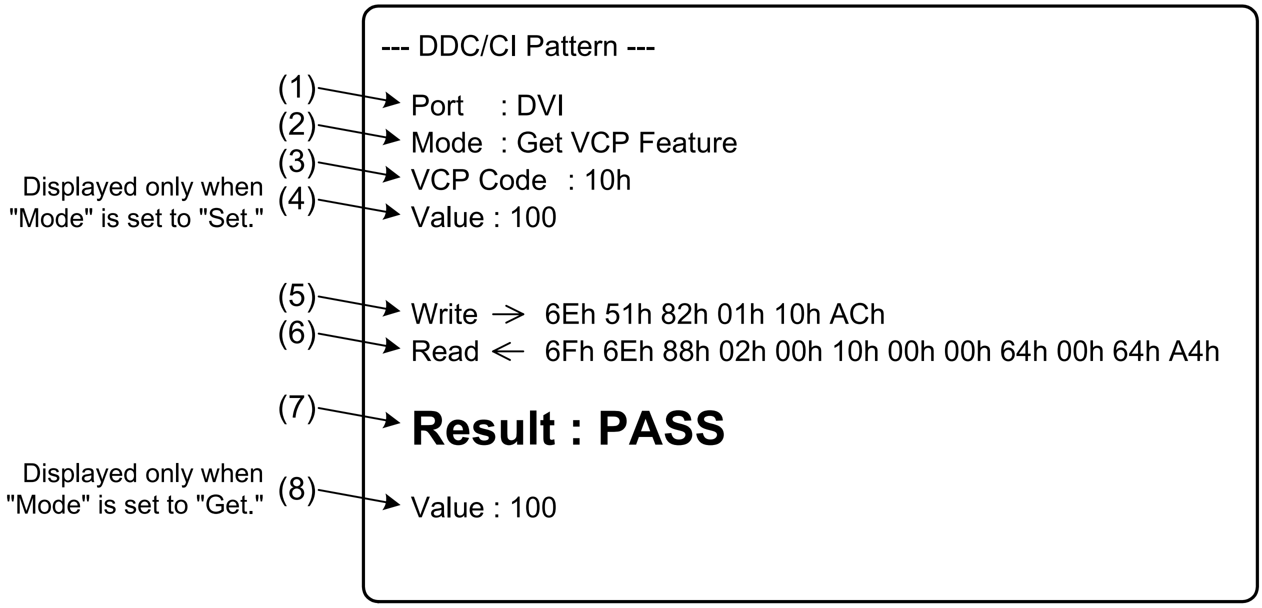


Fig. 6.17.3 DDC/CI pattern

Table 6.17.4 DDC/CI Pattern Display Items

No.	Display Contents		
1	Port	Output mode used for DDC/CI transfer DVI or Dsub	This item is set on the VG-859C.
2	Mode	DDC/CI transfer mode Get VCP Feature : Get status of connected device Set VCP Feature : Send control command to connected device	
3	VCP Code	Transfer command (set in Hex)	
4	Value	(Displayed only when "Mode" is set to “Set VCP Feature.”) Parameter value transferred from the VG-859C to the connected device	
5	Write	Data sent from the VG-859C	This item displays the result of transmission.
6	Read	Data received by the VG-859C	
7	Result	Transfer result PASS : Transfer ended normally NG : Transfer failed	
8	Value	(Displayed only when "Mode" is set to “Get VCP Feature.”) Parameter value received from the connected device by the VG-859C	

7 SELF-CHECK

7.1 Concerning the self-check

The VG-859C has a function (self-check function) that makes it possible to determine whether the hardware devices are functioning properly.

CAUTION | 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-859C 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-859 Self Check Mode ROM Version : x.xx
		Hardware	BOARD REV: xxxxxxxxh BOARD TYPE: xxxxxxxxh
		HDMI output	HDMI: xx.xx
(2)	Support for optional functions *1	With or without support for optional functions	CC&T&Vchip :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-859C.	p.238
PC card check	For checking the PC card.	p.239
RS-232C check	For checking the RS-232C loopback.	p.240
Flash ROM check	For checking the internal flash ROM.	p.241
Flash ROM initialization	For initializing the internal flash ROM.	p.242

* 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 UnFormated
```

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.

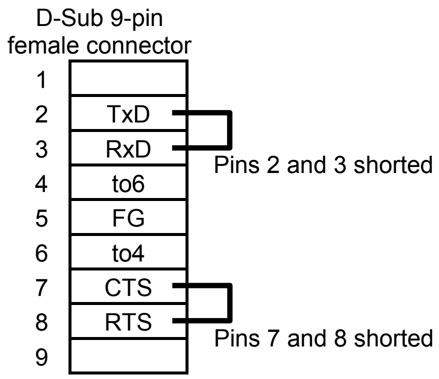


Fig. 7.4.1 Connector

(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
```

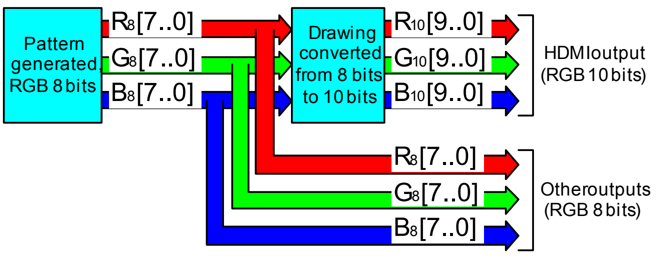
Fig. 7.6.3 Initialization completed

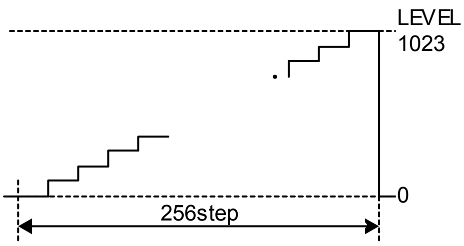
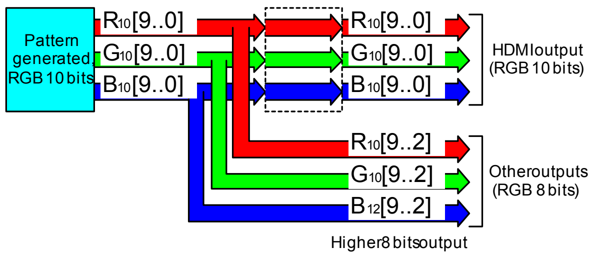
8 MULTI-BIT MODE (❖OPTION)

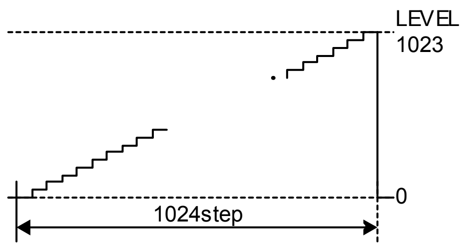
8.1 General description

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 [33] Setting the HDMI output bit mode (❖optional function).”)

<table>
<tr><th>8 bits (standard mode)</th><th>MULTI BIT (Multi-bit mode)</th></tr>
<tr><td>Patterns drawn with 8 bits are converted into the output gray scale, and output.
The number of colors generated simultaneously is 256 x RGB with 12 bits as well.</td><td>Patterns corresponding to the output gray scale are generated, and output.
The number of colors generated simultaneously is 4096 x RGB with 12 bits as well.</td></tr>
<tr><td>Example of video format RGB 30-bit output


For a ramp output

</td><td>Example of video format RGB 30-bit output


For a ramp output

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

CAUTION

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_8	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_10	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_12	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_8	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_10	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_12	4096 colors each for R, G and B (approx. 68.7 billion colors)	12bit×3 (36bit)	25 to 165MHz		

CAUTION

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.187				
FUNC2 FUNC3 Pattern data	Background color level	p.187				
	Gray scale pattern level	p.198				
	Window pattern level	p.201				
	Cursor pattern Cursor color Background color	p.209				
Bitmap pattern support		-	24bit	24bit	30bit	36bit

8.2.2 Changes in timing settings

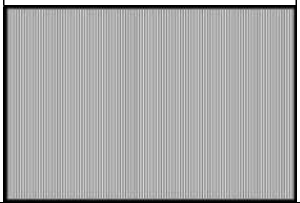
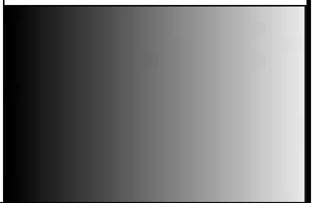
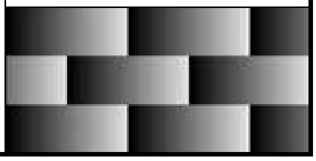
In the multi-bit mode, the timing-related settings are as listed below depending on the video format.

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	μs / 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)			

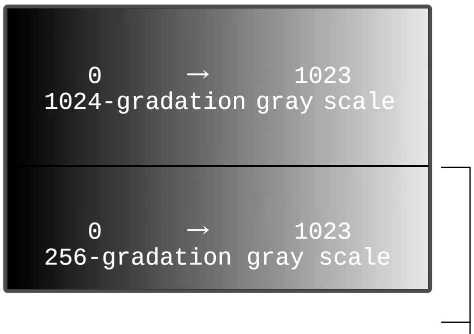
8.2.3 Changing the internal patterns

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]
			

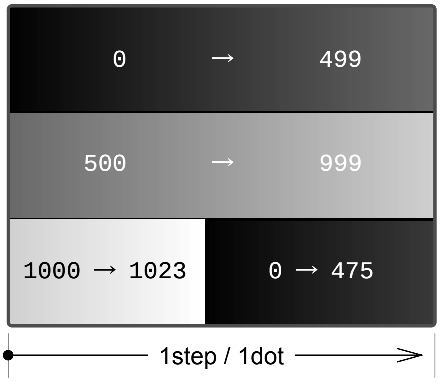
The changes are described using the RGB 10-bit output as the video format.

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 applies 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

<table>
<tr><th colspan="2">Item</th><th>Setting range/restriction</th></tr>
<tr><td rowspan="2">Output</td><td>Analog outputs
(BNC,Dsub,D5,DVI-A)</td><td>The maximum frequency of analog outputs is 165 MHz.
Composite output timing data (such as NTSC data; refer to “11.4 Standard signal timing signal specificataions”) cannot be output.</td></tr>
<tr><td>VBS output</td><td>The VBS output is always OFF.</td></tr>
</table>

9 Concerning the xvYCC FEATURES

9.1 Overview

The VG-859C allows patterns that support xvYCC to be set using HDMI output.

● **What is xvYCC?**

* Maintaining the color range specified by conventional RGB, xvYCC (Extended YCC Colorimetry for Video Applications) allows for a greater range of color reproduction by providing a broader color space. This allows the reproduction of colors that cannot be expressed using conventional RGB (values that would be negative or exceed one if represented using RGB).

9.2 Output Method for xvYCC Patterns

Make the settings given below to express xvYCC patterns.

CAUTION

The setting made here is an example setting that displays a color space that cannot be expressed using conventional RGB.
Refer to this sample and edit as necessary according to your application.

Table 9.2.1 Setting Example for xvYCC Pattern Output

Setting item		Description
HDMI setting	VideoFormat	When using the RGB setting You can create patterns using the Y value for G, the Cb value for B, and the Cr value for R. When using the Y444 or Y422 setting The conventional RGB setting is converted into color differences and output.
	Level mode (Limited Mode)	Set to “Full Range”. Making this setting allows values that exceed the Limited Range to be expressed. For information on the level mode, refer to “[2] Setting the video level” in “5.6 Setting the HDMI output.”
AVI InfoFrame setting	Color difference setting (RGB or YCbCr)	Set to Y444 or Y422. For information on the color difference setting, refer to “5.7 Setting InfoFrame.”
	ColoriMetry	Set to Extended (Extended ColoriMetry Infomation Valid) For information on the ColoriMetry setting, refer to “5.7 Setting InfoFrame.”
Gamut Meta Data Packet setting		Freely set any Gamut Meta Data Packet. For information on the Gamut Meta Data Packet, refer to “5.12 Setting Gamut Meta Data Packet.” and HDMI standard ("High-Definition Multimedia Interface Specification").

9.3 xvYCC Evaluation Patterns

With the VG-859C, you can prepare the following three patterns (Option Nos. 0A, 0B, and 0C) for use as xvYCC evaluation patterns.

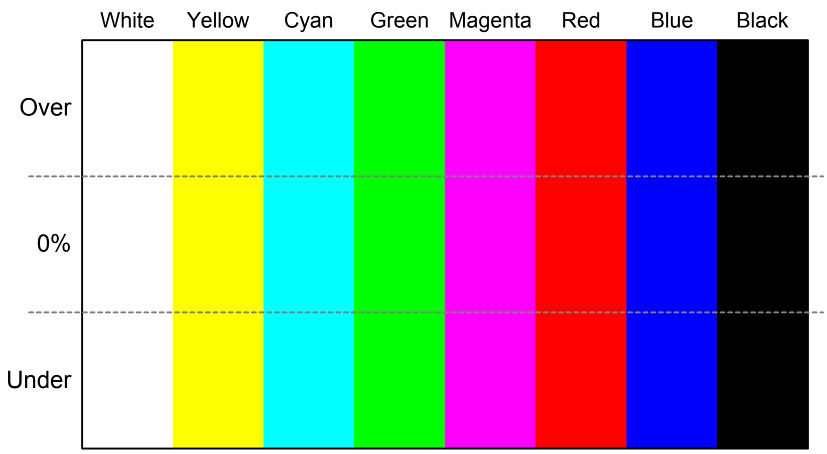


Fig. 9.3.1 xvYCC evaluation patterns

CAUTION

Be sure to make the following settings;

- Set "VideoFormat" in the HDMI setting to "RGB."
- Set "Level mode" in the HDMI setting to "Full Range."

* xvYYC evaluation patterns are prepared for evaluation of TVs supporting xvYYC. The patterns are not displayed correctly on the TVs that do not support xvYYC.

Each value of the xvYCC evaluation pattern is as given below.

Check color reproduction by comparing the color bar of a different level with the standard 100% color bar (when in Limited Mode) given in the middle.

Table 9-3-1 General description of the xvYCC pattern

Setting item		Description
No.0A	Over	4% over standard color bar
	Standard	100% color bar across Limited Range
	Under	4% under standard color bar
No.0B	Over	8% over standard color bar
	Standard	100% color bar across Limited Range
	Under	8% under standard color bar
No.0C	Over	12% over standard color bar
	Standard	100% color bar across Limited Range
	Under	12% under standard color bar

Table 9.3.2 Values for the xvYCC evaluation pattern

Pattern No.			Level values (ITU709)							
			White	Yellow	Cyan	Green	Magenta	Red	Blue	Black
No.0A (4%)	Over	Y	241	227	195	179	81	64	32	16
		Cb	128	12	155	38	218	101	244	128
		Cr	128	139	12	22	234	244	117	128
	Standard	Y	235	219	188	173	78	63	32	16
		Cb	128	16	154	42	214	102	240	128
		Cr	128	138	16	26	230	240	118	128
	Under	Y	235	219	187	170	72	56	24	11
		Cb	128	12	155	38	218	244	244	128
		Cr	128	139	12	22	234	117	117	128
No.0B (8%)	Over	Y	247	235	202	185	83	66	32	16
		Cb	128	7	156	38	221	100	249	128
		Cr	128	139	7	18	238	249	117	128
	Standard	Y	235	219	188	173	78	63	32	16
		Cb	128	16	154	42	214	102	240	128
		Cr	128	138	16	26	230	240	118	128
	Under	Y	235	218	185	168	66	49	16	6
		Cb	128	7	156	35	221	100	249	128
		Cr	128	139	7	18	238	249	117	128
No.0C (12%)	Over	Y	253	244	209	191	86	68	34	16
		Cb	128	3	157	31	225	99	253	128
		Cr	128	139	3	14	242	253	117	128
	Standard	Y	235	219	188	173	78	63	32	16
		Cb	128	16	154	42	214	102	240	128
		Cr	128	138	16	26	230	240	118	128
	Under	Y	235	217	183	165	60	42	7	1
		Cb	128	3	157	31	225	99	253	128
		Cr	128	139	3	14	242	253	117	128

* The above values are for 8-bit output. For 10-bit and 12-bit output, corresponding values must be used.

10 REMOTE CONTROL

By connecting the RB-614C or RB-649 remote control box, the VG-859C 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 “10.4.1 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**

10.1 RB-614C/RB-649

10.1.1 Key layout diagrams

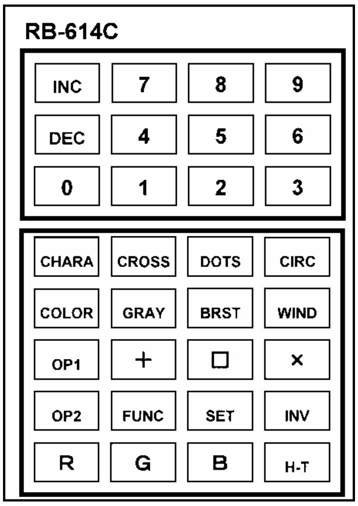


Fig. 10.1.1 RB-614C

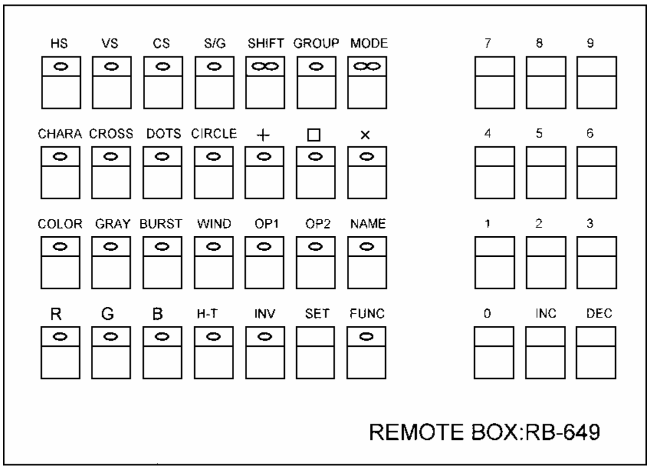


Fig. 10.1.2 RB-649

10.1.2 Connections

Connect the connecting cable of the RB-614C or RB-649 to the remote connector on the rear panel of the VG-859C.

10.1.3 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-859C/RB-1848 keys.

Table 10.1.1 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” 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.

11 REFERENCE

This chapter contains information on the following subjects.

11.1 Internal data

11.1.1 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/priority output port” in 5.4 Setting the output conditions) 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
* (xvYCC) : Programs which xvYYC is set.

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PG1 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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 (VESA specifications 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	70.053	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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 8, Flicker 7)	Moving Window 1
900	107.422	80.046	220.000	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80A	Window (Format 9, Flicker 7)	Moving Window 2
901	106.481	80.061	230.000	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80B	Window (Format E, Flicker 7)	Moving Window 3
902	106.402	80.001	238.340	1600×1280	Prog	N	N	ANALOG	RGB	UXGA1280-80C	Window (Format F, 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

PG1 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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 Indigo1024-70	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 9000t1	OPT21 (crosstalk width 60%)	Cross Talk 60%
935	78.125	72.005	135.000	1280×1024	Prog	N	N	ANALOG	RGB	HP 9000t2	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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 (Format 0, Flicker 0, 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 (Format 0, Flicker 0, 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	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

PG1 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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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	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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
850	31.469	59.940	25.175	640×480	Prog	N	N	ANALOG	RGB	EIA640×480p@59.94	OPT13 (gamma correction ramp wr=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 wr=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

PG2 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	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	EIA1920×1080i@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	EIA1440×576i@50	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
895	15.625	50.000	27.000	1440×576 *R	Int	N	N	ANALOG	RGB	EIA1440×576iW@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	EIA2880×576i@50	OPT26 (SMPTE color version)	SMPTE RP133 COL
903	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	RGB	EIA2880×576iW@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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 (SMPTE color version)	SMPTE 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 (SMPTE RP-133)	SMPTE 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

PG2 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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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 1152i(*p0)	4-step gray scale	Gray 4 step
945	31.250	50.000	72.000	1920×1080	Int	P	N	BI 1250	YPbPr	AUS 1080i(*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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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, Flicker 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	193.250	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	SMPTE295Mi(*p0)	90% window	90% Window
999	62.500	50.000	148.500	1920×1080	Prog	N	N	TRI-1250	YPbPr	SMPTE295Mp(*p0)	100% window	100% Window

PG3 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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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	EIA1920×1080i@59.94	OPT27 (HDMI speaker check)	Audio Select
859	33.750	60.000	74.250	1920×1080	Int	P	P	ANALOG	YC444*pH	EIA1920×1080i@60	OPT35 (HDMI CEC pattern)	CEC Monitor
860	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	YC444*pS	EIA1440×480i@59.94	OPT1F (AFD pattern)	AFD Pattern
861	15.751	60.002	27.028	1440×480 *R	Int	N	N	ANALOG	YC444*pS	EIA1440×480i@60	256-step gray scale	Gray 256 step
862	15.734	59.940	27.000	1440×480 *R	Int	N	N	ANALOG	YC444*pS	EIA1440×480iW@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	EIA1440×480iW@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	EIA2880×480i@59.94	OPT38 (H ramp scroll)	Ramp scroll (H)
873	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	YC444*pS	EIA2880×480i@60	OPT39 (V ramp scroll)	Ramp scroll (V)
874	15.734	59.940	54.000	2880×480	Int	N	N	ANALOG	YC444*pS	EIA2880×480iW@59.94	OPT3A (Diagonal ramp scroll)	Ramp scroll (Diagonal)
875	15.750	60.000	54.054	2880×480	Int	N	N	ANALOG	YC444*pS	EIA2880×480iW@60	OPT13 (gamma correction ramp wr=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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
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	EIA1920×1080i@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	EIA1440×576i@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	EIA1440×576iW@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	EIA2880×576i@50	Circle (Format 2)	Circle 3
903	15.625	50.000	54.000	2880×576	Int	N	N	ANALOG	YC444*pS	EIA2880×576iW@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

PG3 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	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 H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
940	31.500	120.000	54.054	1440×480*R	Int	N	N	ANALOG	YC444*pS	EIA1440×480i@120	100% window (white 3%)	Window (7, 7, 7)
941	31.469	119.880	54.000	1440×480*R	Int	N	N	ANALOG	YC444*pS	EIA1440×480iW@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	EIA1440×480iW@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	EIA720×576pW@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	EIA1440×576i@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	EIA1440×576iW@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	1dot 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	EIA1440×480i@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	EIA1440×480i@240	OPT0C (character edge O)	O Character Line
953	62.937	239.760	108.000	1440×480*R	Int	N	N	ANALOG	YC444*pS	EIA1440×480iW@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	EIA1440×480iW@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	44.955	59.939	74.175	1280x720	Prog	P	P	ANALOG	(xvYCC)*	EIA1280x720p@59.94	OPT0A (xvYCC pattern (1))	+/-4% Color Bar
961	45.000	60.000	74.250	1280x720	Prog	P	P	ANALOG	(xvYCC)*	EIA1280x720p@60	OPT0B (xvYCC pattern (2))	+/-8% Color Bar
962	37.500	50.000	74.250	1280x720	Prog	P	P	ANALOG	(xvYCC)*	EIA1280x720p@50	OPT0C (xvYCC pattern (3))	+/-12% Color Bar
963	33.716	59.939	74.175	1920x1080	Int	P	P	ANALOG	(xvYCC)*	EIA1920x1080i@59.94	OPT0A (xvYCC pattern (1))	+/-4% Color Bar
964	33.750	60.000	74.250	1920x1080	Int	P	P	ANALOG	(xvYCC)*	EIA1920x1080i@60	OPT0B (xvYCC pattern (2))	+/-8% Color Bar
965	28.125	50.000	74.250	1920x1080	Int	P	P	ANALOG	(xvYCC)*	EIA1920x1080i@50	OPT0C (xvYCC pattern (3))	+/-12% Color Bar
966	67.432	59.939	148.350	1920x1080	Prog	P	P	ANALOG	(xvYCC)*	EIA1920x1080p@59.94	OPT0A (xvYCC pattern (1))	+/-4% Color Bar
967	67.500	60.000	148.500	1920x1080	Prog	P	P	ANALOG	(xvYCC)*	EIA1920x1080p@60	OPT0B (xvYCC pattern (2))	+/-8% Color Bar
968	56.250	50.000	148.500	1920x1080	Prog	P	P	ANALOG	(xvYCC)*	EIA1920x1080p@50	OPT0C (xvYCC pattern (3))	+/-12% Color Bar
969											OPT19 (ITC pattern crosshatch & marker)	ITC Cross & Marker

PG3 program No.970-999

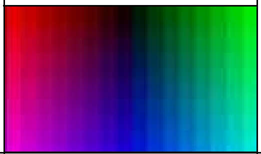
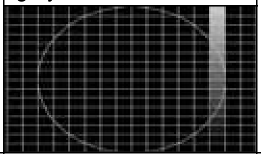
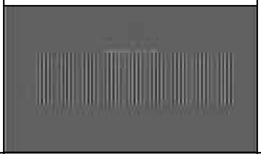
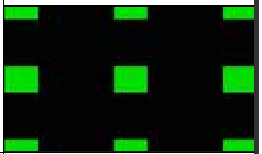
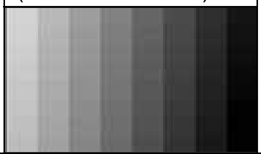
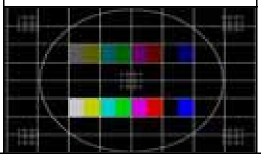
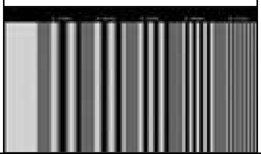
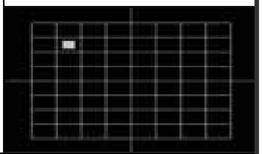
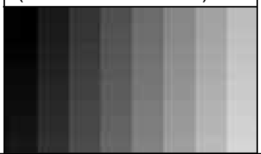
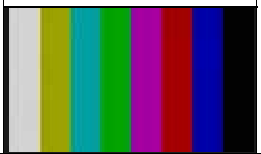
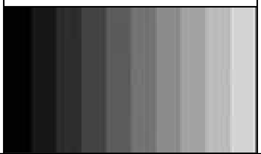
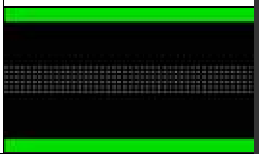
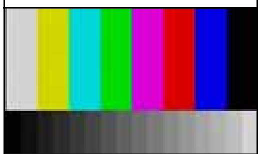
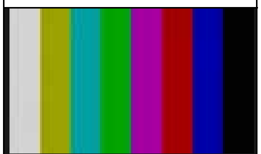
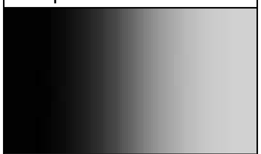
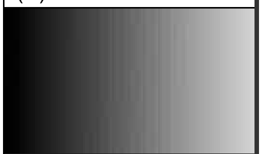
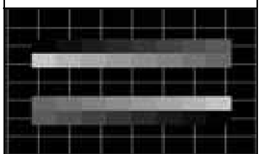
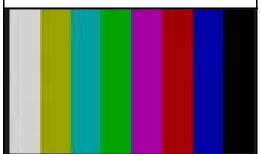
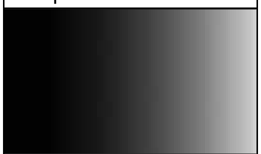
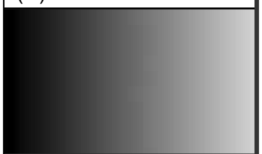
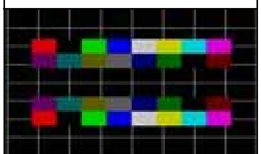
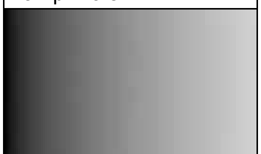
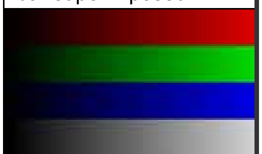
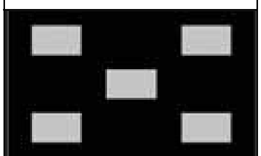
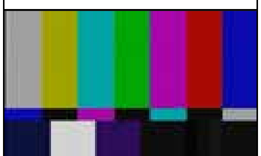
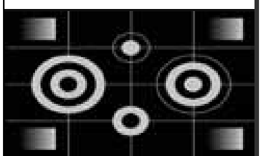
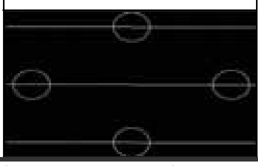
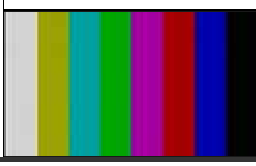
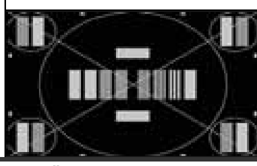
Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity H	Sync polarity V	Sync Type	Color difference	Timing data name	Pattern data	Pattern data name
970											OPT1A (ITC pattern H character)	ITC H Character
971											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 (19×15 crosshatch & marker)	D.Y.Test
980	15.734	59.940	13.500	712×484	Int	N	N	NTSC	YpbPr*p3	NTSC	OPT34 (circle & crosshatch)	Circle & Cross
981	25.625	50.000	13.500	702×574	Int	N	N	PAL	YPbPr*p2	PAL	OPT3C (ANSI pattern contrast)	ANSI Pattern (C)
982	25.625	50.000	13.500	702×574	Int	N	N	SECAM	YPbPr*p2	SECAM	OPT3D (ANSI pattern 9Point)	ANSI Pattern (9)
983	67.433	59.940	148.352	1980×1080	Prog	P	P	TR1080	YPbPr*p0	1920×1080@59.94p	OPT3E (ANSI pattern Hor Reso)	ANSI Pattern (H)
984	56.250	50.000	148.500	1980×1080	Prog	P	P	TR1080	YpbPr*p0	1920×1080@50p	OPT3F (ANSI pattern Ver Reso)	ANSI Pattern (V)
985	33.716	59.940	74.176	1920×1080	Int	P	P	TR1080	YPbPr*p0	1920×1080@59.94i	OPT17 (SMPTE RP27.1)	SMPTE RP27.1
986	28.125	50.000	74.250	1920×1080	Int	P	P	TR1080	YPbPr*p0	1920×1080@50i	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO.
987	44.955	59.940	74.176	1280×720	Prog	P	P	TR720	YPbPr*p0	1280×720@59.94p	OPT26 (SMPTE color version)	SMPTE RP133 COL
988	37.500	50.000	74.250	1280×720	Prog	P	P	TR720	YPbPr*p0	1280×720@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

CAUTION

PG3 No.960 to 968 are evaluation patterns for xvYYC. The patterns are not displayed correctly on the TVs that do not support xvYYC.

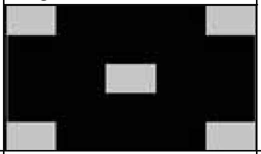
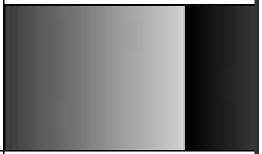
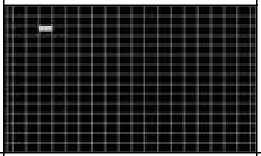
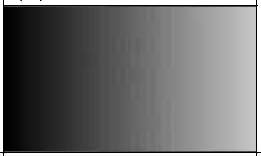
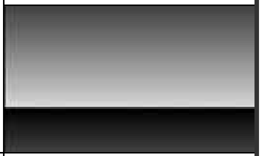
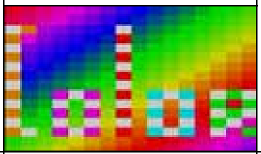
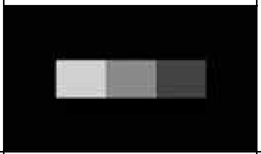
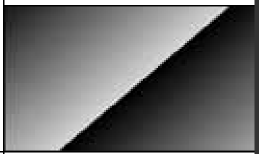
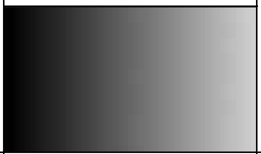
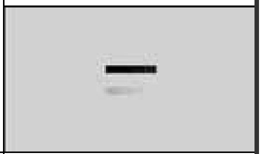
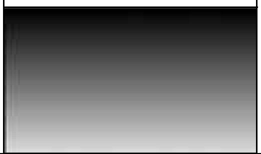
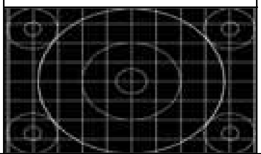
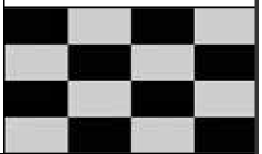
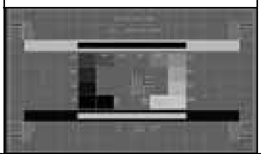
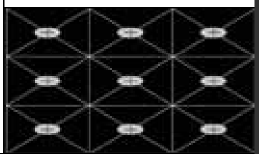
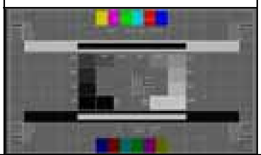
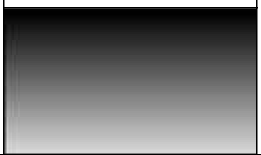
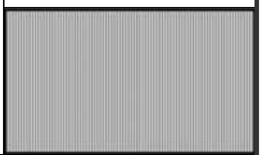
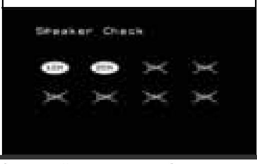
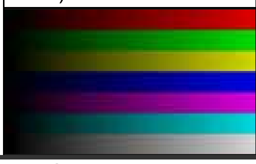
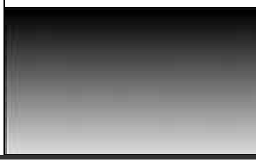
11.1.2 Optional pattern data

■ 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	xvYCC pattern (1) 	12	10 steps & 1/10 MHz 	1A	ITC pattern H character 
03	8 color bars & 16 gray scale 	0B	xvYCC pattern (2) 	13	Gamma correction ramp wr=2.5 	1B	32-gradation gray scale (H) 
04	Gray scale & crosshatch 	0C	xvYCC pattern (3) 	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 “11.1.2.2 Concerning the DDC patterns (No.0E, 22, 23, 2E)”
*2: Refer to “11.1.2.3 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**	Lipsync pattern 	**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 

*1: Refer to “11.1.2.2 Concerning the DDC patterns(No.0E,22,23,2E.
*2: Refer to “11.1.2.4 Concerning the HDMI speaker check(No.27).”
*3: Refer to “11.1.2.6 Concerning the HDMI CEC pattern (No.35).”

11.1.2.1 Concerning the xvYCC evaluation patterns (Nos. 0A,0B,0C)

Option pattern Nos. 0A, 0B, 0C are xvYCC evaluation patterns. For details, refer to “9 Concerning the xvYCC.”

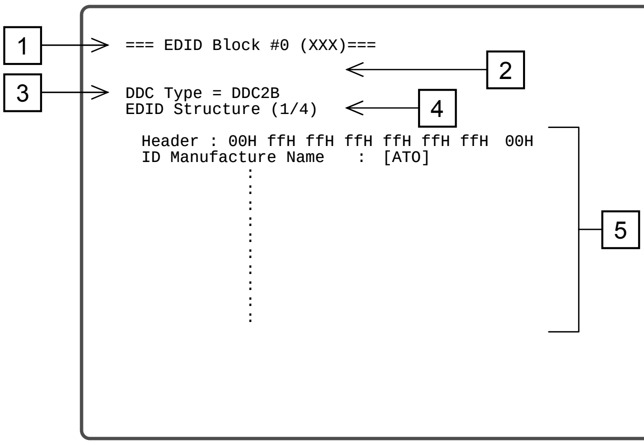
11.1.2.2 Concerning the DDC patterns (No.0E, 22, 23, 2E)

When a DDC pattern is executed, the EDID is obtained from the receiver (such as a display) connected to the VG-859C, 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 [9] 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.

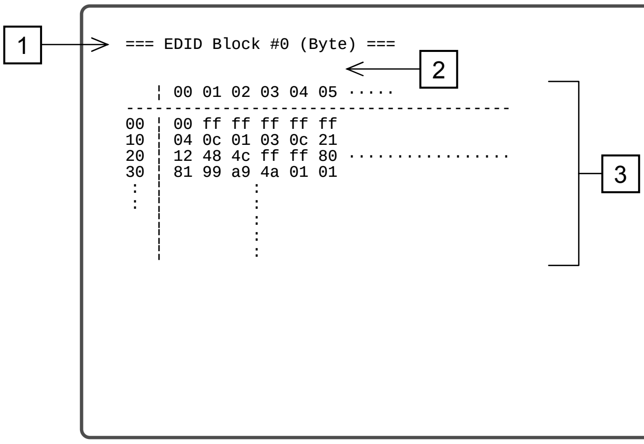
● **GUI display of EDID (optional pattern No.0E, 22, 23)**



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.

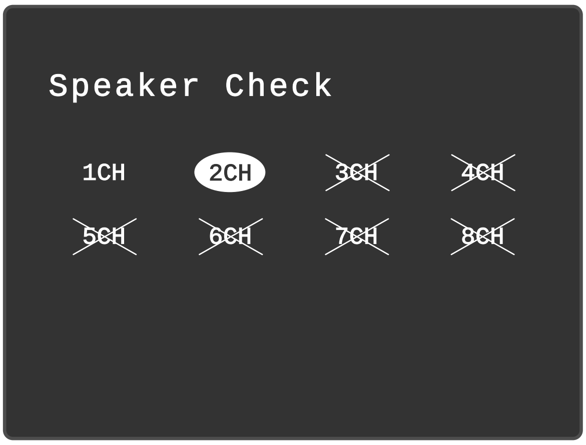
* If it is not possible to obtain the EDID because the receiver was not connected to the specified port or for some other reason, the above displays do not appear, and “EDID Read Error” is indicated at the top left of the display instead.

11.1.2.3 Concerning the AFD pattern (No.1F)

Optional pattern No.1F is the AFD pattern for evaluating the aspect ratio of the EIA/CEA-861 standard. Switching between the various AFD patterns is possible using the [►] and [◄] keys. For details, refer to "Concerning the AFD patterns for evaluating the aspect ratio" in 5.4 Setting the output condition data.

11.1.2.4 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.

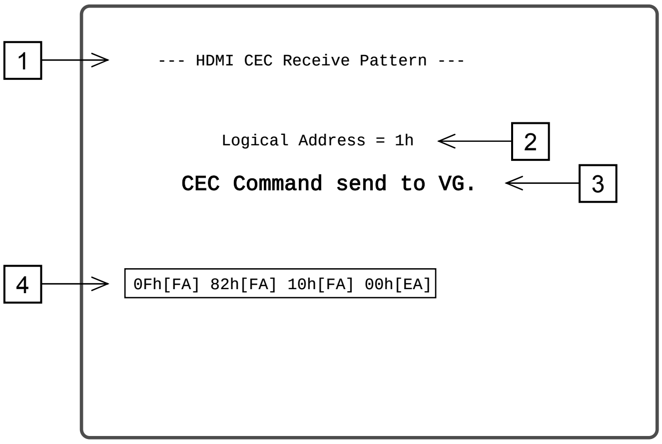
11.1.2.5 Concerning the Lipsync pattern (No.33)

Option pattern No.33 is a Lip Sync pattern.

For details on the Lip Sync function, refer to "6.15.6 Lip Sync function"

11.1.2.6 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-859C 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-859C. (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. **XXh [FA] XXh [FA] XXh [FA] XXh [EA]** Acknowledge A: Acknowledged (the VG-859C responds) N: Not acknowledged (a command other than a command for the logical address set has been received) End of Message E: End of message F: No end of message Command received “TX” is a command sent by the VG-859C; “RX’ is a command received by the VG-859C. * Commands which are sent to the destination address of FH are deemed to be broadcast messages and displayed as acknowledged.

11.1.2.7 Concerning the DDC/CI pattern (No.3B)

Option pattern No.3B changes to the DDC/CI pattern by the optional support.

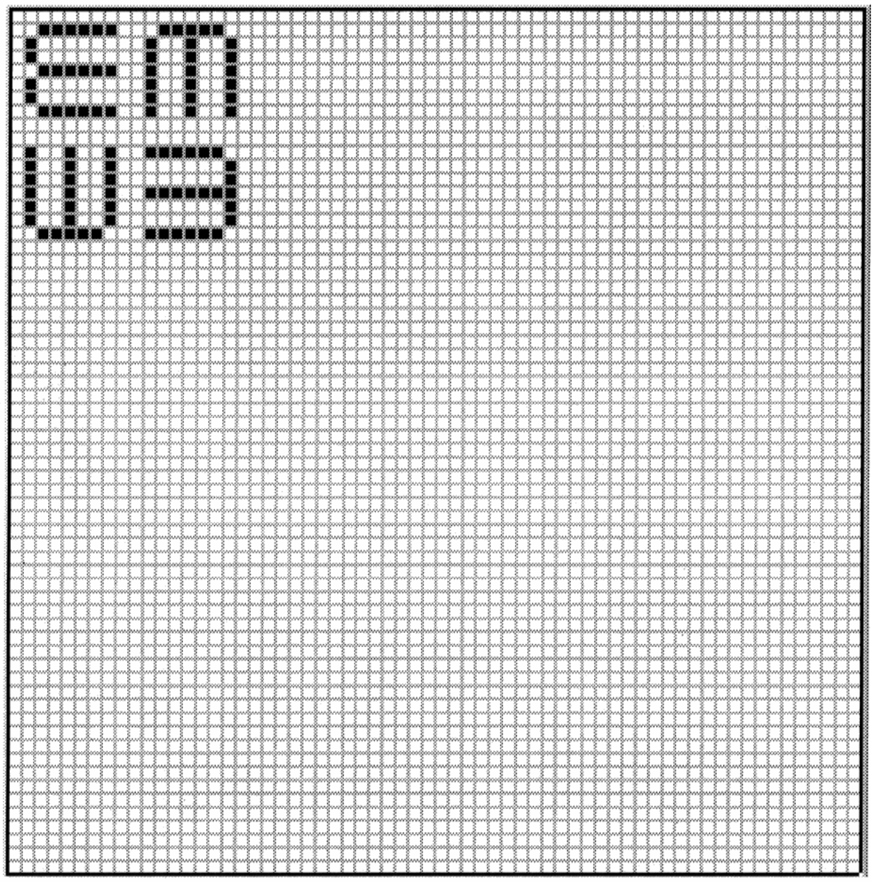
For details, refer to “6.17 DDC/CI function (❖optional function).”

11.1.3 User character pattern data

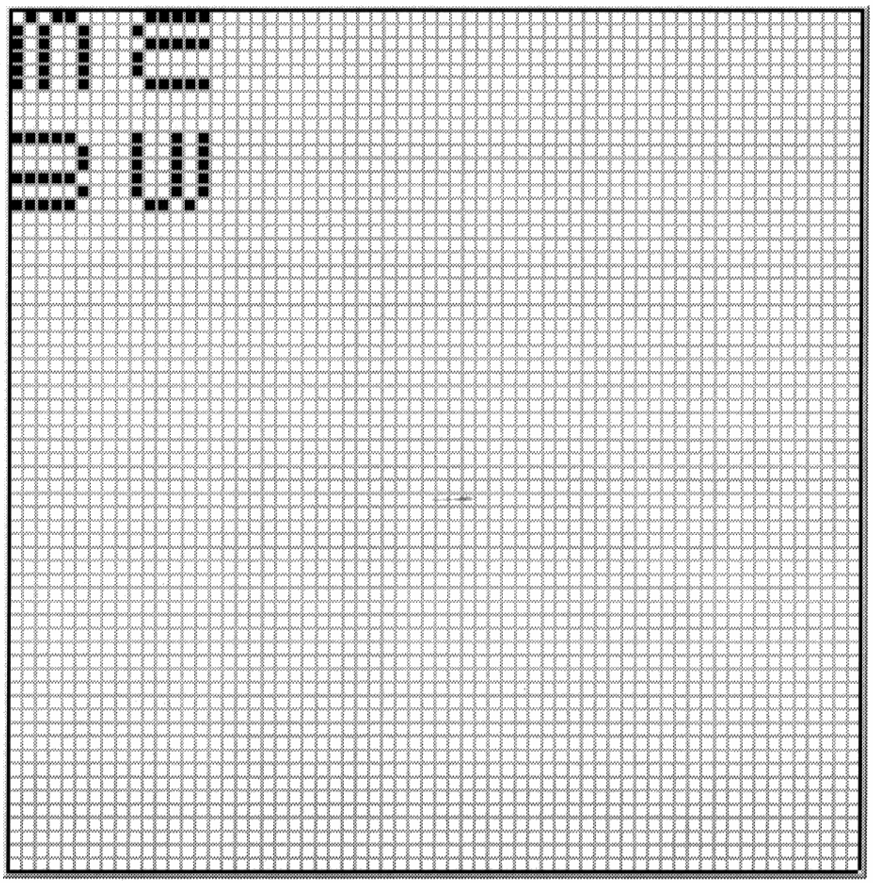
Code (H)	Description	Cell size	Reference page
F0	Letters “me” #1	18 × 18	p.280
F1	Letters “me” #2 (VESA specifications)	18 × 18	p.280
F2	Chinese character "AI"	64 × 64	p.281
F3	Chinese character "BI"	64 × 64	p.281
F4	Chinese character "TAKA"	32 × 32	p.282
F5	Chinese character "KIRI"	32 × 32	p.282
F6	Chinese character "KEN"	32 × 32	p.283
F7	Burst	64 × 64	p.283
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

■ F0H [letters “me” #1]/F1H [letters “me” #2 (VESA specifications)]

F0H

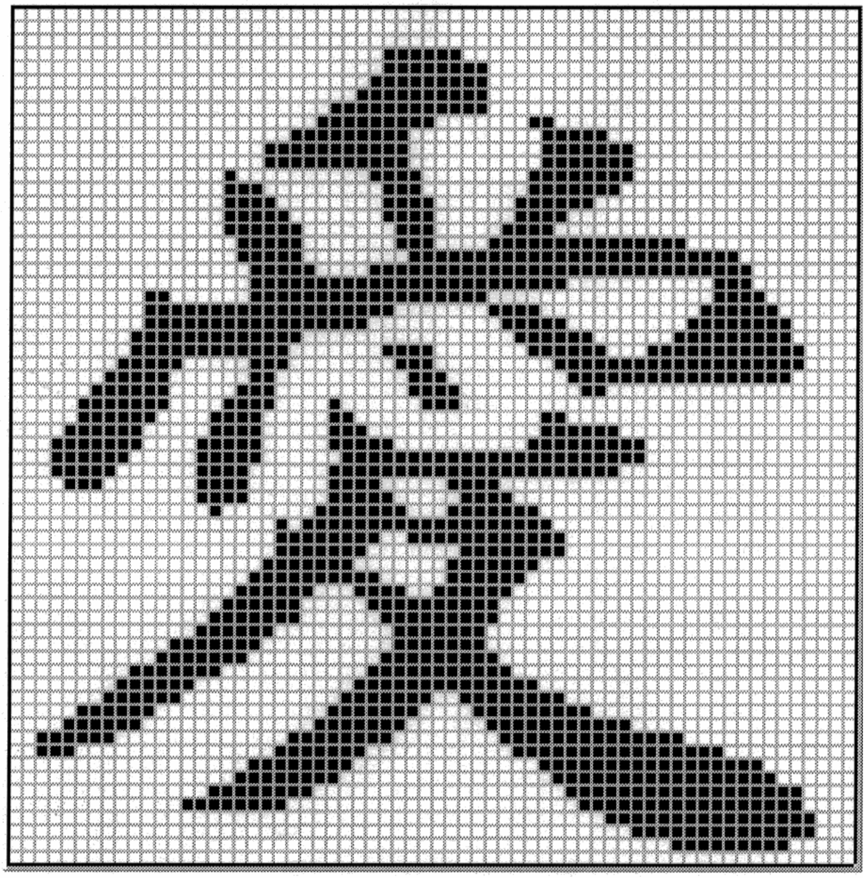


F1H

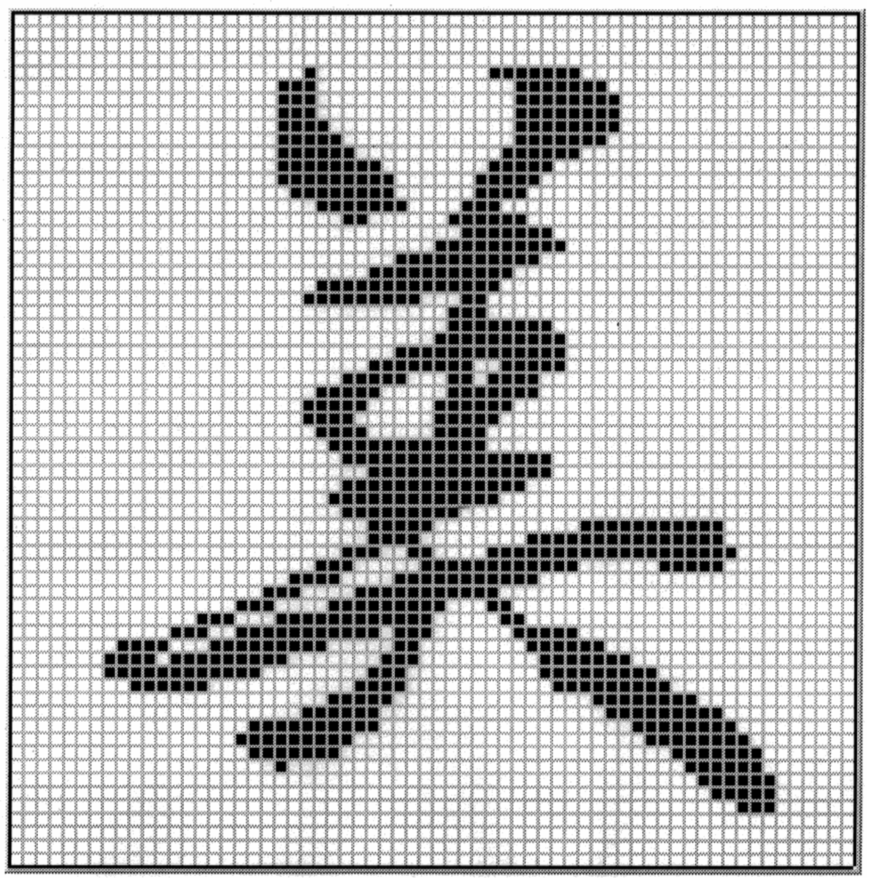


■ F2H [Chinese character "AI"]/F3H [Chinese character "BI"]

F2H

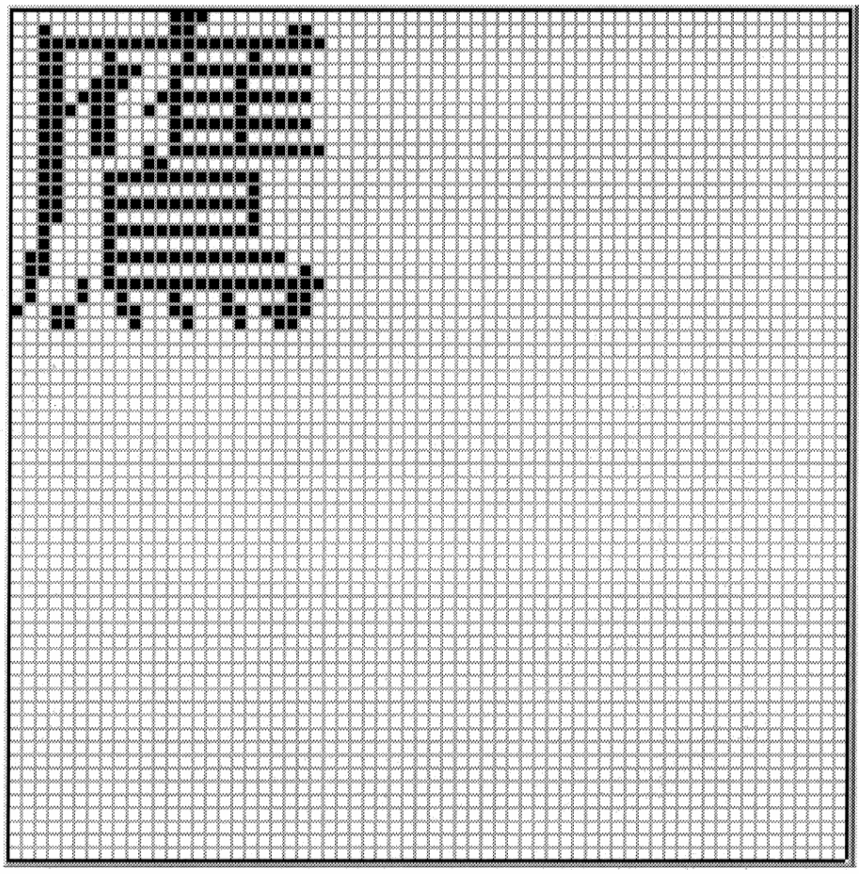


F3H

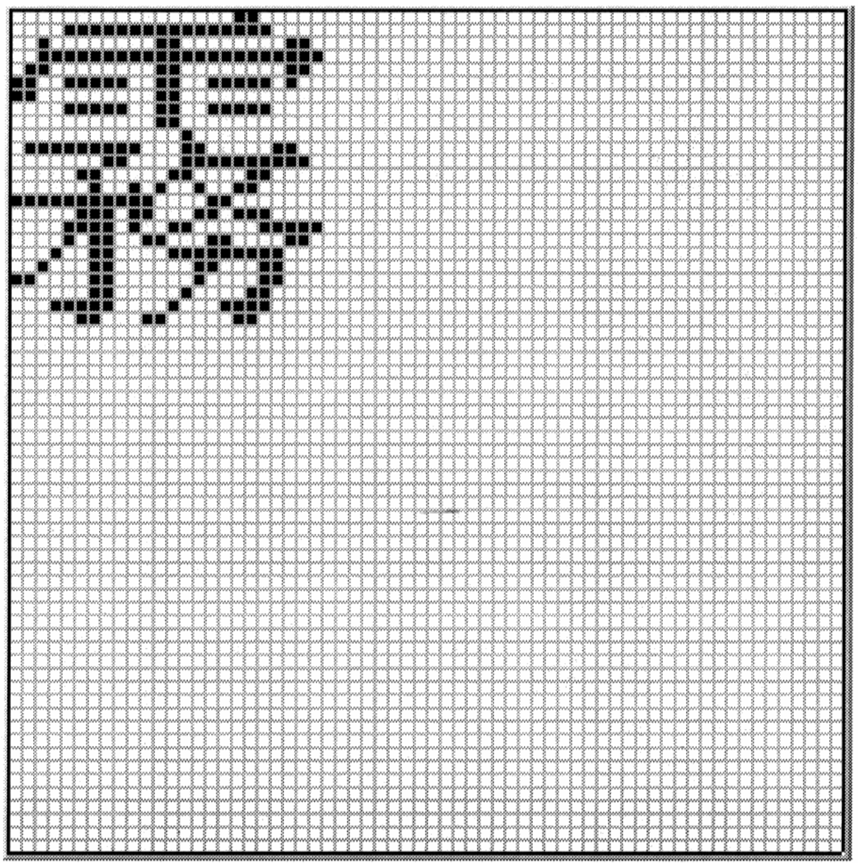


■ F4H [Chinese character "TAKA"]/F5H [Chinese character "KIRI"]

F4H

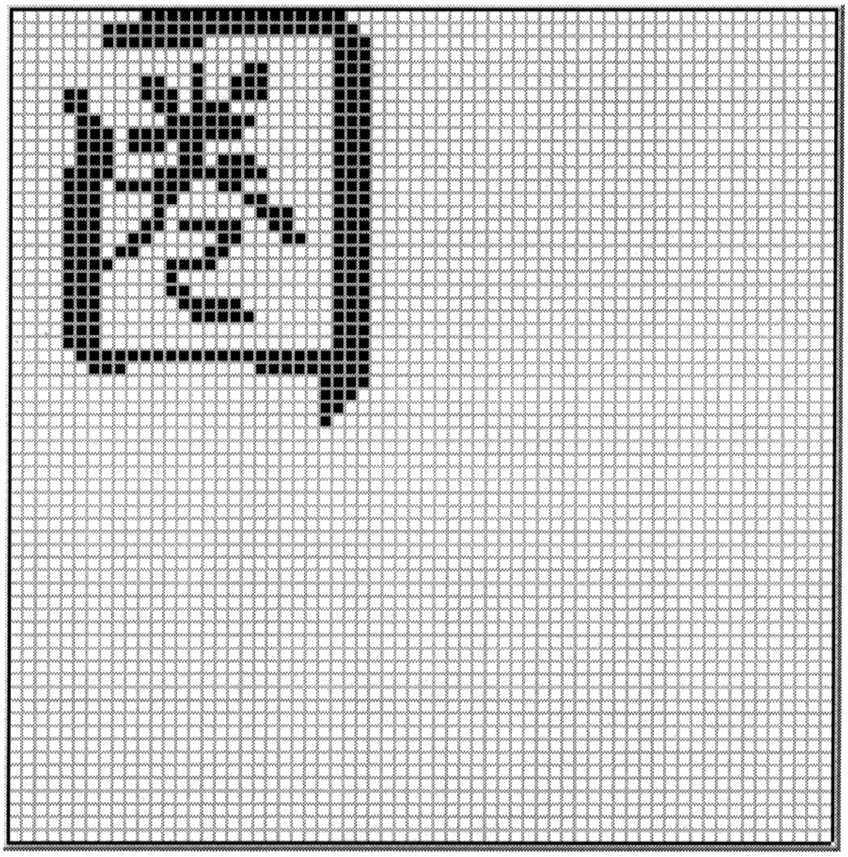


F5H

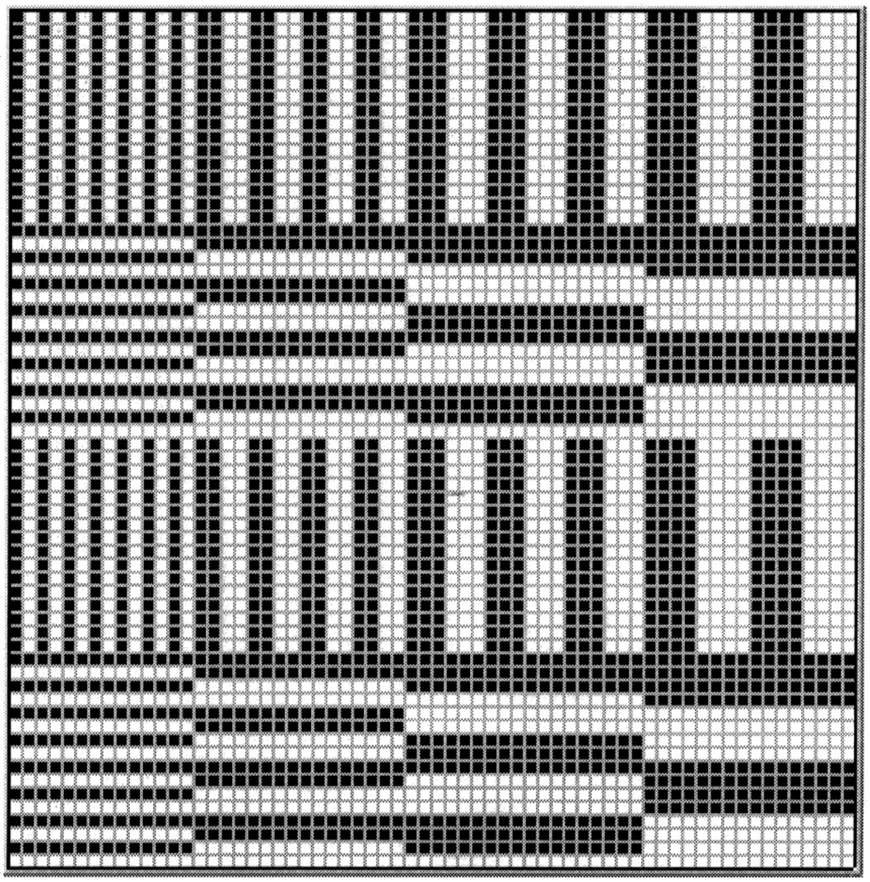


■ F6H [Chinese character "KEN"]/F7H [Burst]

F6H

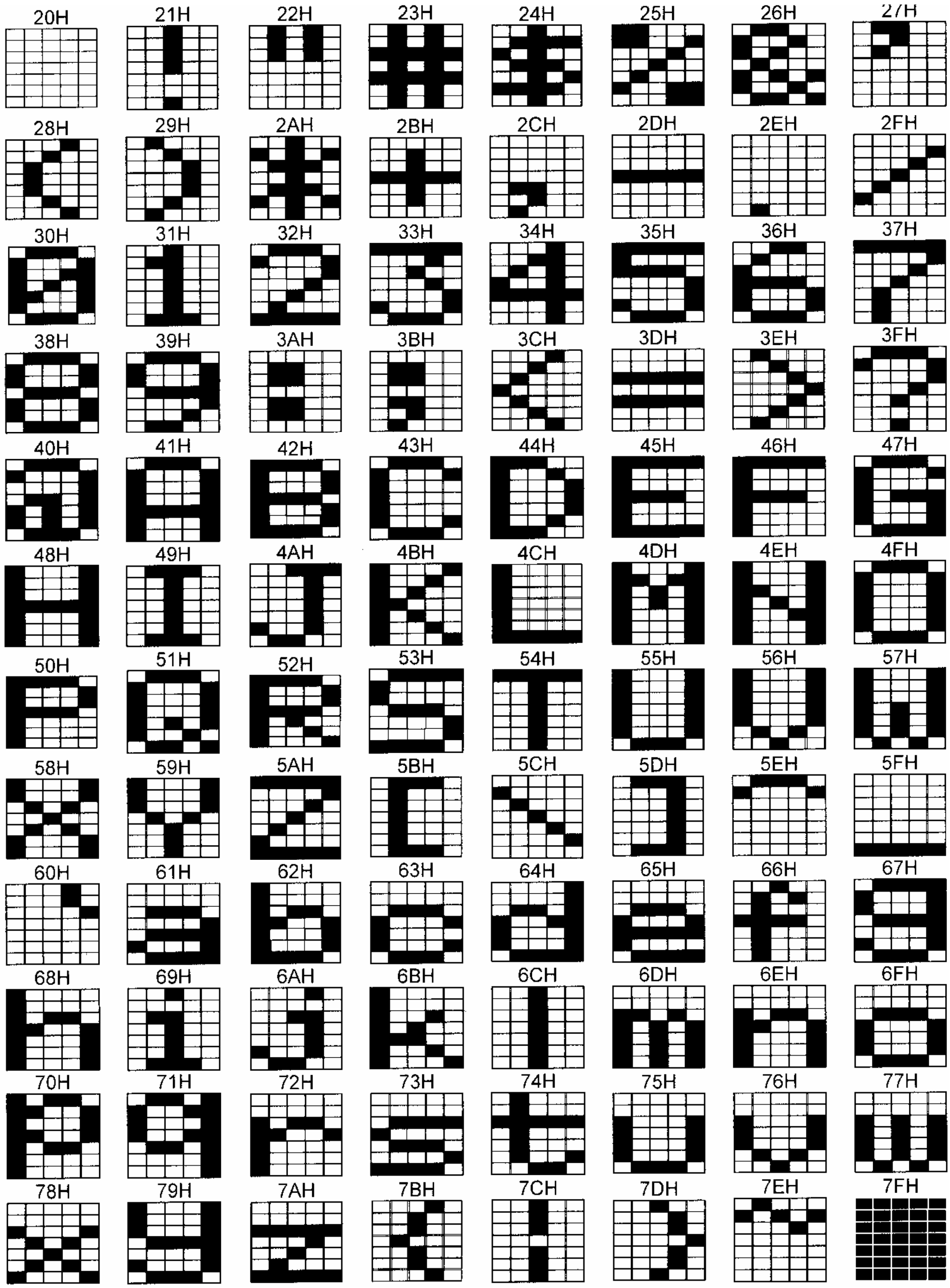


F7H

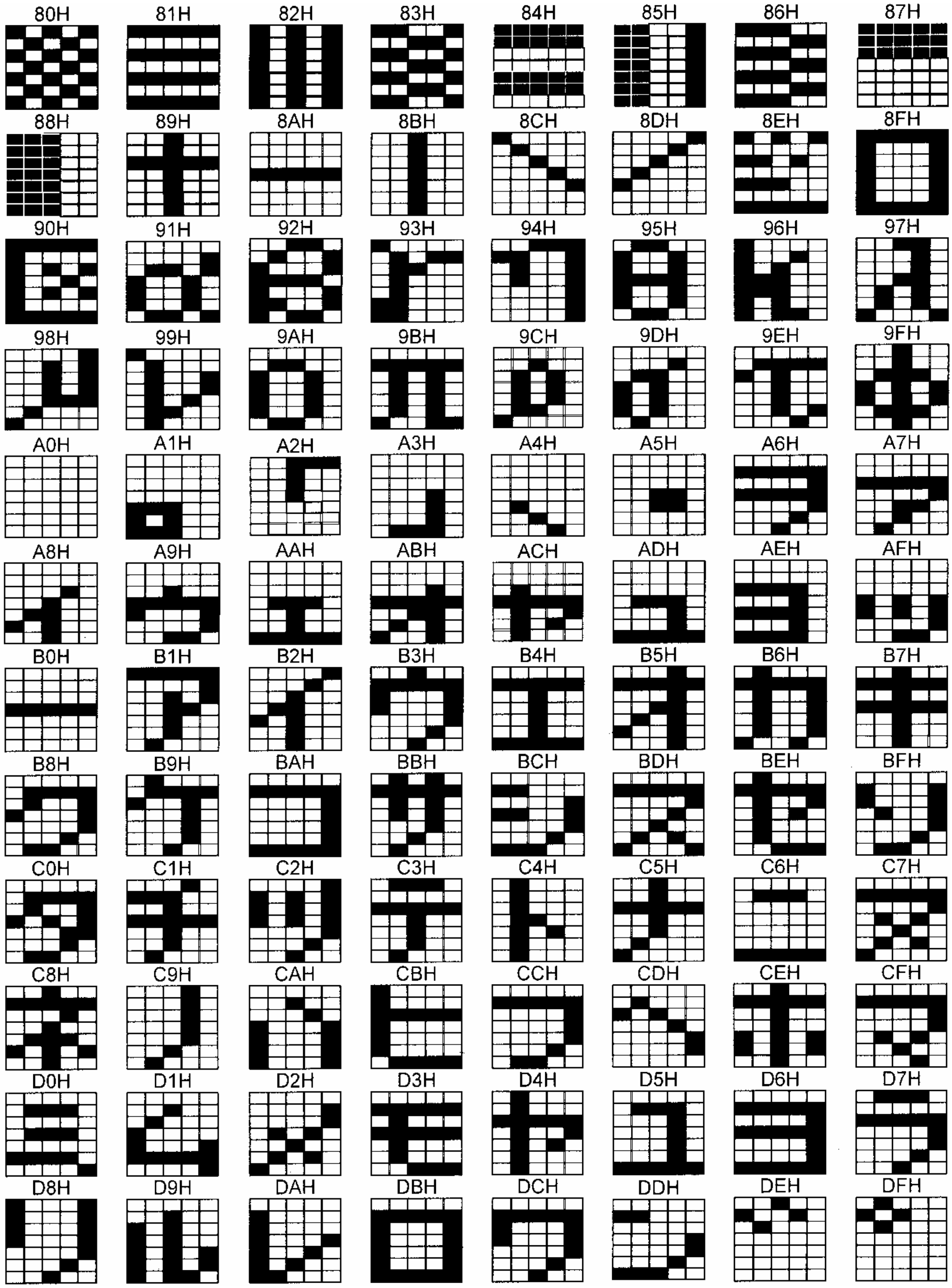


11.1.4 Character pattern data

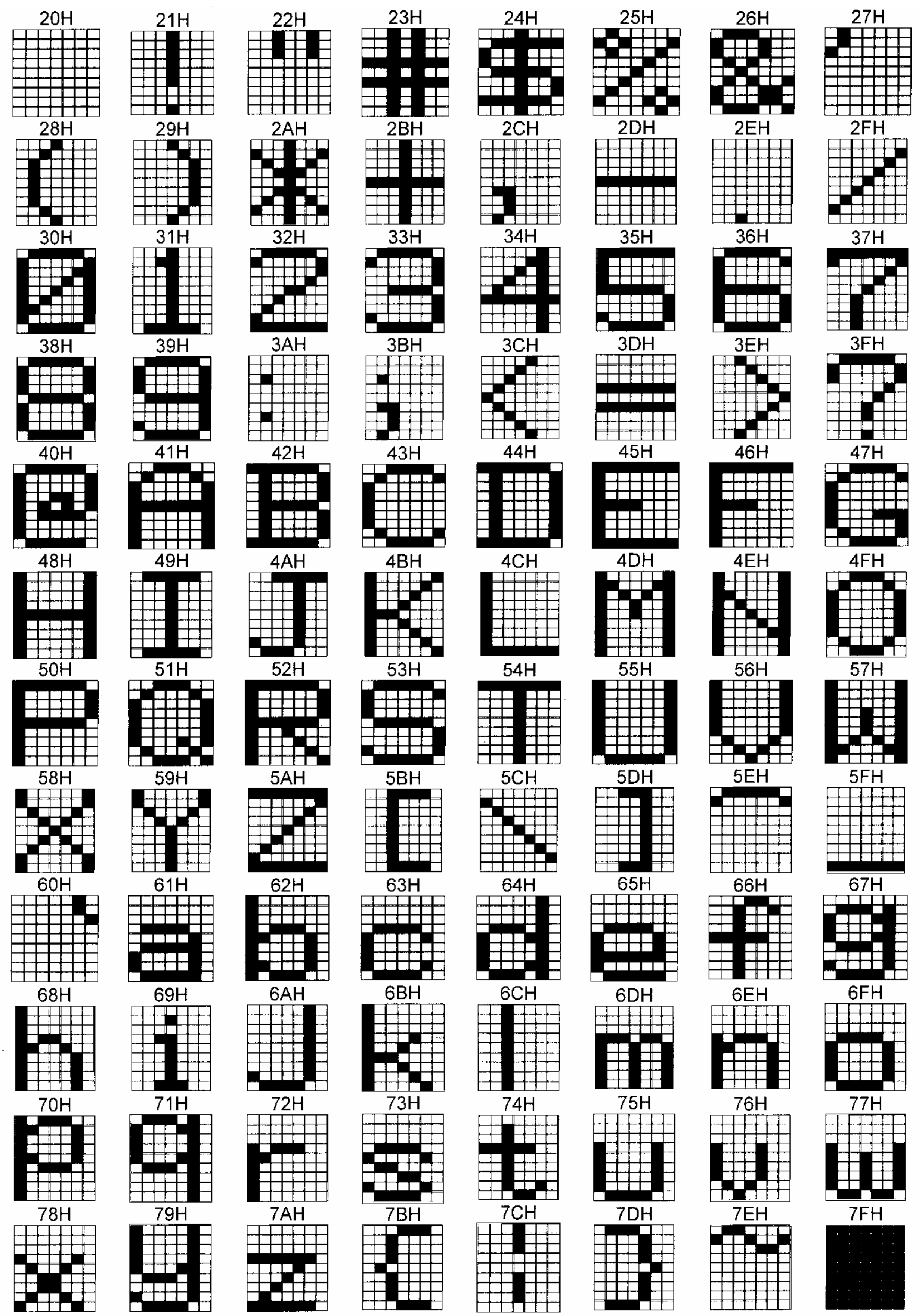
■ 5 × 7 character pattern table (1 of 2)



■ 5 × 7 character pattern table (2 of 2)

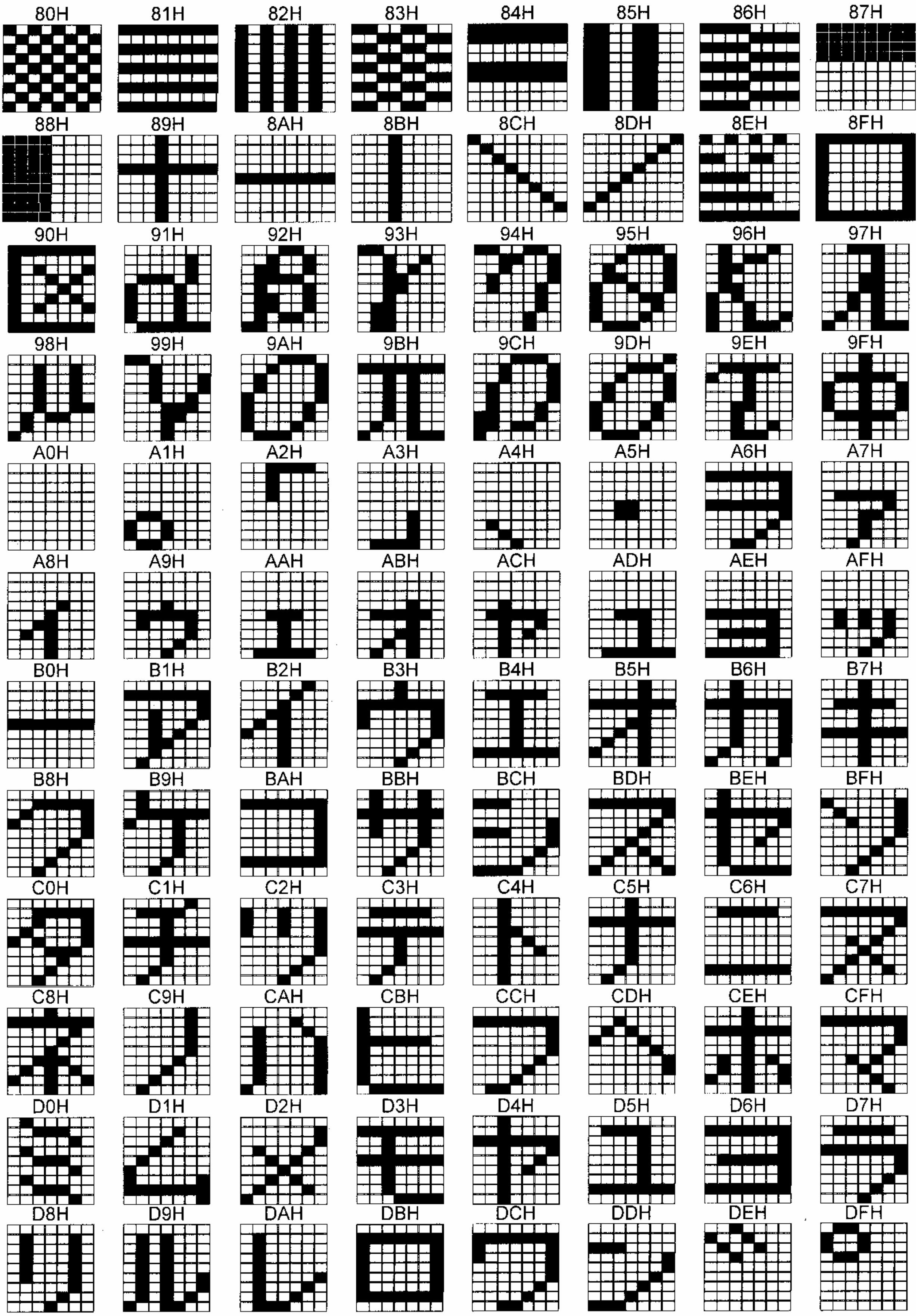


■ 7 × 9 character pattern table (1 of 2)

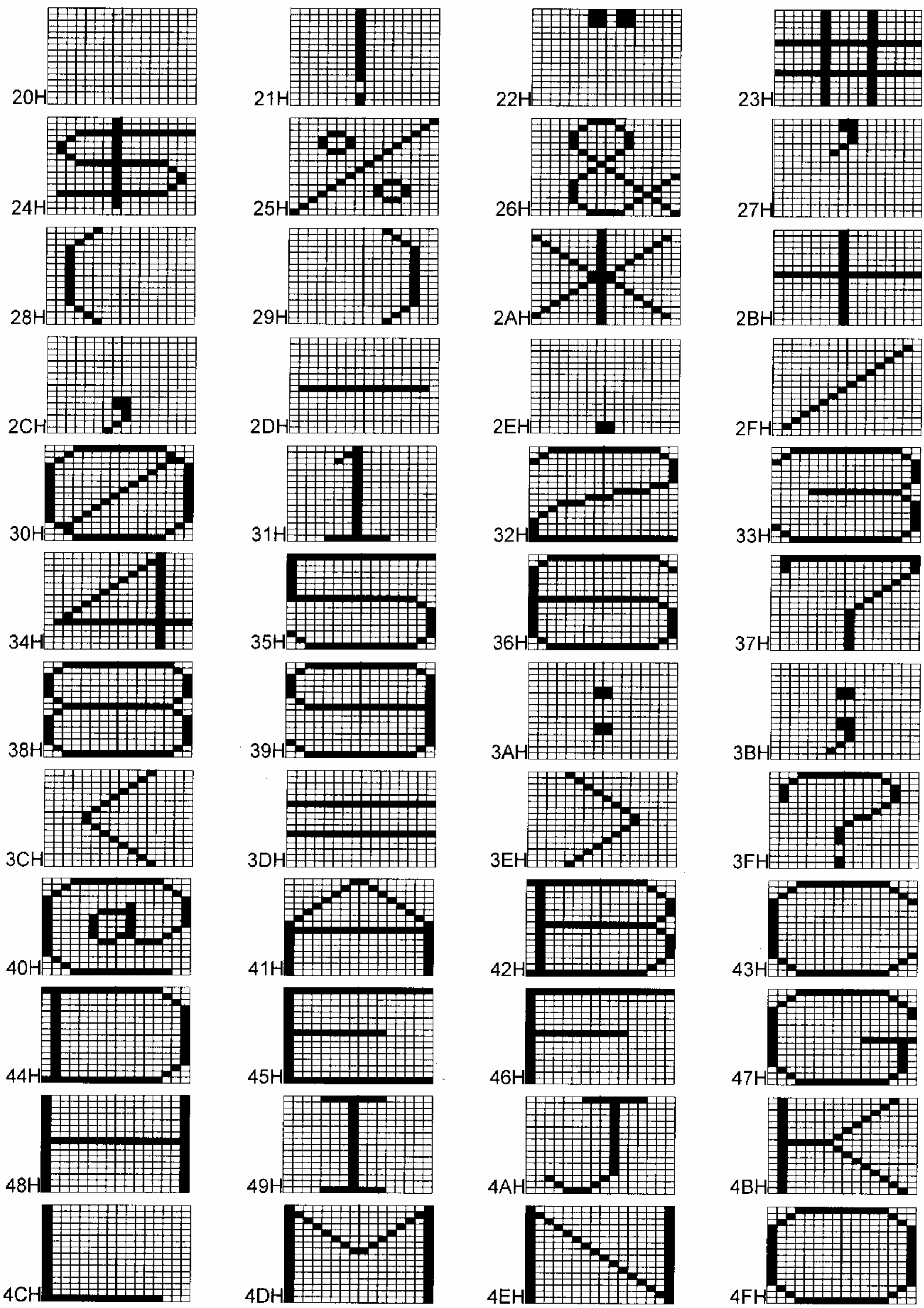


■ 7 × 9 character pattern table (2 of 2)

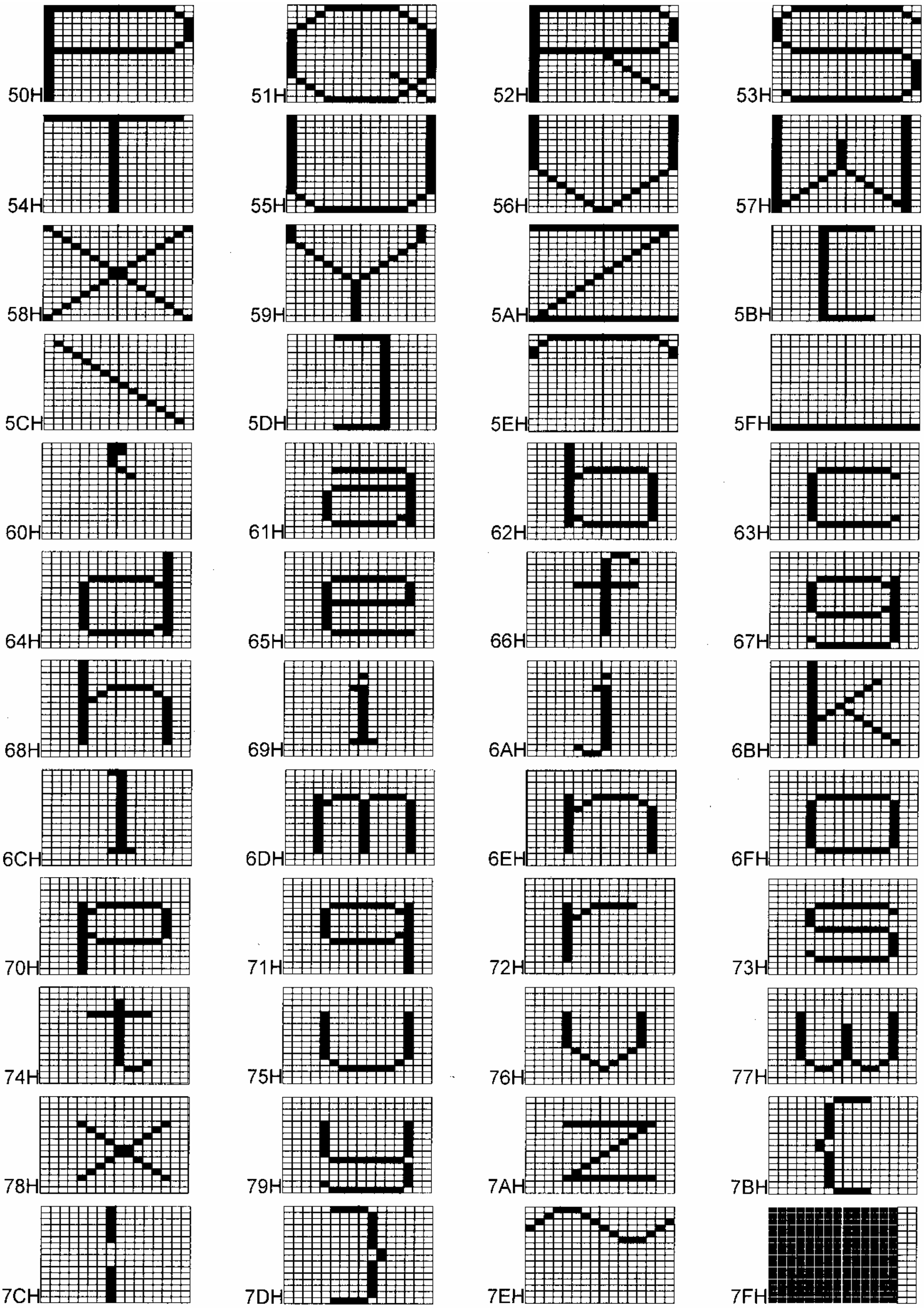
* 8 × 9 dots are used for 80H to 8FH.



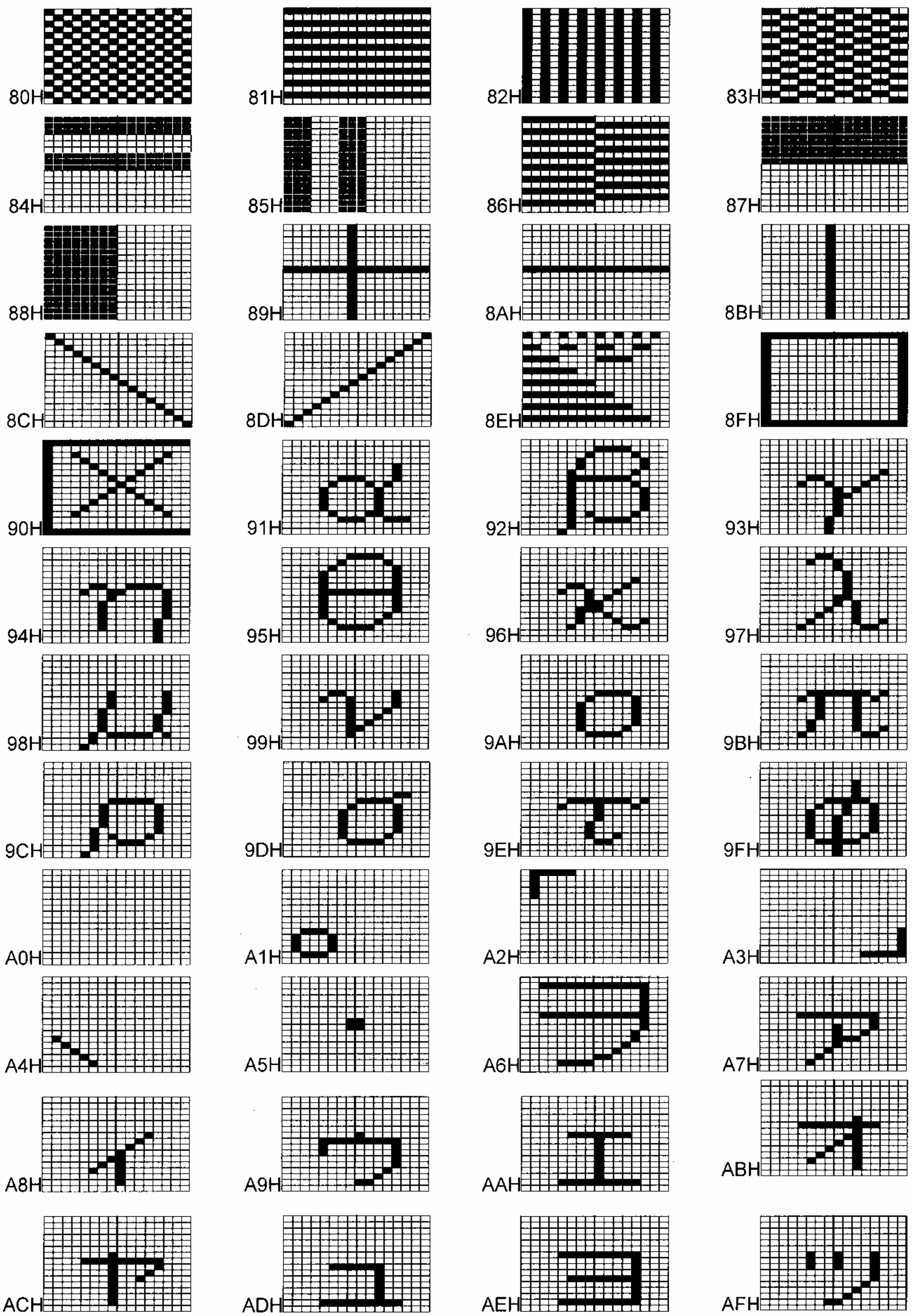
■ 16 × 16 character pattern table (1 of 4)



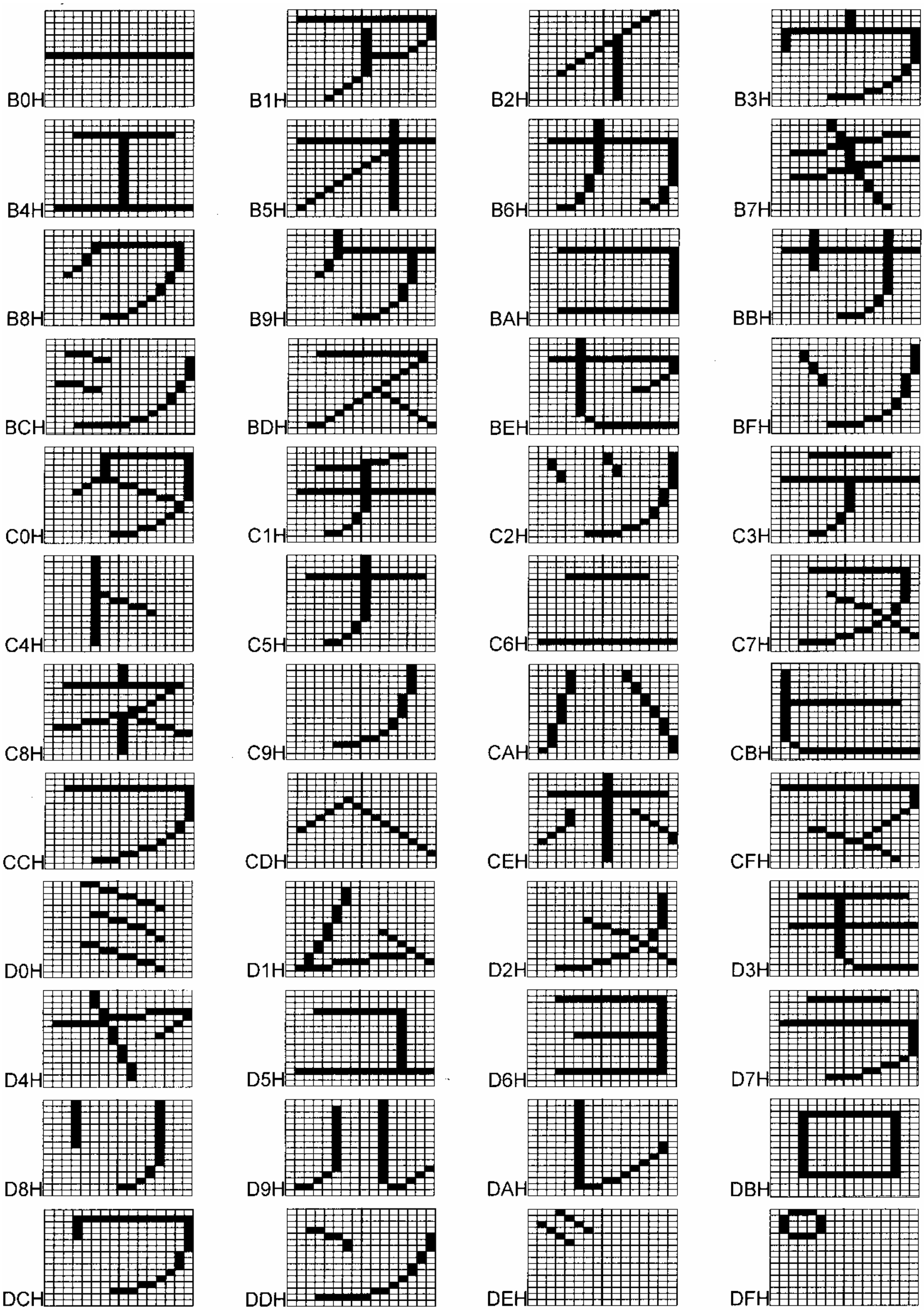
■ **16 × 16 character pattern table (2 of 4)**



■ 16 × 16 character pattern table (3 of 4)



■ **16 × 16 character pattern table (4 of 4)**



11.2 Concerning PC cards

11.2.1 PC cards which can be used

Use the CF card provided with the VG-859C 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.

11.2.2 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-pth code display starts from 40, and when files are created, the display changes to start from 0. If data is registered with opt-pth 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-pth 50, the file which is created will have the filename of opt016.vgd.

11.2.3 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

11.2.4 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-859C 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.)

11.3 Table 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	DotClk 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 ≥ Hsync + Hbackp + Hdisp)
05	HD over	HDstart + HDwidth in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod ≥ 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 ≥ Setup] and [Video ≥ Sync] and [Video ≥ (Set0up + 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 UnFormated	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 Registed	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 Registed	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 codes 40H to 5CH

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	
44	Vfp over	Vfrontp in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal ≥ Vsync + Vbackp + Vdisp)
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 ≥ 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.	
55	Segment ACK error	Segment pointer ACK was not received in DDC2	
56	Not Pattern License	Pattern license is not disengaged.	Consult the manufacturer on disengagement of pattern license.
5A	Audio Data Non Entry	Program data containing no audio data is executed.	
5B	Audio Sampling error	Error in the audio sampling frequencies	
5C	LipSync DelayTime Err	Error in delay time for Lip Sync.	Set the delay time shorter than the ON/OFF time.
5D	LipSyncEDIDLatencyErr	The latency of EDID for Lip Sync is invalid.	
5E	LipSyncAudioSourceErr	Error in audio source for Lip Sync.	Set “Audio Source” to “INTER-PCM/ INTER-DCD” and “Sweep” to “OFF.”

■ Error codes 5DH and up

Code (H)	Error message	Description		Remedial action
70 to 72	File system err	Reserved		
73	Not free area	The data to be copied onto the PC card is over 16 Mbytes.		
74	DMA Error	An error occurred during pattern output.		A failure may have occurred. Contact the manufacturer.
75	Data Not Registed	An attempt was made to copy PC card data but the copy source file was not found.		
76	Video Board Busy	An error occurred on the video output board.		A failure may have occurred. Contact the manufacturer.
77	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.
78	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.
79	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.	Messages displayed when the function currently being executed stopped because the execution of another function has priority	Check the priorities of the functions. (Refer to “12.4.4 Concerning functions which cannot be executed simultaneously.”)
	STOP : VChip	V-chip was stopped during its execution.		
	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.”)		

Error messages 5DH and up

11.4 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	720	1080
Line signal 2	Scanning system	Interlace	-	Progressive
Line signal 3	Aspect ratio	4:3	Letter-box	16:9

1) Composite output timing signals

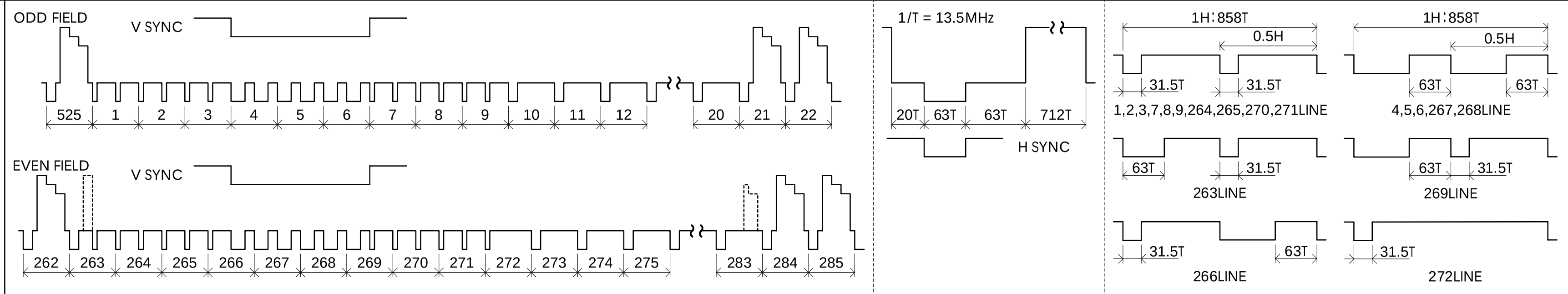
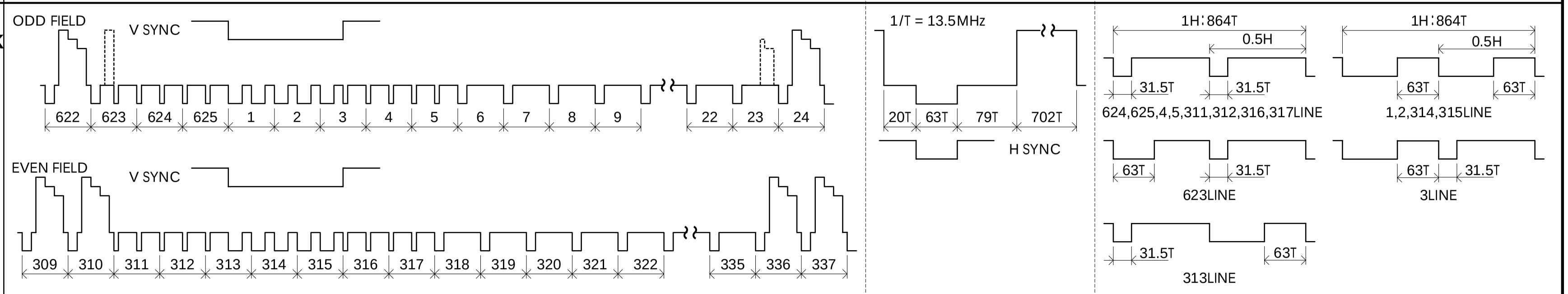
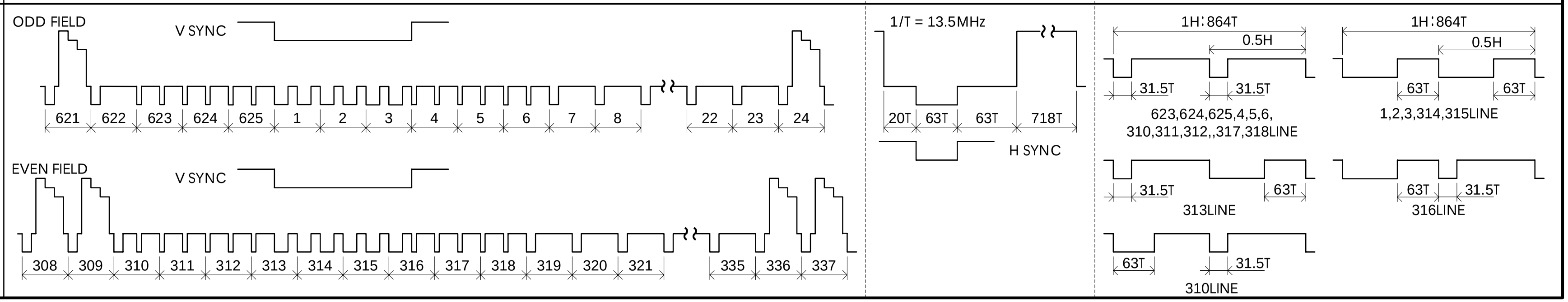
* Only the following timing signals are output for VBS and Y/C outputs.

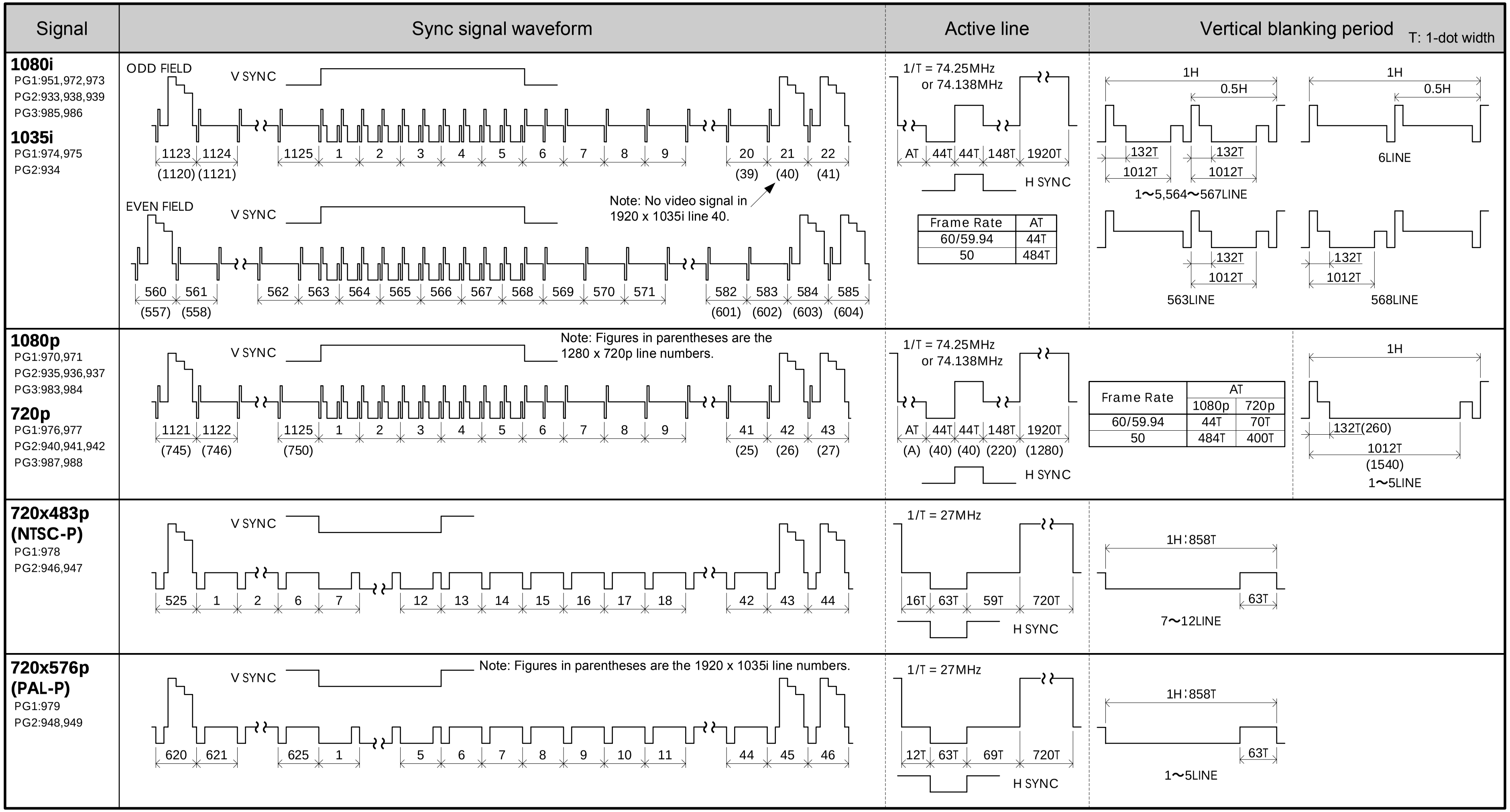
Signal format	Reference standard	Resolution	Total no. of samples	V period [Hz] frame (field)	Subcarrier frequency [MHz]	Aspect ratio	D5 connector line signal [V]			SETUP	Program number			Remarks (main countries where used)
							1	2	3		PG1	PG2	PG3	
NTSC (Japan)	NTSC (RS-170A)	712×484	858×525	59.94 (29.97)	3.579545	4:3	0	0	0	OFF	950, 968	930	980	Japan
						16:9	0	0	5.0	OFF	-	918	-	
						4:3 (LB)	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)	PAL (BT.470-6)	702×574	864×625	50 (25)	4.433619	4:3	0	0	0	OFF	969	931	981	U.K, Germany
						16:9	0	0	5.0	OFF	-	920	-	
						4:3 (LB)	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	59.94 (29.97)	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
						16:9	0	0	5.0	OFF	-	922	-	
						4:3 (LB)	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	-

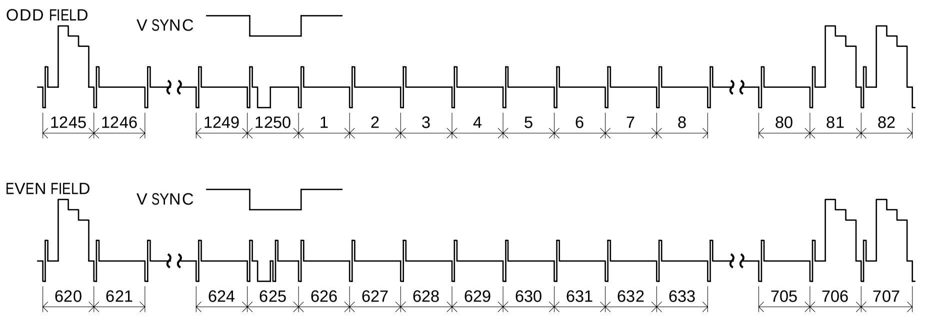
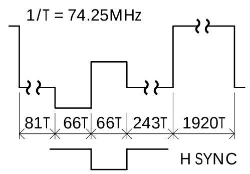
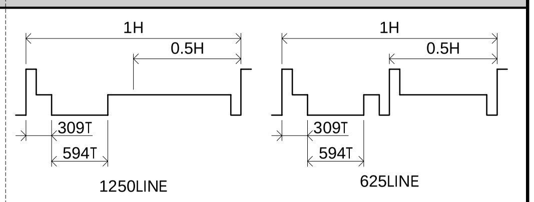
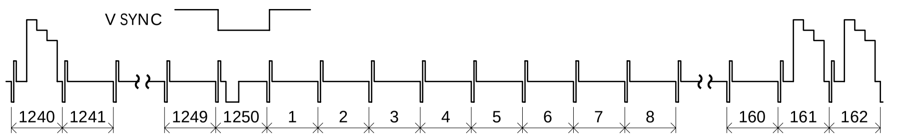
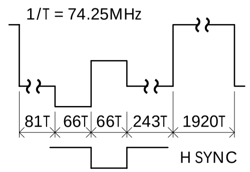
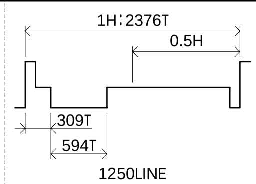
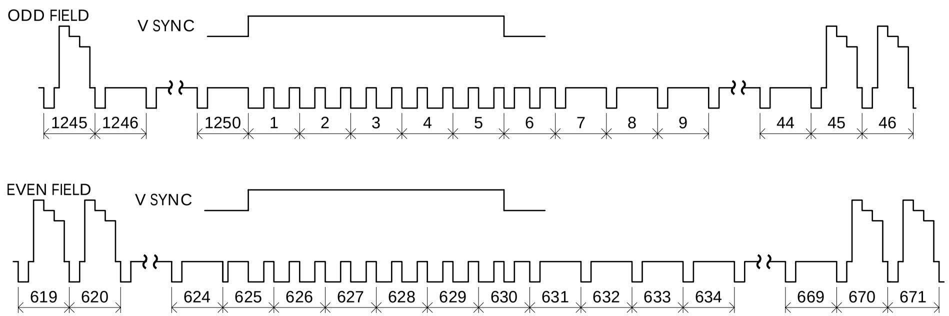
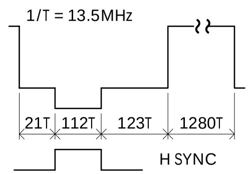
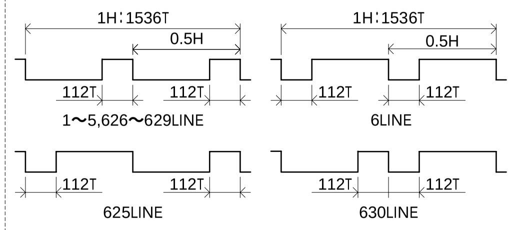
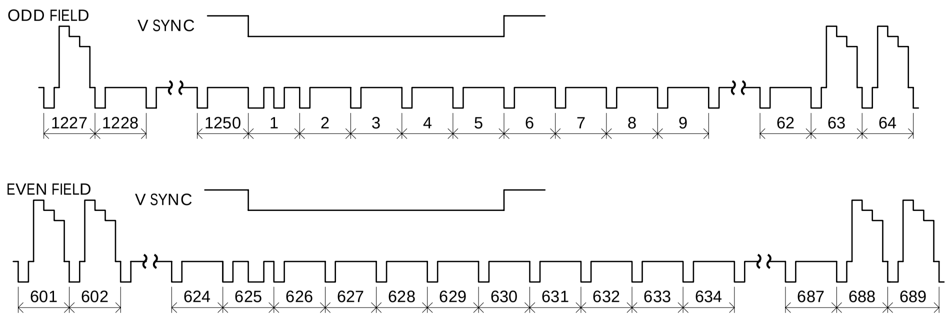
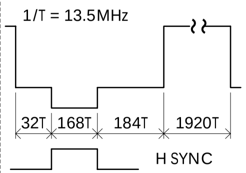
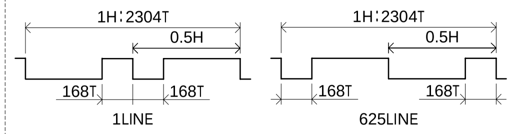
■ Standard signal timing signal waveforms

Signal	Sync signal waveform / Active line / Vertical blanking period (T: 1-dot width)
NTSC-J PG1:950,968 PG2:918,919,930 PG3:980 **NTSC-M** PG1:994 PG2:924 **NTSC-443** PG2:925 **PAL-M** PG2:926 **PAL-60** PG2:927	
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	



Frame Rate	AT
60/59.94	44T
50	484T

Frame Rate	AT 1080p	AT 720p
60/59.94	44T	70T
50	484T	400T

Signal	Sync signal waveform	Active line	Vertical blanking period T: 1-dot width
1080i SMPTE-295M (China) PG2:998			
1080p SMPTE-295M PG2:999 **Only analog output signals supported**			
1152i (Australlian) PG2:944			
1080i (1250) (Australlian) PG2:945			

12 Specifications and checkpoints

12.1 Main specifications

12.1.1 Output

Dot clock frequency	Analog		5.00 to 250.00MHz
	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. 4096 lines
Video memory			4096 dots × 2048 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**

12.1.2 External interfaces

Remote connector (25-pin)
RS-232C (9pin)
LAN (10/100BASE-TX)

12.1.3 General ratings

Supply voltage	AC100 to 120V, AC200 to 240V
Power line frequency	50Hz / 60Hz
Power consumption	70VA MAX
Dimensions	370 (W) × 73 (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)

12.2 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-859C.
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.

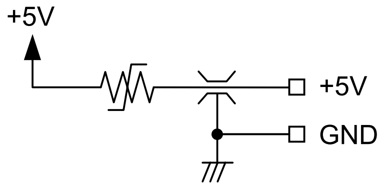


Fig. 12.2.1 DDC power supply output circuit

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-859C. If such the voltage of such a power supply is connected, both the VG-859C and the connected device may fail.

12.3 Connector pin layouts

12.3.1 DVI digital serial output connector

● Connector: Morex, DVI-I (74320-1000), 24 pins + 5 pins (analog)
DVI-D (74320-4000), 24 pins

● Output: TMDS

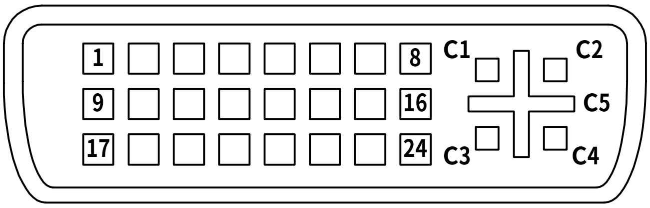


Fig. 12.3.1 Pin layout

Table 12.3.1 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 Hrizonatal 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 "12.2 Concerning the DDC power supply."

12.3.2 HDMI connector

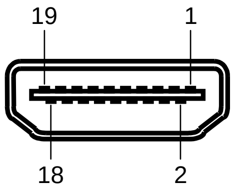


Fig. 12.3.2 Pin layout

Table 12.3.2 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 “12.2 Concerning the DDC power supply.”

12.3.3 Analog D-Sub connector

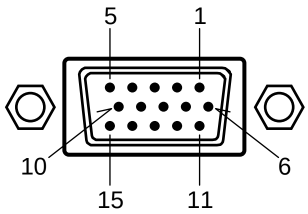


Fig. 12.3.3 Pin layout

Table 12.3.3 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 "12.2 Concerning the DDC power supply."

12.3.4 D5 connector

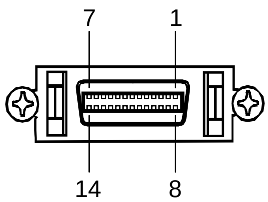


Fig. 12.3.4 Pin layout

Table 12.3.4 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

12.3.5 Y/C (S) connector

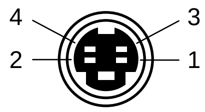


Fig. 11.3.5 Pin layout

Table 11.3.5 Pin numbers

Pin No.	Signal
1	GND
2	GND
3	Y
4	C

12.3.6 Remote (D-Sub 25-pin female) connector

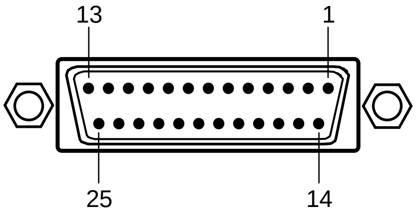


Fig. 12.3.6 Pin layout

Table 12.3.6 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-859C.
*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.

	KX0	KX1	KX2	KX3	KX4	KX5	KX6	KX7
KY0	CHARA	CROSS	DOTS	CIRCLE	+	□	×	CURSOR
KY1	COLOR	GRAY	BURST	WINDOW	OPT1	OPT2	FORMAT	NAME
KY2	R/R-Y	G/Y	B/B-Y	INV	HS/CS	VS	G/S	YPbPr
KY3	MUTE	PROG	TIMING	PAT	SAVE	LEVEL	SHIFT	FUNC
KY4	0	1	2	3	4/A	5/B	6/C	7/D
KY5	8/E	9/F	⏶⏶	⏷⏷	◀	▶	SET	ESC

Fig. 12.3.7 RB-1848 key matrix

	KX0	KX1	KX2	KX3	KX4	KX5	KX6	KX7
KY0	CHARA	CROSS	DOTS	CIRC	+	□	×	
KY1	COLOR	GRAY	BRST	WIND	OP1	OP2		
KY2	R	G	B	H-T	INV	INC	DEC	
KY3							SET	FUNC
KY4	0	1	2	3	4	5	6	7
KY5	8	9						

Fig. 12.3.8 RB-614C key matrix

	KX0	KX1	KX2	KX3	KX4	KX5	KX6	KX7
KY0	CHARA	CROSS	DOTS	CIRCLE	+	□	×	HS
KY1	COLOR	GRAY	BURST	WIND	OP1	OP2		VS
KY2	R	G	B	H-T	INV	INC	DEC	
KY3							SET	FUNC
KY4	0	1	2	3	4	5	6	7
KY5	8	9	S/G	SHIFT	GROUP	MODE	NAME	CS

Fig. 12.3.9 RB-649 key matrix

12.3.7 RS-232C (D-Sub 9-pin male) connector

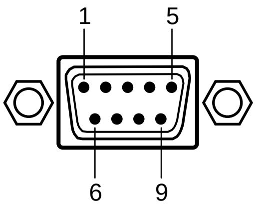


Fig. 12.3.10 Pin layout

Table 12.3.7 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

12.4 Checkpoints

This instruction manual has been drawn up on the basis of firmware version 6.00 for the VG-859C (VG859/VG-859A/VG-859B). 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.”

Furthermore, all of the specification manuals referred to in this operation manual were created based on the following items at the time this manual was published. Some specifications may have changed depending on revisions to specification manuals that have been referred to. If so, please contact a member of our sales division.

High-Definition Multimedia Interface Specification Version 1.3a

EIA/CEA-861-D

VESA Display Data Channel Command Interface Standard Version1.1

12.4.1 Differences between individual models (in the VG-859 series)

This instruction manual has been drawn up on the basis of the VG-859C. It supports all the models in the VG-859 series, but some of its details may not be supported by older firmware versions.
The table blow shows the main differences between the models.

Table 12.4.1 Differences between models in VG-859 series (1)

Item			VG-859	VG-859A	VG-859B	VG-859C
HDMI-related items *2	HDMI version *2		1.0	1.1	1.2	1.3
	CEC function		Not supported	Not supported	Supported	Supported
	xvYCC support		Not supported	Not supported	Not 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
	GamutMetaData Packet		Not supported	Not supported	Not 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 12.4.2 Differences between models in VG-859 series (2)

Item			VG-859	VG-859A	VG-859B	VG-859C
Function	LipSync function		Not supported	Not supported	Not supported	Supported
Internal programs	Internal program tables		PG1, 2	PG1, 2	PG1, 2, 3	PG1, 2, 3
	Optional patterns	No.0A	Circle & line	Circle & line	Circle & line	xvYCC pattern (1)
		No.0B	Character edge (H)	Character edge (H)	Character edge (H)	xvYCC pattern (2)
		No.0C	Character edge (O)	Character edge (O)	Character edge (O)	xvYCC pattern (3)
		No.27	“Song of Youth”	“Song of Youth”	HDMI speaker check	HDMI speaker check
		No.33	Crosshatch & marker	Crosshatch & marker	Crosshatch & marker	Lipsync pattern
		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 12.4.3 Differences in InfoFrame settings by model

General	Setting item	VG-859 HDMI1.0	VG-859A HDMI1.1	VG-859B HDMI1.2	VG-859C HDMI1.3
New items added in VG-859C (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 InforFrame”

*3: Older versions of the VG-859C supported up to 24 bits for RGB and YCbCr 4:2:2. The video format settings for these versions are given below.

Table 12.4.4 VG859/VG-859A/VG-859B 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 “12.4.5 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).

12.4.2 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 which can be used			
Function		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 "10.1.3 Concerning the key operations."

12.4.3 Concerning the optional functions

The following two functions are options. They are not supported by the VG-859C 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[33]Setting the HDMI output bit mode(❖optional function)
- Half-pixel scrolling "6.15.5 Half-pixel scrolling (❖optional function)"
- DDC/CI function "6.17 DDC/CI function (❖optional function)"

Contact Astrodesign separately concerning support for these optional functions.

12.4.4 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
↓
Setting Closed caption is set to "ON."
↓
HDCP (executed) Closed caption (not 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
↓
Setting Closed caption is set to "ON."
↓
Audio sweep (shut down) Closed caption (executed)

● **Scrolling using direct display FUNC0 cannot be operated while another function is being executed.**

<Example> While the Teletext function (executed) is being executed
↓
Operation Output pattern scrolling is set using direct display FUNC0.
↓ (Initiated by the [FORMAT] key + [+] + [1] key, etc.)
Teletext (executed) Scrolling (not 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."
↓
HDCP (executed) Teletext (not executed) Flicker (not executed)

12.4.5 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 (Primary Port)” setting

Table 12.4.5 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 (Do not execute the HDCP function.)	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			X: Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

* Be sure to set the output setting for the set priority output port to “ON” before executing HDCP.

[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 “11.4 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 [33] 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-859C 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) 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.”

3) 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”). The HDMI output is set OFF when analog or DVI and no RGB output has been set as the priority output port.

Table 12.4.6 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-859	VG-859A VG-859B	VG-859C
Output	HDMI	25 to 100 MHz	×	×	○ 1-dot increment
		100.001 to 165 MHz		○ 2-dot increments	○ 2-dot increments
Dot clock frequency			X : Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

Table 12.4.7 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-859	VG-859A VG-859B	VG-859C
Output	HDMI	25 to 81 MHz	○ 2-dot increments	○ 2-dot increments	○ 1-dot increment
		81.001 to 100 MHz	×		
		100.001 to 165 MHz	×	○ 2-dot increments	○ 2-dot increments
Dot clock frequency			X : Cannot be output. ○: Can be output. Increments of x dots: restriction on horizontal timing setting		

[3] About Setting Color Difference Output

The conditions for setting RGB or color difference output differ depending on the output terminal being used. Refer to the following table.

Table 12.4.8 When the Primary Port is Analog and DVI is Set

Output terminal	Output Conditions RGB/ YPbPr Setting	
	RGB	YPbPr
Analog DVI	Output using RGB	Output using YpbPr
HDMI	Output according to the video format setting	Output is turned OFF

Table 12.4.9 When the Primary Port is HDMI

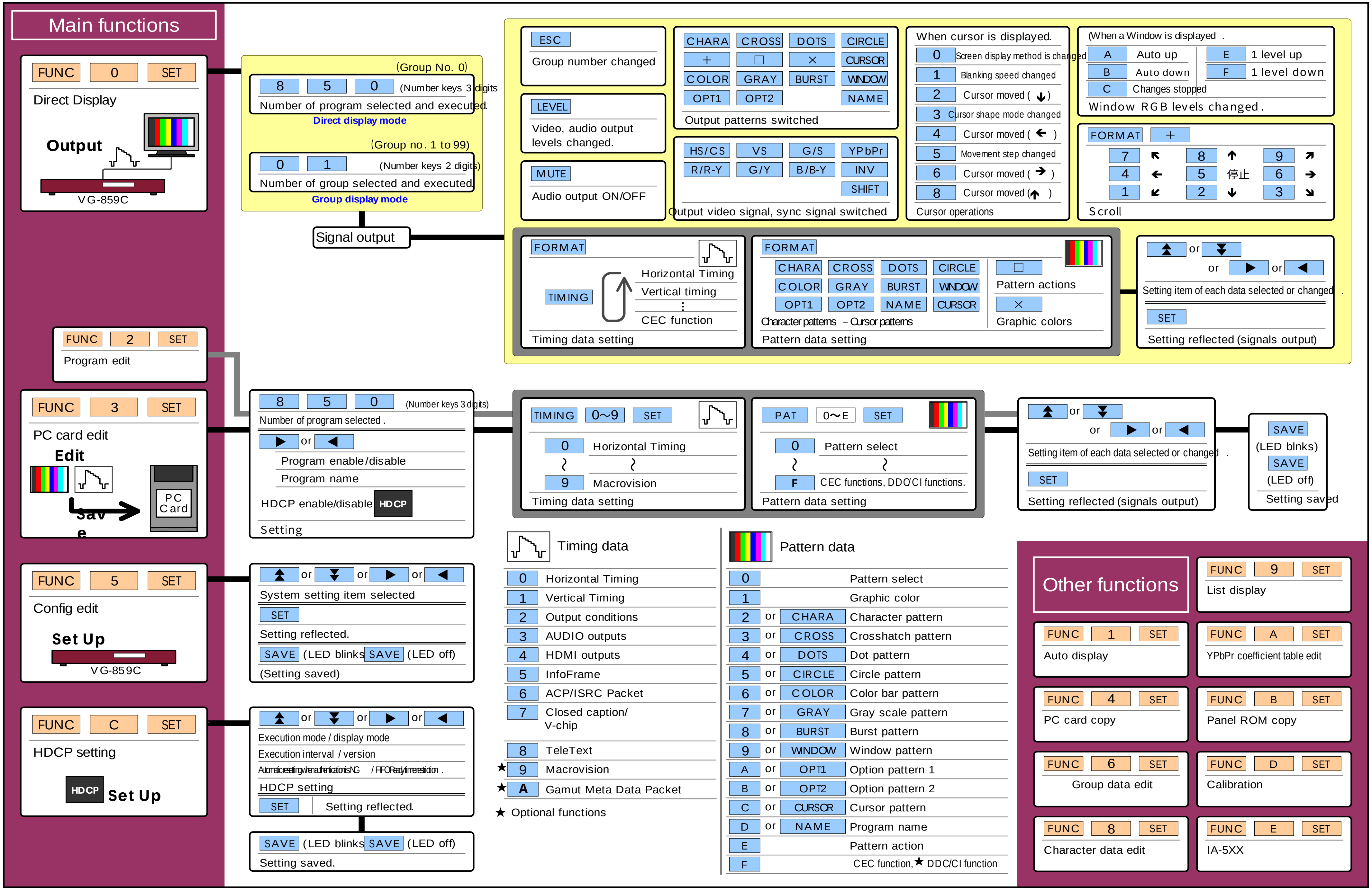
Output terminal	Output Conditions RGB/ YpbPr setting	
	RGB	YPbPr
Analog DVI	Output using RGB	Output using RGB (YpbPr setting is invalid)
HDMI	Output according to the video format setting	Output according to the video format setting

CAUTION

The composite and component specification timing built into the VG-859C (refer to "11.4 Standard signal timing signal specifications") results when the primary port is "Analog" and "YPbPr" has been set.
Accordingly, by initial default HDMI output is OFF. If you are going to prioritize HDMI output, we recommend that you select a timing that conforms to EIA standards (a setting where the Timing Data Name is written in the form EIA XXXXXX as given in "11.1.1 Program data")

12.4.6 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-859C
(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
Signal output
ESC
Group number changed
LEVEL
Video, audio output levels changed.
MUTE
Audio output ON/OFF
CHARA CROSS DOTS CIRCLE
+ □ × 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 signal, sync signal switched
When cursor is displayed.
0 Screen display method is changed
1 Blanking 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
B Auto down
C Changes stopped
E 1 level up
F 1 level down
Window RGB levels changed.
FORMAT +
7 ↖ 8 ↑ 9 ↗
4 ← 5 停止 6 →
1 ↙ 2 ↓ 3 ↘
Scroll
FORMAT
TIMING
Horizontal Timing
Vertical timing
CEC function
Timing data setting
FORMAT
CHARA CROSS DOTS CIRCLE
COLOR GRAY BURST WINDOW
OPT1 OPT2 NAME CURSOR
Character patterns – Cursor patterns
□ Pattern actions
× Graphic colors
Pattern data setting
or or or
Setting item of each data selected or changed.
SET
Setting reflected (signals output)
FUNC 2 SET
Program edit
FUNC 3 SET
PC card edit
Edit
PC Card
Save
8 5 0 (Number keys 3 digits)
Number of program selected.
or
Program enable/disable
Program name
HDCP enable/disable HDCP
Setting
TIMING 0~9 SET
0 Horizontal Timing
9 Macrovision
Timing data setting
PAT 0~E SET
0 Pattern select
F CEC functions, DDC/CI functions.
Pattern data setting
or or
Setting item of each data selected or changed.
SET
Setting reflected (signals output)
SAVE (LED blnks)
SAVE (LED off)
Setting saved
FUNC 5 SET
Config edit
Set Up
VG-859C
or or or
System setting item selected
SET
Setting reflected.
SAVE (LED blinks) SAVE (LED off)
(Setting saved)
FUNC C SET
HDCP setting
HDCP Set Up
or or or
Execution mode / display mode
Execution interval / version
Automatic setting when a function is NG / FIFO Ready time selection.
HDCP setting
SET Setting reflected.
SAVE (LED blinks) SAVE (LED off)
Setting saved.
Timing data
0 Horizontal Timing
1 Vertical Timing
2 Output conditions
3 AUDIO outputs
4 HDMI outputs
5 InfoFrame
6 ACP/ISRC Packet
7 Closed caption/ V-chip
8 TeleText
★ 9 Macrovision
★ A Gamut Meta Data Packet
★ Optional functions
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 Option pattern 1
B or OPT2 Option pattern 2
C or CURSOR Cursor pattern
D or NAME Program name
E Pattern action
F CEC function, ★ DDC/CI function
Other functions
FUNC 9 SET
List display
FUNC 1 SET
Auto display
FUNC A SET
YPbPr coefficient table edit
FUNC 4 SET
PC card copy
FUNC B SET
Panel ROM copy
FUNC 6 SET
Group data edit
FUNC D SET
Calibration
FUNC 8 SET
Character data edit
FUNC E SET
IA-5XX

VG-859C Instruction Manual

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