

PROGRAMMABLE VIDEO SIGNAL GENERATOR

# VG-848/VG-848H RB-1848

**Instruction Manual** 

Ver.4.00



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SIGNAL GENERATOR

# VG-848/VG-848H RB-1848

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2007.1

Ver.4.00

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## **BEFORE OPERATION**

## Introduction

Thank you very much for purchasing this model VG-848/VG-848-H video signal generator.

This manual contains details on the operation procedures to be followed when the VG-848/VG-848-H (RB-1848) is used, the checkpoints and precautions to be observed, and so on. Improper handling may result in malfunctioning. Before using the VG-848/VG-848-H, 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

## **AWARNING**

## 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.

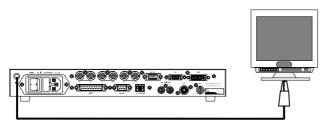
## **Concerning foreign matter**

■ 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.

## **A** CAUTION

## Concerning the generator

■ When connecting the VG-848/VG-848-H to a display unit, use the FG cable provided to connect the frame ground (FG) terminal on the VG-848/VG-848-H 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-848/VG-848-H 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-848.

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

- When disconnecting the VG-848/VG-848-H 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-848/VG-848-H and allow it to warm up for about 10 to 15 minutes before use so as to ensure that the VG-848/VG-848-H 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-848/VG-848-H (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-848 (RB-1848)

A general description of the VG-848 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-848 system settings

The system settings (FUNC5) of the VG-848 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 Remote control

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

#### Chapter 9 Reference

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

## **Chapter 10 Specifications and checkpoints**

The VG-848's specifications and checkpoints are contained in this chapter.

## Appendix (list of functions)

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-848/VG-848-H main unit
- •VG-848/VG-848-H (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-848/VG-848-H.

## ■ 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-848/VG-848-H, 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.



# CONCERNING THE VG-848 (RB-1848)

## 1.1 General description

The VG-848 and VG-848-H portable video signal generators (hereafter referred to simply as the "VG-848") support applications in all areas of the display instrumentation field. The VG-848 can deliver RGB analog output signals, low-voltage serial digital (Panel Link) output signals and NTSC/PAL/SECAM output signals as well as color difference signals and tri-level sync signals among analog output 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 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 timing data, pattern data and other outputs can be easily set using the SP-8848 or the RB-1848. It is also possible for users to create their own optional patterns and register natural images.

In terms of the optional functions offered, the generator also supports TV-oriented functions such as closed caption, V-chip, Teletext and Macrovision. (\* Contact Astro if any optional functions are 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, serial digital outputs and NTSC/PAL/SECAM outputs. There is no need for any adapters, etc.

#### ■ Wide dot clock frequency ranges

The dot clock frequencies supported by the VG-848 are the 5 to 300 MHz range for analog outputs, the 25 to 300 MHz range for digital outputs.

#### **■** Full-color outputs supported

The generator supports full-color displays consisting of 16.77 million colors.

#### ■ LAN supported

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

### ■ Registration of program data on a PC card

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

#### ■ Creation of optional patterns

In addition to the conventional basic patterns (11 types including character, crosshatch, color bar and gray scale) and optional patterns (up to 64 types can be incorporated), a function that allows users to create their own optional patterns has been added. This function makes it possible to create the optional patterns which are useful for developing and evaluating the next-generation displays.

### ■ Sample data incorporated inside

A total of 300 types of timing data and 300 types of pattern data are registered inside the VG-848 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-848 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
	Caption *1	Closed caption/V-chip
	TeleText *1	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

<sup>\*1:</sup> Optional function

The various program data, optional patterns and user character patterns are contained as sample data on the EPROM inside the VG-848 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.

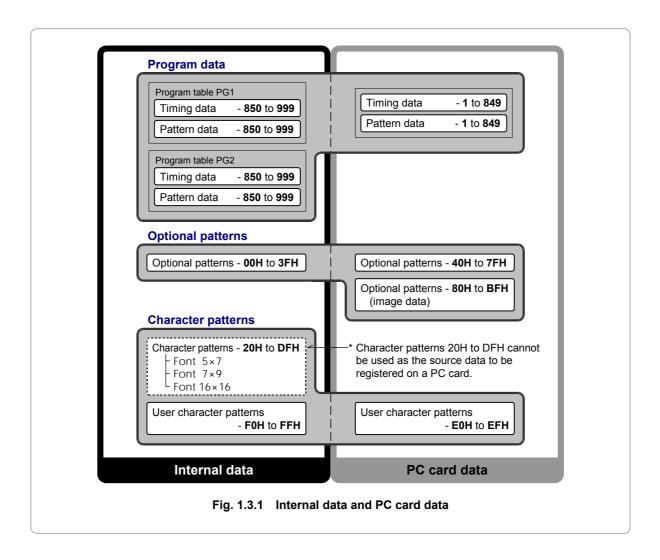
For details on the internal data, refer to "9.1 Internal data"

Table 1.3.2 Number of internal sample data

	Number of data
Program data	150 (850 to 999) × 2 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	Number of data	
Program data	849 (1 to 849)	849 (1 to 849)	
Optional patterns	64 (40H to 7FH)	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	
Number of group data	98 (1 to 98)	Concerning groups"	
Number of characters in group names	20 characters		



## 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.

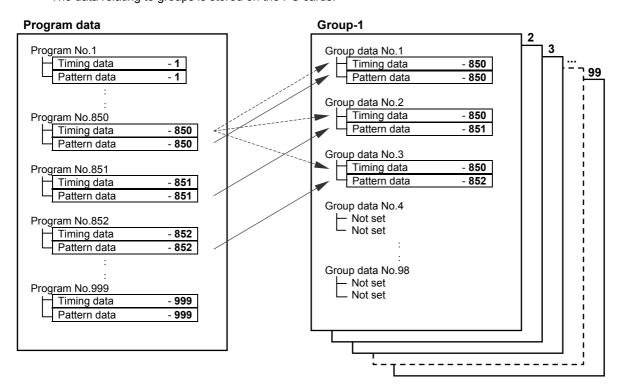


Fig. 1.4.1 Configuration of a group

## 1.5 Concerning the operating modes

The VG-848 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 Main differences from existing models

The main differences between the VG-848 and existing models (VG-828/VG-828-D) are listed in the table below.

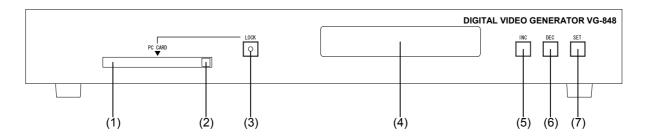
Table 1.6.1 Main differences from VG-828 and VG-828-D

Item	VG-828/VG-828-D	VG-848
Panel ROMs	Can be used.	Cannot be used.
Memory cards	Flash ATA PC card	CF cards (with PC card adapter)
Remote control box	Editing not possible with RB-614C or RB-649.	Editing not possible with RB-614C or RB-649. Editing possible with RB-1848.
TTL outputs (R/G/B, RH/GH/BH)	Not supported To ensure compatibility with existing generators, these outputs can be set with program data but they will be ignored when the settings are executed.	Not supported (No setting items available with the VG-848)
NRZ / RZ	Not supported To ensure compatibility with existing generators, these outputs can be set with program data but they will be ignored when the settings are executed.	Not supported (No setting items available with the VG-848)
External control	RS-232C and USB connections  * Terminal commands expanded for use by the VG-848 cannot be used.	RS-232C and LAN connections Set using config edit FUNC5. (Refer to "the VG-848 system settings" in Chapter 3.) RS-232C baud rate and other settings can be performed.

## 1.7 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.

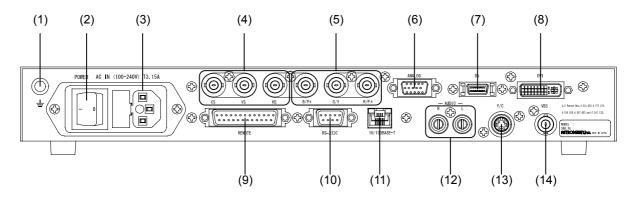
## 1.7.1 VG-848 front panel



(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)	[ <b>1</b> ] 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 " at a " (which appears on the RB-1848) in this manual.
(6)	[ <b>¥</b> ] 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.

<sup>\*</sup> 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-848 is used, the programs are not executed until the [SET] key is pressed after pressing the [♠] or [♥] key.

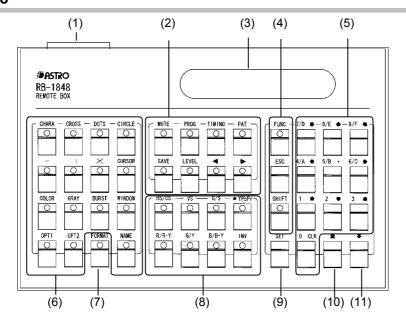
## 1.7.2 VG-848 rear panel



(1)	Frame ground (FG)	Connect this frame ground terminal to the frame ground terminal of the unit which is connected to the VG-848.
(2)	POWER switch	This is used to turn the generator's power ON and OFF.
	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)	BNC analog output connectors	HS = Horizontal sync signal, VS = vertical sync signal, CS = composite sync signal.
(5)	BNC analog output connectors	The RGB or YPbPr video signals are output from these connectors.
(6)	D-SUB 15-pin (mini)	Analog output connector.

(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)	BNC analog output connectors	HS = Horizontal sync signal, VS = vertical sync signal, CS = composite sync signal.
(5)	BNC analog output connectors	The RGB or YPbPr video signals are output from these connectors.
(6)	D-SUB 15-pin (mini)	Analog output connector.
(7)	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.)
(8)	DVI digital serial connector (CH1)	(The analog rated value is OFF.)
(9)	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.
(10)	RS-232C connector (9-pin female)	This is used to connect a personal computer using an RS-232C cable.
(11)	Ethernet port (10/100BaseTX)	This port is used for connection to a LAN using the Ethernet cable.
(12)	AUDIO output connectors	These are the audio output connectors. Frequencies ranging from 100 Hz to 20 kHz can be set.
(13)	S connector	NTSC/PAL/SECAM Y/C video output connector
(14)	VBS output connector	NTSC/PAL/SECAM VBS composite video output connector

## 1.7.3 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 e		dit 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 sel	This is used to select the program data.		
	[TIMING] key	This is used to sel	ect the timing data.		
	[PAT] key	This is used to sel	ect the pattern data.		
	[SAVE] key	This is used to sav	ve the data.		
	[LEVEL] key	This is used to adj	ust the output level, display the screen on which to input characters from the display unit, etc.		
	[◀] key	This is used to mo	ve to the previous item (on the LCD screen).		
	[►] key	This is used to mo	ve 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 us	ed 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		ed to select the output signals. When a key is selected, its LED lights. tching the output video signals and sync signals"		
(9)	[SET] key	This key is used to	execute the functions and program data.		
(10)	[ <b>1</b> ] key	This is used to incr	rement the program numbers (+1) and also to display the previous page on the LCD.		
(11)	[ <b>▼</b> ] key	This is used to decrement the program numbers (-1) and also to display the next page on the LCD.			

<sup>\*</sup> When the [♠] key or [♣] key on the front panel of the VG-848 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.



## **OPERATING PROCEDURES**

## 2.1 Concerning the VG-848's functions

The VG-848 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\_i] 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).	Adjustments and inspections on production lines	p.33
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.44
2	Program edit	This temporarily changes the program data, and outputs signals.	Tests and evaluations undertaken by development and engineering departments	p.45
3	PC card edit	This edits the program data, and registers it on the PC card.	Creation of PC cards	p.45
4	PC card copy	This copies the data registered on the PC card.	Creation of PC cards	p.47
5	Config edit	This performs the VG-848 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.54
8	Character edit	This edits the user character patterns and registers them.	Tests and evaluations undertaken by development and engineering departments	p.56
9	List display	This lists the registered data on the display.	Tests and evaluations undertaken by development and engineering departments	p.58
Α	YPbPr coefficient table edit	This edits the coefficient tables for the YPbPr data output.	-	p.62
В	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.64
С	HDCP setting	This sets the HDCP mode. *3	-	p.65
D	Calibration	This calibrates the signal output levels.	-	p.72
Е	IA-5XX	Reserved for IA series. *4	-	

<sup>\*1:</sup> 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.

<sup>\*2:</sup> VG-813, 823, 826A and 827

<sup>\*3:</sup> This function is supported by the VG-848-H but not by the VG-848.

<sup>\*4:</sup> 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-848 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-848 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 $^{^{\star 2}}$	The VG-848 starts up in the auto display mode.
When the POWER switch is set to ON while the [\$\frac{1}{4}\$] key is held down *2	The VG-848 starts up in the self-check mode.

<sup>\*1:</sup> 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.

## 2.3 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.	

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

## 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-848, 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

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

Press the [LOCK] key for 5 seconds.

A beep tone is heard.

Lightly press the EJECT button to the right of the card slot.

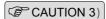
The EJECT button pops out.

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)











- 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-848 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

No.	Setting item	Description	Reference page
1	Group number	For setting group numbers.	p.15
2	Beep tone	For selecting whether to turn the beep tone ON or OFF.	p.15
3	Pattern display mode	For selecting a single pattern or multi pattern.	p.16
4	NAME display mode	For selecting the NAME display mode	p.16
5	Terminal mode	For selecting the external control interface (RS-232C/LAN).	p.17
6	Data mode	For selecting the format for the conditions under which the program data is output.	p.18
7	Baud rate/data bits	For selecting the RS-232C baud rate and data bits.	p.18
8	Parity bit/stop bit	For selecting the RS-232C parity bit and stop bits.	p.19
9	Start program	For selecting the program to be executed when the power is turned on.	p.19
10	DDC pattern	For selecting the port when executing DDC optional patterns.	p.20
11	IP address/port no.	For setting the IP address and port number of the LAN.	p.21
12	License key	License key (this cannot be changed).	p.22
13	VBS level fine adjustment	For finely adjusting the VBS output level.	p.22
14	Video level fine adjustment	For finely adjusting the RGB video output level.	p.23
15	DVI level mode	For selecting the DVI output level mode.	p.24
16	Key lock mode	For selecting the key lock mode for preventing the erroneous operation of the [LEVEL] and [FUNC] keys.	p.24
17	Terminal mode display	For selecting what is to be displayed on the LCD when the terminal mode is established.	p.24
18	Tri-level sync signal mode	For selecting the tri-level sync signal mode	p.25
19	VBS output filter	For setting the VBS and Y/C output filter.	p.26
20	DDC transfer clock	For selecting the clock frequency during DDC.	p.27
21	DDC Read mode	For selecting the DDC Read mode	p.27
22	RB-614C H-T key	For selecting the H-T key function of the RB-614C.	p.29
23	Drawing dots for 1-pixel drawing	For setting the drawing dots for 1-pixel drawing in the TV timing mode.	p.29
24	Overlay cursor	For setting the overlay display of the cursor to ON or OFF.	p.30
25	Internal program table	For selecting the internal program tables.	p.30
26	Scroll trigger *1	For setting the scroll trigger function to ON or OFF.	p.31

<sup>\*1:</sup> 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: <u>5</u> (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-848. 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.



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: <u>0</u> (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 :<u>O</u>N (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 :<u>0</u> (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 :<u>S</u>IO (0-2)

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-848 is set to RS-232C. (Factory setting)	
1	LAN	The external control interface of the VG-848 is set to LAN.	
2	вотн	A response is returned to the interface which received the signals (RS-232C when the signals were received by the RS-232C interface or LAN when they were received by the LAN interface) when signal reception is detected.	
		* Do not use this setting for regular operation.	

- \* When the VG-848 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."



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:<u>0</u> (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:<u>3</u>8400 (0-4) RS-Dlen :8 (0/1)

Fig. 3.3.7 Selecting the baud rate and data bits

Table 3.3.7 Baud rate selection method

Key	LCD display	Description	
0	9600	The baud rate is set to 9600 bps.	
1	19200	The baud rate is set to 19200 bps.	
2	38400	The baud rate is set to 38400 bps. (Factory setting)	
3	57600	The baud rate is set to 57600 bps.	
4	115200	The baud rate is set to 115200 bps.	

Table 3.3.8 Data bit selection method

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



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

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

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

Cfg:RS-Parity:<u>N</u>ONE (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:85<u>0</u> PAT:850

Fig. 3.3.9 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 "9.1.2.1 Concerning the DDC patterns.")

OPT Pattern #0E(DDC) : <u>D</u>isable (0-2)

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.	

## 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-848, 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:19<u>2</u>.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	Use these keys to set the IP address of the VG-848. Setting range: 0.0.0.0 to 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-848 to be used for receiving data. Setting range: 1024 to 65535 Factory setting: 8000



- 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-848 requires the same network address as the IP address of the VG-848.
- The VG-848 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.

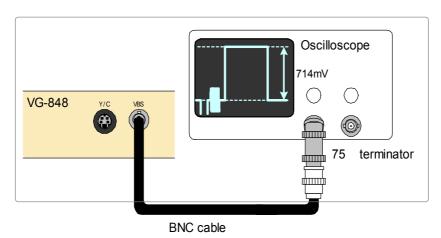
Set the pattern to a white monotone at any timing data at which output is possible. (Example of pattern creation: Set all the patterns to OFF, and select the [INV] key. Set the digital level to "255.")

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

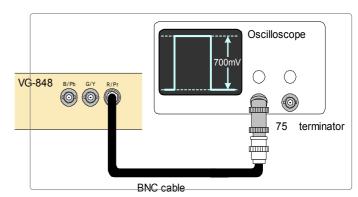
Key	LCD display	Description	
0	R	The adjustment color is set to red.	
1	G	The adjustment color is set to green.	
2	В	The adjustment color is set to blue.	

#### 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:  $724mV \Rightarrow 700mV$ )

#### 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 Calibration execution method").
- Calibration is performed at the factory prior to shipment.

#### [15] Setting the digital level mode

Select the DVI level mode.

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

Fig. 3.3.15 Selecting the DVI level mode

Table 3.3.14 DVI level mode selection method

Key	LCD display	Description
0	0-255	The digital level is not converted and output 0-255. (Factory setting)
1	16-235	The digital level is converted to 16-235.



At the "16 to 235" setting, the VBS and Y/C outputs are OFF.

#### [16] Setting the key lock mode

Select the key lock mode for preventing malfunctioning.

Cfg:Func & Level Lock: <u>N</u>o 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.	

<sup>\*1:</sup> The operation of the [LEVEL] key using the direct display FUNCO is inhibited.

#### [17] Setting the terminal mode display

Select the LCD screen display in the terminal mode.

Cfg:Term mode display <u>N</u>ormal (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.	

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

#### [18] Setting the tri-level sync signal mode

#### Select the tri-level sync signal mode.

Cfg:Tri Sync mode :<u>N</u>ORMAL (0/1)

Fig. 3.3.18 Selecting the tri-level sync signal mode

Table 3.3.17 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. 3.3.18 shows the relationship between the tri-level sync signals and horizontal sync signals (HS) for the VG-848 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. 3.3.19. When the shift mode is established, the timing data from the existing VG generator can be output in the same way from the VG-848, and the data is output as shown in Fig. 3.3.20.

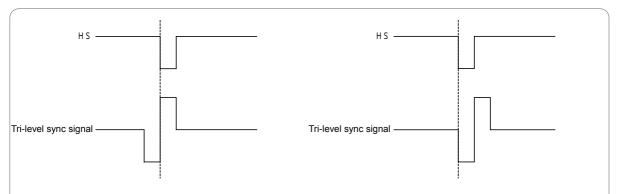


Fig. 3.3.19 Sync signals of VG-848 (normal mode)

Fig. 3.3.20 Sync signals of existing VG generator

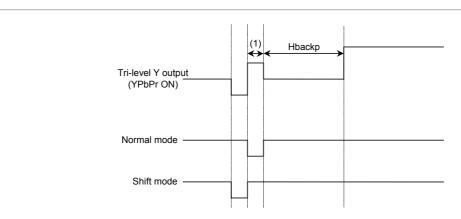


Fig. 3.3.21 Comparison between normal mode and shift mode



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

#### 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 : <u>0</u> (0-5)

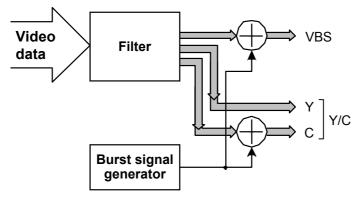
Fig. 3.3.22 Selecting the VBS output filter level

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	$\downarrow$	
2	-1.0dB	$\downarrow$	
3	-3.0dB	$\downarrow$	
4	-7.0dB (factory setting)	$\downarrow$	
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.

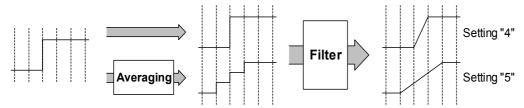


Fig. 3.3.23 Figure showing settings "4" and "5"

## [20] Setting the DDC transfer clock

#### Select the clock frequency for DDC.

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

Fig. 3.3.24 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.	

#### [20] Setting the DDC read method

#### Select the DDC read method.

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

Fig. 3.3.25 Selecting the DDC read method

Table 3.3.20 DDC read method selection method

Key	LCD display	Description
0		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 Concerning the DDC read mode

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

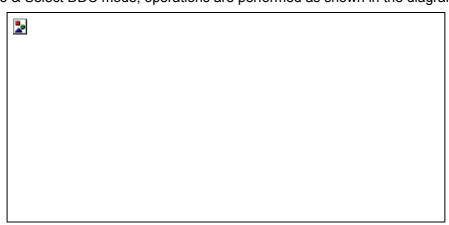


Fig. 3.3.26 Auto & Select DDC mode operations

#### [22] 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 : <u>G</u>ROUP (0/1)

Fig. 3.3.27 Selecting the RB-614C H-T key function

Table 3.3.23 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.

#### [23] 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 : <u>2</u>dot (0/1)

Fig. 3.3.28 Selecting the drawing dots

Table 3.3.24 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.	



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

## [24] Setting the overlay cursor

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

Cfg:Overlay Cursor:<u>O</u>FF (0/1)

Fig. 3.3.29 Selecting the overlay display

Table 3.3.25 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.

#### [25] Setting the internal program table

Select the program table of the internal data.

Cfg:InternalProgramTable : <u>P</u>G1 Table (1/2)

Fig. 3.3.30 Selecting the internal program table

Table 3.3.26 Internal program table selection method

Key	LCD display	Description
1	PG1 Table	Table PG1 which is compatible with existing generators is selected. (Factory setting)
2	PG2 Table	Table PG2, which is configured with NTSC, PAL or other standard timing data which supports EIA, VESA or analog TV specifications, is selected.

#### [26] Setting the scroll trigger (\*optional function)

#### Set the scroll trigger function to ON or OFF.

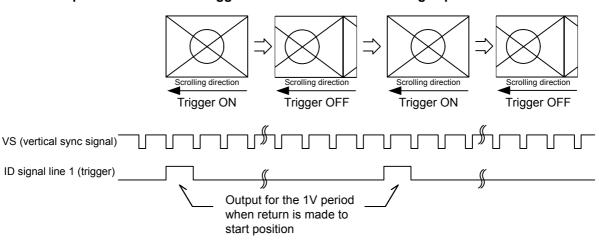
Cfg:Output ScrollTrigger :<u>O</u>FF(0/1)

Fig. 3.3.28 Selecting the scroll trigger

Table 3.3.23 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





- 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.



# SIGNAL OUTPUT AND DATA REGISTRATION PROCEDURES

## 4.1 Output of video signals (direct display FUNCO)

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

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.34

This section describes the direct display mode.

#### 4.1.2 Group data output (group display mode)

p.35

This section describes the group display mode.

#### 4.1.3 Changing the group numbers

p.36

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.36

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:  $\underline{0}$  (0-E) Direct Display

# (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 (PG1and 2) must be set. (Config edit FUNC5)
  - \* For details on the internal data, refer to "Program data" in 9.1.1.
- Fig. 4.1.1 Selecting the function



Fig. 4.1.2 Inputting the program number

- 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-848 are used, however, the [SET] key must be pressed after pressing the  $[\, \, \, \, \, \, ]$  or  $[\, \, \, \, \, \, ]$  key.

\* 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.

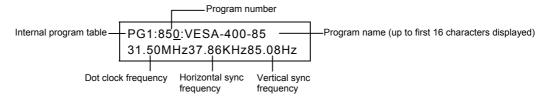


Fig. 4.1.3 Outputting the video signals



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.32) to "4.1.12 Changing the timing data settings" (p.39).

#### 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: <u>0</u> (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.

```
G01: <u>1</u>:
```

Fig. 4.1.5 Inputting the group data number

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

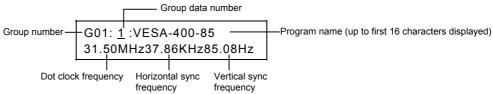


Fig. 4.1.6 Outputting the video signals



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.32).

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

Refer to "4.1.4 Switching the output patterns" (p.32) to "4.1.12 Changing the timing data settings" (p.39).

#### 4.1.3 Changing the group numbers

#### (1) Press the [ESC] key.

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

Fig. 4.1.7 Changing the group number

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

The group number can also be selected one at a time using the  $[ \frac{1}{4} ]$  key and  $[ \frac{1}{4} ]$  key.

(3) Press the [SET] key.

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



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

#### 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.

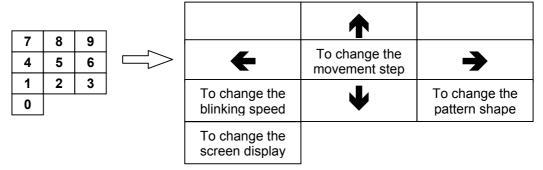


Fig. 4.1.9 Operations performed by cursor keys and key positions

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 $\rightarrow$ Normal 1 mode $\rightarrow$ Normal 2 mode $\rightarrow$ Reverse 1 mode $\rightarrow$ Reverse 2 mode)			
1	This changes the blinking speed. (No blinking $\rightarrow$ once in 1V $\rightarrow$ $\rightarrow$ once in 64V)			
2	This moves the cursor downward.			
3	This changes the pattern shape and switches the normal mode to the sub-pixel mode or vice versa.			
	Normal mode (Cross $\rightarrow$ V-Line) $\rightarrow$ Sub-pixel mode (5×5 $\rightarrow$ Cross $\rightarrow$ V-Line) $\rightarrow$ 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 $\rightarrow$ green $\rightarrow$ blue when it moves to the right and blue $\rightarrow$ green $\rightarrow$ red when it moves to the left.			
4	This moves the cursor to the left.			
5	This changes the movement step. (100dots → 10dots → 1dot)			
6	This moves the cursor to the right.			
8	This moves the cursor upward.			



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

#### ■ Moving the cursor

The cursor is moved using the [2], [4], [6] and [8] number keys.

When it moves, the screen display and the values of the cursor coordinates displayed on the LCD screen change.

Table 4.1.3 Cursor movements

Key	Movement direction	
2	<b>Ψ</b> : Downward	
4	★: Toward the left	
6	→: Toward the right	
8	<b>↑</b> : Upward	

<sup>\*</sup> 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 → Pixel units → RGB units (default) Normal1 Normal2	<b>→</b>	Pixel units Reverse1 *1 No display	<b>→</b>	RGB units Reverse2 *1 (hereafter repeated)
----------------------------------------------------------------	----------	------------------------------------------	----------	--------------------------------------------------

<sup>\*1: &</sup>quot;Reverse" is the Normal display with its characters rotated 180° so that its position is reversed at the top and bottom.

#### Switching the cursor blinking speed

The blinking speed of the cursor is changed using the [1] number key.

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

No blinking → Blinking once in 1V → Blinking once in 2V → Blinking once in 4V → Blinking once in 8V

Blinking once in 16V → Blinking once in 32V → Blinking once in 64V → (hereafter repeated)

#### ■ Changing the cursor shape

The shape of the cursor is changed using the [3] number key.

Each time the [3] key is pressed, the shape is changed by one setting in the following sequence. "Cross-shaped cursor" is the default shape.

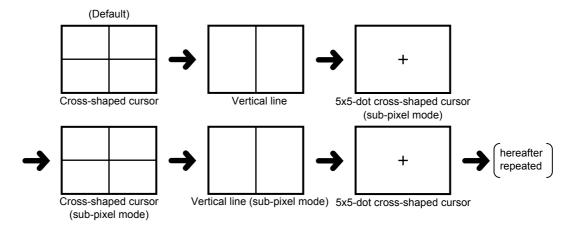


Fig. 4.1.10 Cursor shapes

#### ■ Switching the movement steps of the cursor

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

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

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

#### 4.1.6 Changing the window RGB levels

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

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

#### (1) Press the [WINDOW] key.

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



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



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

#### 4.1.7 Switching the output video signals and sync signals

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

Table 4.1.6 Video and sync signals to be output

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

#### 4.1.8 Switching audio output muting ON or OFF

Select the setting by pressing the [MUTE] key.

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

#### 4.1.9 Changing the video output levels

#### (1) Press the [LEVEL] key.

The LED of the [LEVEL] key lights, and the video output level is displayed on the LCD screen.

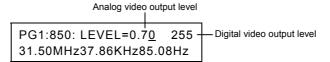


Fig. 4.1.12 Video output level

- (2) Input the 3-digit number using the number keys. The numerical values can also be incremented or decremented by one at a time using the [♣] key and [♣] key.
  - \* The changes are reflected in the outputs immediately.

Table 4.1.7 Changes in the video output levels

Item	Description
Analog video output level	The changes are reflected in the analog output only. Variable range: 0.30 to 1.20 [V]
Digital video output level	The changes are reflected in both the analog and digital outputs. Variable range: 0 to 255



When "0-255" (factory setting) is selected as the [15] DVI level mode setting 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.

#### (3) Press the [LEVEL] key.

The original display is restored.

#### 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. 4.1.13 Scrolling the pattern

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

Table 4.1.8 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	
2	D	For scrolling the pattern downward.	the specified direction.	
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	
7	L-U	For scrolling the pattern toward the top left.	the specified direction.	
8	U	For scrolling the pattern upward.		
9	R-U	For scrolling the pattern toward the top right.		

<sup>\*</sup> 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.



Scrolling operations cannot be performed when the HDCP, audio sweep, closed caption/V-chip, Teletext or Macrovision function is being used. (Refer to "10.4.3 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 FUNCO, 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.

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.

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.

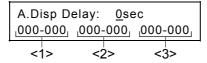


Fig. 4.2.3 Inputting the delay time and program numbers

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

When 1 to 99 has been specified as the group number

Only the delay time is set. The setting range is 0 to 999 seconds. No program numbers are displayed.

When 0 has been specified as the group number

Delay time: Setting range of 0 to 999 seconds

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

XXX - YYY

- 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: <u>3</u> (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.

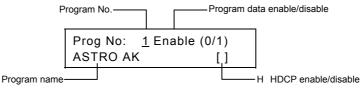


Fig. 4.3.2 Inputting the program number

#### (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: <u>0</u> (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: <u>0</u> (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.



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-848 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 [\$\frac{1}{2}\$] key and [\$\frac{1}{2}\$] 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/ROM Copy Sel :<u>0(</u>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.48
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.48
4	CHR Data Copy	For copying user character patterns in 1-character increments.	p.49
5	IMG Data Copy	For copying image data in 1-data increments.	p.49
6	OPT Data Copy	For copying user-created optional patterns in 1-data increments.	p.50
7	Group Data Copy	For copying group data in 1-group increments.	p.50
8	Auto Data Copy	For copying the auto display data.	p.51
9	Card Erase	For erasing all the data on the PC card.	p.51
Α	All Copy	For copying all the data on the PC card.	p.52
В	1 Prog Data Erase	For erasing the program data in 1-program increments.	p.53
С	Card Initialize	For initializing PC cards.	p.53

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



#### Concerning the handling of PC cards

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

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

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

- (1) Use the number keys to input the number (1 to 999) of the program whose data is to be copied, and press the [SET] key.
  - \* The VG-848's internal programs (No.850 to 999) can also be selected as the copy source.

1 Prog Data Copy Source Prog: <u>1</u>

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-848's internal programs (No.850 to 999) cannot be selected as the copy destinations.

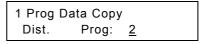


Fig. 4.4.4 Inputting the copy destination data program number

- (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-848's internal programs (No.850 to 999) can also be selected as the copy source.

Blk Prog Data Copy Source Prog: <u>1</u>- 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-848's internal programs (No.850 to 999) cannot be selected as the copy destinations.

Blk Prog Data Copy Dist. Prog: 1<u>1</u>- 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-848's internal user character patterns (F0H to FFH) can also be selected as the copy sources.

CHR Data Copy Source CHR:E<u>0</u>

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-848's internal user character patterns (F0H to FFH) cannot be selected as the copy sources. CHR Data Copy Dist. CHR:E<u>1</u>

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:<u>1</u>

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-848'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.

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.

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: <u>1</u>
```

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.

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.

#### 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-848 to copy all the data, use steps (1) to (5) below as a general guideline.



- Do not eject the PC card while data is being copied. Doing so may damage the PC card.
- When replacing the PC card, do not mistake the copy source card for the copy destination card or vice versa. Doing so may destroy the data.
- (1) Insert the PC card serving as the copy source, and press the [SET] key.

The first session data is read from the copy source.

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.

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.

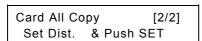
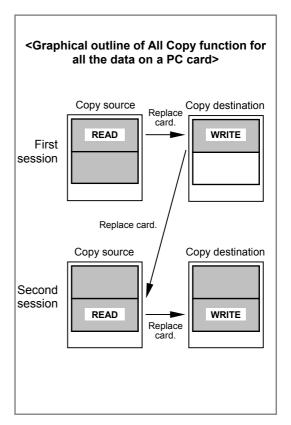


Fig. 4.4.21 Setting up the copy destination PC card

(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: <u>1</u>

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  $[\, \, \, \, \, \, \, \, \, \, ]$ 

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: <u>6</u> (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.: <u>1</u>

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=85 $\underline{0}$  Pat=900  $\leftarrow$  GEdit 03:Tim=85 $\underline{0}$  Pat=902  $\leftarrow$  (01) 02:Tim=851 Pat=901  $\leftarrow$  ...

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=85<u>0</u> (01) 02:Prg=851

Fig. 4.5.4 Setting the group data (PROG)

Input the program number.

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

Table 4.5.2 Selection method

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

#### (4) Save the edited data.

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").
- 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)



- User character patterns are edited while they are on the display. Before
  proceeding with the editing, connect the display device to the VG-848, and
  check that the patterns are displayed properly.
- The VG-848'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: <u>8</u> (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

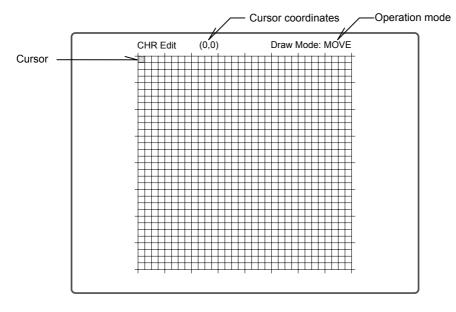


Fig. 4.6.4 What is displayed

#### (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 $\rightarrow$ dot clearing $\rightarrow$ 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.

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.
- 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)



- 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-848, 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: <u>9</u> (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:<u>0</u> (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.59
1	Program Name List	Used to display a list of the program names.	p.59
2	Group Name List	Used to display a list of the group names.	p.60
3	OPT Name List	Used to display a list of the optional pattern names.	p.60
4	IMG Name List	Used to display a list of the image data names.	p.61
5	Group Data List	Used to display the group data *1 registered in the group.	p.57

<sup>\*1:</sup> The program names, horizontal sync frequency, vertical sync frequency, program data enable/disable, horizontal timing, vertical timing, output condition, audio output 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 (85<u>0</u>) Program Data List

Fig. 4.7.3 LCD display

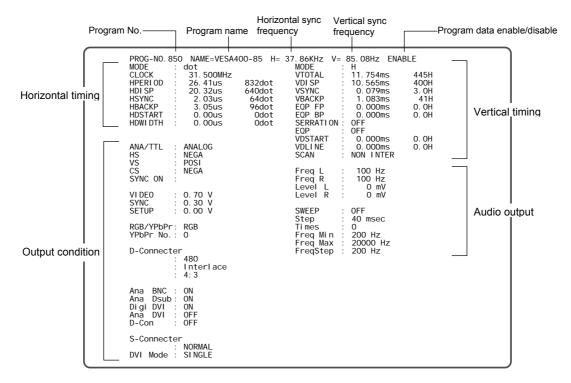


Fig. 4.7.4 Example of what is shown on the display

#### ■ 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=85<u>0</u>)
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= <u>1</u>))
Group Name List
```

Fig. 4.7.7 LCD display

```
Grou 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=4<u>0</u>)
OPT Name List
```

Fig. 4.7.9 LCD display

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

OPT-PTN List Block(Used=XXXXX, Unused=XXXXX)

NO SIZE NAME

40 506 256 Block Color

41 255 648-GRAY

42 317 Cross&Circle&Gray

SIZE: Number of unused blocks (in 1KB increments) on PC card

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

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

OPT-PTN List Block(Used=XXXXX, Unused=XXXXXX)

NO 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= <u>1</u>)
IMG Name List
```

Fig. 4.7.11 LCD display

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

IMG data Li st Bl ock (Used=XXXXX, Unused=XXXXX)

NO OPT-NO SI ZE NAME

1 80 (1024, 768) Image#1
2 81 (640, 480) Image#2
3 82 (1920, 1440) Image#3

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.

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

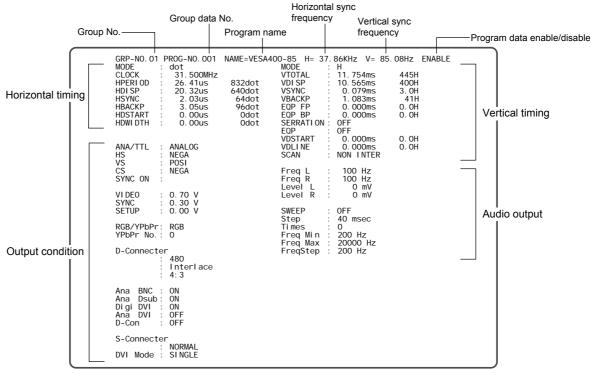


Fig. 4.7.15 Example of what is shown on the display

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

# 4.8 Setting the color difference coefficients

(YPbPr coefficient table edit FUNCA)

There are ten coefficient tables for conversion into YPbPr.

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

The YPbPr coefficient tables are valid when "YPbPr" has been selected as "[4] 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."

#### 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								
	а	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: <u>A</u> (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  $[\, \bigstar \,]$  key or  $[\, \bigstar \,]$  key.

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

Fig. 4.8.2 Inputting the table number

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

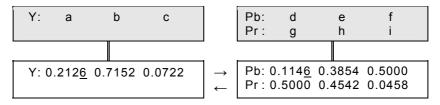


Fig. 4.8.3 Inputting the coefficients

#### (4) Save the edited data.

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



To restore the values in tables No.0 to 3 to the values given in Table 4.8.1, initialize the flash ROM as in 7.6. 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-848, and saved on PC cards.

- Use an RS-232C (crossover) cable to connect the VG-848 and the existing VG model.
- (2) Press the [FUNC] key, [B] key and [SET] key.

Select Function: <u>B</u> (0-E) ROM Copy

Fig. 4.9.1 Selecting the function

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

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

Fig. 4.9.2 Selecting the data copy source VG model

Table 4.9.1	Data copy source VG model selection method
-------------	--------------------------------------------

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

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

Table 4.9.2 Data copy selection method

Function	: <u>0</u>	(0-2)
Block Prog. Data	Со	ру

Fig. 4.9.3 Selecting the data to be copied

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

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

Table 4.9.3 Copy source ROM type selection method

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

Fig. 4.9.4 Selecting the ROM type as the copy source

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 sou	irce (existing model)	
Src Prg No.	:00 <u>1</u> -010	
Dst Prg No.	:005-015	
Copy destination (VG-848)		

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

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

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



If data outside the setting range of the VG-848 is included in the copied program data, the program data concerned will be disabled.

# 4.10 Setting and executing HDCP (HDCP set FUNCC) Supported by the VG-848-H only

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 FUNCO. 

"4.10.3 HDCP execution."

#### 4.10.1 HDCP settings

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

Select Function: <u>C</u> (0-E) HDCP Setting

Fig. 4.10.1 Selecting the function

(2) Select the execution mode and display mode.

Exec. Mode: <u>E</u>nable (0-2) Disp. Mode: NG Only (0-2)

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	0	Disable	HDCP is not executed.
mode (Exec. Mode)	1	Enable	HDCP is executed when all programs are executed.
(Exec. Mode)	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	0	NG Only	The results appear on the display only when the checks yields NG.
(Disp. Mode)	1	All	The check results appear on the display every time.
	2	Pattern	HDCP is executed with the pattern displayed.

(3) Press the [▼] key to move to the next page, and set the HDCP authentication execution interval (Interval) using the number keys.

The HDCP authentication is executed at the interval which has been set (in 1-second increments). Setting range: 1 to 10 [sec] (factory setting: "1")

Interval: <u>1</u> sec (1-10)

Fig. 4.10.3 Setting the execution interval

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

Ri NG Reset : ON (0/1)

Fig. 4.10.4 Setting automatic resetting ON/OFF

Table 4.10.2 Automatic resetting ON/OFF setting method

Key	LCD display	Description
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.



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

- (5) Save the data which has been set.
  - 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

- 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: <u>3</u> (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.

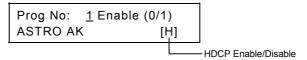


Fig. 4.10.7 Selecting enable or disable for HDCP

Table 4.10.3 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	Н	Enable (HDCP is executed when "Program" has been selected as the HDCP execution mode).

#### (3) Save the data which has been set.

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

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



- HDCP is executed only when programs are executed by direct display FUNCO.
- When operations are initiated by a function other than direct display FUNCO, the
  authentication check is not conducted, and so errors such as the hot plug error cannot be
  detected.
- The HDCP function cannot be executed simultaneously with the pattern action, audio sweep and a few other functions. For details, refer to "10.4.3 Concerning functions which cannot be executed simultaneously."

#### 4.10.3.1 Executing HDCP

When a program is executed by direct display FUNCO, 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.

#### 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:  $[*] \rightarrow [*]$ .

PG1: 1:XXXXXXX → PG1: 1:XXXXXXX 31.50MHz37.86KHz83.40Hz \* ← 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" or "All" has been selected as the display mode (Disp. Mode) by the HDCP set FUNCC:

When "All" is selected, the results are shown in 5 each time the HDCP authentication and encryption are completed.

When "NG Only" is selected, the results are shown in 5 only when the results are NG. \* The pattern is not displayed.

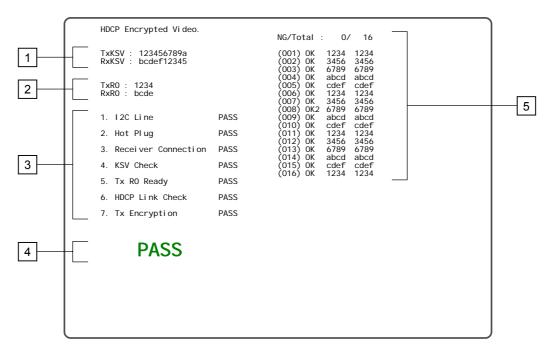


Fig. 4.10.10 What appears on the display during HDCP execution (NG Only/All)

Details of what is displayed are given below.

No.	Details
1	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.
2	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.
3	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.
4	If all the authentications have been conducted successfully, "PASS" (green) is displayed here; otherwise, "NG" (red) appears.
5	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 Synchronization Verification Values (Ri, Ri') and HDCP authentication status are displayed instead.

This is always displayed here.

If the authentication has been completed successfully, "Authentication PASS" is displayed here; if it has failed, "Authentication NG" appears.

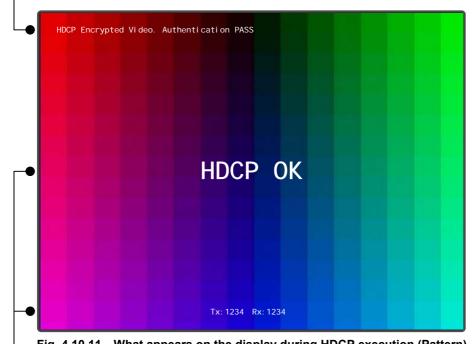


Fig. 4.10.11 What appears on the display during HDCP execution (Pattern)

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

Top: HDCP authentication status (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.

#### 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. Resetting is automatic when the timing data is switched.

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 (250ms) occurred in the Ri read instruction of the receiver.
153H	HDCP Tx KSV Error	The KSV of the transmitter does not contain twenty "0" and "1."
154H	HDCP Rx KSV Error	The KSV of the receiver does not contain twenty "0" and "1."
155H	HDCP Link Check Error	The values did not match during the initial authentication.
156H	HDCP Encrypt Error	Encryption was not completed.
157H	HDCP Hot Plug Error	The DVI connector is not connected to the receiver. *2
158H	HDCP Ri Ready Error	The Ready bit of the receiver was not set to high.
159H	HDCP DVIModeDual Err	The DVI mode is set to dual.
15aH	HDCP Hfp Error	The H front porch is "0."
15bH	HDCP Hbp Error	The H back porch is "0."
15cH	HDCP Hblank Error	The H blanking interval is less than "128."
15dH	HDCP Vfp Error	The V front porch is "0."
15eH	HDCP H-TIM Error	H timing error.
160H	I2C ACK Error Tx	ACK is not returned from the transmitter.
161H	I2C ACK Error Rx	ACK is not returned from the receiver.
162H	I2C Line Error	The I2C line is not operating properly.
165H	HDCP Ri NG	The values of Ri and Ri' do not match.

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

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

# 4.11 How to execute calibration (calibration FUNCD)

This section describes how the video output levels are calibrated.

Since the VG-848's video output levels were adjusted during its shipment inspection using a 1.5-meter long cable, there is no need to calibrate the generator for normal use.

When the cable used to connect the generator with the display is long or external conditions cause the video output levels to be at variance from the settings, proceed with calibration to suit the conditions concerned.

#### What to have ready

Provide the following equipment for executing calibration.

- Oscilloscope
  - A model which can measure voltage levels below 2mV during 700mV measurements is recommended.
- Multimeter
  - A model with a DC voltage accuracy of  $\pm 0.5\%$  rdg.  $\pm 5$  dgt or less is recommended.
- 750 terminator
  - A model with V.S.W.R. characteristics of less than 1.1 is recommended.
- BNC cable Cable used for connecting the VG-848 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.

V

Execute automatic calibration.

Finely adjust the video levels.

V

End

#### (1) Executing calibration

Display the setting screen on which calibration is initiated.



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: <u>D</u> (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-848 and measuring two actual output levels, both values are compensated.

- 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:<u>M</u>IN (0/1)

Fig. 4.11.3 Selecting the reference voltage level

Table 4.11.1 Reference voltage level selection method

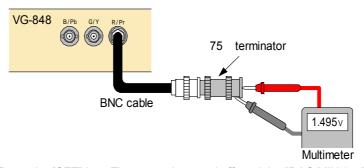
Key	LCD display	Description
0	MIN	Reference voltage level 1) (approx1000mV) is output.
1	MAX	Reference voltage level 2) (approx. 1500mV) is output.

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

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



- 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.

- Press the [¥] key to move to the next page.
- 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: <u>-</u>1000G: -1000B: -1000 MaxR:+1500G:+1500B:+1500

Fig. 4.11.5 Setting the reference voltages

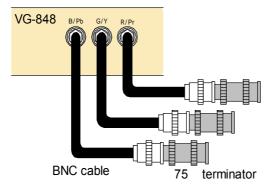
- 3) Press the [SAVE] key. The LED of the [SAVE] key blinks.
- 4) Press the [SAVE] key. When the data has been saved, the "DACOUT VOLT DATA SAVE" message is displayed, and the LED of the [SAVE] key goes off.

MinR: <u>-</u>1000G: -1000B: -1000 DACOUT VOLT DATA SAVE

Fig. 4.11.6 Saving the data

#### (4) Automatic calibration execution

- Press the  $[\ \ \ ]$  key to move to the next page.
- Connect as shown in the figure below.



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.

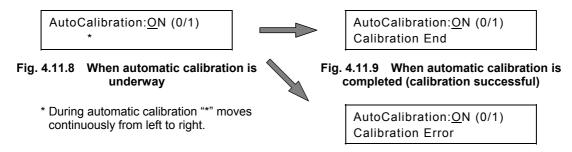


Fig. 4.11.10 When automatic calibration is completed (calibration unsuccessful)

#### 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-848. 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



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

#### Fine adjustment of video levels (5)

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, vertical timing, output condition, audio output, closed caption/V-chip \*, Teletext \* and Macrovision \* data (optional functions indicated by \*).

#### 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.

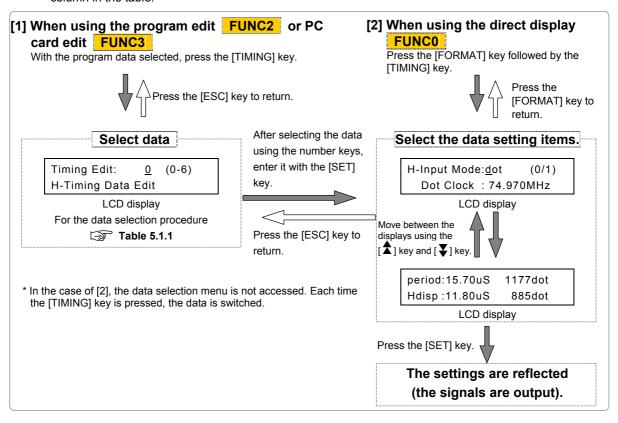
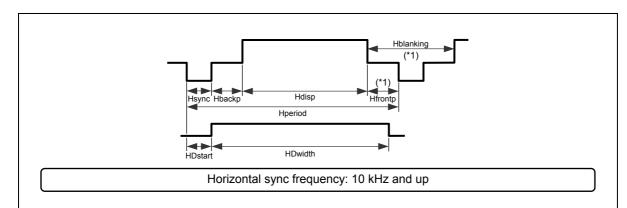


Fig. 5.1.1 Basic operations for setting the timing data

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.76	p.81
1	V-Timing Data Edit	Vertical timing		p.77	p.85
2	Output Data Edit	Output condition		p.78	p.93
3	Audio Data Edit	Audio output		p.79	p.100
4	Caption Data Edit	Closed caption/V-chip		p.80	p.104
5	TeleText Edit	Teletext	Optional function	p.80	p.116
6	Macrovision Edit	Macrovision		p.80	p.121

#### 5.1.2 Horizontal timing data configuration list



Timing data	Setting item	Setting range		Remarks	
Horizontal timing	Input mode	us or dots			
	Dot clock frequency	5.000 to 300.000 N	1Hz	1 kHz increments	
	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)	*2
				5 to 100 MHz: 1-dot increments	
				Up to 200 MHz: 2-dot increments	
				Up to 250 MHz: 4-dot increments	
	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

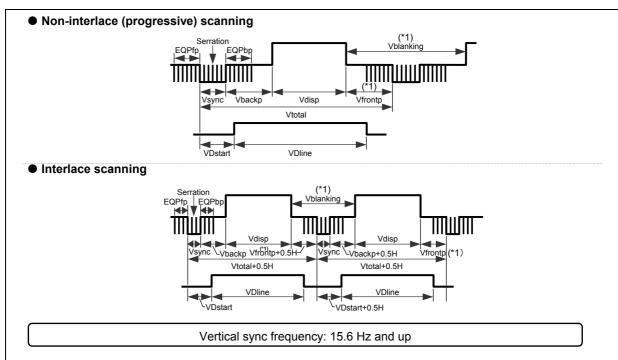
- \*1: Hfrontp and Hblanking are calculated from the values of other setting items.
  - Hfrontp = Hperiod Hdisp Hsync Hbackp
  - Hblanking = Hperiod Hdisp
- \*2: When "0" is set for H FRONT PORCH, then set Hsync to:
  - 2 dots or more when the dot clock frequency is 100.001 to 200 MHz
  - 4 dots or more when the dot clock frequency is 200.001 to 300 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 300 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 300 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-848.)

Set the sum within the following range: (HDstart + HDwidth) ≤ Hperiod

\* In addition to the above, other restrictions apply to the DVI output.

© 5.1.12 Timing restrictions on DVI output (p.74)

#### 5.1.3 Vertical timing data configuration list



Timing data	Setting item	Setting range			Remarks	
Vertical	Input mode	H / ms				
timing	Scanning mode	Non-interlace, interla	ice & sync, inte	erlace & video		
	Vtotal	0.000 to 99.999 ms	4 to 8192 H	Non-interlace (progressive)	1H increments	
			4 to 4096 H	Interlace scanning		
	Vdisp	0.000 to 99.999 ms	1 to 4096 H			
	Vsync	0.000 to 99.999 ms	1.0 to 99.0 H		0.5H increments	
	Vbackp	0.000 to 99.999 ms	0 to 4096 H		1H increments	
	Vfrontp	(0.000 to 99.999 ms)	(0 to 4096 H)			*1
	EQPfp	0.000 to 99.999 ms	0.0 to 99.0 H		0.5H increments	*2, 3
	EQPbp					
	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-848.)

Set the sum within the following range: (VDstart + VDline) ≤ Vtotal

# 5.1.4 DVI output timing restrictions

In addition to the restrictions described earlier, the horizontal timing data of DVI outputs are subject to the restrictions below.

Mode	Setting item	Setting range		
Single Link	Dot clock frequency	25 to 165MHz		
	All horizontal timing data *1	Dot clock frequency 25 to 100 MHz : 1-dot increments Dot clock frequency 100.001 to 165 MHz : 2-dot increments		
Dual Link	Dot clock frequency	50 to 300MHz		
	All horizontal timing data *1	4-dot increments		

<sup>\*1:</sup> Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking

#### 5.1.5 Output condition data configuration list

Timing data	Setting item		Setting range	
Output condition	Sync signal o	utput mode	ANALOG / TR1080 / TR1035 / TR720 / NTSC / PAL /	
			SECAM / NTSC-M / NTSC-443 / PAL-M / PAL-60 /	
			PAL-N / PAL-Nc	
	CV (composit	te video sync signal)	OFF / R / G / RG / B / RB / GB / RGB	
	CS (composit	te sync signal)	Nega / Pogi / OFF / HS / VS	
	HS (horizonta	al sync signal)	Nega / Posi / OFF / CS	
	VS (vertical s	ync 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 le	evel	0.00 to 0.60 V (in 0.01V increments)	
	RGB/YPbPr		RGB / YPbPr	
	YPbPr coeffic	cient table number	0 to 9	
	D connector	Line1	480 / 720 / 1080	
		Line2	Interlace, progressive	
		Line3	4:3 / 4:3LB / 16:9	
	BNC connect	or output	OFF / ON	
	D-Sub conne	ctor output		
	DVI-D connec	ctor output		
	DVI-A connec	ctor output		
	D connector of	output		
	S connector of	output format	Normal, letter-box, squeeze	
	DVI output m	ode	Single Link / Dual Link	
	Aspect ratio		4:3, 16:9, same as screen resolution, user setting [H 1-255]:[V 1-255]	
	Black insertio	n function ON/OFF	OFF / ON	
	Black insertion	Insertion position	Entire screen, left half, right half	
		Pattern display (ON) time	0 to 255V	
		Black insertion (OFF) time	0 to 255V	

# 5.1.6 Audio output data configuration list

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

# 5.1.7 Closed caption/V-chip data configuration list (\*optional function)

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
	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)

#### 5.1.8 Teletext data configuration list (❖optional function)

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

#### 5.1.9 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

# 5.2 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.

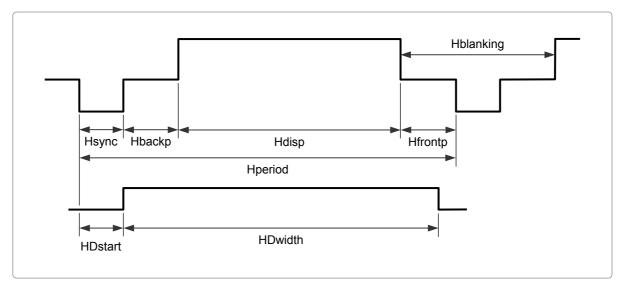


Fig. 5.2.1 Horizontal timing data

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 output, the horizontal timing data is subject to other restrictions. Refer to "5.1.4 DVI output timing restrictions."

Table 5.2.1 Reference pages for setting details

No.	Setting item	Reference page
1	Input mode	p.82
	Dot clock frequency	
2	Hperiod	p.83
	Hdisp	
	Hblanking	
3	Hsync	p.84
	Hbackp	
	Hfrontp	
4	HDstart	p.84
	HDwidth	

#### 5.2.2 Details of item settings

#### [1] Setting the input mode and dot clock frequency

H-Input Mode:<u>d</u>ot (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	0	μS	μs mode: The values for the items are input in microseconds.
(H-Input Mode)	1	dot	dot mode: The values for the items are input in dots.
Dot clock (Dot Clock)	Number keys	XX.XXXMHz	Setting range: 5.000 to 300.000 MHz  • When the "C" ([SHIFT) + [6]) key is pressed, * appears on the LCD display, and the setting is fixed.

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

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

Table 5.2.3 Input modes

- 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 83<u>2</u>dot 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]

<sup>\*</sup> 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 300 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]

<sup>\*</sup> 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.



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

#### [4] Setting HDstart and HDwidth

HDstart: 0.00uS <u>0</u>dot 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]



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-848.)

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.

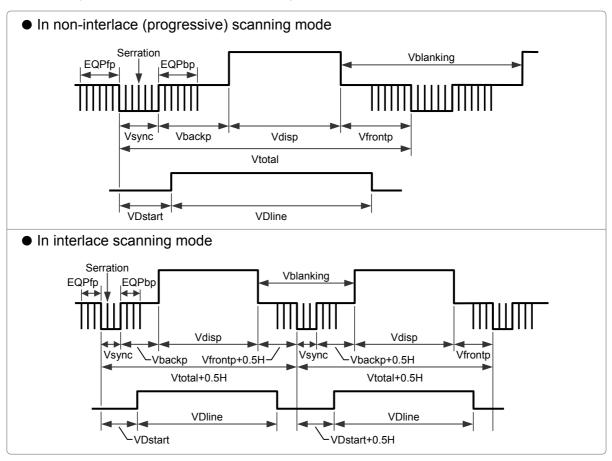


Fig. 5.3.1 Vertical timing data

Table 5.3.1 Reference pages for setting details

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.)

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

No.	Setting item	Reference page
1	Input mode	p.86
	Scanning mode	
2	Vtotal	p.87
	Vdisp	
	Vblanking	
3	Vsync	p.88
	Vbackp	
	Vfrontp	
4	EQPfp	p.89
	EQPbp	
5	Serration	p.91
	EQP (on/off)	
6	VDstart	p.92
	VDline	

#### [1] Setting the input mode and scanning mode

V-Input Mode:<u>H</u> (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	Н	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	0	Non Interlace	Non-interlace (progressive) scanning mode
(Scan)	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 figure below shows the differences based on the scanning mode.

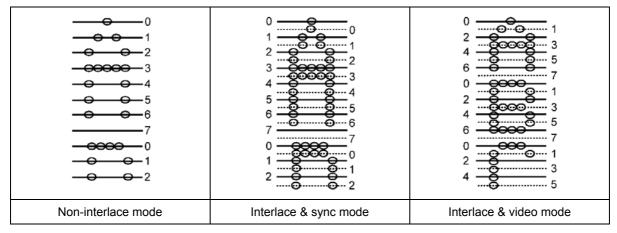


Fig. 5.3.3 Differences by scanning mode



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

<sup>\*</sup> 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.

# [2] Setting Vtotal, Vdisp and Vblanking

Vtotal :11.754mS 44<u>5</u>H Vdisp1:10.565mS 400H

Fig. 5.3.4 Setting Vtotal and Vdisp

#### Table 5.3.3 Vtotal and Vdisp (Vblanking) setting method

Setting item	Key	LCD display	Description
Vtotal	Number keys	XX.XXXmS XXXXH	Setting range:  In the non-interlace scanning mode  0.000 to 99.999 [ms], 4 to 8192 [H] (in 1H increments)  In the interlace scanning mode  0.000 to 99.999 [ms], 4 to 4096 [H] (in 1H 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.
Vdisp	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 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 - Vdisp  For Vblanking in the interlace scanning mode, refer to Fig. 5.3.1.  Setting range: 2H or more

#### [3] Setting Vsync, Vbackp and Vfrontp

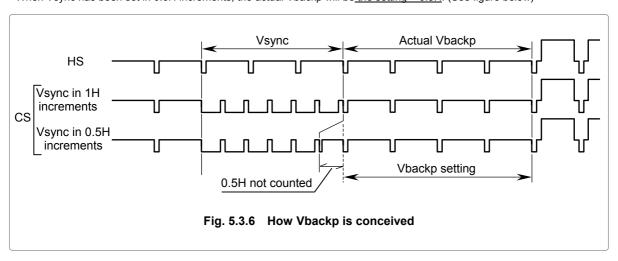
 $\begin{array}{ccc} \text{Vsync} & : \text{ 0.079mS} & \text{ 3.}\underline{0}\text{H} \\ \text{Vbackp} & : \text{ 1.083mS} & \text{ 41H} \end{array}$ 

Fig. 5.3.5 Setting Vsync and Vbackp

Table 5.3.4 Vsync and Vbackp (Vfrontp) setting method

Setting item	Key	LCD display	Description
Vsync	Number keys	XX.XXXmS XX.XH	Setting range: 0.000 to 99.999 [ms], 1.0 to 99.0 [H] (in 0.5H increments)
Vbackp	Number keys	XX.XXXmS XXXXH	Setting range: 0.000 to 99.999 [ms], 0 to 4096 [H](in 1H increments)
Vfrontp			Vfrontp is automatically calculated from the values of Vtotal, Vdisp, Vsync and Vbackp.  Calculation formula: Vfrontp = Vtotal - Vdisp - Vsync - Vbackp Setting range:  0.000 to 99.999 [ms], 0 to 4096 [H]

<sup>\*</sup> When Vsync has been set in 0.5H increments, the actual Vbackp will be the setting + 0.5H. (See figure below)



#### [4] Setting EQPfp and EQPbp

EQPfp: 0.000mS 0.<u>0</u>H EQPbp: 0.000mS 0.0H

Fig. 5.3.7 Setting EQPfp and EQPbp

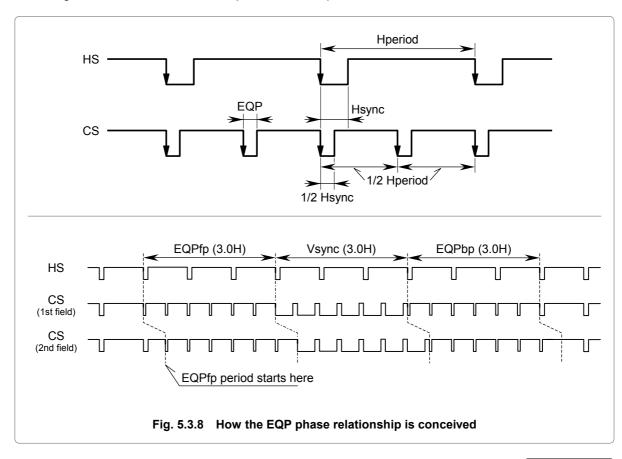
Table 5.3.5 EQPfp and EQPbp setting method

Setting item	Key	LCD display	Description
EQPfp	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)
EQPbp	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)



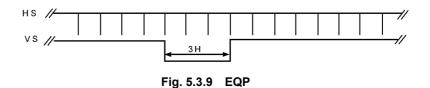
- When the non-interlace (progressive) scanning mode is used and tri-level sync signals are output, EQPfp and EQPbp cannot be set in 0.5H increments. Set them in 1H increments.
- When the interlace scanning mode is used and tri-level sync signals are output, EQPfp must be set within the range of [(EQPfp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

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



Setting examples Next page

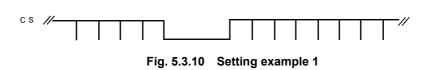
Four examples of the EQPfp, EQPbp, EQP and Serration are shown below.



#### <Example 1>

Table 5.3.6 Setting 1

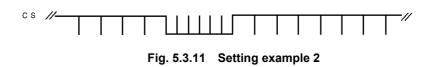
Setting item	Setting
EQPfp	ОН
EQPbp	ОН
EQP	OFF
Serration	OFF



#### <Example 2>

Table 5.3.7 Setting 2

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



#### <Example 3>

Table 5.3.8 Setting 3

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



#### <Example 4>

Table 5.3.9 Setting 4

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



Fig. 5.3.13 Setting example 4

#### [5] Setting Serration and EQP (ON/OFF)

Serration	: <u>O</u> FF	(0-3)
EQP (on/of	f):OFF	(0/1)

Fig. 5.3.14 Setting Serration and EQP (ON/OFF)

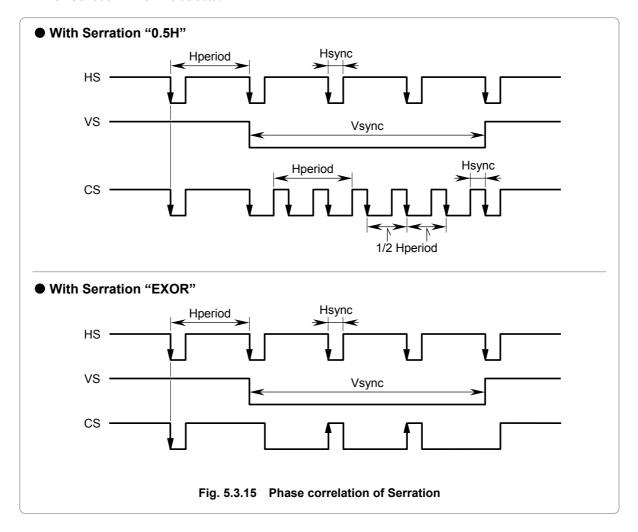
Table 5.3.10 Serration and EQP (ON/OFF) setting method

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.	



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.



#### [6] Setting VDstart and VDline

Fig. 5.3.16 Setting VDstart and VDline

Table 5.3.11 VDstart and VDline setting method

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



The sum of VDstart and VDline cannot be set in excess of VTotal. (\* The settings can be edited to ensure data compatibility with other models, but they will be ignored by the VG-848.)

Set the sum within the following range:

(VDstart + VDline) ≤ Vtotal

# 5.4 Setting the output condition data

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

Table 5.4.1 Reference pages for setting details

No.	Setting item	Reference page	
1	Sync signal out	p.94	
2	CV (composite	p.95	
	CS (composite s		
	HS (horizontal s	ync signal)	
	VS (vertical syn	c signal)	
3	Video output lev	rel	p.96
	Setup level		
	Sync signal leve		
4	RGB / YPbPr		p.96
5	YPbPr coefficier	nt table number	p.96
6	D connector Lin	e1	p.97
7	D connector Lin	e2	p.97
	D connector Lin	e3	
8	BNC connector	p.97	
	D-Sub connecto		
9	DVI-D connecto	r output	p.98
	DVI-A connecto	r output	
	D connector output		
10	S connector out	p.98	
11	DVI output mod	p.98	
12	Aspect ratio	p.99	
13	Black insertion function ON/OFF		p.99
	Black insertion	Insertion position	
		Pattern display (ON) time	
		Black insertion (OFF) time	

#### [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
5	PAL	PAL mode	969 (PG1)	to ON. If the sync signals (Hsync, Hperiod, Vsync and Vtotal) settings
6	SECAM	SECAM mode	964 (PG1)	selected differ from the standard
7	NTSC-M	NTSC-M mode	994 (PG1) 859 (PG2)	timings contained inside the VG-848, the VBS output is set to OFF.
8	NTSC-443	NTSC-443 mode	860 (PG2)	
9	PAL-M	PAL-M mode	861 (PG2)	
Α	PAL-60	PAL-60 mode	862 (PG2)	
В	PAL-N	PAL-N mode	863 (PG2)	
С	PAL-Nc	PAL-Nc mode	864 (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:<u>R</u>GB (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	0		OFF
(composite video sync signal)	1	R	The composite sync signal is carried on R.
Syric digital)	2	G	The composite sync signal is carried on G.
	3	RG	The composite sync signal is carried on R/G.
	4	В	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	0	N	Negative
(composite sync signal)	1	Р	Positive
Signal)	2	-	OFF
	3	HS	The horizontal sync signal is set.
	4	VS	The vertical sync signal is set.
HS	0	N	Negative
(horizontal sync signal)	1	Р	Positive
olginal)	2	-	OFF
	3	CS	The composite sync signal is set.
VS	0	N	Negative
(vertical sync signal)	1	Р	Positive
	2	-	OFF

<sup>•</sup> 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.

<sup>•</sup> 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)



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.

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	0	SMPTE 274M, 296M, RP-177
No.	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: <u>1</u>080 (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		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: <u>I</u>nterlace (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	0	OFF	The output is set to OFF.
output D-Sub connector output	1	ON	The output is set to ON.

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

DVI-D :<u>O</u>N 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	0	OFF	The DVI digital output is set to OFF.
output	1	ON	The DVI digital output is set to ON.
DVI-A connector 0 output 1	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 : <u>N</u>ORMAL (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)
(C Commedia)	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.

3:Output at NORMAL setting

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

9: Output at LETTER BOX setting

4: Output at NORMAL setting

16: Output at LETTER BOX setting

#### [11] Setting the DVI output mode

DVI Mode : SINGLE (0/1)

Fig. 5.4.11 Selecting the DVI output mode

Table 5.4.12 DVI output mode selection method

Setting item	Key	LCD display	Description
DVI output mode	0	SINGLE	The signals are output in the Single Link mode.
	1	DUAL	The signals are output in the Dual Link mode.*1

#### [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, 25, 26, 34 or 3D is output.

Aspect Mode : <u>4</u>:3 (0-3) User: H: 1 V: 1(1-255)

Fig. 5.4.12 Setting the aspect ratio

Table 5.4.13 Aspect ratio setting method

Setting item	Key	LCD display	Description
Aspect ratio	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 black insertion

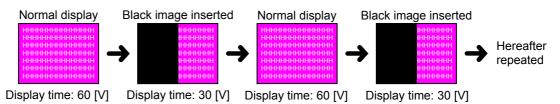
Insert Black Frame:<u>O</u>FF Sel:All ON: 0 OFF: 0

Fig. 5.4.13 Setting the black insertion

Table 5.4.14 Black insertion setting method

Setting item	Key	LCD display	Description	
Black insertion function	0	OFF	A black ima	age is not inserted. (Normal setting)
ON/OFF (Insert Black Frame)	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.100
		R	
2	Output level	L	p.100
		R	
3	SWEEP	p.101	
4	Frequency	Time step	p.102
	sweep	Number of repetitions	
5	Frequency sweep	Minimum frequency	p.102
		Maximum frequency	
6	Frequency sweep	Frequency step	p.103

#### [1] Setting the output frequency

FREQ L : <u>1</u>00 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: <u>0</u> 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 : <u>O</u>FF (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 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  $0V \to 2V \Rightarrow$  right  $0V \to 2V \Rightarrow$  left  $2V \to 0V \Rightarrow$  right  $2V \to 0V] \Rightarrow ...$  Hereafter repeated.

When sweeping from right to left: [Right  $0V \to 2V \Rightarrow$  left  $0V \to 2V \Rightarrow$  right  $2V \to 0V \Rightarrow$  left  $2V \to 0V \Rightarrow$  le



- 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 "10.4.3 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: <u>4</u>0 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	١
Time step	0	40	40 ms	This sets the time interval per step.
(SWEEP 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	
	А	240	240 ms	
	В	260	260 ms	
	С	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: <u>2</u>00Hz MAX:20000Hz

Fig. 5.5.5 Setting the minimum and maximum frequencies for frequency sweep

Table 5.5.6 Frequency sweep minimum and maximum frequency setting method

Setting item	Key	LCD display	Description
Minimum frequency (MIN)	Number keys	XXX00 Hz	Setting range: 200 to 20000 [Hz] (in 100 Hz increments)
Maximum frequency (MAX)			

# [6] Setting the frequency step for frequency sweep

FREQ SWEEP (200-19800) STEP: <u>2</u>00Hz

Fig. 5.5.6 Setting the frequency step for frequency sweep

Table 5.5.7 Frequency sweep frequency step setting method

Setting item	Key	LCD display	Description
Frequency step	Number keys	XXX00 Hz	Setting range: 200 to 19800 [Hz] (in 100 Hz increments)

# 5.6 Setting the closed caption and V-chip functions (❖optional function)

#### 5.6.1 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.



- 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 "10.4.3 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 5.6.1 Reference page for details on closed caption settings

No.	Setting item	Reference page	
1	Output data	p.106	
2	Loop	p.106	
	Delay		
3	Internal caption data  Output mode		p.107
List	of internal caption data	p.108,109	

Table 5.6.2 Reference page for details on V-chip settings

No.	Setting item	Reference page
1	Rating systems	p.110
2	MPAA ratings	p.111
	U.S. TV ratings	
3	Extension bits FV, V, S, L and D for U.S. TV rating systems	p.113
4	Canadian English rating	p.114
	Canadian French rating	
5	Interval	p.115

#### • 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).

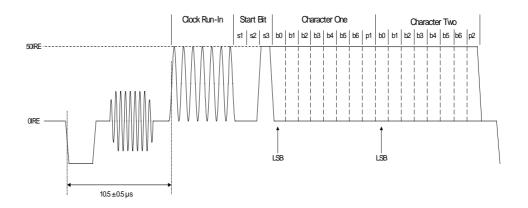


Fig. 5.6.1 Line 21 (284) waveform

#### 5.6.2 Details of closed caption item settings

#### [1] Setting the output data

CaptionDataNo: <u>0</u> (0=Default 1-20=User)

Fig. 5.6.2 Setting the output data

Table 5.6.3 Output data setting method

Setting item	Key/LCD display	Description
Output data	0	This uses the internal caption data.
(CaptionDataNo)		(For details on the data, refer to "5.6.3 Internal caption data.")
	1-20	This uses the data (UserData) edited by SP-8848.

\* UserData can be edited using the SP-8848 software program provided. The VG main unit does not have any editing functions.

#### [2] Setting loop and delay

CaptionLoop : <u>0</u>sec(0-10) CaptionDelay: 0sec(0-10)

Fig. 5.6.3 Loop and delay setting

Table 5.6.4 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.



- 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:<u>O</u>FF (0-8) DefStyle:PopOn (0-2)

Fig. 5.6.4 Setting the output mode and style

#### Table 5.6.5 Output mode setting method

Setting item	Key	LCD display	Description
Output mode	0	OFF	This sets the closed caption function to OFF.
(CaptionDefMode)	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.

<sup>\*</sup> 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 5.6.6 Setting method for style in closed caption mode

Setting item	Key	LCD display	Description
Style	0	PopOn	This sets the Pop
(DefStyle)	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

aispiayea.

**PaintOn**: The caption data is displayed character by character.



When a number from 1 to 20 has been selected for the output data in "[1] Setting the output data", the contents of UserData take precedence, and the setting of this item is not reflected.

# 5.6.3 Internal caption data

■ CC1 to 4 (1/2)

0 "	-,	5 1 " 1 " 1	
Setting		Row, color, optional setting, etc.	Characters
CaptionDefMode	DefStyle		
CC1	Pop-on	ROW: 13	Closed Caption Mode 1 Pop-On
		Background: Black, semi-transparent	
		Text: White	
	Roll-up	RU2	Closed Caption Mode 1
	-	ROW: 2,3	Roll-up RU2
		Background: Blue, non-transparent	
		Text: Cyan (row 2), White (row 3)	
	Paint-on	ROW: 2,3,4	Closed Caption Mode 1
		Background: Red, semi-transparent	Paint-on
		Text: Green	ABCDEFGHIJKLMNOPQRSTUVWXYZ
CC2	Pop-on	ROW: 2 - Indent4	Closed Caption Mode 2 PopO
002		3 - Indent4, Tab Offset 2	0123456789
		Background: White, semi-transparent	
		Text: Cyan, underlined	
	Roll-up	RU3	Closed Caption Mode 2
	Tton-up	ROW: 13,14,15 - Indent4	Roll-up RU3
		Background: White, non-transparent	!"#\$%&'()ñ+
		, ,	! #\$ /0X ()II+
	Paint-on	Text: Green (row 13), white (rows 14, 15)  ROW: 8 - Indent8, Tab Offset 3	ClosedCentionMede2
	Pairit-Oil	·	ClosedCaptionMode2
		9 - Indent4、Tab Offset 2	Paint-On abcdefg
		Background: Magenta, non-transparent	
		Text: White, in italics	
CC3	Pop-on	ROW: 2,13	Closed Caption Mode 3 Pop-On
		Background: Cyan, semi-transparent	ÁÉÓÚÜü'¡*.–©SM∙□"
		Text: Yellow, underlined, flashing	
	Roll-up	RU4	Closed Caption Mode 3
	-	ROW: 5	Roll-up RU4
		Background: Cyan, semi-transparent	ÃãÍÌìÒòÕõ{} \ ^_ ~
		Text: Blue	®°··· ¢£ â êâêîôû
	Paint-on	ROW: 2	Closed Caption Mode 3 Paint-On
	i aint on	4 - Tab Offset 1	ÀÂÇÈÊËĕÎÏïÔÙùÛ«»
		6 - Tab Offset 2	ÃãÍÌÌÒòÕõ{} \ ^_ ~
		8 - Tab Offset 3	ÄäÖöߥ¤
		Background: White, non-transparent	AaOois‡¤
CC4	Pop-on	Text: Red ROW: 2	Closed Caption Mode 4 Pop-On
004	- up-un	4 - Tab Offset 1	ÀÂÇÈÊËËÎÏÏÔÙùÛ«»
			AAÇEEEeIIIOUUU«»
		6 - Tab Offset 2	ÃãÍÌÒÒÕÕ{} \ ^_ ~
		8 - Tab Offset 3	ÄäÖöߥ¤
		Background: Green, semi-transparent	
	D. II	Text: White, flashing	Observations for Maria 4
	Roll-up	RU3	Closed Caption Mode 4
		ROW: 11,12,13	Roll-up RU3
		Background: Cyan, non-transparent	ÄäÖöߥ¤
		Text: Green, in italics	
	Paint-on	ROW: 5 - Indent4	Closed Caption Mode 4
		6 - Indent4、Tab Offset 1	Paint-On
		7 - Indent4、Tab Offset 2	ABCDEFGHIJKLM
		8 - Indent4、Tab Offset 3	nopqrstuvwxyz
		Background: Black, semi-transparent	
		Text: White	
L	ļ	TOAL TYTING	ļ

■ TXT1 to 4 (2/2)

■ 1X11 to 4 (2)	12)		
Setting		Row, color, optional setting, etc.	Characters
CaptionDefMode	DefStyle		
TXT1	-	Background: Black Text: White	Text Mode 1 Astrodesign,Inc. ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz !"#\$%&'()*+,/ :;<=>?@[¥]^_' ® ° · · · ¢ £ â êâêîôû ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz
TXT2	-	Background: Black Text: White	Text Mode 2 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyzU
TXT3	-	Background: Black Text: White	Text Mode 3 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz
TXT4	-	Background: Black Text: White	Text Mode 4 ABCDEFGHIJKLMNOPQRSTUVWXYZ 012345678901234567890 abcdefghijklmnopqrstuvwxyz

#### 5.6.4 Details of V-chip item settings

#### [1] Setting the rating system

VChipSystem:<u>O</u>FF (0-4)

Fig. 5.6.5 Setting the rating system

Table 5.6.7 Rating system setting method

Setting item	Key	LCD display	Description
Rating system	0	OFF	This sets the V-chip to OFF.
(VChipSystem)	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:<u>G</u> (0-7) VChipUSTV:TV-Y (0-5)

Fig. 5.6.6 Setting the MPAA and U.S. TV ratings

#### Table 5.6.8 MPAA ratings setting method

Setting item	Key	LCD display	Description
MPAA rating	0	G	"General Audience" is set as the MPAA rating.
(VChipMPAA)	1	PG	"Parental Guidance" is set as the MPAA rating.
	2	PG-13	"Parents Strongly Cautioned" is set as the MPAA rating.
	3	R	"Restricted" is set as the MPAA rating.
	4	NC-17	"No one 17 and Under Admitted" is set as the MPAA rating.
	5	X	"Adult Movie" is set as the MPAA rating.
	6	Not Rated	"Not Submitted for MPAA review" is set as the MPAA rating.
	7	N/A	"N/A" is set as the MPAA rating

#### 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 limit (not supported in this rating)

Table 5.6.9 U.S. TV ratings setting method

Setting item	Key	LCD display	Description
U.S. TV rating	0	TV-Y	"All Children" is set as the U.S. TV rating.
(VChipUSTV)	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 5.6.11

The cursor on the LCD display moves only to the bits which can be set. The cursor appears at "Non" for those bits which cannot be set.

VChipUSTVExtension (0/1)
FV:- V:- S:- L:- D:- Non

Fig. 5.6.7 Setting the U.S. TV rating extension bits

Table 5.6.10 U.S. TV rating extension bit setting method

Setting item	Key	LCD display	Description
Extension bits	0	-	The specified bit is set to OFF.
(VChipUSTVExtension) FV, V, S, L, D	1	*	The specified bit is set to ON.

#### Names and descriptions of U.S. TV rating extension bits

FV: Fantasy Violence

Acts of fantasy violence = violence in animated features and comics.

V: Violence

Violence

S: Sexual Situations

Sexual content

L: Adult Language

Foul language

**D**: Sexually Suggestive Dialog Sexually suggestive dialog

Table 5.6.11 U.S. TV ratings and extension bits which can be set

		Extension bit (●: can be set)				
		FV	V	S	L	D
	TV-Y					
	TV-Y7	•				
ng	TV-G					
' rati	TV-PG		•	•	•	•
U.S. TV rating	TV-14		•	•	•	•
U.S	TV-MA		•	•	•	

#### [4] Setting the Canadian English and Canadian French rating systems

VChipEnglish:E (0-6)VChipFrench:E (0-5)

Fig. 5.6.8 Setting the Canadian English and French ratings

Table 5.6.12 Canadian English rating setting method

Setting item	Key	LCD display	Description
Canadian			"Exempt" is set as the Canadian English rating.
English rating (VChipEnglish)	1	С	"Children" is set as the Canadian English rating.
(VOIIIPEIIGIIOII)	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

Exempt

No age restrictions apply.

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 5.6.13 Canadian French TV rating setting method

Setting item	Key	LCD display	Description
Canadian			"Exempt" is set as the Canadian French rating.
French rating (VChipFrench)	1	G	"General" is set as the Canadian French rating.
(VOIIIPI TETION)	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.

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. 5.6.9 Setting the interval

#### Table 5.6.14 Interval setting method

Setting item	Key/LCD display	Description
Interval	Number keys	1-1023 (unit: V)

# 5.7 Setting Teletext

#### 5.7.1 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.



- 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 "10.4.3 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 5.7.1 Reference page for details on Teletext settings

No.	Setting item	Reference page
1	Output	p.118
	Data transfer mode	
2	Page	p.118
List of i	nternal Teletext data	p.119,120

#### 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.

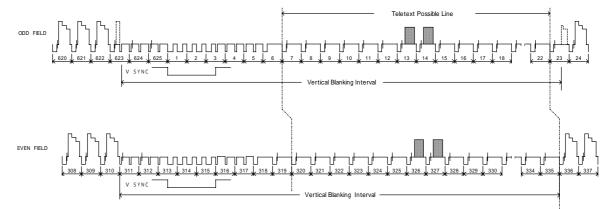


Fig. 5.7.1 VBI waveforms

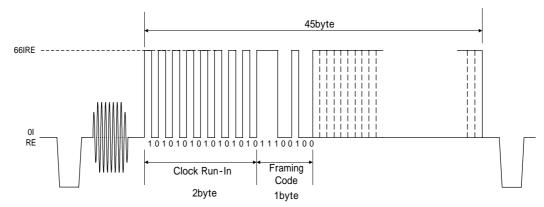


Fig. 5.7.2 Teletext waveforms

<sup>\*</sup> 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.

#### 5.7.2 Details of item settings

#### [1] Setting the output ON/OFF and data transfer mode

TeleText: <u>D</u> isable	(0/1)
TeleTextLine:4	(0/1)

Fig. 5.7.3 Setting the output ON/OFF and data transfer mode

Table 5.7.2 Output ON/OFF and data transfer mode setting method

Setting item	Key	LCD display	Description
Output	0	Disable	Teletext is set to OFF.
(TeleText)	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-848 are shown in "5.7.3 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.



Fig. 5.7.4 Setting the pages to be output

Table 5.7.3 Output page setting method

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

# 5.7.3 Internal Teletext data

**(1/2)** 

(1/2		-	_	_	-
Page	Contents	Screen	Page	Contents	Screen
100	Index Page	TINDEX  CONTENTS INFORMATION  THIS PAGE 100 CLOCKCLACKER S05 THE PAGE 100 CLOCKCLACKER S05 THE PAGE 100 CLOCKCLACKER S05 THE PAGE 102 PATTERN1 S55 SUBTITUE 103 PATTERN2 S65 CHARACTER PAGE 204 COLOURS 301 HITTE FLAT 302	101	Test Page	TELETERT SIGNAL SENESATOR  THIS IS SENESATOR  THIS
102	Newsflash	THE STATE OF THE S	103	Subtitle	TUB TITLE SUB TITLE SUB TITLE
200	Character (English)	200 PAGE   200	201	Character (German)	201 PAGE 1 201  C
202	Character (Swedish /Finnish /Hungarian)	202 PAGE : 202  Swedish/Finnish/hungarian  20	203	Character (Italian)	203 PAGE : 203
204	Character (French)	0.112.33.4.5 6.70.07.01.20.12.13.12.03.30.05.07.00.7.01.20.20.20.20.20.20.20.20.20.20.20.20.20.	205	Character (Portuguese /Spanish)	205 PAGE 1 205  Particular st / Spanish  UNITED STATE

**(2/2)** 

Page	Contents	Screen	Page	Contents	Screen
206	Character (Czech /Slovak)	206 PAGE   206  CERCIT STOVAR  20	301	Colours	JOI PAGE : JOI WHITE YELLOW CYAN GREEN PROCENTA JEST JOI JOY
302	White Flat	302 PAGE : 302	505	Clock Cracker	505 PAGE   505   1
515	Multi Page	SUBCODE:0 SUBCODE:1 SUBCODE:3 4 sub-pages	555	Test Pattern1	555 PAGE 1 555 CONTROL 2 CASE 1 2 CASE 1 2 CASE 2 C
560	Test Pattern2	SAO PACE : SAO	-	Other pages default page	If page number 700 is selected

# 5.8 Setting Macrovision ( optional function)

#### 5.8.1 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.



- 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 "10.4.3 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 5.8.1 Reference page for details on Macrovision settings

No.	Setting item	Reference page
1	Output mode	p.118

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.

# 5.8.2 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. 5.8.1 Setting the output mode

Table 5.8.2 Output mode setting method

Setting item	Timing system	Key	Mode/LCD display		
Output mode	NTSC-M	0	OFF		
(Macrovision Mode)		1	DVD/STB Type 1	(AGC only)	
		2	DVD/STB Type 2	(AGC + 2Line Colorstripe)	
		3	DVD/STB Type 3	(AGC + 4Line Colorstripe)	
		4	VHS USA		
		5	VHS US obs.		
	NTSC-J	0	OFF		
		1	DVD/STB Type 1	(AGC only)	
		2	DVD/STB Type 2	(AGC + 2Line Colorstripe)	
		3	DVD/STB Type 3	(AGC + 4Line Colorstripe)	
		4	VHS Japan 1		
		5	VHS Japan 2		
	NTSC-443	0	OFF		
		1	DVD/STB		
	PAL-60	0	OFF		
		1	DVD/STB		
	PAL-M	0	OFF		
		1	DVD/STB		
	PAL	0	OFF		
		1	DVD/STB		
		2	VHS		
	PAL-N	0	OFF		
		1	DVD/STB		
		2	VHS		
	PAL-Nc	0	OFF		
		1	DVD/STB		
		2	VHS		
	SECAM	0	OFF		
		1	DVD/STB		
		2	VHS		

# 6

# PATTERN DATA CONFIGURATION AND SETTING PROCEDURES

# 6.1 Configuration of pattern data and basic operations

#### 6.1.1 Configuration of pattern data

The pattern data consists of a total of 15 data, namely, the patterns such as character and crosshatch, graphic color which sets the colors of the patterns, pattern select \*1 which sets the patterns to be output, and the pattern action which set the scroll, flicker and other pattern movements. (See Table 6.1.1)

All the patterns selected by pattern select are superimposed onto one another and displayed on the pattern display. Patterns are divided into four planes. When patterns are superimposed and displayed, the planes with the higher priority levels are displayed in the foreground.

- \*1: Patterns can also be selected using the output control keys (R, G, B and INV).
- \*2: The cursor plane is superimposed onto the other patterns and displayed only when "ON" has been selected for [26] Setting the overlay cursor of config edit FUNC5.

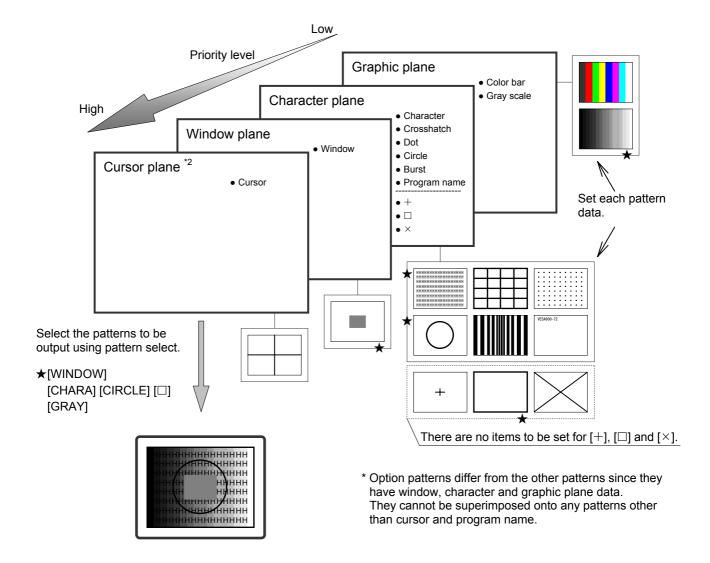


Fig. 6.1.1 Configuration of pattern data

#### 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.

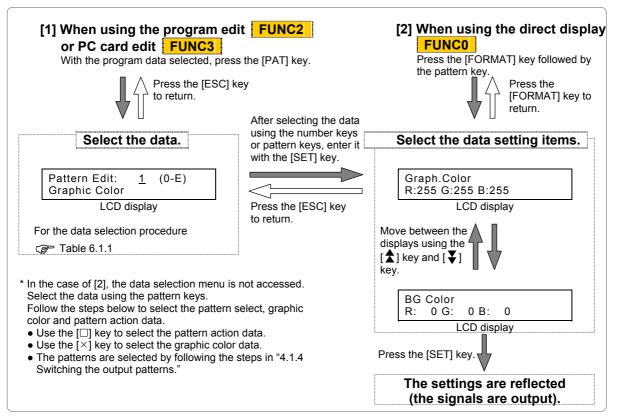


Fig. 6.1.2 Basic operations for setting the pattern data

Table 6.1.1 Pattern data selection method and reference pages

Table 6.1.1 Tattern data selection method and reference pages						
Key		LCD display	Pattern data	Reference		
Number keys	Pattern key			page		
0		Pattern Select	Pattern select	p.127		
1		Graphic Color	Graphic color	p.127		
2	CHARA	CHARA Data Edit	Character pattern	p.128		
3	CROSS	CROSS Data Edit	Crosshatch pattern	p.130		
4	DOTS	DOTS Data Edit	Dot pattern	p.132		
5	CIRCLE	CIRCLE Data Edit	Circle pattern	p.134		
6	COLOR	COLOR Data Edit	Color bar pattern	p.136		
7	GRAY	GRAY Data Edit	Gray scale pattern	p.138		
8	BURST	BURST Data Edit	Burst pattern	p.140		
9	WINDOW	WINDOW Data Edit	Window pattern	p.141		
Α	OPT1	OPT1 Data Edit	Optional pattern 1	p.148		
В	OPT2	OPT2 Data Edit	Optional pattern 2			
С	CURSOR	CURSOR Data Edit	Cursor pattern	p.149		
D	NAME	NAME Data Edit	Program name	p.152		
E		Action Edit	Pattern action	p.153		

# 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.

- $\bullet$  Pattern keys: CHARA, CROSS, DOTS, CIRCLE, + ,  $\square$  ,  $\times$  , 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:25<u>5</u> 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: <u>0</u> G: 0 B: 0

Fig. 6.3.2 Setting the background color

Table 6.3.2 Background color setting method

Setting item	Key	LCD display	Setting range
Background color (BG Color) R, G, B	Number keys	XXX	0 to 255

# 6.4 Setting the character pattern

The following items are set for the character pattern data.

- (1) Format and font
- (2) Character code and cell size

#### (1) Set the format and font.

Format: <u>C</u>hara List (0-2) Font: 7\*9 (0-2)

Fig. 6.4.1 Setting the format and font

Table 6.4.1 Format and font setting method

Setting item	Key	LCD display	Description	ı	
Format (Format)	0	Chara List	Character list  The character pattern (20H to DFH) specified by "Font" is repeatedly displayed.  All one character  The character pattern (character pattern or user character pattern) specified by "Character code" is repeatedly displayed.  Corner & center  The character pattern or user character pattern is pecified by "Character code" is displayed in the layout shown in the figure on the right.		"#\$%&'
	1	All 1 Chara			ННННННН
	2	Corner&Center			HHH
Font (Font)	0	5*7	5 × 7	The character patte selected.	rn set (20H to DFH) to be used in
(1 5111)	2	7*9 16*16	7 × 9 16 × 16	*9.1.4 Charact	ter pattern data"

#### (2) Set the character code and cell size (horizontal, vertical).

Code: 48[<u>H</u>] (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	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]

<sup>\*1:</sup> There are two ways to input the characters: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, characters cannot be input from the display if they have been edited using direct display FUNCO.

#### Correlation between the font and cell size

<Example with  $7 \times 9$  font and  $16 \times 16$  cell size>

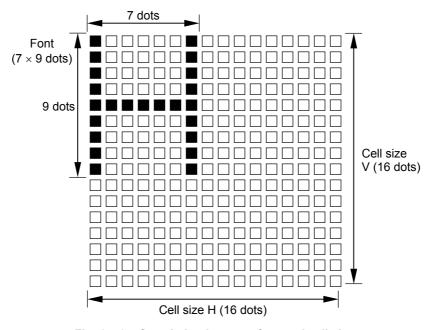


Fig. 6.4.3 Correlation between font and cell size

# 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= 2<u>0</u> V= 20 Width :H= 1 V= 1

Fig. 6.5.2 Setting the interval and line width

Table 6.5.2 Interval and line width setting method

Setting item	Key	LCD display	Description
Interval (Interval) H, V	Number keys	XXXX	In the line mode, the number of crosshatch lines is set.  In the dot mode, the number of dots between the crosshatch patterns is set.  Setting range: 0 to 9999 *1
Line width (Width) H, V	Number keys	XXX	Setting range: 1 to 255 [dot]

<sup>\*1:</sup> The crosshatch in the H (or V) direction is not displayed if "0" is set for the H (or V) interval.

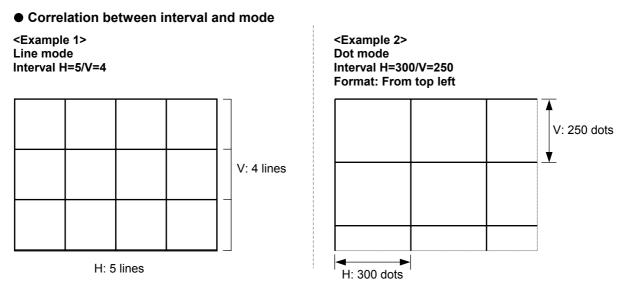


Fig. 6.5.3 Correlation between interval and mode

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

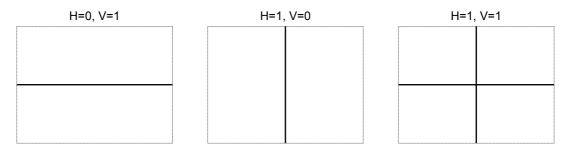


Fig. 6.5.4 Correlation between interval H and V

#### 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.

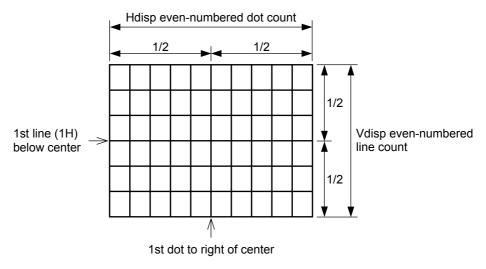


Fig. 6.5.5 Screen center

# 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= 2<u>0</u> 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.

<sup>\*1:</sup> 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 Correlation between interval and mode Sexample 2> Dot mode Interval H=300/V=250 Format: from LeftTop V: 250 dots H: 5 lines H: 300 dots

Fig. 6.6.3 Correlation between interval and mode

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

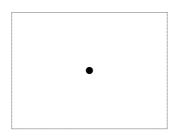


Fig. 6.6.4 Correlation between interval H and V

#### 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.

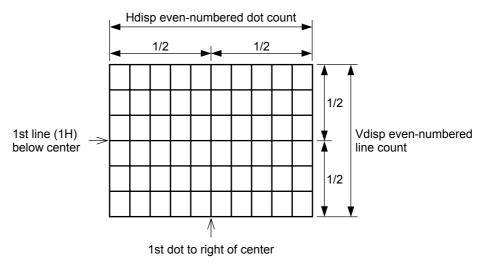


Fig. 6.6.5 Screen center

# 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:<u>0</u> (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

<sup>\*1:</sup> 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.)

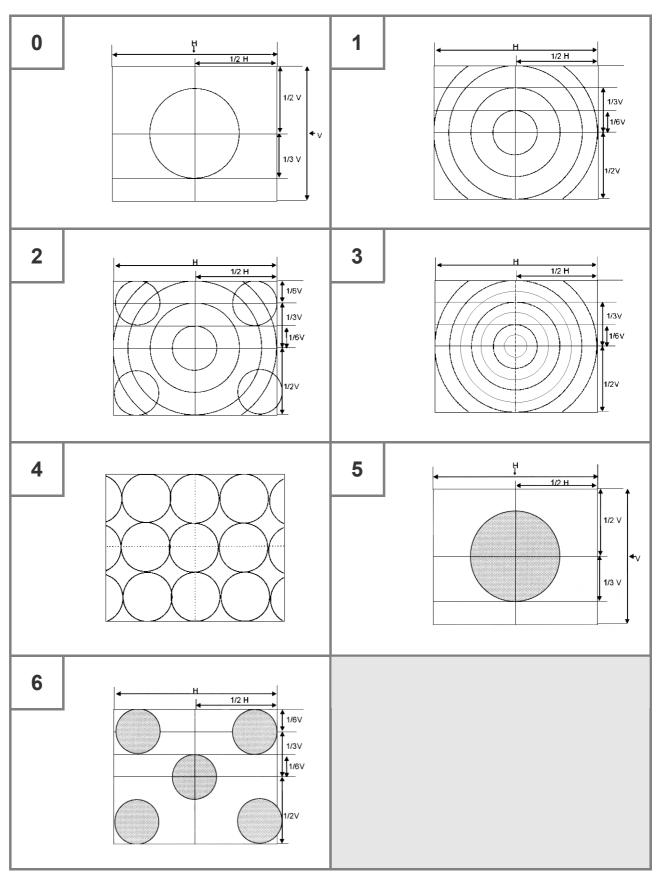


Fig. 6.7.2 Formats

# 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: <u>%</u>	(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	0	%	% mode: A percentage is specified for the interval.
(Mode)	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.  C0 1 2 ~ F C0
	1	Ver	Vertical direction  * The H interval is ignored.  C0  1  2  Vertical direction  F  C0
	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 2 2 3 4 2 2 0 Vertical direction  F C0 1 C0 1 2

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

Repeat :1<u>6</u> (1-16) Interval :H= 6.3 V= 6.3

Fig. 6.8.2 Setting the number of repetitions and interval

Table 6.8.2 Number of repetitions and interval setting method

Setting item	Key	LCD o	lisplay	Des	scriptic	n				
Number of repetitions (Repeat)	Number keys	XX			This sets the number of colors. Setting range: 1 to 16					
Interval (Interval)	Number keys	In the % mode  XXX.X Setting range: 0.0 to 100.0 [%]								
H, V	v xxxx				In the dot mode Setting range: 1 to 9999 [dot]					
<b>Example: For direction 2 (H &amp; V)&gt;</b> Number of repetitions = 5 H interval										
	V interval	CO	C1	C2	СЗ	C4	C0	<b>C1</b>		
		C2	C3	C4	C0	C1	C2	СЗ		
		C4	C0	C1	C2	СЗ	C4	C0		
				•••		•••	•••			

#### (3) Set the color layout (C0 to CF) of the color bars.

Fig. 6.8.3 Setting the color layout

Table 6.8.3 Color layout setting method

Setting item	Key	LCD display	Color
Color layout	0		None
C0 to CF	1	R	Red
	2	G	Green
	3	RG	Red, green
	4	В	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: <u>%</u>	(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	0	%	% mode: The intervals are designated as a percentage.
(Mode)	1	dot	Dot mode: The intervals are designated as <u>a number of dots</u> .
Direction (Direction)			The pattern is repeated in the designated direction according to the settings for the number of repetitions, intervals and level layout.
	0	Hor	The pattern is repeated in the horizontal direction, and when it arrives at a corner, it continues on the next line which has been divided by the V interval.
	1	Ver	The pattern is repeated in the vertical direction, and when it arrives at a corner, it continues on the next column which has been divided by the H interval.

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

Repeat :1<u>6</u> (1-16) Interval :H= 6.3 V= 6.3

Fig. 6.9.2 Setting the number of repetitions and intervals

Table 6.9.2 Number of repetitions and interval setting method

Setting item	Key	LCD display	Description
Number of repetitions (Repeat)	Number keys	xx	The number of levels is set. Setting range: 1 to 16
Intervals (Interval)	Number keys	XXX.X	In the % mode Setting range: 0.0 to 100.0 [%]
H, V		xxxx	In the dot mode Setting range: 1 to 9999 [dot]

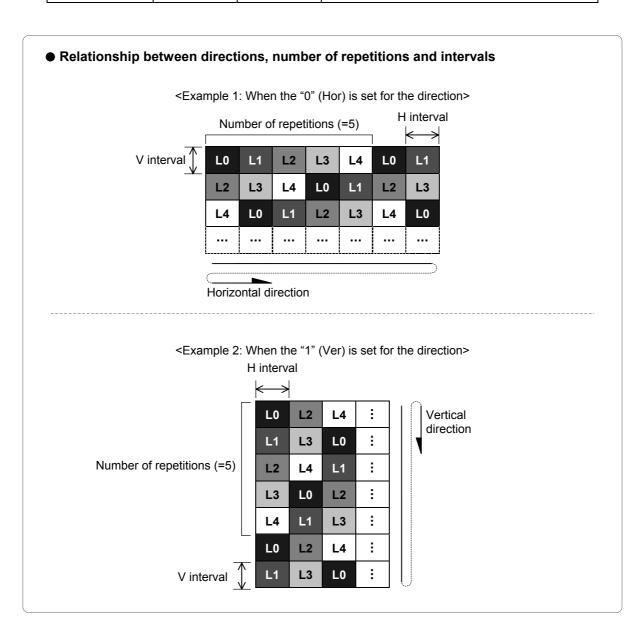
#### (3) Set the level layout (L0-LF) of the gray scale.

L0: <u>0</u> 1: 17 2: 34 3: 51 L8:13<u>6</u> 9:153 A:170 B:187 L4: 68 5: 85 6:102 7:119 LC:204 D:221 E:238 F:255

Fig. 6.9.3 Setting the level layout

Table 6.9.3 Level layout setting method

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



# 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	0	L->R	The pattern is increased from left to right.
(Format)	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>

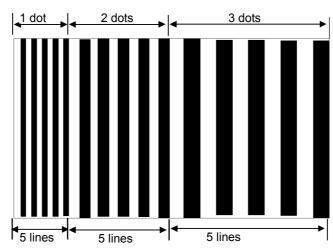


Fig. 6.10.2 Example of burst pattern setting

#### 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	0	%	% mode: The widths (horizontal, vertical) are set as a percentage.
(Mode)	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
	В	L SCROLL	Format B: Scrolling to the left
	С	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 FUNCO is executed. (1 window)
			② 4.1.6 Changing the window RGB levels

[Format diagrams] Next page

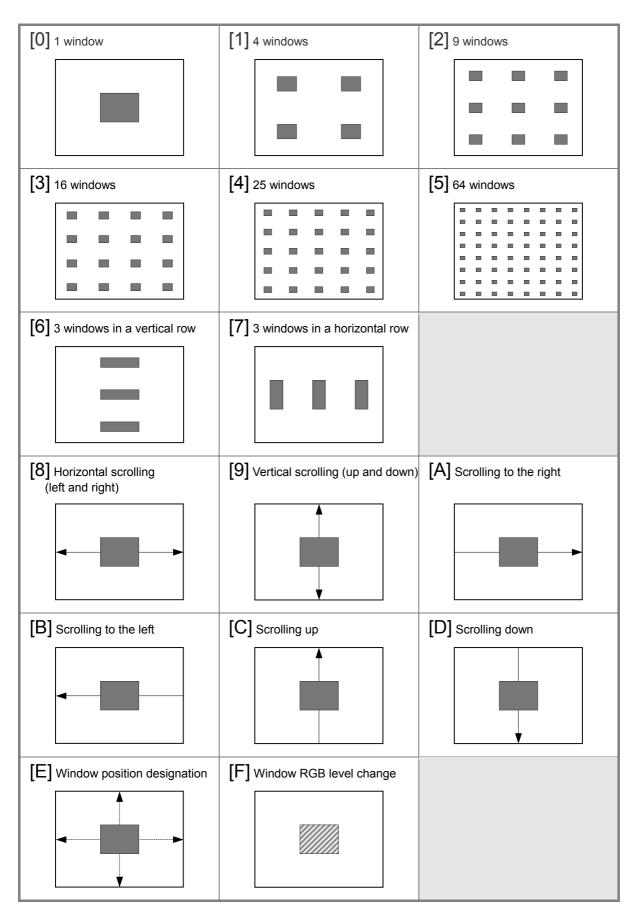


Fig. 6.11.2 Formats

#### (2) Set the horizontal and vertical widths and the window color (RGB).

Width:H= 20.<u>0</u> V= 20.0 R:255 G:255 B:255

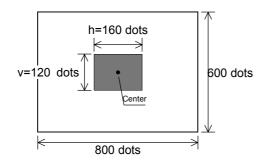
Fig. 6.11.3 Setting the horizontal and vertical widths and the window color

Table 6.11.2 Horizontal and vertical width and window color setting method

Setting item	Key	LCD display	Setting range
Width (Width)	Number	XXX.X	In the % mode : 0.0 to 100.0 [%]
H, V	keys	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>



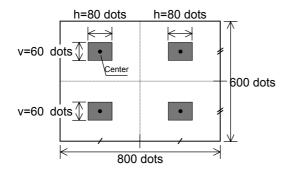
#### In the dot mode

H width = h = 160 [dot] V width = v = 120 [dot]

#### In the % mode

H width =  $(h / 800) \times 100 = 20$  [%] V width =  $(v / 600) \times 100 = 20$  [%]

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



#### In the dot mode

H width =  $h \times 2 = 160$  [dot] V width =  $v \times 2 = 120$  [dot]

#### In the % mode

H width =  $(h \times 2 / 800) \times 100 = 20$  [%] V width =  $(v \times 2 / 600) \times 100 = 20$  [%]

<sup>\*</sup> 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:<u>0(</u>None) (0-9)

Fig. 6.11.4 Performing the format-related settings

Table 6.11.3 Flicker interval setting method

Formats 0 to 7 c	Formats 0 to 7 or E						
Setting item	Key	LCD display	Description				
Flicker interval	0	0 (None)	No flicker				
(Flicker)	1	1 (1V)	1V (once per V period)	Flicker occurs at the designated			
	2	2 (2V)	2V	interval.			
	3	3 (4V)	4V				
	4	4 (8V)	8V				
	5 5 (16V)		16V				
	6	6 (32V)	32V				
	7	7 (64V)	64V				
8 8 (4LEVEL) The window RGB level is set to one of 4 leve the desired interval (in V increments).							
			* For the RGB level and	I time settings, refer to (5).			
9 9 (*Optional function) The window RGB level is set to 16 level				is set to 16 levels.			

Table 6.11.4 Scrolling speed setting method

Formats 8 to D	Formats 8 to D							
Setting item	Key	LCD display	Description					
Scrolling speed	0	1V: 1 dot	1 dot	The pattern is moved by the				
(Flicker)	1	1V: 2 dots	2 dots	designated number of dots in 1V (once per V period).				
	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	Formats F						
Setting item	Key	LCD display	Description				
Level change	0	1V: 1 level	1V (once per V period)	The RGB level is changed by one			
speed (Flicker)	1	2V: 1 level	2V	level at the designated time.			
(Flicker)	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.<u>0</u>, 20.0) Pos #2( 80.0, 80.0)

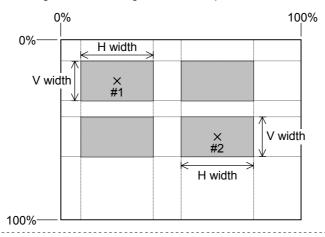
Fig. 6.11.5 Setting the window center position

Table 6.11.6 Window center position setting method

Setting item	Key	LCD display	Description
Window center position (Format-E Pos) #1, #2 (H, V)	Number keys	(XXX.X, XXX.X)	The window center position is designated.  Setting range: 0.0 to 100.0 [%]  * When (0,0) has been set for #2, one window with #1 serving as the center position is displayed.

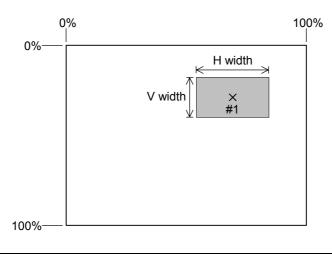
#### ● When #2 is not (0,0)

Windows are formed from the sections produced by AND-ing the area bounded by the widths of the H and V settings with #1 serving as the center position with the area bounded by the widths of the H and V settings with #2 serving as the center position.



#### ● When #2 is (0,0)

A window is formed from the area bounded by the widths of the H and V settings with #1 serving as the center position.



(5) When flicker interval "8(4LEVEL)" has been selected for a pattern 0 to 7 or E, set the display time and RGB level (4 levels).

T0:	8 T1:	24	(0-255)
T2:	8 T3:	20	(0-255)

Fig. 6.11.6 Setting the display time

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

R2: 20 G2: 20 B2: 20 R3: 32 G3: 32 B3: 32

Fig. 6.11.7 Setting the RGB levels (4 levels)

Table 6.11.7 Display time and RGB level 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
R0/G0/B0  Display time: T0  Display time: T0	R1/G1/B1	R2/G2/I	→ Hereafter repeated

(6)(❖ Optional function) When a flicker interval of "9 (16LEVEL)" and format 0 to 7 or E are selected, set the display time and RGB level (16 levels). The basic setting is identical to "4LEVEL". At 16LEVEL, the display time can be set up to 999V.

Table 6.11.8 Display Time/RGB Level (16 Levels) Setting Method

Setting item	Key	LCD	Setting range	
Display period	Number	XXX	0 to 999 [ V ]	
T0 to 15	keys			
RGB level	Number	XXX	8bit/LUT10bit mode	: 0 to 255
R0 to 15 / G0 to 15 /	keys	XXXX	10bit mode	: 0 to 1023
B0 to 15			12bit mode	: 0 to 4095

## 6.12 Setting the optional patterns



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

OPT1-NO: <u>0</u> (00-BF)

#### Optional pattern 2

OPT2-NO:2<u>5</u> (00-BF)

Fig. 6.12.1 Setting the optional pattern number

#### Table 6.12.1 Optional pattern No. setting method

Setting item	Key	LCD display	Setting range
Option pattern No., OPT1-NO or OPT2-NO	Number keys	XX	00 to BF *1

\*1: Optional patterns 00H to 3FH: Internal optional pattern Optional patterns 40H to 7FH: User-created optional patterns Optional patterns 80H to BFH: Image data (#1 to #64) (registered by user)

For details on the internal optional patterns (00H to 3FH), refer to the "9.1.2 Optional pattern data" list (p.172).

\* 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	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 shape	s						
		<5*5>	<cross> <v-line></v-line></cross>				
		+					
			Pivel increment				
Pixel increment							
			RGB increment				
Normal mo	de:	The cursor move	es in 1-pixel increments.	•			
		The cursor color	is displayed in the color which has been set.				
Sub-pixel n	node:	The cursor color	es in the RGB increments which make up the individure is displayed in the sequence of $R \rightarrow G \rightarrow B$ when the cell eright and in the sequence of $B \rightarrow G \rightarrow R$ when the current	cursor			
Move	ement t	oward the right →	$R \stackrel{\Rightarrow}{\leftarrow} G \stackrel{\Rightarrow}{\leftarrow} B \stackrel{\Rightarrow}{\leftarrow} R \stackrel{\Rightarrow}{\leftarrow} G \stackrel{\Rightarrow}{\leftarrow} B \leftarrow Movem$	ent toward the lef			
			[Position display mode setting	Novt nog			

Table 6.13.2 Position display mode setting method

Setting item	Key	LCD display	Description			
Position display	0	OFF	The cursor position does not appear on the display.			
mode (Pos.Disp)						
(1 66.5.66)			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 Movement step (1, 10 or 100) (0 and up)			
	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  (GATE=301 :STEP10) (1, 10 or 100)			
			(R=1201 G=1202 B=1203)			
			R color horizontal — G color horizontal coordinate (1 and up)  G color horizontal coordinate (2 and up)  G 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°. 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°. 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  $[\spadesuit]$ , [4] for  $[\clubsuit]$ , [6] for  $[\clubsuit]$  and [8] for  $[\blacktriangledown]$ )

#### (2) Set the flicker interval and movement step.

Flicker : <u>0</u> (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	0	0 (None)	No flicker		
(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		8V		
	5	5 (16V)	16V		
	6	6 (32V)	32V		
	7	7 (64V)	64V		
Movement step	0	1 dot	1 dot	The cursor moves in increments of the	
(Step)	1	10 dots	10 dots	designated number of dots.	
	2	100 dots	100 dots		

#### (3) Set the cursor color (R/G/B) and background color (BR/BG/BB).

R:25<u>5</u> 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

Fig. 6.14.1 Setting the display position, font and program name

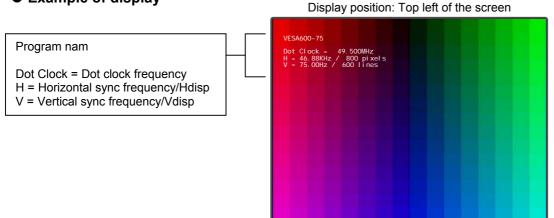
Table 6.14.1 Display position, font and program name setting method

Setting item	Key	LCD display	Description		
Display	0	Cntr	Center of the screen This selects where on the		
position (Pos)	1	L-T	Top left of the screen	screen the program name is to be displayed.	
(1 03)	2	L-B	Bottom left of the screen		
	3	R-T	Top right of the screen		
	4 5		Bottom right of the screen		
			Top center of the screen		
6		С-В	Bottom center of the screen		
Font	0 5*7		5 × 7	This selects the character	
(Font)	1	7*9	7 × 9	pattern used for display.	
2		16*16	16 × 16	"9.1.4 Character pattern data"	
Program name	Input using number keys (+ [SHIFT] key) or input from display	XXXXX	Max 20 characters		

<sup>\*1:</sup> 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 FUNCO.

\* If the [NAME] key has been selected, the dot clock frequency, horizontal sync frequency, vertical sync frequency, Hdisp and Vdisp will be appear on the display in addition to the program name. However, since the display which appears when HDCP is executed will differ, refer to "4.10.3.3 What appears on the display during HDCP execution."

#### Example of display



## 6.15 Setting pattern action



The pattern action function cannot be executed at the same time as when the HDCP, audio sweep and some other functions are being used. For details, refer to "10.4.3 Concerning functions which cannot be executed simultaneously."

By setting the pattern action data, scrolling and palette scrolling on the graphic planes, scrolling on the character plane and scrolling on the window plane as well as flicker and simple moving picture can be executed.

For details on simple moving pictures, refer to 6.15.2.

#### 6.15.1 Setting method

The following items are set for the pattern action data.

- (1) Execution interval
- (2) Graphic plane -- Scrolling ON/OFF, scrolling direction
- (3) Character plane -- Scrolling ON/OFF, scrolling direction
- (4) Graphic plane, character plane -- Scrolling step
- (5) Number of repetitions for simple moving picture
- (6) Window plane -- Scrolling ON/OFF, flicker ON/OFF Graphic plane -- Palette scrolling ON/OFF
- (7) Window plane -- Scrolling direction, step
- (8) Graphic plane -- Palette scrolling step, start position, end position

#### (1) Set the pattern execution interval (in V increments).

Fig. 6.15.1 Setting the execution interval

Table 6.15.1 Execution interval setting method

Setting item		Key	LCD display	Setting range
Execution			XXX V	1 to 255
interval	Action Interval2, 3, 4	Number keys	XXX V	0 to 255 (0: when no interval is going to be used)

\* When Action Interval 2, 3 or 4 is used, the conditions set will be repeated in sequence from 1. (Example: When a value other than "0" has been set for Action Interval 2 or 3, the following will be repeated: Active Interval  $1 \to 2 \to 3 \to 1 \to 2 \to 3 \dots$ )

By means of this setting, a number of different types of scrolling such as simulated 2-3 pulldown can be performed. For normal scrolling, set "0" for Action Interval 2, 3 and 4.

Pull-down scrolling: Using the scrolling function, 2-3 pull-down and other types of scrolling can be achieved artificially.

#### • What is 2-3 pull-down?

This is a conversion system for harmonizing 30 fps (frames per second) 60-field NTSC signals with 24 fps films when converting regular movies and other film sources into video signals (a process referred to as "telecine"). The first frame of the film is converted into the equivalent of two fields and the second frame into the equivalent of three fields, and these five fields are repeated for every two frames of the film so that 24 frames are made the equivalent of 60 fields.

#### (2) Set the graphic plane scrolling and scrolling direction.

G-SCR: <u>O</u> FF	(0/1)
G-Dir :L-D	(0-9)

Fig. 6.15.2 Setting the graphic plane scrolling ON/OFF and direction

Table 6.15.2 Graphic plane scrolling ON/OFF and direction setting method

Setting item	Key	LCD display	Description			
Scrolling	0	OFF	Scrolling is not executed. (Factory setting)			
(G-SCR)	1	ON	Scrolling is executed.			
Scrolling direction	0	Mov	The display start coordinates are moved, and simple moving picture is executed. *1			
(G-Dir)	1	L-D	Scrolling toward the bottom left.	Scrolling is executed in the		
	2	D	Scrolling downward.	designated direction.		
	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.			

<sup>\*1:</sup> For details on the simple moving picture, refer to "6.15.2 Concerning the simple moving picture function."

#### (3) Set the character plane scrolling and scrolling direction.

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

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

Table 6.15.3 Character plane scrolling ON/OFF and scrolling direction setting method

Setting item	Key	LCD display	Description			
Scrolling	0	OFF	Scrolling is not executed. (Factory setting)			
(C-SCR)	1	ON	Scrolling is executed.			
Scrolling	1	L-D	Scrolling toward the bottom left.	Scrolling is executed in the		
direction (C-Dir)	2	D	Scrolling downward.	designated direction.		
(0 011)	3	R-D	Scrolling toward the bottom right.			
	4	L	Scrolling toward the left.			
	6	R	Scrolling toward the right.			
	7	L-U	Scrolling toward the top left.			
	8	U	Scrolling upward.			
	9	R-U	Scrolling toward the top right.			

#### (4) Set the graphic plane and character plane scrolling step.

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

Fig. 6.15.4 Setting the graphic plane and character plane scrolling step

Table 6.15.4 Graphic plane and character plane scrolling step setting method

Setting item		Key	LCD display	Setting range
Scrolling step in H direction, V direction	G&C-Step1	Number keys		H : 1 to 255 [dot] V : 1 to 255 [H]
Vallection				* 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		H: 0 to 255 [dot] (0: when no step is V: 0 to 255 [H] going to be used)

<sup>\*</sup> When Action Interval 2, 3 or 4 is used, select the settings to match G&C-Step 2, 3 and 4. For normal scrolling, set "0" for G&C-Step 2, 3 and 4.

#### (5) Set the number of simple moving picture repetitions.

Fig. 6.15.5 Setting the number of simple moving picture repetitions

Table 6.15.5 Number of simple moving picture repetition setting method

Setting item	Key	LCD display	Setting range
Number of repetitions (G-Repeat) in H direction, V direction	Number keys	xx	1 to 15

<sup>\*</sup> This setting is valid only when "Mov" has been set as the graphic plane scrolling direction (G-Dir).

#### (6) Set the window scrolling and flicker, and graphic plane palette scrolling.

What is to be referenced in the LUT (look-up table) is moved for palette scrolling. This takes effect only for the graphic plane.

W-SCR :<u>O</u>FF W-FLK:OFF (0/1) P-SCR :OFF (0/1)

Fig. 6.15.6 Setting the window scrolling, and flicker and palette scrolling

Table 6.15.6 Window scrolling and flicker, and palette scrolling setting method

Setting item	Key	LCD display	Description	
Scrolling (W-SCR)	0	OFF	Window scrolling is not executed. (Factory setting)	
	1	ON	Window scrolling is executed.	
Flicker (W-FLK)	0	OFF	Window flicker is not executed.	
	1	ON	Window flicker is executed.	
Palette scrolling (P-SCR)	0	OFF	Palette scrolling is not executed. (Factory setting)	
	1	ON	Palette scrolling is executed.	

#### (7) Set the window scrolling direction and step.

W-Dir :<u>L</u> (1-9) W-Step1: 1 (1-255)

Fig. 6.15.7 Setting the window scrolling direction and step

Fig. 6.15.7 Window scrolling direction and step setting method

Setting ite	m	Key	LCD display	Description		
Scrolling direction		1	L-D	The window is scrolled toward the bottom left.	executed in the designated direction.  ft.	
(W-Dir)		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)		

<sup>\*</sup> When Action Interval2-4 is used for the execution interval, choose a W-Step2-4 setting which corresponds. When conducting normal scrolling, set "0" for W-Step2-4.

## (8) Set the palette scrolling step, start position and end position.

P-Step:<u>+(0/1)</u> 0(0-128) P-Sta: 0 End: 0(0-255)

Fig. 6.15.8 Setting the palette scrolling step, start position and end position

Table 6.15.8 Palette scrolling step, start position and end position setting method

Setting item		Key	LCD display	Description
Scrolling step (P-Step)	Sign	0	+	Used for setting a positive value.
		1	-	Used for setting a negative value.
(Г Сюр)	Number of steps	Number keys	XXX	Setting range: 1 to 128
Start position (P-Sta)		Number keys	XXX	Setting range: 0 to 255
End position (End)		Number keys	XXX	Setting range: 0 to 255

#### 6.15.2 Concerning the simple moving picture function

This function enables simple moving pictures to be displayed by drawing a multiple number of pictures in the drawing area and moving the display start coordinates.

Provided as an example here is a description of the display method used for  $640 \times 480$  9-frame simple moving pictures.

#### (1) Create the images.

Create the  $640 \times 480$  9-frame images consisting of  $1920 \times 1440$  images stacked three vertically and three horizontally. (See Fig. 6.15.9)

(2) Register the images created in optional patterns No.80H to BFH (image data No.1 to 64) using the Windows software (SP-8848) provided.

#### (3) Set the program data.

Described here are the settings for pattern data only. Timing data use the regular settings.

- 1) Set the number of the optional pattern registered in (2) as "optional pattern 1" or "optional pattern 2."
- 2) Select the optional pattern (OPT1 or OPT2) using "pattern select."
- 3) Set the execution interval (Action Interval 1), graphic plane scrolling (G-SCR), scrolling direction (G-Dir), scrolling step (G&C-Step1) and number of simple moving picture repetitions (G-Repeat) using "Pattern action."
  - Action Interval 1: Set the time interval during which the frame is to be moved in V increments.

CAUTION'

- 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."

As a result of the above settings, images #1 to #9 with a  $640 \times 480$  frame size are displayed in the sequence of #1  $\rightarrow$  #2  $\rightarrow$  ...  $\rightarrow$  #9 by moving the display start coordinates from the 1920  $\times$  1440 images registered in the optional pattern.

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.

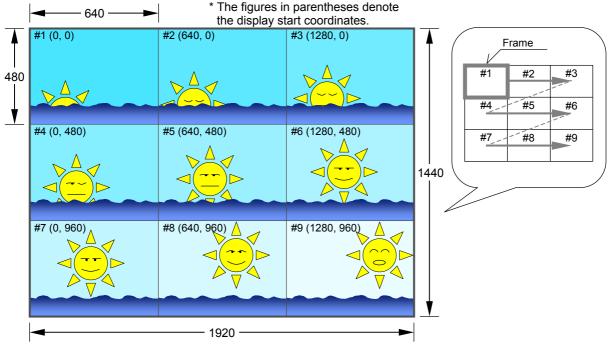


Fig. 6.15.9 Example of images for simple moving pictures



# **SELF-CHECK**

## 7.1 Concerning the self-check

The VG-848 has a function (self-check function) that makes it possible to determine whether the hardware devices are functioning properly.



Turn the power off when exiting the self-check.

### 7.1.1 How to start up the self-check

Turn on the power of the VG-848 while pressing the [ 1] key.

\* All the LEDs light when the RB-1848 is connected.

The display cycles through the version information, MAC address, and other information shown below about every 5 seconds.

order	Contents		Display		
(1)	Version information	Firmware	VG-848 Self Check Mode ROM Version : 5.00		
		Hardware	BOARD REV: 000B3019h BOARD TYPE: 00010103h		
(2)	Optional function support information	Closed Caption, TeleText, Vchip	CC&T&Vchip : ON Macrovision : ON		
		Macrovision Scroll Trigger	Scroll Trigger : ON		
		Window 16 level	Window 16Level Flicker: Enable		
(3)	Additional pattern support information*1 (Option)		Pattern 001 :ON Pattern 002 :ON .		
(4)	Other information of the unit	Serial Number MAC address	S/N :XXXXXXXX MAC: XX:XX:XX:XX:XX		

<sup>\*1)</sup> Please ask ASTRODESIGN for addition of patterns.

## 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-848.	p.160
PC card check	For checking the PC card.	p.161
RS-232C check	For checking the RS-232C loopback.	p.162
Flash ROM check	For checking the internal flash ROM.	p.163
Flash ROM initialization	For initializing the internal flash ROM.	p.164

<sup>\*</sup> 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 : <u>0</u> (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: [ 1] key)

Key Check (ESC=end) KEY=INC

Fig. 7.2.3 Displaying the results

## 7.3 PC card check



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 : <u>1</u> (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



A connector is required for this check. Ensure that the connector has been installed correctly before conducting the check.

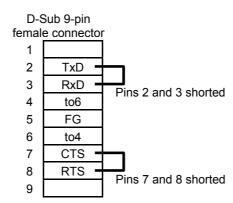


Fig. 7.4.1 Connector

(1) Press the [2] key and [SET] key.

```
Select Item : <u>2</u> (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 : <u>3</u> (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



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.

Fig. 7.6.3 Initialization completed



# REMOTE CONTROL

By connecting the RB-614C or RB-649 remote control box, the VG-848 can be operated by remote control.

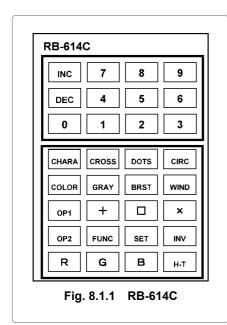
The following three functions can be executed using the RB-614C or RB-649. Neither box can be used to edit program data, etc. (Refer to "10.4.1 Restrictions on functions used by SP-8848, RB-614C and RB-649.)

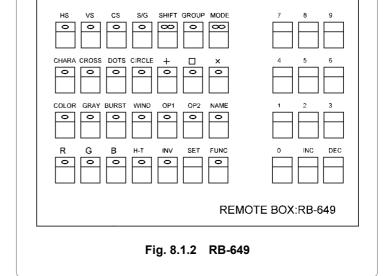
#### Functions which can be executed by remote control

- Direct display FUNC0
- PC card data copy FUNC4
- List display FUNC9

#### 8.1 RB-614C/RB-649

#### 8.1.1 Key layout diagrams





#### 8.1.2 Connections

Connect the connecting cable of the RB-614C or RB-649 to the remote connector on the rear panel of the VG-848.

#### 8.1.3 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-848/RB-1848 keys.

Table 8.1.1 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)	Н-Т
FORMAT		-		-
NAME		-		NAME
MUTE to ▶	(*2)	-		-
PROG, TIMING, PAT		-		MODE (*5)
	(*3)	Н-Т	(*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
<b>1</b>		INC		INC
₹		DEC		DEC

<sup>\*1)</sup> CHARA, CROSS, DOTS, CIRCLE, +,  $\square$ ,  $\times$ , COLOR, GRAY, BURST, WINDOW, OPT1, OIPT2

- Lighted (red): Only the timing data is executed.
- Lighted (green): Only the pattern data is executed.

<sup>\*2)</sup> MUTE, SAVE, LEVEL, ◀, ▶

<sup>\*3)</sup> The function of the GROUP key on the RB-649 corresponds to the [ESC] key used to change the group numbers with direct display FUNCO on the RB-1848. (Refer "4.1.3 Changing the group numbers.)

<sup>\*4)</sup> 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 "[20] Setting the RB-614C H-T key" of config edit FUNC5.

<sup>\*5)</sup> The [MODE] key on the RB-649 works as follows in the direct display mode.

<sup>•</sup> Lighted (red, green): All the program data is executed.

## REFERENCE

This chapter contains information on the following subjects.

Program data Commentary PG1 No.850 to 999	p.168
PG2 No.850 to 999	p.173
Optional pattern data Codes 00H to 3FH	p.178
User character pattern data Codes F0H to FFH	n 18 <sup>,</sup>
	р. 10
Character pattern dat	. 40
5×7	r -
7×9 16×16	·
Concerning PC cards	
Usable PC cards, data registration formats, etc	p.194
	n 196
List of error messages	

#### 9.1 **Internal data**

#### 9.1.1 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.909: EIA640  $\times$  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.
- \* 3 : This is a tri-level sync signal output.
- \* pN : "N" denotes the YPbPr coefficient table number.

PG1 program No	.850-	879																												
Pattern data name	Character List	Words	H Character 1	H Character 2	H Character 3	H Character 4	H Character 5	H Character 6	@ Character	Chinese Chara 1	Chinese Chara 2	Chinese Chara 3	1 dot ON/OFF	me Character 1	me Character 2	H Character Line	O Character Line		1 line Cross5x5	2 line Cross5x5		2 line Cross8x8	1 line Cross10x8	2 line Cross10x8	1 line Cross16x12	2 line Cross16x12		Burst 1	Burst 2	Burst 3
Pattern data	Character list 7×9	OPT27 (Song of Youth)	Character 1 (H 5×7 / 10×14)	Character 1 (H 7×9/14×18)	Character 1 (H 16×16/32×32)	Character 2 (H 5×7/10×14)	Character 2 (H 7×9/14×18)	Character 2 (H 16×16/32×32)	Character 1 (@ 7×9/14×18)	Character 1 (Chinese character "KU" 7×9/14×18)	Character 1 (Chinese character "BI" 7×9/64×64)	Character 1 (Chinese character "Al" 7x9/64x64)	Character 1 (chessboard 16×16/16×16)	Character me (#1 18×18)	Character me (VESA specifications 18×18)	OPT0B (character edge H)	OPT0C (character edge O)		1-dot width crosshatch (H=5,V=5)	2-dot width crosshatch (H=5,V=5)	OPT23 (DDC pattern D-Sub-EDID display)	2-dot width crosshatch (H=8,V=8)	1-dot width crosshatch (H=10,V=8)	2-dot width crosshatch (H=10,V=8)	1-dot width crosshatch (H=16,V=12)	2-dot width crosshatch (H=16,V=12)		Burst (Format 0)	Burst (Format 1)	Burst (Format 2)
Timing data name	VESA400-85	VESA480-72	VESA480-75	VESA600-56	VESA600-60	VESA600-72	VESA768-60	VESA768-70	VESA768-75	VESA1024-75	VESA1024-85	VESA1200-60	VESA1200-65	VESA1200-70	VESA1200-75	VESA1200-80	VESA1200-85	VESA1350-70	MDA	CGA	EGA	PGA	VGA-TEXT350-50	VGA-TEXT350-60	VGA-TEXT350-70	VGA-TEXT400-50	VGA-TEXT400-60	VGA-TEXT400-70	VGA350-50	VGA350-60
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
or rity	z	Z	Ь	Ь	Ъ	z	Z	Ъ	Ъ	Ь	Ъ	۵	۵	Ъ	Ъ	Ь	Ь	Z	Z	Z	Z	Z	Z	Z	z	Z	Z	Z	Z	z
Sync polarity N P	z	Z	Р	Ь	Ь	Z	Z	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Р	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	640x400	640x480	640x480	009×008	009×008	009×008	1024x768	1024x768	1024x768	1280x1024	1280x1024	1600x1200	1600x1200	1600x1200	1600x1200	1600x1200	1600x1200	1800x1350	720x350	640x200	640x350	640x400	720x350	720x350	720x350	720x400	720x400	720x400	640x350	640x350
Dot clock frequency [MHz]	31.500	31.500	31.500	36.000	40.000	50.000	65.000	75.000	78.750	135.000	157.500	162.000	175.500	189.000	202.500	216.000	229.500	236.500	16.260	14.360	16.260	24.870	28.320	28.320	28.320	28.320	28.320	28.320	25.175	25.175
Vertical frequency [Hz]	85.080	72.809	75.000	56.250	60.317	72.188	60.004	70.069	75.029	75.025	85.024	000:09	92.000	70.000	75.000	80.000	85.000	70.053	49.825	860.09	59.713	966.69	50.026	59.937	70.082	50.026	59.937	70.082	50.030	59.940
Horizontal frequency [KHz]	37.861	37.861	37.500	35.156	37.879	48.077	48.363	56.476	60.023	976.67	91.146	75.000	81.250	87.500	93.750	100.000	106.250	98.214	18.435	15.746	21.855	30.478	31.467	31.467	31.467	31.467	31.467	31.467	31.469	31.469
Program No.	850	851	852	853	854	855	856	857	828	826	098	861	862	863	864	865	998	867	898	698	870	871	872	873	874	875	876	877	878	879

PG1 program No	.880-	909																												
Pattern data name	Burst 4		Sign Wave Scroll	Multi Burst	1/10MHz x 10step	Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6	Circle 7		Window 1	Window 2	Window 3	Window 4	Window 5	Window 6	Moving Window 1	Moving Window 2	Moving Window 3	Window Level	Flicker Window 1	Flicker Window 2	Flicker Window 3	Flicker Window 4		Color Bar 1	Color Bar 2
Pattern data	Burst (Format 3)		OPT10 (sine wave scroll)	OPT11 (multi burst)	OPT12 (10 steps & 1/10 MHz)	Circle (Format 0)	Circle (Format 1)	Circle (Format 2)	Circle (Format 3)	Circle (Format 4)	Circle (Format 5)	Circle (Format 6)		Window (Format 0, Flicker 0)	Window (Format 1, Flicker 0)	Window (Format 2, Flicker 0)	Window (Format 3, Flicker 0)	Window (Format 4, Flicker 0)	Window (Format 5, Flicker 0)	Window (Format 8, Flicker 7)	Window (Format 9, Flicker 7)	Window (Format E, Flicker 7)	Window (Format F, Flicker 0)	Window (Format 0, Flicker 1)	Window (Format 0, Flicker 3)	Window (Format 0, Flicker 5)	Window (Format 0, Flicker 7)		Color bar (horizontal, 8 colors $\times$ 1)	Color bar (horizontal, 8 colors × 2)
Timing data name	VGA350-70	VGA400-50	VGA400-60	VGA400-70	VGA480-50	VGA480-60	S-VGA-56	S-VGA-72	S-VGA-75	09-VSX	XGA-66	XGA-70	SXGA-57	SXGA-60A	SXGA-60B	SXGA-60C	SXGA-70	UXGA1200-60	UXGA1200-85A	UXGA1200-85B	UXGA1280-80A	UXGA1280-80B	UXGA1280-80C	UXGA1280-82	IBM 8514A	1BM 5080	IBM 5550	0009 MBI	NAVIGATION	Mac 480-66A
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
o ity N	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z	z	z	Z	Z	Z	Z	z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z
Sync polarity N N	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z	z	z	z	Z	Z	Z	z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Prog	Int	Prog	Prog	Prog
No. of display dots (H×V)	640x350	640x400	640x400	640x400	640x480	640x480	800×600	800×600	800×600	1024x768	1024x768	1024x768	1280x1024	1280x1024	1280x1024	1280x1024	1280x1024	1600x1200	1600x1200	1600x1200	1600x1280	1600x1280	1600x1280	1600x1280	1024x768	1024x1024	640x754	1280x1024	323x246	640x480
Dot clock frequency [MHz]	25.175	25.175	25.175	25.175	25.175	25.175	36.000	50.000	49.500	000:59	71.640	75.000	100.000	106.930	110.160	109.470	132.880	160.000	220.000	230.000	220.000	230.000	238.340	246.000	44.900	89.120	24.020	111.520	6.380	30.240
Vertical frequency [Hz]	70.086	50.030	59.940	70.086	50.030	59.940	56.160	72.188	75.000	59.797	66.110	70.069	57.030	29.678	59.747	59.999	74.161	59.941	85.053	85.049	80.046	80.061	80.001	80.396	86.958	59.999	73.130	60.003	59.978	199.99
Horizontal frequency [KHz]	31.469	31.469	31.469	31.469	31.469	31.469	35.156	48.077	46.875	48.077	53.946	56.476	089'09	63.498	63.750	63.719	78.907	74.627	107.422	106.481	107.422	106.481	106.402	109.821	35.522	63.359	29.581	63.364	15.714	35.000
Program No.	880	881	882	883	884	885	988	887	888	688	890	891	892	893	894	895	968	897	868	668	006	901	902	903	904	902	906	406	806	606

PG1 program N	o.910	-939																												
Pattern data name	Color Bar 3	Color Bar 4	Color Bar 5	Color Bar 6	Color Temp.	Random 256 Color	256 Color Chara	256 Block Color	8Color & 16Gray	Gray 4 step	Gray 8 step(H)	Gray 16 step (H)	Gray 32 step (H)	Gray 64 step (H)	Gray 256 step(H)	Gray 8 step(V)	Gray 16 step (V)	Gray 32 step (V)	Gray 64 step (V)	Gray 256 step(V)	Gray 64 Block 1	Gray 64 Block 2	Circle & Cross	Cross Talk 90%	Cross Talk 60%	Black	RGB	R	9	В
Pattern data	Color bar (vertical, 8 colors × 1)	Color bar (vertical, 8 colors $\times$ 2)	Color bar (horizontal, H=0.1%)	Color bar (vertical, V=0.1%)	OPT06 (color temperature)	OPT2D (random 256 colors)	OPT2A (256-color character)	OPT00 (256-block color)	OPT03 (8 colors & 16 gray)	Gray scale (4 steps)	Gray scale (horizontal 8 gradations)	Gray scale (horizontal 16 gradations)	OPT1B (horizontal 32 gradations of gray)	OPT1C (horizontal 64 gradations of gray)	OPT2B (horizontal linear gradation ramp)	Gray scale (vertical 8 gradations)	Gray scale (vertical 16 gradations)	OPT36 (vertical 32 gradations of gray)	OPT37 (vertical 64 gradations of gray)	OPT2C (vertical linear gradation ramp)	OPT01 (64-gradation block gray/white → black)	OPT02 (64-gradation block gray/black → white)	OPT34 (circle & crosshatch)	OPT0D (crosstalk width 90%)	OPT21 (crosstalk width 60%)	Black solid	White solid	Red solid	Green solid	Blue solid
Timing data name	Mac 480-66B	Mac 600-66	Mac 624-57	Mac 768-60	Mac 768-75	Mac 870-75	NEC PC9801	NEC PC9801XL	NEC 768-60A	NEC 768-70	NEC 1024-60	NEC 1024-70	NEC 1024-75	NEC 768-60B	99-006 NNS	92-006 NNS	SUN 800-84	SUN 1024-76	SONY NEWS	SONY 1024-74	SONY 1024-74	SGI Indigo768-60	SGI Indigo1024-70	SGI IRIS4D	HP 9000t1	HP 9000t2	VAX 768-60	VAX 1024-66	Fujitsu FMV 1024-75	Fujitsu FMV 1024-100
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
o iti z	z	Z	Z	Z	Z	Z	Z	z	z	Z	Z	z	z	Z	Z	z	z	Z	Z	Z	Z	Z	z	z	z	Z	Z	Z	Z	Z
Sync polarity N N	z	Z	z	Z	Z	Z	Z	z	z	Z	Z	z	z	Z	Z	z	z	Z	Z	Z	Z	Z	z	z	z	Z	Z	Z	Z	Z
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	640x480	800×600	832x624	1024x768	1024x768	1152x870	640x400	1120x750	1120x750	1024x768	1280x1024	1280x1024	1280x1024	1024x768	1152x900	1152x900	1024x800	1280x1024	1280x1024	1280x1024	1280x1024	1024x768	1280x1024	1280x1024	1280x1024	1280x1024	1024x864	1280x1024	1024x768	1024x768
Dot clock frequency [MHz]	31.330	50.000	57.280	64.000	80.000	100.000	21.050	47.840	78.430	75.000	107.500	127.000	135.000	000:59	92.940	105.590	92.940	135.000	107.500	135.000	135.000	64.000	130.000	107.350	108.170	135.000	69.120	119.840	78.780	108.410
Vertical frequency [Hz]	609.99	888.99	74.546	59.561	74.927	75.062	56.416	79.847	60.047	70.069	59.929	69.853	74.112	80.09	65.950	890.97	84.031	76.107	60.023	74.112	74.112	59.637	72.382	666'65	59.973	72.005	000'09	66.473	75.057	100.828
Horizontal frequency [KHz]	34.967	48.828	49.722	48.780	60.241	189.89	24.823	32.857	50.019	56.476	64.603	74.882	78.855	48.363	61.795	71.732	70.838	81.130	63.384	78.855	78.855	48.485	77.014	63.866	63.331	78.125	54.000	70.660	60.046	80.662
Program No.	910	911	912	913	914	915	916	917	918	616	920	921	922	923	924	925	976	927	928	676	930	931	932	933	934	935	936	937	938	626

PG1 program No	.940-	969											1									1								
Pattern data name	R-B	R-G	G-B	Dot H20 / V20	Dot H60 / V60	256 Block Color	Total Test	SMPTE RP133 COL	Window & Edge	Circle & Line	Flicker Window 1	Flicker Window 1	Black	RGB	R	9	В	R-B	R-G	G-B	256 Block Color	ITC H Character	Window & Edge	ITC Cross & Marker	NTSC Color Bar	Color & Cross	Pairing	Cross & Circle	NTSC Color Bar	NTSC Color Bar
Pattern data	Magenta solid	Yellow solid	Cyan solid	Dot (H=20, V=20)	Dot (H=60, V=60)	OPT00 (256-block color)	OPT09 (crosshatch & circle & character)	OPT26 (SMPTE color version)	OPT30 (window & edge)	OPT0A (circle & line)	Window (Format 0, Flicker 0, 2-3 pulldown)	Window (Format 0, Flicker 0, 2-3 pulldown)	Black solid	White solid	Red solid	Green solid	Blue solid	Magenta solid	Yellow solid	Cyan solid	OPT00 (256-block color)	OPT1A (ITC pattern H character)	OPT30 (window & edge)	OPT19 (ITC pattern crosshatch & marker)	OPT0F (NTSC color bar)	OPT05 (color bar & crosshatch)	OPT07 (pairing)	OPT08 (crosshatch & circle & gray)	OPT0F (NTSC color bar)	OPTOF (NTSC color bar)
Timing data name	Fujitsu FMV5166	Fujitsu FMV5133	Fujitsu SIGMA	HITACHI SXGA	Panasonic M550	VESA600-75		ASTRO SC-2025	SXGA+	OXGA	NTSC (*p3)	1080i ( *3,*p0 )					MEDICAL-11	MEDICAL-1N	MEDICAL-2I	MEDICAL-2N	VESA400-88	1200-90		VESA1024-60	SECAM (*p2)	W-VGA	W-SVGA	W-XGA	NTSC (*p3)	PAL (*p2)
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	YPbPr	YPbPr	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	YPbPr	RGB	RGB	RGB	YPbPr	YPbPr
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	NTSC	Tri-Sync (1080)	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	SECAM	ANALOG	ANALOG	ANALOG	NTSC	PAL
Sync polarity N N	Z	Z	Z	Z	۵	Z	Z	Z	Z	Z	Ь	Z	Z	Z	Z	Z	Z	Z	Z	Ь	Z	z	Ь	Z	Z	Z	Z	Z	Z	Z
	Z	Z	N	Z	<u>ا</u>	N	Z	N	N	Z	Ь	Z	z	Z	Z	Z	Z	Z	Z	Z	Z	z	l P	N	Z	z	N	Z	Z	Z
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Int	Prog	Prog	Prog	Prog	Int	Prog	Int	Prog	Prog	Prog	Prog	Prog	Int	Prog	Prog	Prog	Int	Int
No. of display dots (H×V)	1280x1024	1280x1024	1280x1024	1280x1024	640x400	009×008		746x471	1400x1050	2048x1536	712x484	1920x1080					1170x1168	1170x584	947x946	947x473	720x400	1600x1200		1280x1024	702x574	864x480	1072x600	1376x768	712x484	702x574
Dot clock frequency [MHz]	134.370	135.040	108.100	135.060	22.770	49.500		28.640	115.210	265.010	13.500	74.250					46.200	46.200	36.830	36.830	35.500	243.000		108.000	13.500	34.240	53.940	87.440	13.500	13.500
Vertical frequency [Hz]	74.833	75.122	60.017	71.640	968.69	75.000		59.948	59.981	59.599	59.940	000:09					49.986	50.026	60.003	60.062	85.039	000:06		60.020	50.000	59.944	60.317	60.004	59.940	50.000
Horizontal frequency [KHz]	79.698	80.381	63.738	78.160	26.354	46.875		31.473	64.000	94.643	15.734	33.750					31.216	31.216	30.692	30.692	37.927	112.500		63.981	15.625	31.471	37.879	48.363	15.734	15.625
Program No.	940	941	942	943	944	945	946	947	948	646	950	951	952	953	954	955	926	657	958	626	096	1961	962	896	964	996	996	196	896	696

PG1 program No	0.970-	999																												
Pattern data name	Gamma Ramp 1	Gamma Ramp 2	Gamma Ramp 3	SMPTE PR27.1	SMPTE RP133 MONO	SMPTE RP133 COL	64 Gray & Color	Gray & Circle	Cross & Marker	SMPTE RP133 COL	1dot ON/OFF		D.Y.Test	TTL test	SMPTE Color Bar	Timing Chart		Center & Edge	Diagonal & Edge 1	Diagonal & Edge 2	Display Position	256 Block Color		Moving Bar	NTSC Color Bar		IMG Disp #1	IMG Disp #2	IMG Disp #3	IMG Disp #4
Pattern data	OPT13 (gamma correction ramp wr=2.5)	OPT14 (gamma correction ramp r=2.0)	OPT15 (gamma correction ramp r=0.5)	OPT17 (SMPTE RP27.1)	OPT25 (SMPTE RP-133)	OPT26 (SMPTE color version)	OPT1D (64 gray + RGBW color)	OPT1E (gray scale + circle)	OPT29 (crosshatch & marker)	OPT26 (SMPTE color version)	OPT35 (chessboard & window)	OPT22 (DDC pattern DVI-EDID display)	OPT33 (19×15 crosshatch & marker)	OPT32 (3 gradation window)	OPT16 (SMPTE color bar)	OPT28 (timing chart)		Center & edge	Edge & diagonal line	Edge & diagonal line & center	OPT24 (display position adjuster)	OPT00 (256-block color)		Moving bar	OPT0F (NTSC color bar)		OPT80 (image data #1 display)	OPT81 (image data #2 display)	OPT82 (image data #3 display)	OPT83 (image data #4 display)
Timing data name	1080P (*3,*p0)	1080P (*3,*p0)	1080i ( *3,*p0 )	1080i ( *3,*p0 )	1035i ( *3,*p1 )	1035i ( *3,*p1 )	720P (*3,*p0)	720P (*3,*p0)	483P(*p2) (NTSC PROG.)	PAL * 2 (*p2) (PAL PROG.)	VESA1344-60	VESA1344-60	VESA1392-60	VESA1392-60	VESA1440-60	VESA1440-60									NTSC-M (*p3)	VGA480-60	VGA480-60	VESA600-72	VESA768-70	VESA1024-75
Color	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	YPbPr	RGB	RGB	RGB	RGB	RGB
Sync Type	Tri-Sync (1080)	Tri-Sync ( 1080 )	Tri-Sync ( 1080 )	Tri-Sync (1080)	Tri-Sync (1035)	Tri-Sync (1035)	Tri-Sync ( 720 )	Tri-Sync ( 720 )	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	NTSC-M	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
nr ity	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Z	z	Ъ	Ь	Ь	Z	Ъ	Ь	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Ь	Z	Ь	Ь
Sync polarity P P	Ь	Ь	Ь	Ь	Ь	Ь	Ь	N	z	Z	z	Ν	N	Ь	Ν	N	Ν	Ν	N	Ν	Ν	Ν	N	Ν	Z	Z	Ь	Ν	Ь	Ь
Int / Prog	Prog	Prog	Int	Int	Int	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	1920x1080	1920x1080	1920x1080	1920x1080	1920x1035	1920x1035	1280x720	1280x720	720x483	720x576	1792x1344	1792x1344	1856x1392	1856x1392	1920x1440	1920x1440									712x484	640x480	640x480	009×008	1024x768	1280x1024
Dot clock frequency [MHz]	148.500	148.352	74.250	74.176	74.250	74.176	74.250	74.176	27.000	27.000	204.750	204.750	218.250	218.250	234.000	234.000									13.500	25.175	25.175	50.000	75.000	135.000
Vertical frequency [Hz]	000'09	59.940	000'09	59.940	60.000	59.940	000'09	59.940	59.940	50.000	000'09	000'09	26.995	26.669	000'09	000'09									59.940	59.940	59.940	72.188	70.069	75.025
Horizontal frequency [KHz]	67.500	67.433	33.750	33.716	33.750	33.716	45.000	44.955	31.469	31.250	83.640	83.640	86.333	86.333	000'06	000'06									15.734	31.469	31.469	48.077	56.476	79.976
Program No.	026	971	972	973	974	975	926	116	876	626	086	981	982	983	984	688	986	186	886	686	066	166	665	666	994	666	966	266	866	666

PG2 program N	lo.850	-879				1					1	1						1												
Pattern data name	NTSC Color Bar	Cross & Circle	Cross & Circle	NTSC Color Bar	Cross & Circle	Cross & Circle	NTSC Color Bar	Cross & Circle	Cross & Circle	NTSC Color Bar	SMPTE Color Bar	100%, 100% Color Bar	75%, 75% Color Bar	SMPTE RP133 MONO	SMPTE RP133 COL	Gray 256 step	Gray 128 step	Gray 64 step	Gray 32 step	Gray 16 step	Gray 8 step	Gray 4 step	Gamma Ramp 1	Gamma Ramp 2	Gamma Ramp 3					
Pattern data	OPTOF (NTSC color bar)	OPT34 (crosshatch & circle)	OPT34 (crosshatch & circle)	OPTOF (NTSC color bar)	OPT34 (crosshatch & circle)	OPT34 (crosshatch & circle)	OPT0F (NTSC color bar)	OPT34 (crosshatch & circle)	OPT34 (crosshatch & circle)	OPT0F (NTSC color bar)	OPTOF (NTSC color bar)	OPT0F (NTSC color bar)	OPT0F (NTSC color bar)	OPTOF (NTSC color bar)	OPTOF (NTSC color bar)	OPT16 (SMPTE color bar)	100%, 100% color bar	75%, 75% color bar	OPT25 (SMPTE RP-133)	OPT26 (SMPTE color version)	256-step gray scale	128-step gray scale	64-step gray scale	32-step gray scale	16-step gray scale	8-step gray scale	4-step gray scale	OPT13 (gamma correction ramp wr=2.5)	OPT14 (gamma correction ramp=2.0)	OPT15 (gamma correction ramp=0.5)
Timing data name	NTSC-J 4:3 (*p3)	NTSC-J16:9 (*p3)	NTSC-JLB (*p3)	PAL 4:3 (*p2)	PAL 16:9 ( *p2 )	PAL LB (*p2)	SECAM 4:3 (*p2)	SECAM 16:9 (*p2)	SECAMLB (*p2)	NTSC-M (*p3)	NTSC-443 (*p3)	PAL-M ( *p2 )	PAL-60 ( *p2 )	PAL-N (*p2)	PAL-Nc ( *p2 )		NTSC PROG. (*p2)	NTSC PROG. W (*p2)	NTSC PROG. LB ( *p2)	PAL PROG. (*p2)	PAL PROG. W (*p2)	PAL PROG. LB (*p2)		1920x1080@60p (*3*p0)	1920x1080@59.94p (*3*p0)	1920x1080@50p (*3*p0)	1920x1080@30p (*3*p0)	1920x1080@29.97p(*3*p0)	1920x1080@25p (*3*p0)	1920x1080@24p (*3*p0)
Color difference	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	RGB	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	RGB	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr
Sync Type	NTSC	NTSC	NTSC	PAL	PAL	PAL	SECAM	SECAM	SECAM	NTSC-M	NTSC-443	PAL-M	PAL-60	PAL-N	PAL-Nc	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)
Sync polarity N N	Z	Z	Z	Z	Z	z	Z	Z	Z	Z	z	z	z	Z	Z	Z	Z	z	Z	Z	Z	z	Ь	Ь	Ь	Ь	Ь	Ь	Ь	Z
	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z	z	z	Z	Z	N (	N	Z	N	N	N	z	J P	J P	J P	J P	J P	J P	J P	Z
Int / Prog	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	712x484	712x484	712x484	702x574	702x574	702x574	702x574	702x574	702x574	712x484	712x484	712x484	712x484	702x574	702x574		720x483	720x483	720x483	720x576	720x576	720x576		1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080
Dot clock frequency [MHz]	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500	13.500		27.000	27.000	27.000	27.000	27.000	27.000		148.500	148.352	148.500	74.250	74.176	74.250	74.250
Vertical frequency [Hz]	59.940	59.940	59.940	50.000	50.000	50.000	50.000	50.000	50.000	59.940	59.940	59.940	59.940	50.000	50.000		59.940	59.940	59.940	50.000	50.000	50.000		60.000	59.940	50.000	30.000	29.970	25.000	24.000
Horizontal frequency [KHz]	15.734	15.734	15.734	15.625	15.625	15.625	15.625	15.625	15.625	15.734	15.734	15.734	15.734	15.625	15.625		31.469	31.469	31.469	31.250	31.250	31.250		67.500	67.433	56.250	33.750	33.716	28.125	27.000
Program No.	850	851	852	853	854	855	928	857	828	826	098	861	862	863	864	998	998	298	898	698	870	871	872	873	874	875	876	877	878	879

PG2 program N	No.88	0-909		I		I		ı					I																	
Pattern data name	Gray 256 step(V)	Gray 64 step (V)	Gray 32 step (V)	Gray 16 step (V)	Gray 8 step(V)	Gray 4 step (V)	Ramp Scroll(H)	Ramp Scroll(V)	Moving Bar	Ramp Scroll(D)	Black	RGB	R	9	В	RB	RG	GB	1dot Checker	Checker	Sub-pixel Checker	256 Block Color	Moving Window 1	Moving Window 2	Moving Window 3	Flicker Window 1	Flicker Window 2	Flicker Window 3	Flicker Window 4	256 Color Chara
Pattern data	OPT2C (256-step gray scale V)	OPT37 (64-step gray scale V)	OPT36 (32-step gray scale V)	16-step gray scale V	8-step gray scale V	4-step gray scale V	OPT38 (H ramp scroll)	OPT39 (V ramp scroll)	Moving bar	OPT3A (diagonal ramp scroll)	Black solid	White solid	Red solid	Green solid	Blue solid	Magenta solid	Yellow solid	Cyan solid	1-dot checker	1920x1035@59.94i ( *3*p1 ) OPT3C (ANSI pattern contrast)	Subpixel checker	OPT00 (256-color block color)	Moving window 1	Moving window 2	Moving window 3	Flicker window 1	Flicker window 2	Flicker window 3	Flicker window 4	OPT2A (256-color block color "Color" letters)   256 Color Chara
Timing data name	1920x1080@23.98p(*3*p0)	1920x1080@60i ( *3*p0)	1920x1080@59.94i(*3*p0)	1920x1080@50i ( *3*p0)	1920x1080@30sf ( *3*p0 )	1920x1080@29.97sf(*3*p0)	1920x1080@25sf ( *3*p0 )	1920x1080@24sf ( *3*p0 )	1920x1080@23.98sf(*3*p0)		1280x720@60p (*3*p0)	1280x720@59.94p ( *3*p0)	1280x720@50p ( *3*p0)	1280x720@30p (*3*p0)	1280x720@29.97p ( *3*p0)	1280x720@25p (*3*p0)	1280x720@24p ( *3*p0)	1280x720@23.98p ( *3*p0)	1920x1035@60i ( *3*p1)	1920x1035@59.94i ( *3*p1)	SMPTE295Mi (*p1)	SMPTE295Mp (*p1)	AUS 1152i ( *p1 )	AUS 1080i (*p1)						E1A640x480p@59.94
Color	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	RGB	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	YPbPr	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	Tri-Sync(1080)	ANALOG	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(720)	Tri-Sync(1035)	Tri-Sync(1035)	Tri-1250	Tri-1250	1152 BI	1250 BI	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
Sync polarity P P	Ь	Ь	Ь	۵	Ь	۵	Ь	۵	Z	Ь	Ь	Ь	۵	Ь	Ь	Ь	Ь	Ь	Ь	Z	Z	Ь	Z	Z	Z	Z	Z	Z	Z	Z
'	Ь	Ь	Ь	Ъ	Ь	۵	Ь	۵	Z	Ь	Ь	Ь	۵	Ь	Ь	Ь	Ь	Ь	Ь	Z	Z	Ь	Ь	Z	2	Z	Z	<b>Z</b>	Z	Z
Int / Prog	Prog	Int	Int	Int	Int	Int	Int	Int	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Int	Int	Prog	Int	Int	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080		1280x720	1280x720	1280x720	1280x720	1280x720	1280x720	1280x720	1280x720	1920x1035	1920x1035	1920x1080	1920x1080	1280x1152	1920x1080						640x480
Dot clock frequency [MHz]	74.176	74.250	74.176	74.250	74.250	74.176	74.250	74.250	74.176		74.250	74.176	74.250	74.250	74.176	74.250	74.250	74.176	74.250	74.176	74.250	148.500	48.000	72.000						25.175
Vertical frequency [Hz]	23.976	60.000	59.940	50.000	000'09	59.940	50.000	48.000	47.952		000.09	59.940	50.000	30.000	29.970	25.000	24.000	23.976	000:09	59.940	50.000	50.000	50.000	50.000						59.940
Horizontal frequency [KHz]	26.973	33.750	33.716	28.125	33.750	33.716	28.125	27.000	26.973		45.000	44.955	37.500	22.500	22.478	18.750	18.000	17.982	33.750	33.716	31.250	62.500	31.250	31.250						31.469
Program No.	880	881	882	883	884	885	988	887	888	688	890	891	892	893	894	895	968	268	868	668	006	901	902	903	904	905	906	406	806	606

PG2 program No	o.910-	939																												
Pattern data name	Random 256 Color	Gray 64 Block 1	Gray 64 Block 2	8 Color & 16 Gray	Gray & Cross	Color & Cross	Color Temp.	Pairing	Cross & Circle	Total Test	Circle & Line	H Character Line	O Character Line	Cross Talk 90%	Cross Talk 60%	Sign Wave Scroll	Multi Burst	1/10MHz x 10step	SMPTE PR27.1	ITC 9 Window	ITC Cross & Marker	ITC H Character	64 Gray & Color	256 Gray & Color	Gray & Circle	Corner & Center	Display Position	Words	Timing Chart	DDC Func5
Pattern data	OPT2D (random 256-color color bar)	OPT01 (64-gradation block gray: from white to black) Gray 64 Block 1	OPT02 (64-gradation block gray: from black to white)	OPT03 (8 color bars & 16 gray scale)	OPT04 (gray scale & crosshatch)	OPT05 (color bar & crosshatch)	OPT06 (color temperature)	OPT07 (pairing)	OPT08 (crosshatch & circle & gray)	OPT09 (crosshatch & circle & character)	OPT0A (circle & line)	OPT0B (character edge H)	OPTOC (character edge 0)	OPT0D (crosstalk: width 90%)	OPT21 (crosstalk: width 60%)	OPT10 (sine wave scroll)	OPT11 (multi burst)	OPT12 (10 steps & 1/10 MHz)	OPT17 (SMPTE PR27.1)	OPT18 (ITC pattern, 9 windows)	OPT19 (ITC pattern crosshatch & marker)	OPT1A (ITC pattern, H character)	OPT1D (64-gray & RGBW color bar superimposed)	OPT2F (256-gray & RGBW color bar superimposed)	OPT1E (gray scale & circle)	OPT20 (corner & center point markers)	OPT24 (display position adjuster)	OPT27 (Song of Youth)	OPT28 (timing chart)	OPT0E (DDC pattern EDID display)
Timing data name	EIA640x480p@60	EIA720x480p@59.94	EIA720x480p@60	EIA720x480pW@59.94	EIA720x480pW@60	EIA1280x720p@59.94	EIA1280x720p@60	EIA1920x1080i@59.94	EIA1920x1080i@60					EIA1920x1080p@59.94	EIA1920x1080p@60	EIA720x576p@50	EIA720x576pW@50	EIA1280x720p@50	EIA1920x1080i@50	EIA640x480p@59.94	EIA640x480p@59.94	EIA1920x1080p@50	EIA1920x1080p@23.97	EIA1920x1080p@24	EIA1920x1080p@25	EIA1920x1080p@29.97	EIA1920x1080p@30			
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
Sync polarity N N	z	Z	Z	Z	Ь	۵	Ь	۵	Z	Z	Z	Z	۵	Ь	Z	Z	۵	۵	Z	Z	Ь	۵	۵	Ь	Ь	Ь	Z	Z	Z	۵
,	z	g N	z	z	g P	д	Э	۵	Z	Z	g N	N E	д	Э	Z B	z	Э	Э	Z	N g	Э	д	Э	g P	g P	g P	N g	N g	g	g D
y Int /	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	640x480	720x480	720x480	720x480	720x480	1280x720	1280x720	1920x1080	1920x1080					1920x1080	1920x1080	720x576	720x576	1280x720	1920x1080	640x480	640x480	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080	1920x1080			
Dot clock frequency [MHz]	25.200	27.000	27.027	27.000	27.027	74.175	74.250	74.175	74.250					148.350	148.500	27.000	27.000	74.250	74.250	25.175	25.175	148.500	74.175	74.250	74.250	74.175	74.250			
Vertical frequency [Hz]	000.09	59.940	000'09	59.940	000.09	59.939	000.09	59.939	000'09					59.939	000'09	50.000	50.000	50.000	50.000	59.940	59.940	50.000	23.976	24.000	25.000	29.970	30.000			
Horizontal frequency [KHz]	31.500	31.469	31.500	31.469	31.500	44.955	45.000	33.716	33.750					67.432	67.500	31.250	31.250	37.500	28.125	31.469	31.469	56.250	26.973	27.000	28.125	33.716	33.750			
Program No.	910	911	912	913	914	915	916	617	918	616	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	636

PG2 program No	.940-	969										1	1																	
Pattern data name	DDC Dsub	DDC DVI	Character List	H Character 1	H Character 2	H Character 3	H Character 4	H Character 5	H Character 6	Chinese Chara 1	me Character 1	me Character 2	Burst 1	Burst 2	Burst 3	Burst 4	Circle 1	Circle 2	Circle 3	Circle 4	Circle 5	Circle 6	Circle 7	Window 1	Window 2	Window 3	Window 4	Window 5	Window 6	Moving Window 1
Pattern data	OPT23 (DDC pattern D-Sub-EDID display)	OPT22 (DDC pattern DVI-EDID display)	Character list 7x9	Character 1 (H 5x7/10x14)	Character 1 (H 7x9/14x18)	Character 1 (H 16x16/32x32)	Character 2 (H 5x7/10x14)	Character 2 (H 7x9/14x18)	Character 2 (H 16x16/32x32)	Character 1 ("BI" 7x9/64x64)	Character "me" (#1 18x18)	Character "me" (VESA specifications 18x18)	Burst (Format 0)	Burst (Format 1)	Burst (Format 2)	Burst (Format 3)	Circle (Format 0)	Circle (Format 1)	Circle (Format 2)	Circle (Format 3)	Circle (Format 4)	Circle (Format 5)	Circle (Format 6)	Window (Format 0, Flicker 0)	Window (Format 1, Flicker 0)	Window (Format 2, Flicker 0)	Window (Format 3, Flicker 0)	Window (Format 4, Flicker 0)	Window (Format 5, Flicker 0)	Window (Format 8, Flicker 7)
Timing data name	VESA640x350@85	VESA640x400@85	VESA720x400@85	VESA640x480@60	VESA640x480@72	VESA640x480@75	VESA640x480@85	VESA848x480@60	VESA800x600@56	VESA800x600@60	VESA800x600@72	VESA800x600@75	VESA800x600@85	VESA1024x768@43	VESA1024x768@60	VESA1024x768@70	VESA1024x768@75	VESA1024x768@85	VESA1152x864@75	VESA1280x768@60	VESA1280x768@60	VESA1280x768@75	VESA1280x768@85	VESA1280x960@60	VESA1280x960@85	VESA1280x1024@60	VESA1280x1024@75	VESA1280x1024@85	VESA1360x768@60	VESA1400x1050@60
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG
Sync polarity P N	Ь	Ь	Z	Z	Ν	Z	Ь	Ь	Ь	Ь	Ь	Ъ	Ъ	Ν	Ν	Ь	Ь	Ь	Z	Ь	Ь	Ь	Ь	Ь	Ъ	Ь	Ь	Ь	Z	Ь
S Polk	Z	Z	Z	Z	Z	z	Д	Д	Д	Д	Д	۵	۵	Z	Z	Ь	Д	Д	Д	Z	Z	Z	Д	Д	۵	Ь	Ь	Ь	۵	Ь
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Int	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog
No. of display dots (H×V)	640x350	640x400	720x400	640x480	640x480	640x480	640x480	848x480	800x600	800x600	800x600	800x600	800x600	1024x768	1024x768	1024x768	1024x768	1024x768	1152x864	1280x768	1280x768	1280x768	1280x768	1280x960	1280x960	1280x1024	1280x1024	1280x1024	1360x768	1400x1050
Dot clock frequency [MHz]	31.500	31.500	35.500	25.175	31.500	31.500	36.000	33.750	36.000	40.000	50.000	49.500	56.250	44.900	000.39	75.000	78.780	94.500	108.000	68.250	79.500	102.250	117.500	108.000	148.500	108.000	135.000	157.500	85.500	101.000
Vertical frequency [Hz]	85.080	85.080	85.039	59.940	72.809	75.000	82.008	000'09	56.250	60.317	72.188	75.000	85.061	86.958	60.004	70.069	75.029	84.997	75.000	59.995	59.870	74.893	84.837	000'09	85.002	60.020	75.025	85.024	60.015	59.948
Horizontal frequency [KHz]	37.861	37.861	37.927	31.469	37.861	37.500	43.269	31.020	35.156	37.879	48.077	46.875	53.674	35.522	48.363	56.476	60.023	68.677	67.500	47.396	47.776	60.289	68.633	000'09	85.938	63.981	79.976	91.146	47.712	64.744
Program No.	940	941	942	943	944	945	946	746	948	646	026	951	952	953	954	955	926	657	826	626	096	1961	696	696	964	996	996	196	896	696

PG2 program No	.970-	999																												
Pattern data name	Moving Window 2	Moving Window 3	Window Level	Flicker Window 1	Flicker Window 2	Flicker Window 3	Flicker Window 4	2-3 pull-down Window 1	Dot H20/V20	Dot H60/V60	0% Window	5% Window	10% Window	20% Window	30% Window	40% Window	50% Window	60% Window	70% Window	80% Window	90% Window	100% Window	IMG Disp #1	IMG Disp #2	IMG Disp #3	IMG Disp #4	IMG Disp #5	IMG Disp #6	IMG Disp #7	IMG Disp #8
Pattern data	Window (Format 9, Flicker 7)	Window (Format E, Flicker 7)	Window (Format F, Flicker 7)	Window (Format 0, Flicker 1)	Window (Format 0, Flicker 3)	Window (Format 0, Flicker 5)	Window (Format 0, Flicker 7)	Window (Format 0, Flicker 0, 2-3 pulldown)	Dot (H=20, V=20)	Dot (H=60, V=60)	0% window	5% window	10% window	20% window	30% window	40% window	50% window	60% window	70% window	80% window	90% window	100% window	OPT80 (image data #1 display)	OPT81 (image data #2 display)	OPT82 (image data #3 display)	OPT83 (image data #4 display)	OPT84 (image data #5 display)	OPT85 (image data #6 display)	OPT86 (image data #7 display)	OPT87 (image data #8 display)
Timing data name	VESA1400x1050@60	VESA1400x1050@75	VESA1400x1050@85	VESA1600x1200@60	VESA1600x1200@65	VESA1600x1200@70	VESA1600x1200@75	VESA1600x1200@85	VESA1792x1344@60	VESA1792x1344@75	VESA1856x1392@60	VESA1856x1392@75	VESA1920x1200@60	VESA1920x1200@60	VESA1920x1200@75	VESA1920x1200@85	VESA1920x1440@60	VESA1920x1440@75												
Color	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB	RGB							
Sync Type	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG	ANALOG							
Sync oolarity N P	Д	Ь	Д	Д	۵	۵	Ь	Ь	Д	Ь	Ь	Z	Ь	Ь	Ь	Д	Д	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	z
S OU N	g N	g N	g P	g P	g P	g P	g P	N g	N g	g N	N g	g P	N g	N g	g N	g N	Z D	g N	g N	g N	g N	g N	g N	N g	g N	g N	g N	g N	g N	g N
Int / Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog	Prog							
No. of display dots (H×V)	1400x1050	1400x1050	1400x1050	1600x1200	1600x1200	1600x1200	1600x1200	1600x1200	1792x1344	1792x1344	1856x1392	1856x1392	1920x1200	1920x1200	1920x1200	1920x1200	1920x1440	1920x1440												
Dot clock frequency [MHz]	121.750	156.000	179.500	162.000	175.500	189.000	202.500	229.500	204.750	261.000	218.250	288.000	154.000	193.250	245.250	281.250	234.000	297.000												
Vertical frequency [Hz]	59.978	74.867	84.960	000:09	65.000	70.000	75.000	85.000	000:09	74.997	59.995	75.000	59.950	59.885	74.930	84.932	000.09	75.000												
Horizontal frequency [KHz]	65.317	82.278	93.881	75.000	81.250	87.500	93.750	106.250	83.640	106.270	86.333	112.500	74.038	74.556	94.038	107.184	90.000	112.500												
Program No.	026	971	972	973	974	975	926	216	878	6/6	086	981	982	983	984	686	986	286	886	686	066	166	992	666	994	366	966	266	866	666

### 9.1.2 Optional pattern data

■ Optional patterns 00H to 1FH (page 1 of 2)

	ptional patterns ou			NI.	D.II.	NI.	D.II.
No.	Pattern	No.	Pattern Crosshatch & circle &	No.	Pattern	No.	Pattern
00	256-color block color	08	gray	10	Sine wave scroll	18	ITC pattern 9 windows
01	64-gradation block gray (from white to black)	09	Crosshatch & circle & character	11	Multi burst	19	ITC pattern crosshatch & marker
02	64-gradation block gray (from black to white)	0A	Circle & line	12	10 steps & 1/10 MHz	1A	ITC pattern H character
03	8 color bars & 16 gray scale	0B	Character edge (H)	13	Gamma correction ramp wr=2.5	1B	32-gradation gray scale (H)
04	Gray scale & crosshatch	0C	Character edge (0)	14	Gamma correction ramp r=2.0	1C	64-gradation gray scale (H)
05	Color bar & crosshatch	0D	Crosstalk (width 90%)	15	Gamma correction ramp r=0.5	1D	64-gray & RGBW color bar superimposed
06	Color temperature	0E	DDC pattern *1	16	SMPTE color bars	1E	Gray scale & circle
07	Pairing	0F	NTSC color bars	17	SMPTE PR27.1	1F	128-step gray scale (H)

<sup>\*1:</sup> Refer to "9.1.2.1 Concerning the DDC patterns"

■ Optional patterns 20H to 3FH (page 2 of 2)

	ptional patterns 20	H 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)
	-		0. 121 00. 121				_
			FLET BE				_
21	Crosstalk (width 60%)	29	Crosshatch & marker	31	32-gradation gray scale (H)	39	Ramp scroll (V)
					(11)		
22	DDC pattern DVI (*1)	2A	256-color block color	32	3-gradation window	3A	Ramp scroll (diagonal)
	100 100 0 000 per 10 man reserved (100 miles		"Color" letters		3		(11317)
	The state of the s						
	The Section of Taylor Hallow is and in the						
23	DDC pattern D-Sub (*1)	2B	Linear gradation ramp H	33	19 × 15 crosshatch &	3B	ANSI pattern (setup)
23	DDC pattern D-3db (1)	20	direction	33	marker	35	ANOI pattern (setup)
	The state of the s						_
	Company Company Company (Company Company Compa						Market Co.
<u> </u>			Linear gradation ramp V				
24	Display position adjuster	2C	direction	34	Crosshatch & circle	3C	ANSI pattern (contrast)
	Land States						
	ligiti jilgit						
	Trade Control		Random 256-color color		Chessboard & window		
25	SMPTE RP-133	2D	bar	35	* Artist's rendition	3D	ANSI pattern (9 points)
							<b>(3)</b>
26	SMPTE color version	2E	DDC pattern *1 (binary)	36	32-gradation gray scale (V)	3E	ANSI pattern (horizontal resolution)
			EDID Black ## (BMts) ' 60 01 02 03 04 85 05 07 00 09 09 09 00 00		(v)		* Artist's rendition
			60 60 64 61 61 60 61 61 61 61 61 61 61 61 61 61 61 61 61				
			10 · 00 de 35 14 de 32 de 32 de 31 35 37 30 éu				
			256 gray & RGBW color				ANSI pattern
27	Song of Youth	2F	bar superimposed	37	64-gradation gray scale (V)	3F	(vertical resolution)  * Artist's rendition
			(full color)				Arust's rendition
	自然的知识的知识的知识						

<sup>\*1:</sup> Refer to "9.1.2.1 Concerning the DDC patterns"

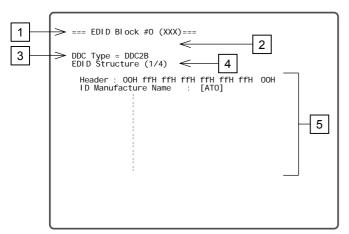
### 9.1.2.1 Concerning the DDC patterns

When a DDC pattern is executed, the EDID is obtained from the receiver (such as a display) connected to the VG-848, 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.

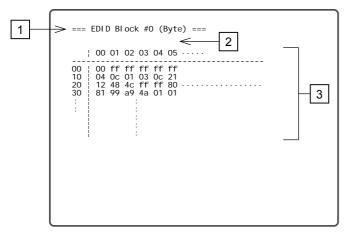
### GUI display of EDID (optional pattern No.0E, 22, 23)



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)

<sup>\*</sup> 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)

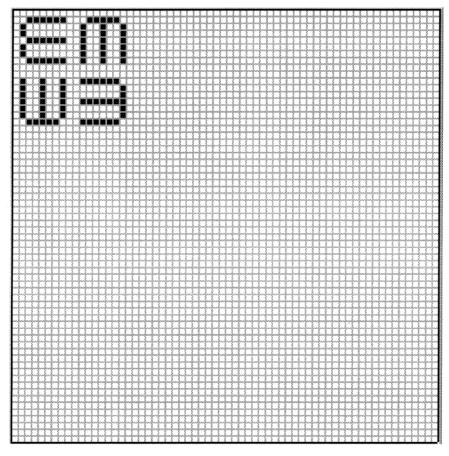
<sup>\*</sup> Switch between the pages using the [▶] and [◄] keys.

<sup>\*</sup> 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.

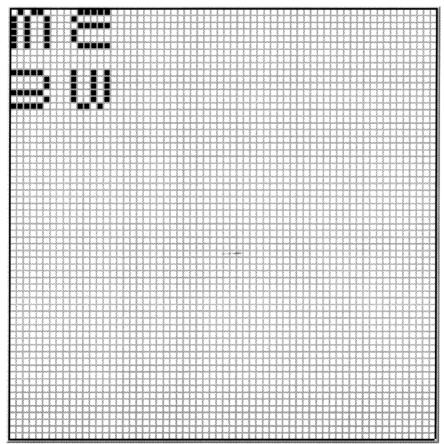
## 9.1.3 User character pattern data

Code (H)	Description	Cell size	Reference page
F0	Letters "me" #1	18 × 18	p.182
F1	Letters "me" #2 (VESA specifications)	18 × 18	p.182
F2	Chinese character "Al"	64 × 64	p.183
F3	Chinese character "BI"	64 × 64	p.183
F4	Chinese character "TAKA"	32 × 32	p.184
F5	Chinese character "KIRI"	32 × 32	p.184
F6	Chinese character "KEN"	32 × 32	p.185
F7	Burst	64 × 64	p.185
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

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

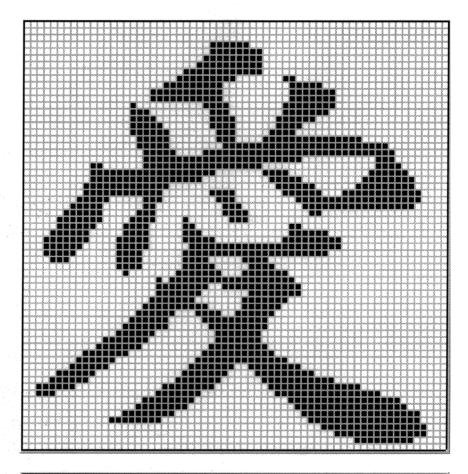


F1H

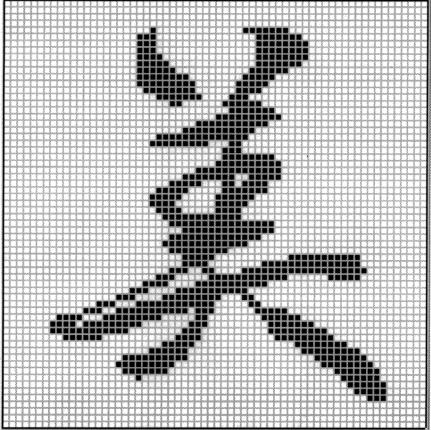


### ■ F2H [Chinese character "AI"]/F3H [Chinese character "BI"]

F2H

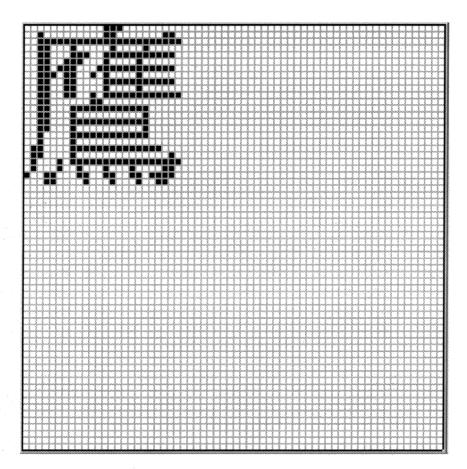


F3H

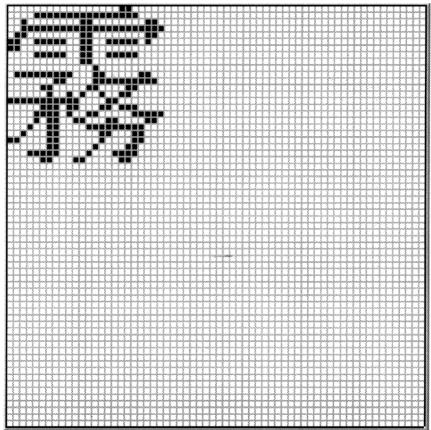


### ■ F4H [Chinese character "TAKA"]/F5H [Chinese character "KIRI"]

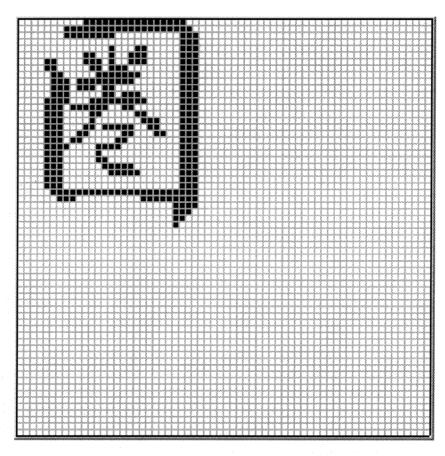
F4H



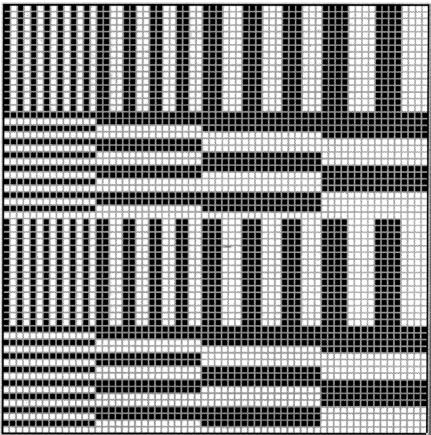
F5H



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

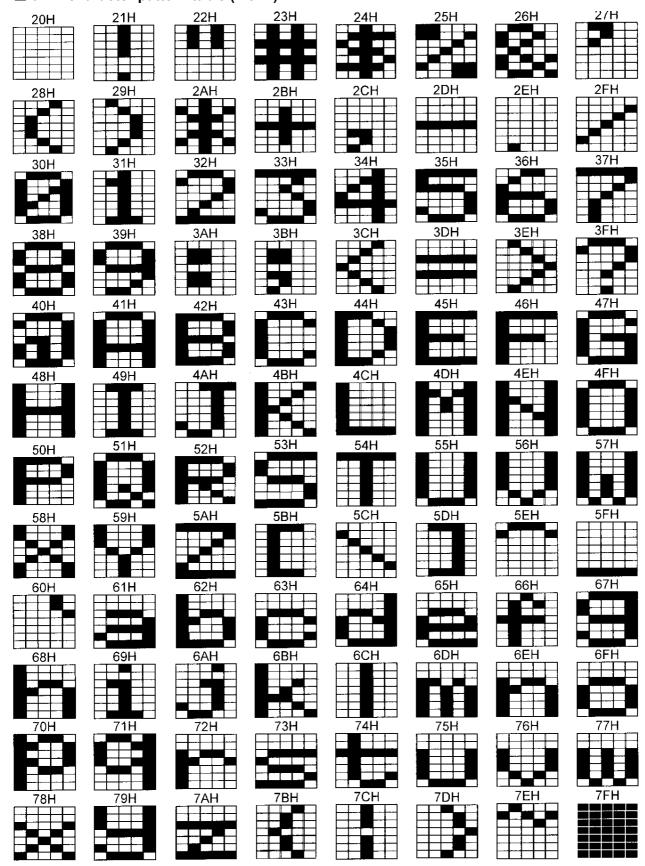


F7H

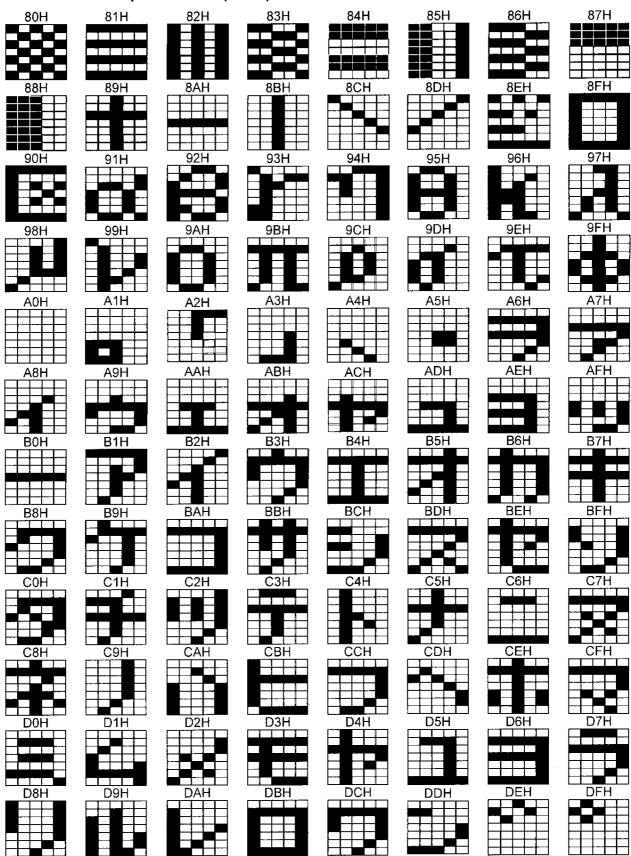


### 9.1.4 Character pattern data

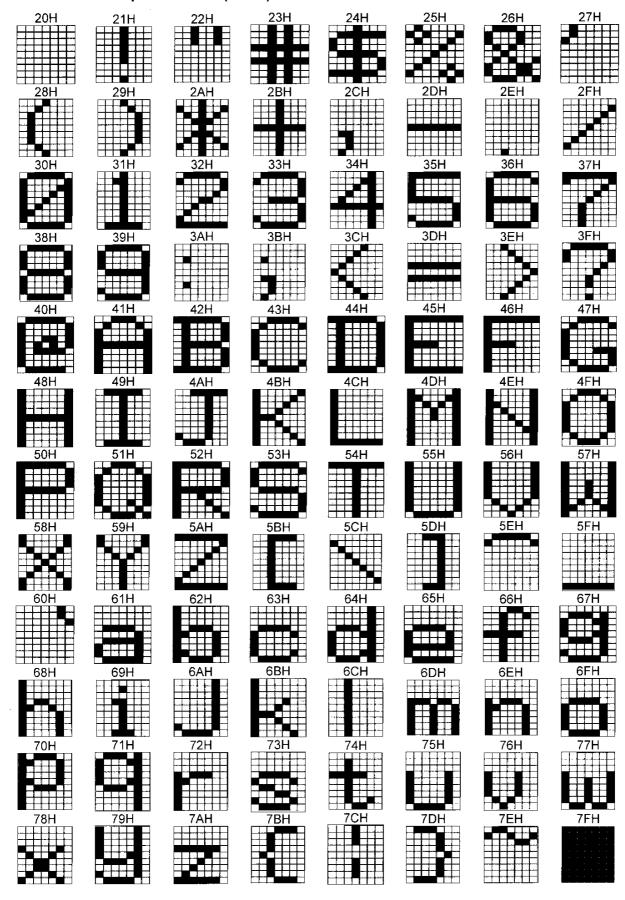
### ■ 5 × 7 character pattern table (1 of 2)



### $\blacksquare$ 5 × 7 character pattern table (2 of 2)

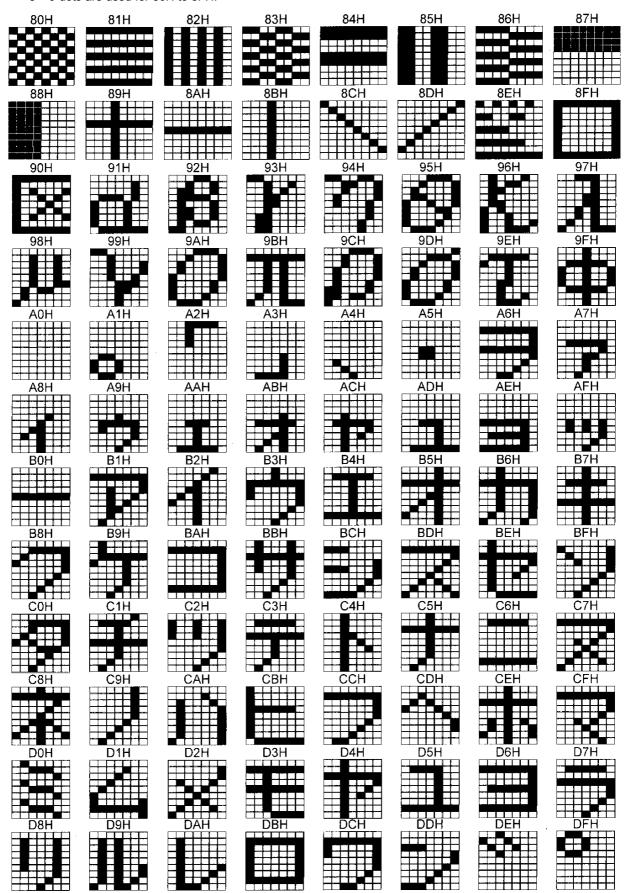


#### $\blacksquare$ 7 × 9 character pattern table (1 of 2)

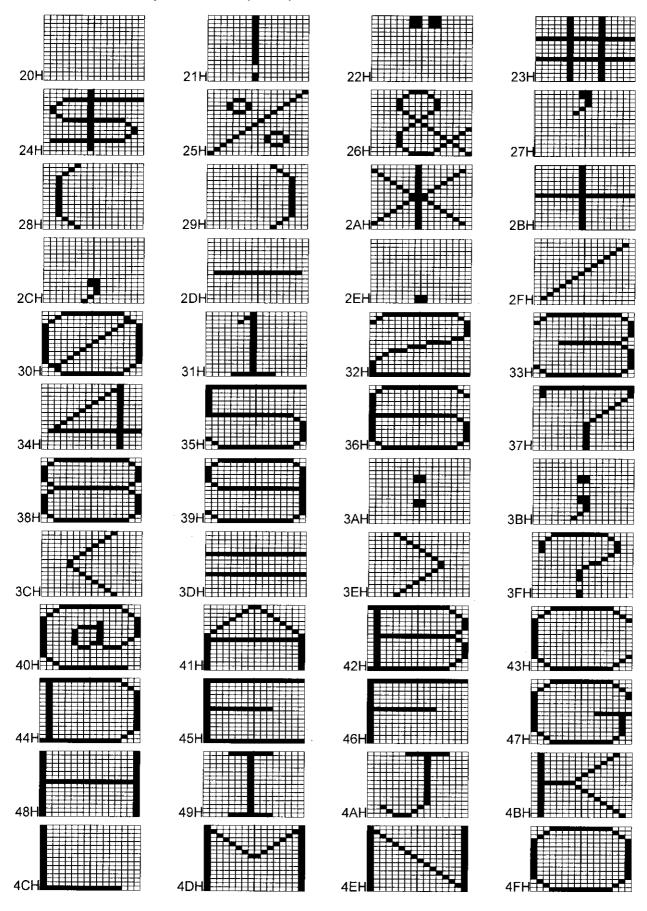


#### $\blacksquare$ 7 × 9 character pattern table (2 of 2)

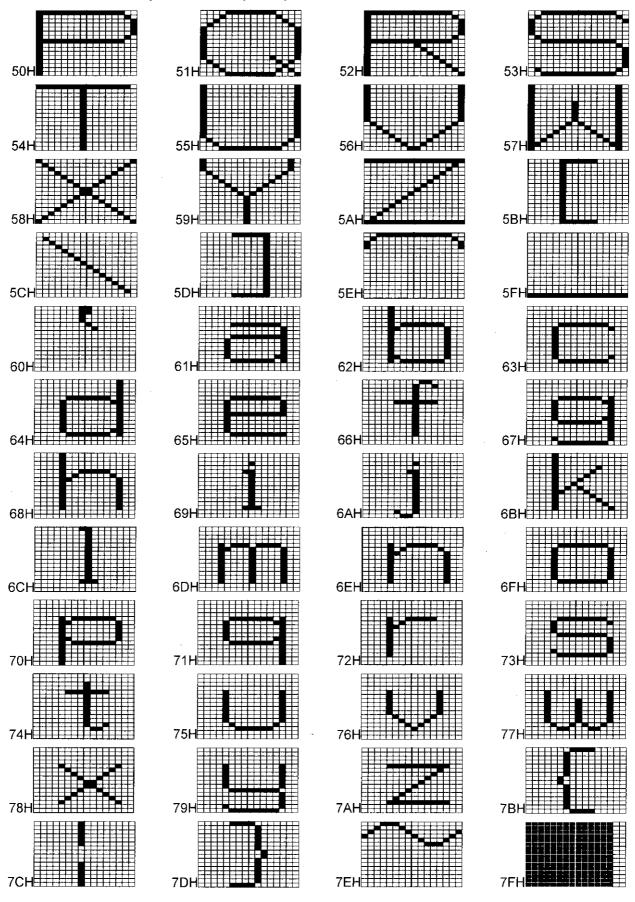
\*  $8 \times 9$  dots are used for 80H to 8FH.



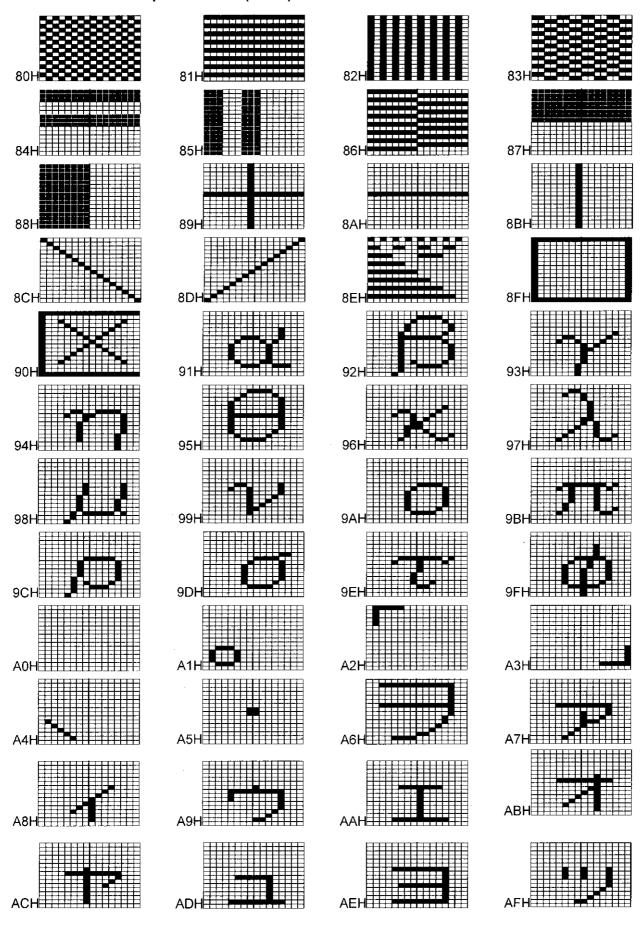
### ■ 16 × 16 character pattern table (1 of 4)



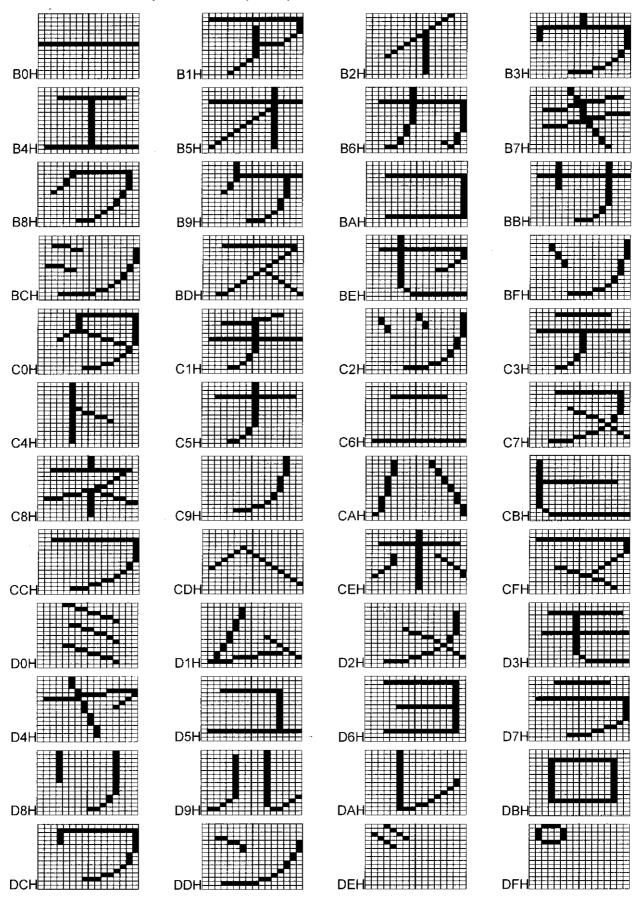
### ■ 16 × 16 character pattern table (2 of 4)



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



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



### 9.2 Concerning PC cards

#### 9.2.1 PC cards which can be used

Use the CF card provided with the VG-848 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.



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.

### 9.2.2 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. (This file is not created with VG-848 version 1.28 or earlier.)

#### ■ 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.

### 9.2.3 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 (VG-848 version 1.29 or later)
            prgext002.vgd
                                    : Extension program data (VG-848 version 1.29 or later)
            prgext003.vgd
                                    : Extension program data (VG-848 version 1.29 or later)
      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
```

### 9.2.4 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-848 because some of its data has been deleted by the PC in error, proceed to initialize the card (p.53) using PC card copy FUNC4. (If this is done, however, all the data remaining on the card will be erased.)

# 9.3 Table of error messages

### ■ Error codes 00H to 1DH

		and the second	and the second of
Code (ப)	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)
90	HD over	HDstart + HDwidth in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod ≥ HDstart + HDwidth)
20	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.	
60	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.	
00	Hfreq over	The horizontal sync frequency in the horizontal timing data is outside the setting range.	
Q0	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.
18	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 66H

40         Vtotal over           40         Vtotal over           41         Vdisp over           42         Vsync over           43         Vbp over           44         Vfp over           45         Vfp over           46         Vfreq over           48         EQPfp over           49         EQPfp over           49         EQPpp over           40         DDC1 Timeout           40         DDC1 ACK error           40         EDID Tim error           50         Macrovision error           51         Move Action Not Exe           52         EDID Header error           53         EDID Check Sum error           54         EDID Headr & Chk Sum err           54         EDID Headr & Chk Sum err           54         EDID Headr & Chk Sum err	Viotal in the vertical timing data is outside the setting range.  Vdisp in the vertical timing data is outside the setting range.  Vsync in the vertical timing data is outside the setting range.	Kemedial action Check the setting range.
Vitotal over Vdisp over Vsync over Vpp over Vfp over Vfreq over Vfreq over EQPfp over EDID Tim error  Macrovision error EDID Header error EDID Header error EDID Header & Chk Sum err EDID Header & Chk Sum err		Check the setting range.
Vdisp over         Vsync over         Vbp over         Vblank over         Vblank over         VD over         EQPbp over         EQPbp over         DDC1 Timeout         DDC1 Timeout         DDC2 ACK error         DDC2 ACK error         DDC2 ACK error         Macrovision error         Move Action Not Exe         EDID Header error         EDID Check Sum error         EDID Header & Chk Sum err         EDID Header & Chk Sum error         EDID Header & Chk Sum error         EDID Header & Chk Sum error		
Vsync over         Vbp over         Vfp over         Vblank over         VD over         EQPfp over         V-TIM data NG         DDC1 Timeout         DDC1 ACK error         EDID Tim error         DDC2 ACK error         EDID Tim error         DDC2 ACK error         EDID Tim error         EDID Tim error         DDC2 ACK error         EDID Tim error         EDID Tim error         EDID Header error         EDID Check Sum error         EDID Check Sum error         EDID Header & Chk Sum err         EDID Header & Chk Sum error         EDID Header & Chk Sum error		
Vbp over         Vfp over         Vblank over         VD over         EQPfp over         V-TIM data NG         DDC1 Timeout         DDC1 ACK error         EDID Tim error         DDC2 ACK error         Macrovision error         Macrovision error         EDID Header error         EDID Header error         EDID Check Sum error         EDID Header & Chk Sum err         EDID Header & Chk Sum error         EDID Header & Chk Sum error         EDID Header & Chk Sum error		
Vfp over         Vblank over         Vfreq over         VD over         EQPfp over         EQPbp over         V-TIM data NG         DDC1 Timeout         DDC1 ACK error         EDID Tim error         DDC2 ACK error         Macrovision error         Move Action Not Exe         EDID Header error         EDID Check Sum error         EDID Header & Chk Sum err         EDID Header & Chk Sum error         EDID Header & Chk Sum error         EDID Header & Chk Sum error	Vbackp in the vertical timing data is outside the setting range	
Vblank over Vfreq over  VD over  EQPfp over  EQPbp over  V-TIM data NG  DDC1 Timeout  DDC1 ACK error  EDID Tim error  DDC2 ACK error  Macrovision error  Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Check Sum error  EDID Header & Chk Sum err	Vfrontp in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal ≥ Vsync + Vbackp + Vdisp)
Vfreq over  VD over  EQPfp over  EQPbp over  V-TIM data NG  DDC1 Timeout  DDC1 ACK error  EDID Tim error  Macrovision error  Macrovision error  Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Header & Chk Sum err  EDID Header & Chk Sum error	Vblanking in the vertical timing data is outside the setting range.	Check the setting range.
VD over EQPfp over EQPbp over V-TIM data NG DDC1 Timeout DDC1 ACK error EDID Tim error DDC2 ACK error Macrovision error Macrovision error EDID Header error EDID Header error EDID Header & Chk Sum error	The vertical sync frequency in the vertical timing data is outside the setting range.	
EQPfp over EQPbp over V-TIM data NG DDC1 Timeout DDC1 ACK error EDID Tim error DDC2 ACK error Macrovision error Move Action Not Exe EDID Header error EDID Check Sum error EDID Header & Chk Sum err	VDstart + VDline in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal ≥ VDstart + VDline)
EQPbp over  V-TIM data NG  DDC1 Timeout  DDC1 ACK error  EDID Tim error  DDC2 ACK error  Macrovision error  Macrovision error  Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Header & Chk Sum err	EQPfp in the vertical timing data is outside the setting range.	Check the setting range.
V-TIM data NG DDC1 Timeout DDC1 ACK error EDID Tim error DDC2 ACK error Macrovision error Move Action Not Exe EDID Header error EDID Check Sum error EDID Header & Chk Sum err	EQPbp in the vertical timing data is outside the setting range.	
DDC1 Timeout DDC1 ACK error EDID Tim error DDC2 ACK error Macrovision error Move Action Not Exe EDID Header error EDID Header error EDID Header & Chk Sum err EDID Headr & Chk Sum err	Error other than those described above in the vertical timing data.	
DDC1 ACK error EDID Tim error DDC2 ACK error Macrovision error Move Action Not Exe EDID Header error EDID Check Sum error EDID Headr & Chk Sum err	A data timeout has occurred in DDC1.	
EDID Tim error DDC2 ACK error Macrovision error Move Action Not Exe EDID Header error EDID Check Sum error EDID Headr & Chk Sum err	ACK was not received in DDC1.	
DDC2 ACK error  Macrovision error  Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Headr & Chk Sum err  EDID Headr & Chk Sum err	A response from EDID was not received.	
Macrovision error  Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Headr & Chk Sum err  EDID Headr & Chk Sum err	ACK was not received in DDC2.	
Move Action Not Exe  EDID Header error  EDID Check Sum error  EDID Headr & Chk Sum err  EDID Headr & Chk Sum err	An IC supporting Macrovision has not been installed.	
EDID Header error EDID Check Sum error EDID Headr & Chk Sum err	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.
EDID Check Sum error EDID Headr & Chk Sum err	Error in the EDID header.	
EDID Headr & Chk Sum err ~62 File system err	EDID checksum error.	
~ 62 File system err	Errors in both the EDID header and checksum.	
	Reserved	
63 Not free area	The data to be copied onto the PC card is over 16 Mbytes.	
64 DMA Error	An error occurred during pattern output.	A failure may have occurred. Contact the manufacturer.
65 Data Not Registed A	An attempt was made to copy PC card data but the copy source file was not found.	
66 Video Board Busy A	An error occurred on the video output board.	A failure may have occurred. Contact the manufacturer.

### **■** Error codes 67H and up

Code (H)	Error message	Description		Remedial action
29	M-CARD Size Over	An attempt was made to copy all the data on a PC card data but the card capacity was exceeded.	data but the card	Use a card with a capacity of 128MB or less.
68	M-CARD Size Differ	An attempt was made to copy all the data on a PC card but the capacities of the copy source and copy destination cards were different.	l but the capacities of ent.	Use cards with the same capacity.
69	BMP Size Over	The bitmap size is too large.		Use a bitmap of 4000 $ imes$ 4000 or less.
81	OPT-Prog. not Exist	Errors which occur when user-generated optional patterns are executed	The user-generated optional pattern does	
82	Variables Stack Err	Variable stack error.	not exist.	
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	Check the priorities of the functions.
	STOP: VChip	V-chip was stopped during its execution.	currently being	executed simultaneously.")
	STOP: CC & VChip	Closed caption and V-chip were stopped during their execution.	executed stopped because the execution of another	
	STOP : TeleText	Teletext was stopped during its execution.	function has priority	
	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 ~ 165		HDCP-related error. (Refer to "4.10.3.4 When HDCP certification has failed/error codes.)	ertification has	

# 9.4 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	ting	Output level		
		00	2.2V	5.0V
Line signal 1	Line signal 1 Number of scanning lines 480		720	1080
Line signal 2	Line signal 2 Scanning system	Interlace	-	Progressive
Line signal 3 Aspect ratio	Aspect ratio	4:3	Letter-box	16:9

<sup>1)</sup> Composite output timing signals

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

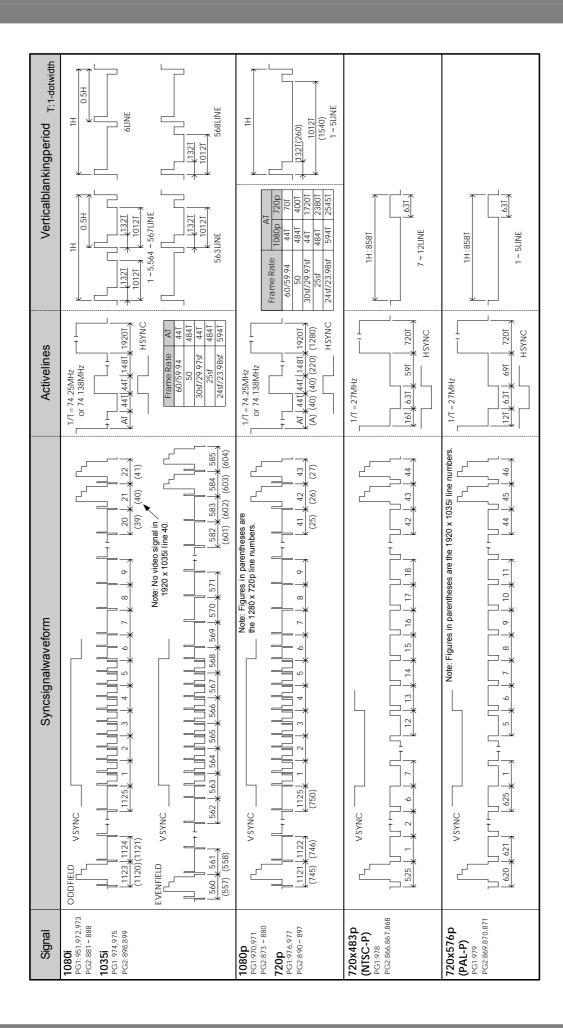
														1		
Remarks (main countries	where used)	Japan			NSA		U.K, Germany			Brazil		Uruguay	Argentina	France, Russia		
number	PG2	850	851	852	859	860	853	854	855	861	862	863	864	928	857	858
Program number	PG1	950, 968	ı	ı	994	1	696	ı	ı	ı	-	ı	1	964	ı	1
SETUP		OFF	OFF	OFF	NO	NO	OFF	OFF	OFF	NO	OFF	NO	OFF	OFF	OFF	OFF
	3	0	5.0	2.2	0	0	0	5.0	2.2	0	0	0	0	0	5.0	2.2
D5 connector line signal [V]	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D5 c line a	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aspect ratio		4:3	16:9	4:3 (LB)	4:3	4:3	4:3	16:9	4:3 (LB)	4:3	4:3	4:3	4:3	4:3	16:9	4:3 (LB)
Subcarrier frequency	[MHz]	3.579545			3.579545	4.433619	4.433619			3.575612	4.433619	4.433619	3.582056	for=4.406250	fob=4.250000	
Resolution Total no. of V period [Hz] samples frame (field)		59.94 (29.97)			59.94 (29.97)	59.94 (29.97)	50 (25)			59.94 (29.97)	59.94 (29.97)	59.94 (29.97)	50 (25)	50 (25)		
Total no. of samples		858×525			858×525	858×525	864×625			858×525	858×525	864×625	864×625	864×625		
Resolution		712×484			712×484	712×484	702×574			712×484	712×484	718×574	702×574	702×574		
Reference standard		NTSC	(RS-170A)		NTSC	NTSC	₽AL	(BT.470-6)		TVA	PAL	TVA	PAL	SECAM		
Signal format		NTSC	(Japan)		NTSC-M	NTSC-443	PAL	(B/D/G/H/I/K) (BT.470-6)		PAL-M	PAL-60	PAL-N	PAL-Nc	SECAM		

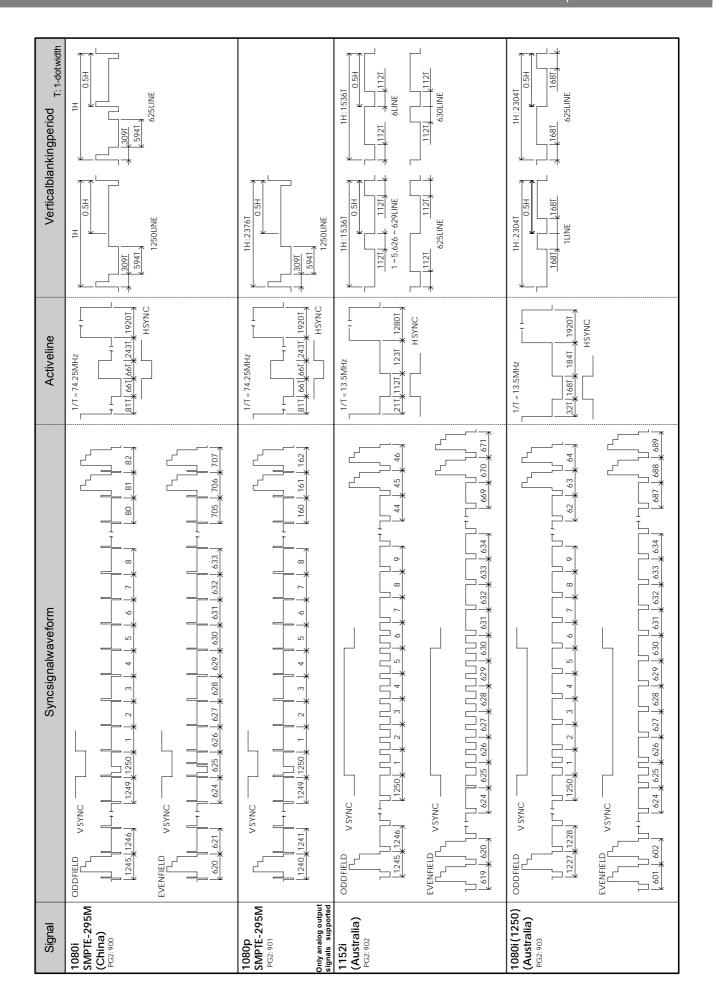
Remarks																			
number	PG2	881	882	883	884	885	886	887	888	873	874	875	876	877	878	879	880	868	899
Program number	PG1	951, 972	973	-	-	-	-	-	-	970	971	-	-	-	-	-	-	974	975
signal [V]	3	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	5.0	5.0	5.0	5.0	5.0	2.0	5.0
D5 connector line signal [V]	2	0	0	0	0	0	0	0	0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0	0
	1	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Aspect ratio		16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9	16:9
Subcarrier frequency	[MHz]	(30)	59.94 (29.97)	50 (25)	(30sf)	(29.97sf)	(25sf)	(24sf)	(23.98sf)	90	59.94	50	30	29.97	25	24	23.98	60 (30)	59.94 (29.97)
V period [Hz]	frame (field)	2200 × 1125	2200 × 1125	2640 × 1125	2200 × 1125	2200 × 1125	2640 × 1125	2750 × 1125	2750 × 1125	2200 × 1125	$2200\times1125$	2640 × 1125	2200 × 1125	2200 × 1125	2640 × 1125	2750 × 1125	2750 × 1125	2200 × 1125	
Total no. of	samples	1920 × 1080								$1920 \times 1080$								$1920 \times 1035$	
Resolution		SMPTE								SMPTE								BTA S-001A	
Reference standard		1080i								1080p								1035i	

Reference standard	Resolution	Total no. of	V period [Hz]	Subcarrier frequency	Aspect ratio	D5 conn	D5 connector line signal [V]	ignal [V]	Program number	number	Remarks
		samples	frame (field)	[MHz]		1	2	3	PG1	PG2	
720p	SMPTE	1280 × 720	1650 × 750	09	16:9	2.2	5.0	5.0	926	890	
			1650 × 750	59.94	16:9	2.2	5.0	5.0	977	891	
			1980 × 750	20	16:9	2.2	5.0	5.0	-	892	
			$3300\times750$	30	16:9	2.2	5.0	5.0	-	893	
			$3300\times750$	29.97	16:9	2.2	5.0	5.0	-	894	
			$3960\times750$	25	16:9	2.2	5.0	5.0	-	895	
			$4125\times750$	24	16:9	2.2	5.0	5.0	-	896	
			$4125\times750$	23.98	16:9	2.2	5.0	5.0	-	897	
720 × 483p	SMPTE	720 × 483	858 × 525	59.94	4:3	0	5.0	0	978	866	
(NTSC-PROG)					16:9	0	5.0	5.0	-	867	
					4:3 (LB)	0	5.0	2.2	-	868	
720 × 576p	BT.1358	720 × 574	864 × 625	20.00	4:3	0	5.0	0	979	869	
(PAL-PROG)					16:9	0	5.0	5.0	-	870	
					4:3 (LB)	0	5.0	2.2	-	871	

T: 1-dotwidth , 63T 63T ) 63T 、 K 63T X 31.5T 316LINE 0.5H 0.5H 4,5,6,267,268LINE . 631 131.51 631 31.51 1,2,3,314,315LINE 1,2,314,315LINE 272LINE 1H:864T 1H:858T 1H:864T 63T Verticalblankingperiod , 63T , 63T ¥ 31.5T 624,625,4,5,311,312,316,317LINE 1,2,3,7,8,9,264,265,270,271LINE 63T 631 631 623,624,625,4,5,6, 310,311,312,,317,318LINE 4 k31.5T 4 k31.5T 623LINE 31.5T 1 31.5T ¥ 31.5T 0.5H ¥ 31.5T J 131.5T 1H:858T 266LINE 1H:864T 1H:864T 313LINE 313LINE 131.5T 31.5T 31.51 131.51 63T ) ( 63T ) 712T 718T 702T H SYNC Activelines 63T 797 63T 1/T = 13.5MHz 1/T = 13.5MHz 1/T = 13.5MHz 201 631 20T 63T **↓** 63T ↓ 20T 283 284 285 335 \ 336 \ 337 336 337 23 332 20 22 322 1 318 | 319 | 320 | 321 Syncsignalwaveform VSYNC NSANC !! VSYNC VSYNC 308 1 309 EVENFIELD EVENFIELD EVENFIELD U 525 ↓ , 622 | | | 621 ODD FIELD ODD FIELD ODD FIELD PAL-B/D/G/H/I/K NTSC-J PG1:950,968 PG2:850,851,852 **SECAM** PG1:964 PG2:856,857,858 PG1:969 PG2:853,854,855 NTSC-443 PG2:860 Signal NTSC-M PG1:994 PG2:859 PAL-NC PG2:864 **PAL-60** PG2:862 PAL-M PG2:861 **PAL-N** PG2:863

Standard signal timing signal waveforms





# 10 SPECIFICATIONS AND CHECKPOINTS

# 10.1 Main specifications

Output				
Dot clock frequency	Analog	5.00 to 300.00MHz		
	Digital	Serial output (Panel Link) Single Link: 25 to 165 MHz  Dual Link: 50 to 300 MHz		
Horizontal frequency		10 to 300 kHz, max. 8192 dots		
Number of vertical sc	anning lines	Max. 8192 lines		
Video memory		4096 dots × 4096 dots		
Video signal output le	evel	0.30 to 1.20V (75Ω)		
Setup level		0 to 0.25V (75Ω)		
Sync signal output lev	vel (HS, CS, VS)	HS, VS: More than 2V (75 $\Omega$ ) CS: 0.3V for binary output; $\pm$ 0.3V for tri-level output (75 $\Omega$ )		
Composite video syno	c signal	Level: 0 to 0.60V (0 to $\pm$ 0.6V for tri-level output) (75 $\Omega$ ) 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 connec	ctors (BNC)	RGB, HS, VS, CS		
Fine adjustment of ar	nalog output levels	Offset level (RGB coupled), video level (separate for R, G and B)		
DVI output		DVI 1.0		
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)		
External interfaces				
Remote connector (2	5-pin)			
RS-232C (9-pin)				
LAN (10/100BASE-T	X)			
General ratings				
Supply voltage		AC100 to 120V, AC200 to 240V		
Power line frequency		50Hz / 60Hz		
Power consumption		70VA MAX		
Dimensions		350 (W) × 44 (H) × 320 (D) mm (excluding protrusions)		
Weight		Approx. 5kg		
Operating temperatur	re	5 to 40°C		
Storage temperature		-10 to 60°C		
Humidity		30 to 85%RH (no condensation)		

<sup>\*</sup> HS: horizontal sync signal, VS: vertical sync signal, CS: composite sync signal

# 10.2 Concerning the DDC power supply

The supply voltage (5V) from the DDC power supply is supplied to the analog D-Sub output and DVI output of the VG-848.

The maximum supply current of the DDC power supply is 0.5A.

The DDC supply voltage is output as shown in the figure below.

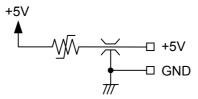


Fig. 10.2.1 DDC power supply output circuit



- 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-848. If such the voltage of such a power supply is connected, both the VG-848 and the connected device may fail.

# 10.3 Connector pin layouts

## 10.3.1 Analog D-Sub connector

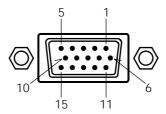


Fig. 10.3.1 Pin layout

Table 10.3.1 Pin numbers

Pin No.	Signal	Pin No.	Signal
1	R	9	+5V (DDC power supply)
2	G	10	GND
3	В	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)		

<sup>\*</sup> The maximum supply current of the DDC power supply is 0.5A. For further details, refer to "10.2 Concerning the DDC power supply."

## 10.3.2 DVI digital serial output connector

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

• Output: TMDS

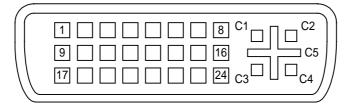


Fig. 10.3.2 Pin layout

Table 10.3.2 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	C5	Analog Ground
15	Ground		(analogR,G,B,return)

<sup>\*</sup> The 1:1 Panel Link data is output from a single connector. Only EVEN data is output with the 1:2 Panel Link.

<sup>\*</sup> The DVI-D (74320-4000) connector does not have the C1 to C5 pins shown in the above figure.

<sup>\*</sup> The maximum supply current of the DDC power supply is 0.5A. For further details, refer to "10.2 Concerning the DDC power supply."

## 10.3.3 D5 connector

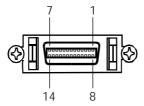


Fig. 10.3.3 Pin layout

Table 10.3.3 Pin numbers

Pin No.	Signal	Pin No.	Signal
1	Υ	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

## 10.3.4 Y/C (S) connector



Fig. 10.3.4 Pin layout

Table 10.3.4 Pin numbers

Pin No.	Signal
1	GND
2	GND
3	Υ
4	С

## 10.3.5 Remote (D-Sub 25-pin female) connector

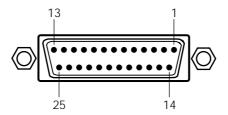


Fig. 10.3.5 Pin layout

Table 10.3.5 Pin numbers

Pin No.	I/O <sup>*1</sup>	Signal	Pin No.	I/O *1	Signal
1	I	KX7	14	I	KX6
2	0	KY2	15	0	KY3
3	0	KY4	16	0	KY1
4	0	KY5	17	I	KX4
5	1	KX5	18	0	KY0
6	1	KX3	19	1	KX2
7	1	KX1	20	1	KX0
8	-	GND	21	-	ID *3
9	0	RMT_RST *2	22	0	RMT_CLK *2
10	0	RMT_LAT *2	23	0	+5V
11	-	GND	24	-	GND
12	0	RMT_DIN *2	25	0	+5V
13	0	RMT_EN *2			

<sup>\*1: &</sup>quot;I" or "O" is as input to or output from the VG-848.

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.

<sup>\*2:</sup> The control signals of these pins are used by Astrodesign. Under no circumstances must any connections be made to these pins.

<sup>\*3:</sup> When fabricating a remote control unit, ground pin 21, and use the key matrix of the RB-614C.

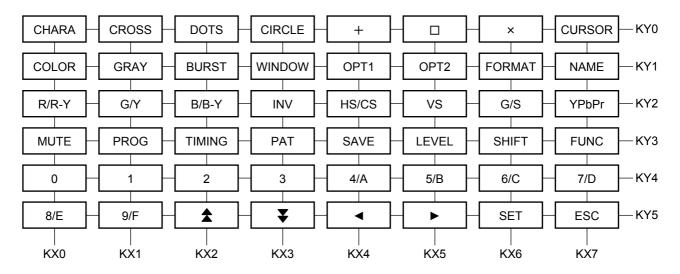


Fig. 10.3.6 RB-1848 key matrix

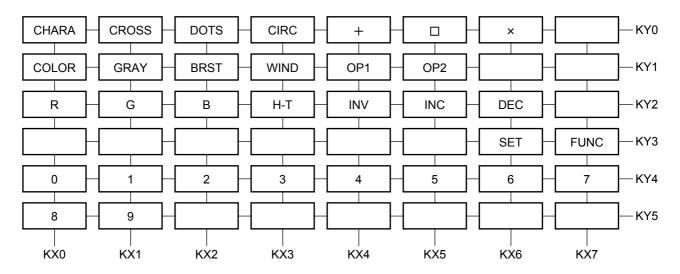


Fig. 10.3.7 RB-614C key matrix

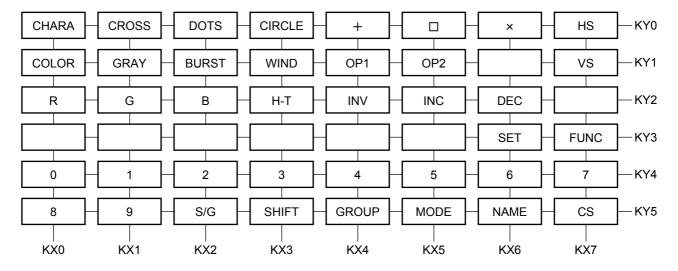


Fig. 10.3.8 RB-649 key matrix

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

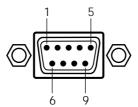


Fig. 10.3.9 Pin layout

#### Table 10.3.6 Pin numbers

Pin No.	I/O	Signal
1	-	NC
2	0	TXD (transmitted data)
3	1	RXD (received data)
4	-	Shorted with pin 6
5	-	FG (frame ground)
6	-	Shorted with pin 4
7	1	CTS (clear to send)
8	0	RTS (request to send)
9	-	NC

## 10.4 Checkpoints

This operation manual was prepared based on VG-835-A (VG-835) firmware version 5.00. If the version for your model is earlier or later than this version and includes functions not described in this operation manual, please contact your Astrodesign sales representative. To check the version, see "7.1 Self-check".

#### 10.4.1 Restrictions on functions used by SP-8848, RB-614C and RB-749

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		•			

<sup>\*1:</sup> The only function of config edit FUNC5 which can be set by the SP-8848 is "[23] Setting the internal program tables." However, the data which has been set cannot be saved.

#### 10.4.2 Concerning the optional functions

The following five functions are options. They are not supported by the VG-848 and VG-848-H standard model.

- Closed caption
- V-chip
- Teletext
- Macrovision
- Scroll trigger

Contact Astrodesign separately concerning support for these optional functions.

<sup>\*2:</sup> 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 FUNCO.) For the differences between the keys on these two boxes and the keys on the RB-1848 remote control box, refer to "8.1.3 Concerning the key operations."

#### 10.4.3 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 FUNCO 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 FUNCO.
- \*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 FUNCO)

<Example> While the audio sweep function (executed) is being executed

Setting Closed caption is set to "ON."

↓
Audio sweep (shut down) Closed caption (not 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 FUNCO.

Unitiated 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)

#### 10.4.4 Concerning the video 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 "9.4 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
  - Hperiod
  - Hsync
  - Scanning mode
  - Vtotal
  - Vsync
- 4) When "16-235" has been set for the DVI level mode (see "[14] Setting the DVI level mode" of config edit FUNC5), the VBS and Y/C outputs are turned off.
- 5) 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 "[24] 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

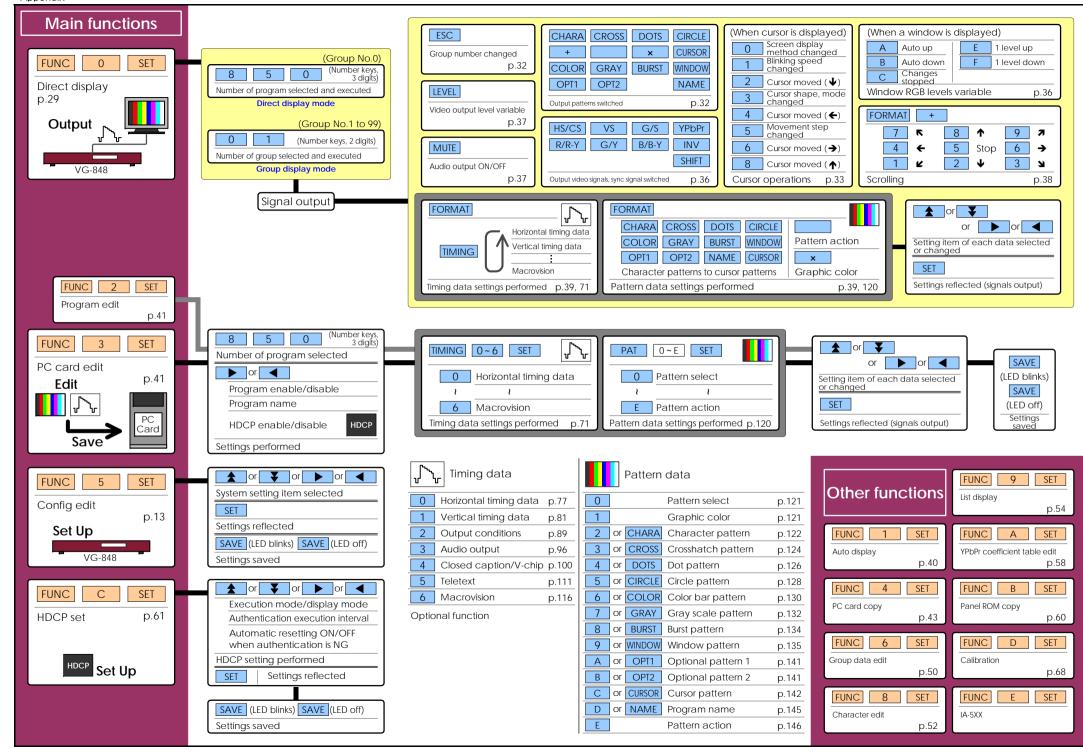
1) The timing signal settings of the DVI output are subject to the following restrictions depending on the mode.

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	Dot clock frequency	50 to 300MHz	
	All horizontal timing signals *1	4-dot increments	

<sup>\*1:</sup> Hperiod, Hdisp, Hsync, Hbackp, Hfrontp, HDstart, HDwidth, Hblanking

- 2) With internal programs, OFF is set as the initial setting for all the DVI analog outputs.
- 3) The differences between the VG-848 and VG-848-H are given below.

	Dual Link	HDCP
VG-848	Supported	Not supported
VG-848-H	Not supported	Supported





## VG-848 / VG-848-H

Instruction Manual

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