ASTRO

Programmable Digital Signal Generator

VG-835-A

Instruction Manual

Ver.3.00

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VG-835-A

Instruction Manual

2007.1

Ver.3.00

ASTRODESIGN,Inc

Contents

BEFORE OPERATION

Introduction

Thank you very much for purchasing this model VG-835-A video signal generator.

This manual contains details on the operation procedures to be followed when the VG-835-A is used, the checkpoints and precautions to be observed, and so on. Improper handling may result in malfunctioning. Before using the VG-835-A, please read through these instructions to ensure that you will operate the generator correctly.

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

Safety precautions

⚠WARNING

Concerning the generator

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

Concerning the power cord

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

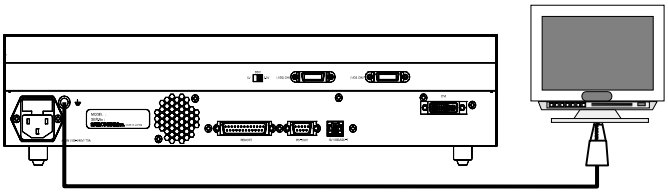
Concerning foreign matter

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

⚠ CAUTION

Concerning the generator

■ **When connecting the VG-835-A to a display unit, use the FG cable provided to connect the frame ground (FG) terminal on the VG-835-A to the frame ground terminal on the display unit. The VG-835-A may malfunction unless these two frame ground terminals are connected using the FG cable which is provided. 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-835A.

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

■ **When disconnecting the VG-835-A 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-835-A and allow it to warm up for about 10 to 15 minutes before use so as to ensure that the VG-835-A 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-835-A. In the configuration presented below, it contains details on the operating procedures, checkpoints, etc. Please take the time to read through the manual prior to use to ensure that the generator will be operated properly.

● Read this first!

BEFORE OPERATION

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

Chapter 1 CONCERNING THE VG-835-A

A general description of the VG-835-A 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-835-A SYSTEM SETTINGS

The system settings (FUNC5) of the VG-835-A 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-835-A's specifications and checkpoints are contained in this chapter.

Appendix

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

What is packed with the generator

The generator comes with the following items.

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

■ Standard accessories

- VG-835-A main unit
- VG-835-A 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-835-A.

■ 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-835-A, programs can be called by their numbers, the character, dot, crosshatch and other pattern data can be turned ON or OFF, and the RGB signals can be switched ON or OFF.
- RB-649:
  Remote control box used with the VG series
- VG series terminal command instruction manual
  The generators in the VG series can be operated using the dedicated terminal commands from an external computer (such as a PC). The commands and data are received and sent though the RS-232C interface or LAN.

1 CONCERNING THE VG-835-A

1.1 General description

The VG-835-A is an all-in-one video signal generator which supports every kind of application in the field of display instrumentation.

This model can be used to output DVI and LVDS signals. It can also display bitmaps with a maximum gradation of 12 bits. Its output signals for a variety of displays including CRTs, LCDs and PDPs can be utilized for the development of video-related equipment technology as well as on the production lines and for the inspections, maintenance and other applications of such equipment.

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

1.2 Features

■ All-in-one model

This generator can output digital DVI and LVDS signals. There is no need for any adapters, etc.

■ Wide dot clock frequency ranges

The model supports dot clock frequencies ranging from 25 to 300 MHz (or 25 to 165 MHz with 10/12-bit outputs) for DVI outputs and from 8 to 270 MHz (or 8 to 135 MHz with 10/12-bit outputs) for LVDS outputs.

■ Full-color outputs supported

Full color displays are provided in 16.77 million colors in the output 8-bit mode and in 68.7 billion colors in the output 12-bit mode.

■ 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-835-A 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-835-A 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
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

The various program data, optional patterns and user character patterns are contained as sample data on the EPROM inside the VG-835-A 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	
Program data	849 (1 to 849)	
Optional patterns	64 (40H to 7FH)	
Optional patterns (image data)	64 (80H to BFH) * This number depends on the image data size and card capacity.	
User character patterns	16 (E0H to EFH)	
Number of characters in program names	20 characters	
Number of groups	99 (1 to 99)	* For details on groups, refer to “1.4 Concerning groups”
Number of group data	98 (1 to 98)	
Number of characters in group names	20 characters	

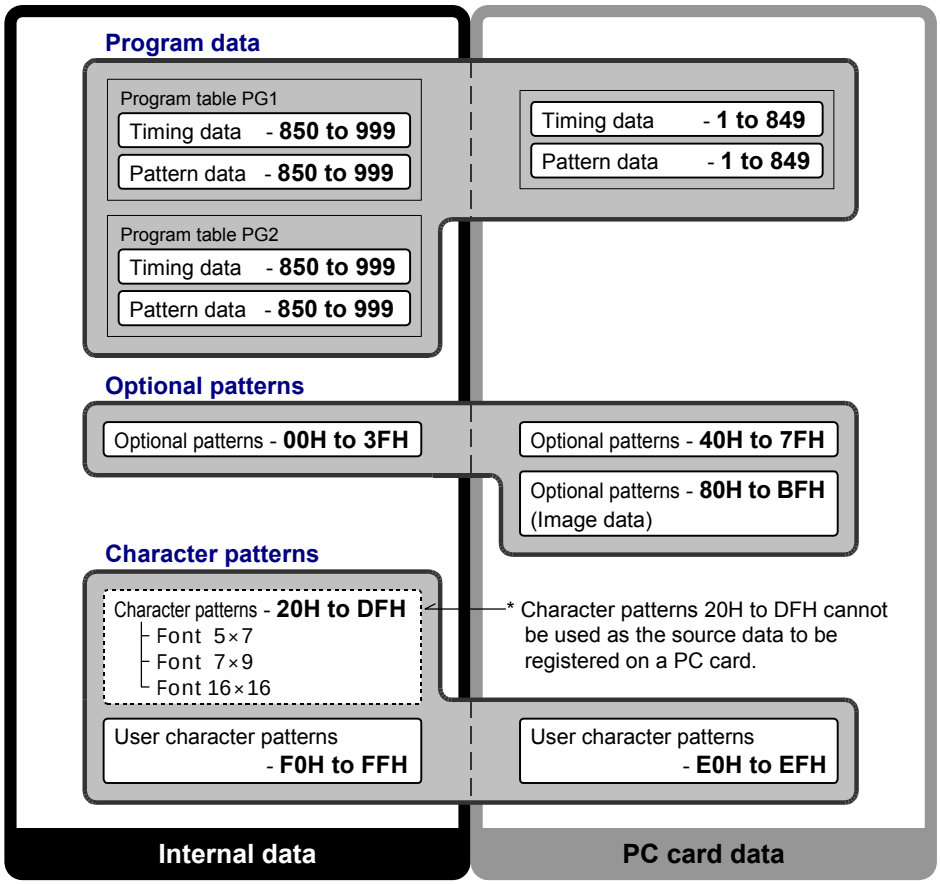


Fig. 1.3.1 Internal data and PC card data

1.4 Concerning groups

A “group” refers to a program data table in which the user can register any program data. It is also possible to select data of one program number for the timing data and another program number for the pattern data.

The data is output on a group by group basis, and so by registering only the data required, operating ease is enhanced in cases where multiple program data are to be output.

The data relating to groups is stored on the PC cards.

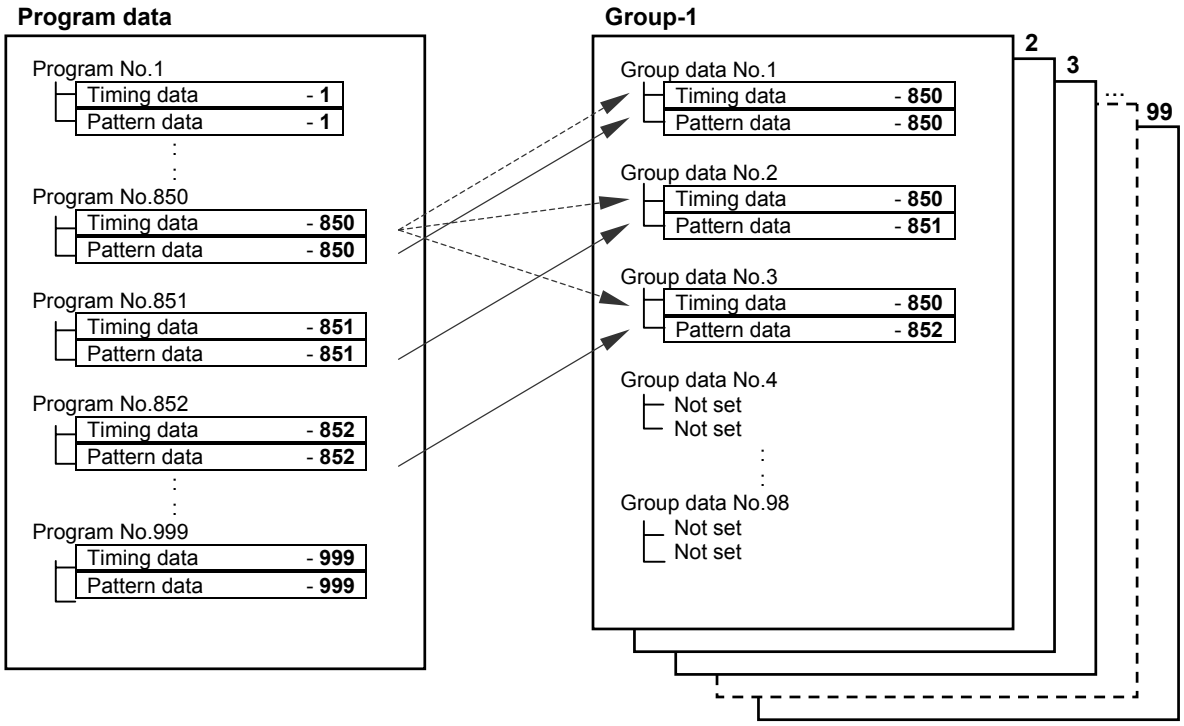


Fig. 1.4.1 Configuration of a group

1.5 Concerning the operating modes

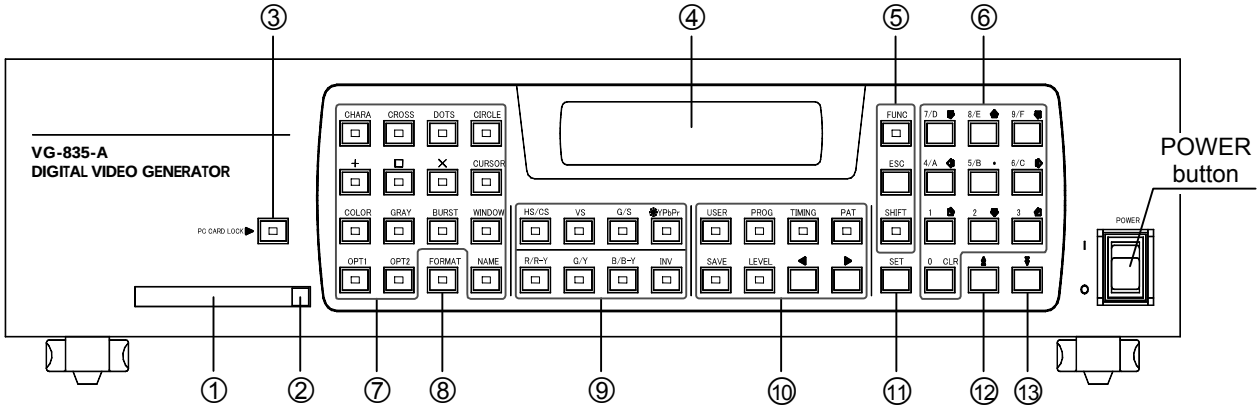
The VG-835-A has four operating modes, each of which is outlined below.

Table 1.5.1 List of operating modes

Mode	Reference section	Description
Direct display mode	4.1.1 Direct output (direct display mode)	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 Group data output (group display mode)	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 Automatic output of video signals (auto display FUNC1)	The video signals of the data in the program or group whose number has been selected are output automatically in this mode in accordance with the specified delay time.
Self-check mode	Chapter 7	Whether the hardware devices are functioning correctly, etc. is checked in this mode.

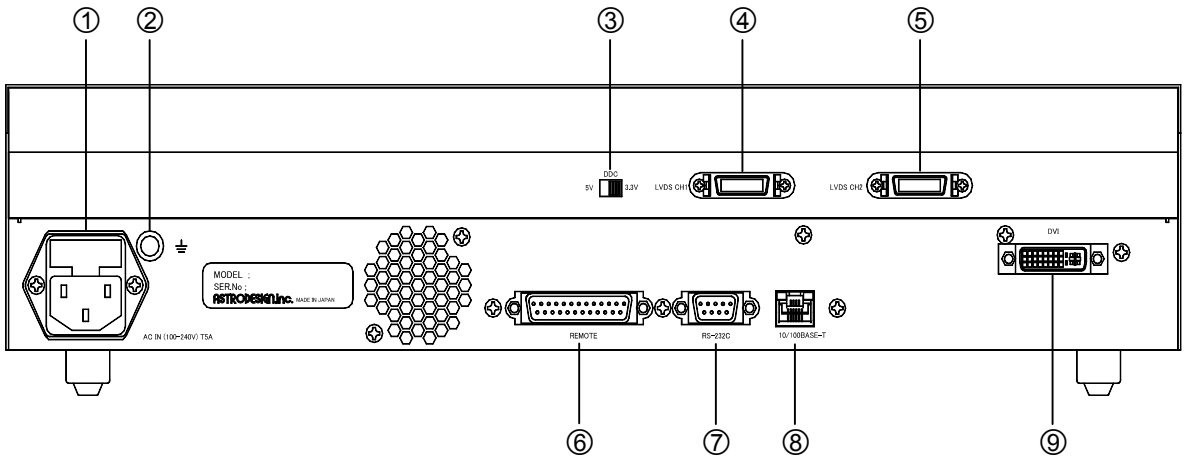
1.6 Panel parts and their functions

1.6.1 VG-835-A front panel



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

1.6.2 VG-835-A rear panel



①	AC input socket	One end of the power cable is connected here. A voltage from 100V to 120V or 200V to 240V is supported.
	CAUTION The POWER switch must always be used to turn the generator's power on and off. Turning the power on and off by plugging in and unplugging the AC power cable may damage the PC card.	
②	Frame ground (FG)	Connect this frame ground terminal to the frame ground terminal of the unit which is connected to the VG-835-A.
③	LVDS output DDC supply power 5V/3.3V selector switch	This is used to select the DDC supply power level of the LVDS output (channels 1, 2).
④	LVDS serial connector (CH1)	
⑤	LVDS serial connector (CH2)	
⑥	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.
⑦	RS-232C connector (9-pin male)	This is used to connect a personal computer using an RS-232C cable.
⑧	Ethernet port (10/100BaseTX)	This port is used for connection to a LAN using the Ethernet cable.
⑨	DVI digital serial connector (CH1)	(The analog rated value is OFF.)

2 OPERATING PROCEDURES

2.1 Concerning the VG-835-A's functions

The VG-835-A has 11 functions including ones for outputting the video signals and for editing and registering the output data. Each function FUNC__ is selected by pressing the [FUNC] key, the number key which corresponds to the function number, and the [SET] key in this order.

A list of these functions is provided below.

Table 2.1.1 List of functions

No.	Function	Description	Main applications	Reference page
0	Direct display	This executes the direct display mode (for outputting the video signals of the data in the program whose number has been selected) or the group display mode (for outputting the video signals of the data in the group whose number has been selected). *1	Adjustments and inspections on production lines	p.31
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.42
2	Program edit	This temporarily changes the program data, and outputs signals.	Tests and evaluations undertaken by development and engineering departments	p.43
3	PC card edit	This edits the program data, and registers it on the PC card.	Creation of PC cards	p.43
4	PC card copy	This copies the data registered on the PC card.	Creation of PC cards	p.45
5	Config edit	This performs the VG-835-A system settings.	-	p.11
6	Group data edit	This registers the group data on the PC card.	Registration of data in group display mode	p.52
8	Character edit	This edits the user character patterns and registers them.	Tests and evaluations undertaken by development and engineering departments	p.54
9	List display	This lists the registered data on the display.	Tests and evaluations undertaken by development and engineering departments	p.56
A	YPbPr coefficient table edit	This edits the coefficient tables for the YPbPr data output.	-	p.60
B	Panel ROM copy	This copies the program data of an existing VG model *2, with which PC cards cannot be used, onto a PC card.	-	p.62

*1: When "0" has been selected as the group number setting of config edit FUNC5, the direct display mode is established; when a number from 1 to 99 has been selected, the group display mode is established.
*2: VG-813, 823, 826A and 827

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

The VG-835-A 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-835-A starts up in the direct display mode or group display mode. *1
When the POWER switch is set to ON while the SET key is held down *2	The VG-835-A starts up in the auto display mode.
When the POWER switch is set to ON while the [▲▲] key is held down *2	The VG-835-A starts up in the self-check mode.

*1: When "0" has been selected as the group number setting of config edit FUNC5, the direct display mode is established; when a number from 1 to 99 has been selected, the group display mode is established.
*2: Hold the key down for about two seconds after the POWER switch has been set to ON.

2.3 Concerning the cursor movements on the LCD display

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

Table 2.3.1 Cursor movements on the LCD display

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

2.4 How to input characters from the display

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

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

(1) Connect the display device to the VG-835-A, and check that the display appears correctly.

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

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

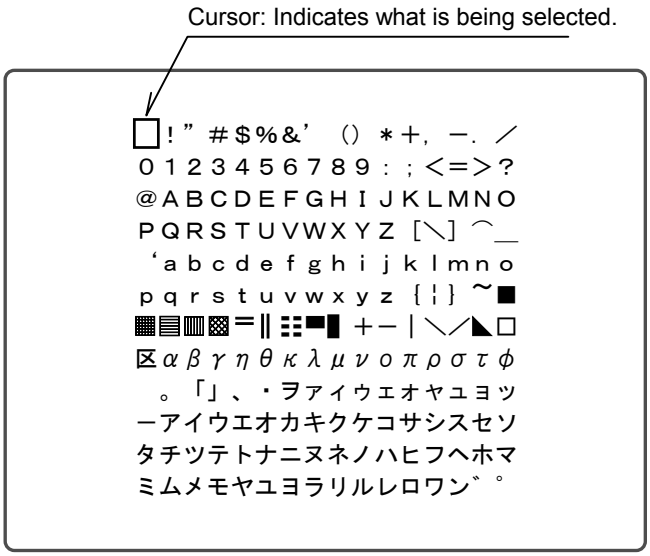


Fig. 2.4.1 What is displayed on the screen

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

Table 2.4.1 Function keys

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

(4) Press the [LEVEL] key.

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

2.5 How to insert and eject the PC cards

2.5.1 How to insert the PC card

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

Insert the card firmly as far as it will go.

A beep tone is heard.

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

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

2.5.2 How to eject the PC card

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

A beep tone is heard.

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

The EJECT button pops out.

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

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

If the card is unlocked properly, a beep tone is heard. ☞CAUTION 3)

CAUTION

1) For the PC card, use the CompactFlash card and PC card adapter packed with the generator. The generator's warranty does not cover any problems in operation which are caused by the use of any other type of card or adapter.

2) Be absolutely sure to follow the above steps to insert and eject PC cards. Taking any other steps may damage the data on the PC card and make it impossible for the PC card to be recognized even when it is re-inserted.

3) It takes two or three seconds for the LED to go off after the EJECT button is pressed and the card is removed. This is because it takes time for the VG generator to process the ejection of the PC card. Refrain from performing any operations during these seconds.

3 VG-835-A 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.13
2	Beep tone	For selecting whether to turn the beep tone ON or OFF.	p.13
3	Pattern display mode	For selecting a single pattern or multi pattern.	p.14
4	NAME display mode	For selecting the NAME display mode	p.15
5	Terminal mode	For selecting the external control interface (RS-232C/LAN).	p.16
6	Baud rate/data bits	For selecting the RS-232C baud rate and data bits.	p.16
7	Parity bit/stop bit	For selecting the RS-232C parity bit and stop bits.	p.17
8	Start program	For selecting the program to be executed when the power is turned on.	p.17
9	DDC pattern	For selecting the port when executing DDC optional patterns.	p.18
10	IP address/port no.	For setting the IP address and port number of the LAN.	p.18
11	Level mode	For selecting the output level mode.	p.19
12	Key lock mode	For selecting the key lock mode for preventing the erroneous operation of the [LEVEL] and [FUNC] keys.	p.19
13	Terminal mode display	For selecting what is to be displayed on the LCD when the terminal mode is established.	p.20
14	Output restriction NG display time	For selecting the time during which to display the NG message when the output is outside of the restriction range.	p.20
15	DDC transfer clock	For selecting the clock frequency during DDC.	p.23
16	DDC Read mode	For selecting the DDC Read mode	
17	LVDS 4-channel bit change *1	For setting the LVDS 4-channel output data array.	p.24
18	Output bit mode	For selecting the output bit mode (8 bits, LUT 10 bits, 10 bits or 12 bits).	p.21
19	LVDS 2-channel bit change	For setting the LVDS 2-channel output data array.	p.24
20	Internal program priority output	For selecting the priority output when an internal program is executed.	p.25
21	DVI mode	For selecting ON or OFF for DVI output mode interleaving. ★ This item takes effect in the output 10-bit or 12-bit mode.	p.26
22	Internal program table	For selecting the internal program table.	p.27
23	Trigger mode *2	For selecting the trigger mode	p.28
24	Overlay cursor	For setting the overlay display of the cursor to ON or OFF.	p.30

*1: Optional function (only for models that support LVDS 4-channel output)

*2: Optional function (only for parallel output, trigger supported model.)

3.2 Setting procedures

3.2.1 Accessing the item setting menus

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

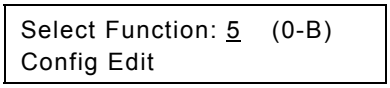


Fig. 3.2.1 Selecting the function

(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.

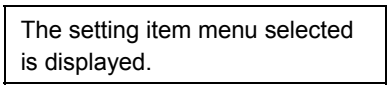


Fig. 3.2.2 Selecting the setting items

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-835-A. 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.

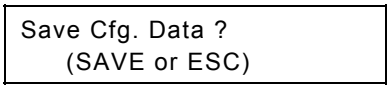


Fig. 3.2.3 Saving the data

(2) Press the [SAVE] key.

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

CAUTION

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

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

3.3 Detailed settings for the items

[1] Setting the group number

Select the group number (0 to 99).

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

```
Cfg:Group No: 0   (00-99)
```

Fig. 3.3.1 Selecting the group number

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

[2] Setting the beep tone

Select ON or OFF for the beep tone.

```
Cfg:Beep    :ON    (0/1)
```

Fig. 3.3.2 Selecting the beep tone

Table 3.3.1 Beep tone selection method

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

[3] Setting the pattern display mode

Select the pattern display mode (Disp Mode).

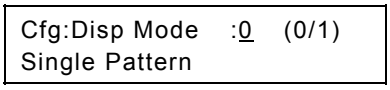


Fig. 3.3.3 Selecting the pattern display mode

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.

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.

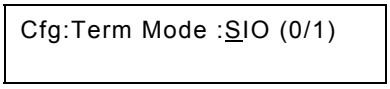


Fig. 3.3.4 Selecting the external control interface

Table 3.3.3 External control interface selection method

Key	LCD display	Description
0	SIO	The external control interface of the VG-835-A is set to RS-232C. (Factory setting)
1	LAN	The external control interface of the VG-835-A is set to LAN.

* When the VG-835-A is to be controlled using the Windows software program (SP-8848) supplied, the terminal mode must be set to match the interface of the PC used.
* When using the terminal commands, refer to the separate “VG Series: Terminal Command Instruction Manual.”

CAUTION

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

[6] Setting the baud rate and data bits

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

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

Fig. 3.3.5 Selecting the baud rate and data bits

Table 3.3.4 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 3.3.5 Data bit selection method

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

CAUTION

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

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

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

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

Fig. 3.3.6 Selecting the parity and stop bit(s)

Table 3.3.6 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 3.3.7 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.

[8] Setting the start program

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

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

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

Fig. 3.3.7 Selecting the numbers of the start programs

* 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.

[9] Setting the DDC pattern

Select enable or disable when DDC optional pattern No.0EH or 2EH is executed.

When “enable” is selected and optional pattern No.0EH or 2EH is executed, EDID is captured from the display or other device connected to the output port which has been set as the “priority output,” and displayed.

“Priority output” is set using “[20] Setting the internal program priority output” with config edit FUNC5 or using “

[1] Setting the priority output” under “5.4.1 Settings common to all outputs” in the output condition data setting section.

When “disable” has been selected, EDID is not captured and neither is the pattern displayed even if 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 (No.0E, 2E).”)

```
OPT Pattern #0E(DDC) :
        Disable    (0/1)
```

Fig. 3.3.8 Selecting enable or disable for the DDC pattern

Table 3.3.8 DDC pattern enable/disable selection method

Key	LCD display	Description
0	Disable	Disabled. (Factory setting)
1	Enable	Enabled

* 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.
Select the “Disable” setting when the unit connected does not support DDC.

[10] Setting the IP address and port number

Set the IP address and port number.

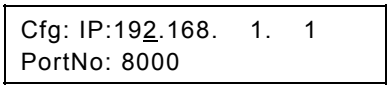


Fig. 3.3.9 Setting the IP address and port number

Table 3.3.9 IP address and port number setting method

Setting item	Key	LCD display	Description
IP address (IP)	Number keys	XXX.XXX.XXX.XXX	Use these keys to set the IP address of the VG-835-A. Setting range: 0.0.0.0 to 255.255.255.255 Factory setting: 192.168.0.2
Port number	Number keys	XXXXX	Use these keys to set the number of the port on the VG-835-A to be used for receiving data. Setting range: 1024 to 65535 Factory setting: 8000

CAUTION

- The same IP address and port number settings as the configuration settings of the accessory software program (SP-8848) must be selected.
- The IP address of the unit (such as a PC) connected to the VG-835-A requires the same network address as the IP address of the VG-835-A.
- The VG-835-A 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.

[11] Setting the digital level mode

Select the video level mode.

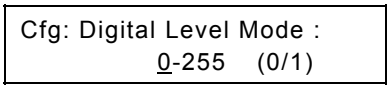


Fig. 3.3.10 Selecting the digital level mode

Table 3.3.10 Digital level mode selection method

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

[12] Setting the key lock mode

Select the key lock mode for preventing malfunctioning.

Fig. 3.3.11 Selecting the key lock mode

Table 3.3.11 Key lock mode selection method

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

*1: The operation of the [LEVEL] key using the direct display FUNC0 is inhibited.
*2: The operation of the [FUNC] key for function no.1-4 and 6-B is inhibited.

[13] Setting the terminal mode display

Select the LCD screen display in the terminal mode.

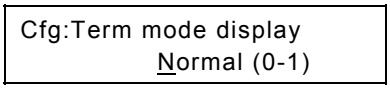


Fig. 3.3.12 Selecting the terminal mode display

Table 3.3.12 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.

[14] Setting the output restriction NG display time

Select the time during which to display the NG message when the output is outside of the restriction range.

No other operations can be performed while the message is displayed.

```
Cfg:Output NG Disp Time
              1 sec (0-10)
```

Fig. 3.3.13 Selecting the output restriction NG display time

Table 3.3.13 Output restriction NG display time selection method

Key	LCD display	Description
Number keys	XX	Setting range : 0 to 10 (factory setting: “1”) 0 : No messages are displayed. 1 to 10 : 1 to 10 [sec] (in 1-second increments) The original display will be restored after the message has been displayed for the duration which has been set.

● Example of an NG message display

<Message indicating hat the DVI output restriction has been exceeded>

```
XXXXXXXXXXXXXXXXXXX
 8bit:DVI OUT NG.
```

<Message indicating that the LVDS output restriction has been exceeded>

```
XXXXXXXXXXXXXXXXXXX
 8bit:2HEAD LVDS OUT NG.
```

[15] Setting the DDC transfer clock

Select the clock frequency for DDC.

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

Fig. 3.3.14 Selecting the DDC transfer clock

Table 3.3.14 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.

[16] Setting the DDC read method

Select the DDC read method.

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

Fig. 3.3.16 Selecting the DDC read method

Table 3.3.16 DDC read method selection method

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

●Concerning the DDC read mode

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

（1）Enhanced DDC

This method is used for access with the segment pointer.

Table 3.3.17 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 3.3.18 Plug & Display DDC mode access

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

●Concerning Auto & Select DDC

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

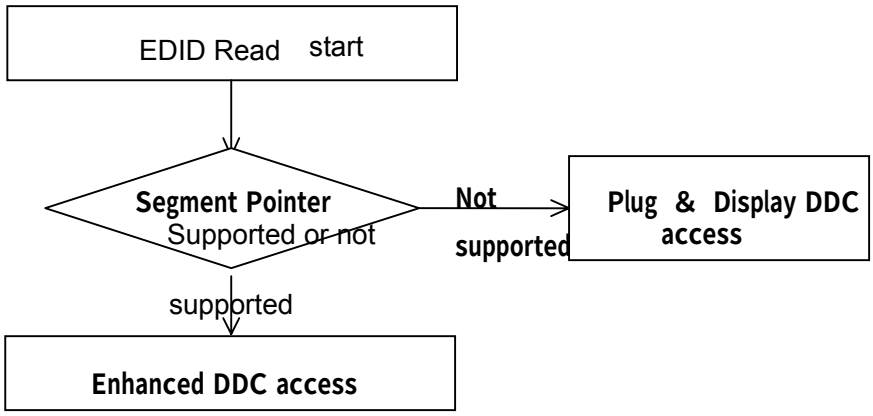


Fig. 3.3.23 Auto & Select DDC mode operations

[17] Setting the LVDS 4-channel bit change (❖Option: Only for models that support LVDS 4-channel output)

Set the data array of the LVDS 4-channel output.

* For details on the data arrays, refer to “10.3.3.2 Data array.”

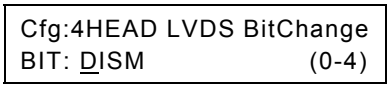


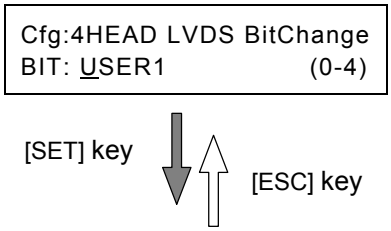
Fig. 3.3.15 Selecting the LVDS 4-channel output data array

Table 3.3.15 LVDS 4-channel output data array selection method

Key	LCD display	Description
0	DISM	Internal data, DISM standard type (Factory setting)
1	OLDI	Internal data, OpenLDI standard type
2	USER1	Three arrangements where the bits are arranged in the way desired by the user can be registered in USER1, 2 and 3, and selected. For details on how to set the bit arrangement, refer to the section below.
3	USER2	
4	USER3	

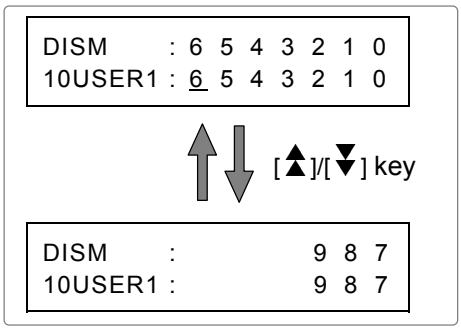
● USER1, 2 and 3 setting method (bit change from DISM)

(1) First select USER1, 2 or 3, and then press the [SET] key.



(2) The DISM standard type bits are displayed on the top line, and the bits set by the user on the bottom line.
(* The same bit settings are used for R, G and B.)
In the output 10-bit or 12-bit mode, the settings span several pages. Use the [▲▲] and [▼▼] keys to move from one page to another.

(3) Specify on the bottom line the bits which are to be allocated to the DISM standard type bits on the top line.
Move the cursor to bit to be set, and use the number keys to input it. Use the [►] and [◄] keys to move the cursor.



(4) After all the bits have been set, press the [ESC] key to return to the system settings.

[18] Setting the output bit mode

Select 8 bits, LUT 10 bits, 10 bits or 12 bits as the output bit mode.

```
Cfg:Bits Output Mode:
      8BIT          (0-3)
```

Fig. 3.3.16 Selecting the output bit mode

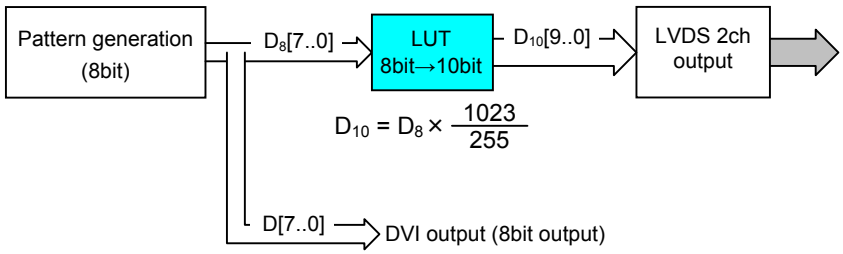
Table 3.3.16 Output bit mode selection method

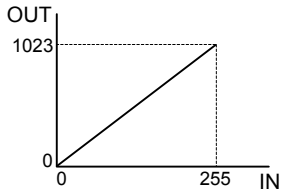
Key	LCD display	Description
0	8BIT	8bit mode :The data is output as 8-bit data. (Factory setting)
1	10BIT	10bit mode :The data is output as 10-bit data.
2	LUT10BIT	LUT10bit mode :With LVDS 2-channel outputs, the 8-bit video data is converted into 10-bit data, and output. (256-step gradation 10-bit output) With outputs other than LVDS 2-channel outputs, the data is output as 8-bit data. * See section below.
❖Option: Only for models that support the 12-bit output mode		
3	12BIT	12bit mode :The data is output as 12-bit data.

● Concerning the LUT 10-bit mode

The LUT 10-bit mode makes possible a high frequency band of up to 270 MHz by converting the 8-bit video data in the LVDS 2-channel output into 10-bit data (256-step gradation 10-bit output) and outputting it.

- The patterns generated by 8 bits each for R, G and B are converted into 10 bits by the LUT (look-up table), and output.
- The 256-step gradation 30-bit output is used for the display colors.
- The settings are the same as for 8 bits. (The levels can be changed in 255 steps.)
- With outputs other than LVDS 2-channel outputs, the data is output in the same way as in the 8-bit mode.





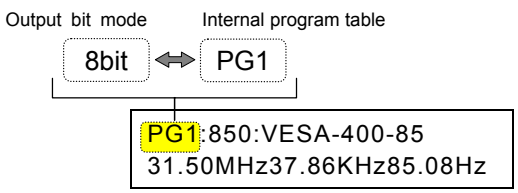
The output level is “0” when “0” serves as the level setting.

The output level is “1023” when “255” serves as the level setting.

● What appears on the LCD display while a program is being executed

While a program is being executed, the internal program table and output bit mode are displayed alternately on the LCD screen every 4 or so seconds at the far left of the top line.

(“10bit” indicates the LUT 10-bit mode.)



LCD display

[19] Setting the LVDS 2-channel bit change

Set the data array of the LVDS 2-channel output.

* For details on the data arrays, refer to “10.3.2.2 Data array.”

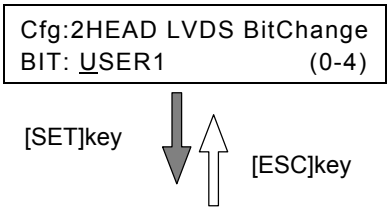
Fig. 3.3.17 Selecting the LVDS 2-channel output data array

Table 3.3.17 LVDS 2-channel output data array selection method

Key	LCD display	Description
0	DEF1	Internal data, DISM standard type (Factory setting)
1	DEF2	Internal data, OpenLDI standard type
2	USER1	Three arrangements where the bits are arranged in the way desired by the user can be registered in USER1, 2 and 3, and selected. For details on how to set the bit arrangement, refer to the section below.
3	USER2	
4	USER3	

● USER1, 2 and 3 setting method (bit change from DEF1)

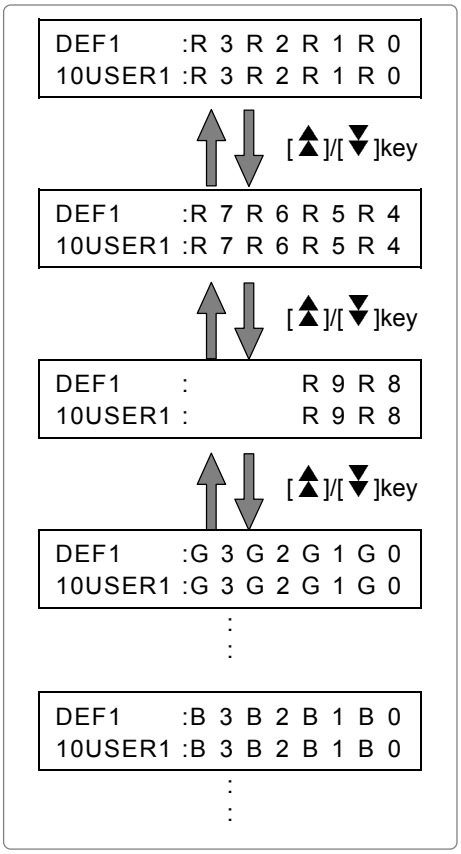
(1) First select USER1, 2 or 3, and then press the [SET] key.



(2) The DEF1 (DISM standard type) bits are displayed on the top line, and the bits set by the user on the bottom line.
The bits are set separately for R, G and B. (* Bits for more than one color cannot be changed together.)
The settings span several pages. Use the [▲] and [▼] keys to move from one page to another.

(3) Specify on the bottom line the bits which are to be allocated to the DEF1 (DISM standard type) bits on the top line.
Move the cursor to bit to be set, and use the number keys to input it. Use the [►] and [◄] keys to move the cursor.

(4) After all the bits have been set, press the [ESC] key to return to the system settings.



[20] Setting the internal program priority output

Select the priority output when executing the internal programs (No.850 to 999). The priority output setting is used for ① and ② below.

① Output to be given priority in 8-bit or LUT 10-bit mode
This setting affects the dot clock frequency setting range and the increment used for setting the horizontal timing data. (☞ Refer to "5.1.5 Valid setting items and timing restrictions for each output.")

② Port where EDID is captured when optional pattern No.0E or 2E (DDC pattern) is executed in any of the output bit modes

```
Prg.850-999 OUTPUT (0-3)
        DVI
```

Fig. 3.3.18 Selecting the internal program priority output

Table 3.3.18 Internal program priority output selection method

Key	LCD display	Description
0	DVI	DVI
1	PARA	Parallel *1
2	4HEAD LVDS	LVDS 4ch *1
3	2HEAD LVDS	LVDS 2ch

*1: The parallel and LVDS 4-channel outputs are supported only as options.

* This setting is canceled when an editing program from No.1 to 849 is executed. The priority output for programs No.1 to 849 is set using "
[1] Setting the priority output" under "5.4.1 Settings common to all outputs" in the output condition data setting section.

[21] Setting the DVI mode (valid in 10-bit or 12-bit mode)

Select the DVI mode when the 10-bit or 12-bit mode is established.

For details on DVI output interleaving, refer to "

10.3.1.1 Data transfer methods."

```
Cfg: DVI Output
   Interleave:OFF      (0/1)
```

Fig. 3.3.19 Selecting the DVI mode

Table 3.3.19 DVI mode selection method

Key	LCD display	Description
0	OFF	Interleave OFF (Factory setting)
1	ON	Interleave ON

* The DVI mode when the 8-bit or LUT 10-bit mode is established is set using "
[1] Setting the output ON/OFF and the DVI mode (valid in 8-bit or LUT 10-bit mode)" in "5.4.2 DVI output" in the output condition data setting section.

[22] Setting the internal program table

Select the program table of the internal data.

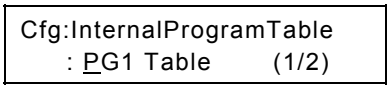


Fig. 3.3.20 Selecting the internal program table

Table 3.3.20 Internal program table selection method

Key	LCD display	Description
1	PG1 Table	Table PG1, which offers interchangeability with previous models, is selected. (Factory setting)
2	PG2 Table	Table PG2, which is configured with the standard timing data of EIA, VESA or a system such as NTSC or PAL which supports analog TV signals, is selected.

[23] Trigger Mode Settings (❖ Optional Function)

Select the trigger function.

This function performs trigger output in synchronization with a pattern from the optional trigger output or parallel output.

```
Cfg:Trigger Mode
    :OFF          (0/1)
```

Fig.3.3.24 Selecting Trigger Mode

Table 3.3.25 Trigger Mode Selection Method

Key	LCD	Description
0	OFF	Trigger output is OFF. The normal SW0 to 3 setting is output from the parallel output.
1	TriggerA	Window trigger 0 is output. The trigger is encoded and output in synchronization with the setting time.
2	TriggerB	Window trigger 1 is output. The trigger outputs the T0 to T3 period only in synchronization with the setting time.
3	Scroll Trigger	Scroll trigger is output. The trigger is output in synchronization with the scroll setting.

●Trigger function

The trigger function is used to output a trigger in synchronization with a pattern for evaluating the video response speed or other parameters. The following triggers are available.

(1) Window trigger

When the format has a setting display of 4 levels or 16 levels (optional function) in the window pattern, a trigger is output in synchronization with the level sequence. For details about the window pattern format setting, see “6.11 Setting the Window Pattern”.

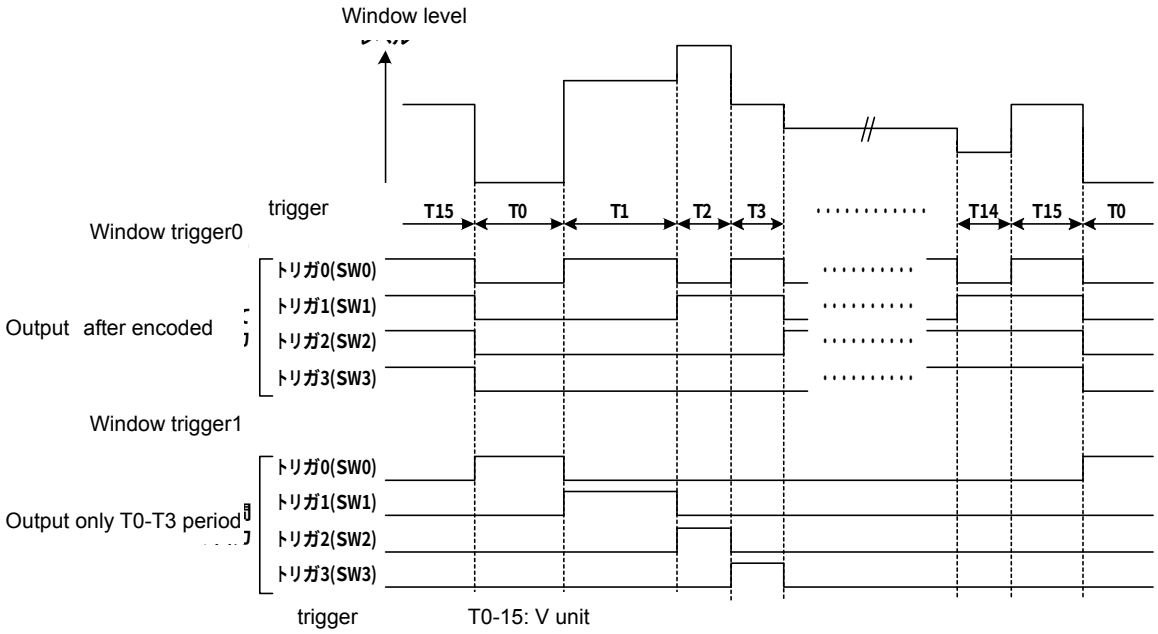


Fig. 3.3.25 Window Trigger Example

(2) Scroll trigger

When a pattern scroll is being performed, a trigger is output when that pattern arrives at the start position.

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

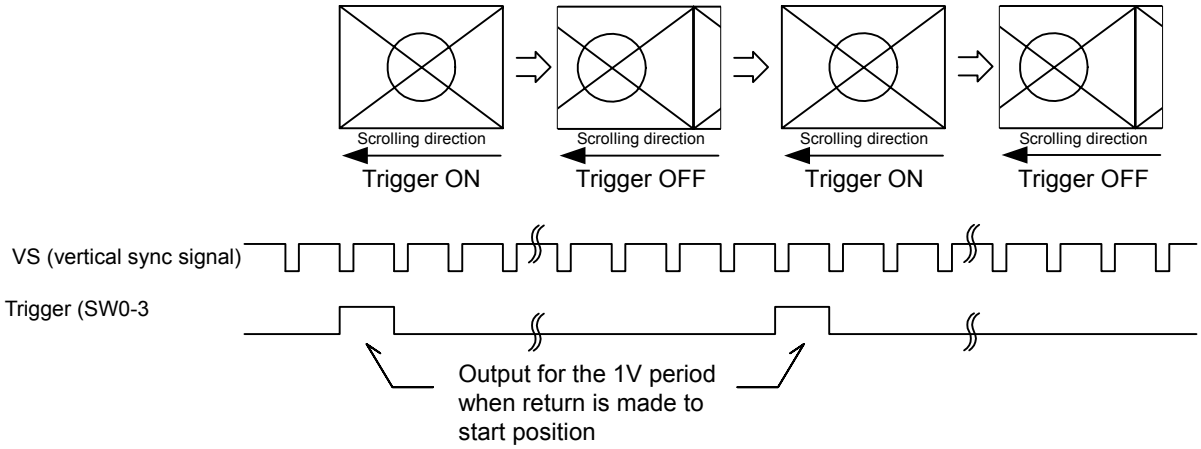


Fig. 3.3.26 Scroll Trigger Example

CAUTION

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

●Trigger output procedure

The trigger is output according to the corresponding output as shown below. For the pin arrangement and other specifications, see “10.3 DVI, LVDS and Parallel Output Specifications”.

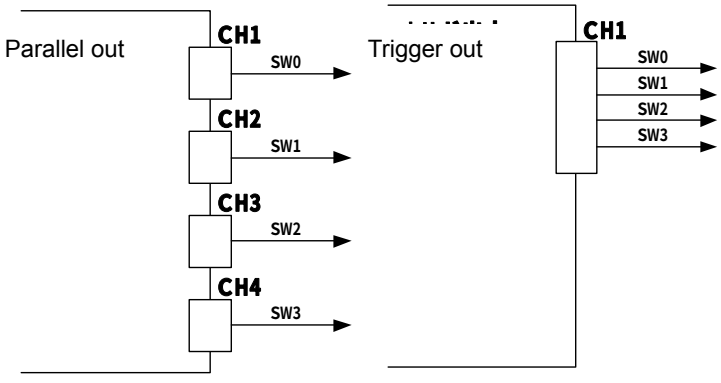


Fig 3.3.27 Trigger output procedure

[24] Setting the overlay cursor

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

```
Cfg:Overlay Cursor:OFF
                   (0/1)
```

Fig. 3.3.21 Selecting the overlay display

Table 3.3.21 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.

4 SIGNAL OUTPUT AND DATA REGISTRATION PROCEDURES

4.1 Output of video signals (direct display FUNC0)

The video signals of the program data stored internally or registered on PC cards are output using the direct display FUNC0.
In addition, the program data settings can be changed (but not saved) while the signals are being output.

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

4.1.1 Direct output (direct display mode)

● Set the group No. to "0."
(This setting is performed by config edit FUNC5 or by "4.1.3 Changing the group numbers.")

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

The direct display mode appears on the LCD display.

```
Select Function: 0   (0-B)
Direct Display
```

Fig. 4.1.1 Selecting the function

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

- Program numbers 001 to 849 are used for PC cards; program numbers 850 to 999 are used for the internal data.
  * When using the internal data, the internal program tables (PG1 and 2) must be set. (Config edit FUNC5)
  * For details on the internal data, refer to "9.1.1 Program data."
- One- or 2-digit numbers (1 to 99) can be input using the number key(s) followed by the [SET] key. (Example: [1] key → [SET] key)
- Program numbers can also be selected using the [▲] key and [▼] key. Numbers which have not been registered and program numbers with "invalid" set for the data are ignored.

```
PG1:  0:
```

Fig. 4.1.2 Inputting the program number

* Normally, this screen appears when the VG-835-A starts up as well. (Refer to "2.2 Operating mode when the generator's power is just turned on.")

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

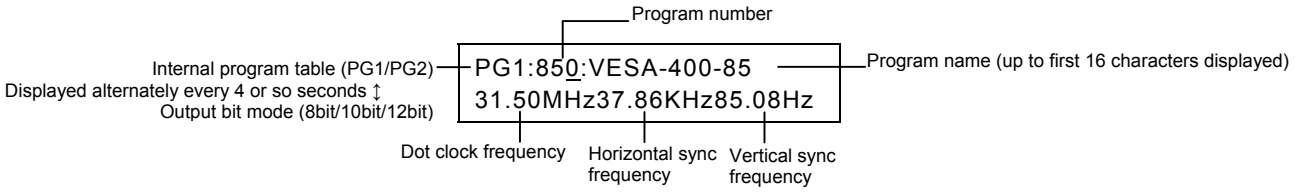


Fig. 4.1.3 Outputting the video signals

CAUTION

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

● How to switch to another program

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

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

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

Refer to "4.1.4 Switching the output patterns" (p.34) to "4.1.11 Changing the timing data settings" (p.41).

4.1.2 Group data output (group display mode)

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

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

```
Select Function: 0   (0-B)
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:  1:
```

Fig. 4.1.5 Inputting the group data number

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

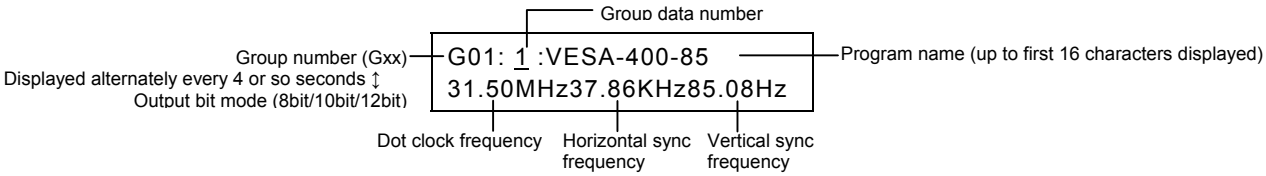


Fig. 4.1.6 Outputting the video signals

CAUTION

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

● How to switch to other group data

Proceed with the operation in step (2).

● How to switch to another group

Refer to "4.1.3 Changing the group numbers" (p.34).

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

Refer to "4.1.4 Switching the output patterns" (p.34) to "4.1.11 Changing the timing data settings" (p.41).

4.1.3 Changing the group numbers

(1) Press the [ESC] key.

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

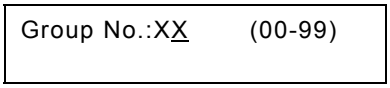


Fig. 4.1.7 Changing the group number

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

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

(3) Press the [SET] key.

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

CAUTION

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

4.1.4 Switching the output patterns

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

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

Table 4.1.1 Pattern data to be output

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

4.1.5 Cursor operations

■ Displaying the cursor pattern

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

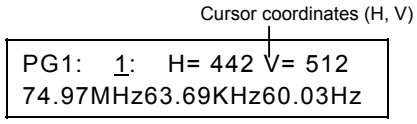


Fig. 4.1.8 Cursor pattern position

■ Cursor pattern function keys

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

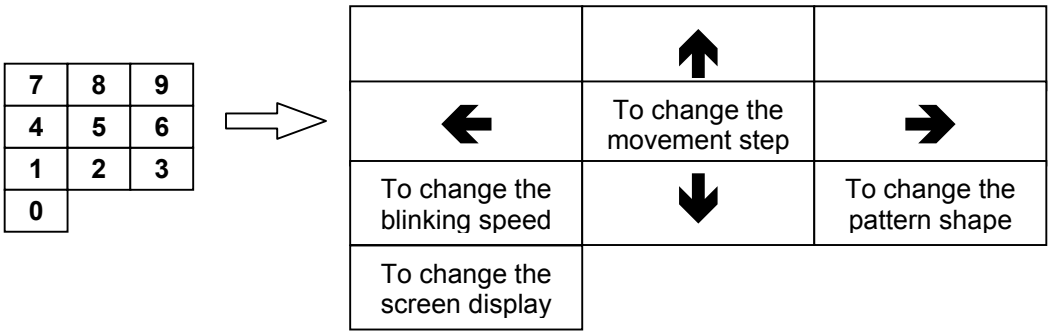


Fig. 4.1.9 Operations performed by cursor keys and key positions

Table 4.1.2 Cursor pattern function keys

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

CAUTION

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

■ Moving the cursor

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

Table 4.1.3 Cursor movements

Key	Movement direction
2	🡻: Downward
4	🡸: Toward the left
6	🡺: Toward the right
8	🡹: Upward

* When the Reverse 1 or Reverse 2 mode is used as the screen display method, the top and bottom of the display will be reversed, and in anticipation of this, therefore, the directions in which the cursor is moved by the keys will be reversed under normal circumstances. (Key 2: 🡹, key 4: 🡺, key 6: 🡸, and key 8: 🡻.)

■ Switching the screen display method

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

Table 4.1.4 Screen display method

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

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

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

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

■ Switching the cursor blinking speed

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

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

■ Changing the cursor shape

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

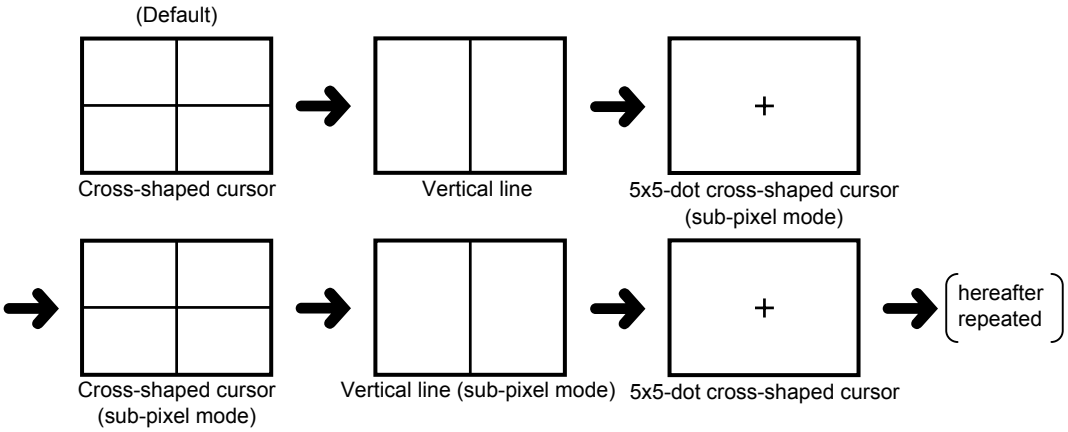


Fig. 4.1.10 Cursor shapes

■ Switching the movement steps of the cursor

The step amount of the cursor when any of the cursor movement keys has been operated is changed using the [5] number key.
Each time the [5] key is pressed, this amount is changed by one setting in the following sequence. “10 dots” is the default amount.

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

4.1.6 Changing the window RGB levels

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

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

(1) Press the [WINDOW] key.

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

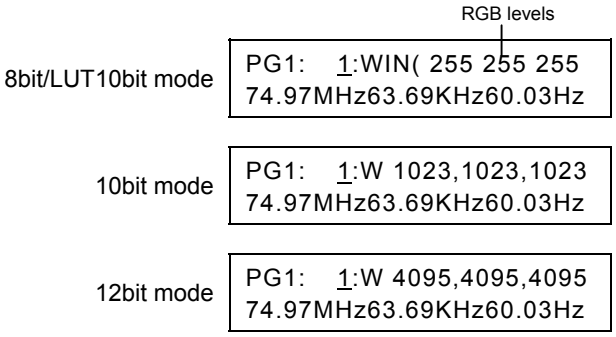


Fig. 4.1.11 Window RGB levels

(2) Change the window RGB levels.

Table 4.1.5 RGB level changes

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

CAUTION

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

4.1.7 Switching the output video signals and sync signals

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

Table 4.1.6 Video and sync signals to be output

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

4.1.8 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.

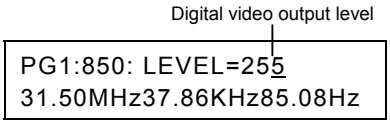


Fig. 4.1.12 Video output level

(2) Input the value using the number keys, and press the [SET] key. Alternatively, the value can be incremented or decremented by 1 each time the [▲] or [▼] key, respectively, is used.

* Any changes made to the value are reflected in the output at once.

Table 4.1.7 Changing the video output level

Item	Variable range
Digital video output level	8bit/LUT10bit mode : 0 to 255 10bit mode : 0 to 1023 12bit mode : 0 to 4095

(3) Press the [LEVEL] key.

The original display is now restored.

4.1.9 Scrolling the output patterns

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

The screen on which to select the scrolling appears.

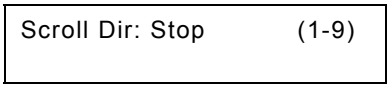


Fig. 4.1.13 Scrolling the pattern

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

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

(3) Press the [FORMAT] key.

The original display is restored.

4.1.10 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 "Chapter 6. PATTERN DATA CONFIGURATION AND SETTING PROCEDURES.")

* 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.

4.1.11 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 "Chapter 5. TIMING DATA CONFIGURATION AND SETTING PROCEDURES.")

* Each time the TIMING is pressed, the data (horizontal timing data, vertical timing data, ...) is switched.

(4) Press the [FORMAT] key.

Operation returns from the timing data setting screen to the original display.

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

4.2 Automatic output of video signals (auto display FUNC1)

The auto display mode is set and executed using auto display FUNC1.
In this mode, the video signals of the program data in the group or program whose number has been selected are automatically output in accordance with the specified delay time.

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

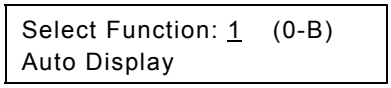


Fig. 4.2.1 Selecting the function

The auto display mode appears on the LCD screen.

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

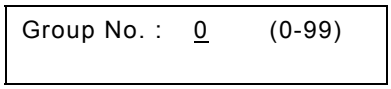


Fig. 4.2.2 Selecting the group number

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.

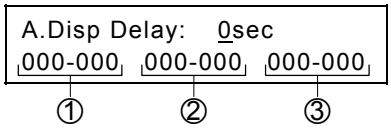


Fig. 4.2.3 Inputting the delay time and program numbers

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.: XXX - YYY
- Input this in 3 digits (example: "001").
- The programs are output in sequence from No.XXX to No.YYY.
- Three sets--①, ② and ③--can be registered, and they are executed in the sequence of ① → ② → ③.
- When "000" has been set for 'XXX' or 'YYY,' the set with this setting is not executed.

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

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

(5) Press the [SET] key.

The auto display mode operations are executed.

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

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

Program data is edited using the program edit FUNC2. This function is used to make temporary changes to program data and output the resulting signals (the changed data is not saved).
In contrast, PC card edit FUNC3 is used to edit and register the program data. It is used to edit the program data and save it on the PC card.
The editing procedure is described below using PC card edit FUNC3 as an example.

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

```
Select Function: 3   (0-B)
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.

* The HDCP data is made available in order to provide interchangeability with other models. It can be edited, but it is not used by the VG-835-A.

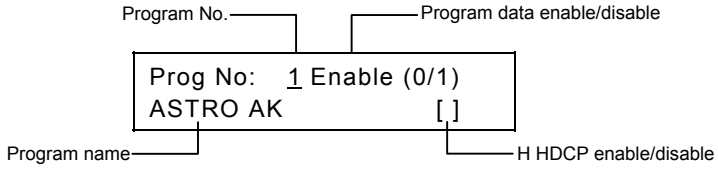


Fig. 4.3.2 Inputting the program number

(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 "Chapter 5. TIMING DATA CONFIGURATION AND SETTING PROCEDURES.")

```
Timing Edit:    0   (0-2)
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 "Chapter 6. PATTERN DATA CONFIGURATION AND SETTING PROCEDURES.")

```
Pattern Edit:    0   (0-E)
Pattern Select
```

Fig. 4.3.4 Setting the pattern data

● To return from a setting screen

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

● To check the changed data

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

(4) Save the edited data.

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

① Return to the display screen shown in Fig. 4.3.2 of step (2).

② Set “Enable” for program data Enable/Disable.
1: Enable
0: Disable

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

③ Input the program name (using not more than 20 characters).
Either input the character codes “20 to DF” directly or select the characters from the display (refer to “2.4 How to input characters from the display”).

④ Press the [SAVE] key.
The LED of the [SAVE] key blinks, and the LCD screen is switched.

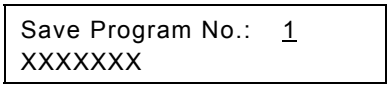


Fig. 4.3.5 Saving the data

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-B)
Card Copy
```

Fig. 4.4.1 Selecting the function

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

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

Fig. 4.4.2 Selecting the type of copy function

Table 4.4.1 Copy function types

Key	LCD display	Description of copy function	Reference page
0	1 Prog Data Copy	For copying program data in 1-program increments.	p.46
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.46
4	CHR Data Copy	For copying user character patterns in 1-character increments.	p.47
5	IMG Data Copy	For copying image data in 1-data increments.	p.47
6	OPT Data Copy	For copying user-created optional patterns in 1-data increments.	p.48
7	Group Data Copy	For copying group data in 1-group increments.	p.48
8	Auto Data Copy	For copying the auto display data.	p.49
9	Card Erase	For erasing all the data on the PC card.	p.49
A	All Copy	For copying all the data on the PC card.	p.50
B	1 Prog Data Erase	For erasing the program data in 1-program increments.	p.51
C	Card Initialize	For initializing PC cards.	p.51

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

CAUTION

Concerning the handling of PC cards

For the steps to insert and eject the PC cards, follow the steps in "2.5 How to insert and eject the PC cards."
Taking any other steps may damage the data on the PC card and make it impossible for the PC card to be recognized even when it is re-inserted.

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

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

* The VG-835-A's internal programs (No.850 to 999) can also be selected as the copy source.

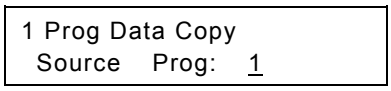


Fig. 4.4.3 Inputting the copy source data program number

(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-835-A's internal programs (No.850 to 999) cannot be selected as the copy destinations.

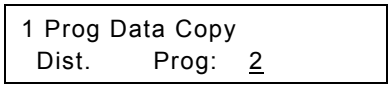


Fig. 4.4.4 Inputting the copy destination data program number

(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-835-A's internal programs (No.850 to 999) can also be selected as the copy source.

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-835-A's internal programs (No.850 to 999) cannot be selected as the copy destinations.

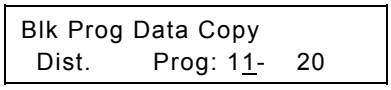


Fig. 4.4.6 Inputting the copy destination data program numbers

(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-835-A's internal user character patterns (F0H to FFH) can also be selected as the copy sources.

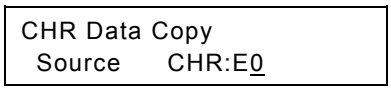


Fig. 4.4.7
Inputting the copy source user character code

(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-835-A's internal user character patterns (F0H to FFH) cannot be selected as the copy sources.

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.

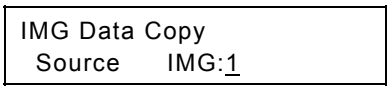


Fig. 4.4.9 Inputting the copy source image data number

(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.

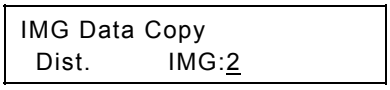


Fig. 4.4.10 Inputting the copy destination image data number

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-835-A'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.

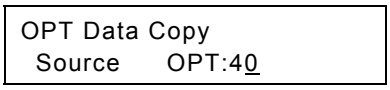


Fig. 4.4.11 Inputting the copy source optional pattern number

(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.

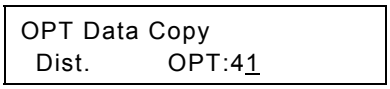


Fig. 4.4.12 Inputting the copy destination optional pattern number

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.

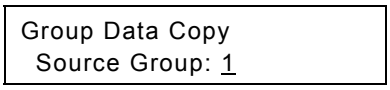


Fig. 4.4.13 Inputting the copy source group number

(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.

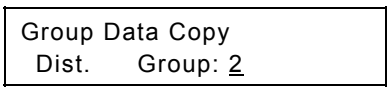


Fig. 4.4.14 Inputting the copy destination group number

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.

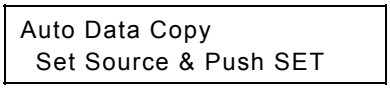


Fig. 4.4.15 Setting up the copy source PC card

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

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.

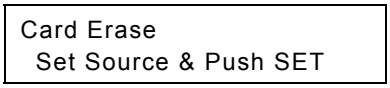


Fig. 4.4.17 Inserting the PC card

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

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

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

■ Copying all the data (All Copy)

When using this function

The All Copy function divides the 64MB PC card supplied into two parts, and loads the data into each part. It takes about 10 minutes for the data to be copied. If a PC capable of reading PC cards is available, it is faster and safer to use it for copying. When using the VG-835-A to copy all the data, use steps (1) to (5) below as a general guideline.

CAUTION

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

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

The first session data is read from the copy source.

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

Fig. 4.4.18 Setting up the copy source PC card

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

The first session data is written on the copy destination.

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

Fig. 4.4.19 Setting up the copy destination PC card

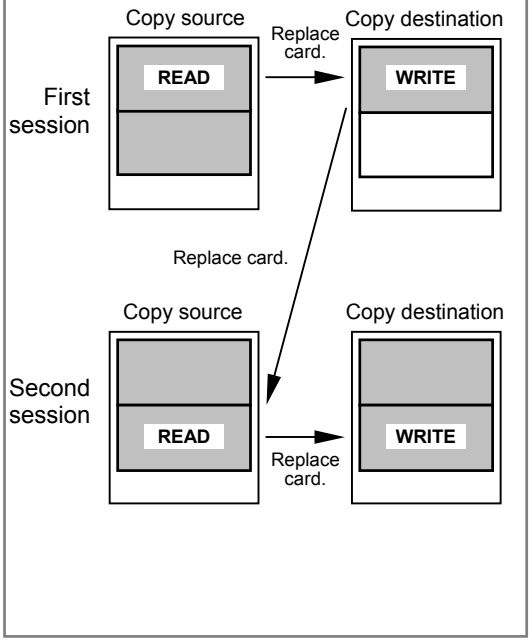
(3) Again insert the PC card serving as the copy source, and press the [SET] key.

The second session data is read from the copy source.

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

Fig. 4.4.20 Setting up the copy source PC card

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



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

The second session data is written on the copy destination.

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

Fig. 4.4.21 Setting up the copy destination PC card

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

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

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

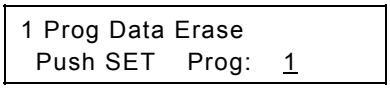


Fig. 4.4.22 Setting up the PC card

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.

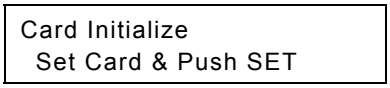


Fig. 4.4.23 Setting up the PC card

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.

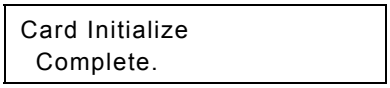


Fig. 4.4.24 Completion of initialization

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

4.5 Editing group data (group data edit FUNC6)

When the data in a multiple number of programs is to be output, the programs can be executed one at a time by changing their numbers in ascending or descending order using the [▲] key or [▼] key in the direct display mode. In the group display mode, on the other hand, programs (group data) can be executed in the order in which they were registered using group data edit FUNC6.
Each group data consists of a timing data program and a pattern data program.
If, for instance, group data No.1 is executed, the pattern data in program No.900 will be executed using the timing data in program No.850, as shown in the table below.

Table 4.5.1 Examples of group data

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

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

```
Select Function: 6   (0-B)
Group Edit
```

Fig. 4.5.1 Selecting the function

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

```
Group No.: 1
```

Fig. 4.5.2 Inputting the group number

(3) Set the group data.

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

```
GEdit 01:Tim=850 Pat=900   →   GEdit 03:Tim=850 Pat=902   →   …
(01)  02:Tim=851 Pat=901   ←   (01)  04:Tim=851 Pat=903   ←
```

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

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

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

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

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

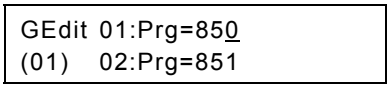


Fig. 4.5.4 Setting the group data (PROG)

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

Table 4.5.2 Selection method

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

(4) Save the edited data.

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

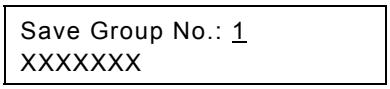


Fig. 4.5.5 Saving the data

② Use the number keys to input the number of the group (1 to 99) in which the data is to be saved.

③ Input the group name (with up to 20 characters).
Either input the character codes “20 to DF” directly or select the characters from the display (refer to “2.4 How to input characters from the display”).

④ Press the [SAVE] key.
The group data is saved, and the LED of the [SAVE] key goes off.

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

4.6 Editing user character patterns (character edit FUNC8)

CAUTION

- User character patterns are edited while they are on the display. Before proceeding with the editing, connect the display device to the VG-835-A, and check that the patterns are displayed properly.
- The VG-835-A's internal user character patterns (F0H to FFH) can be read out but not registered.

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

```
Select Function: 8   (0-B)
Character Edit
```

Fig. 4.6.1 Selecting the function

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

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

```
CHR Edit :E0   (E0-FF)
```

Fig. 4.6.2 Inputting the character code

The character pattern appears on the display

```
CHR Edit :E0
      Editing on Display
```

Fig. 4.6.3 LCD display

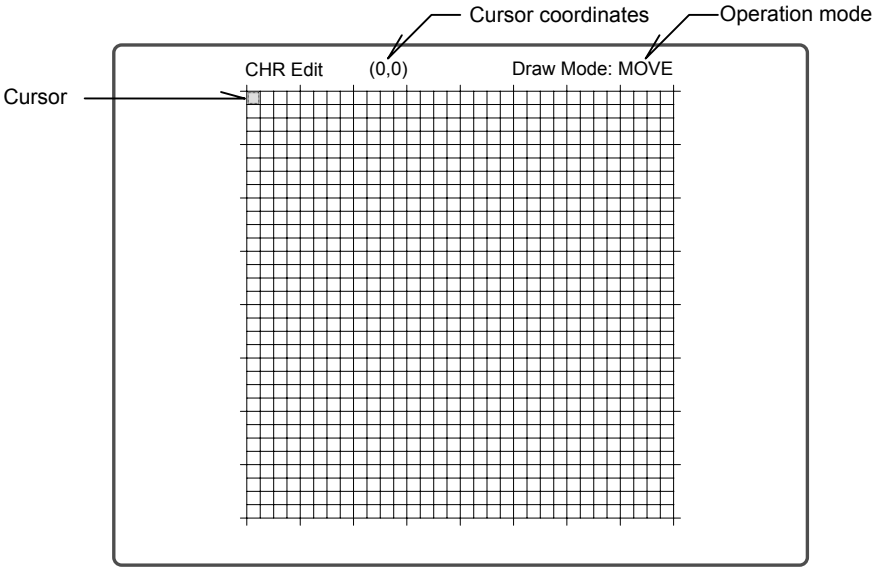


Fig. 4.6.4 What is displayed

(3) Edit the character pattern while referring to the following.

Table 4.6.1 Function keys for editing the character patterns

Key	Function
1 to 4, 6 to 9	● In the dot setting mode: Used to move the cursor or draw in the direction of the arrows of the number keys. ● In the dot clearing mode: Used to move the cursor or clear in the direction of the arrows of the number keys. ● In the movement mode: Used to move the cursor (but not to draw) in the direction of the arrows of the number keys. ● In the shift mode: Used to shift the character pattern in the designated direction of the arrows of the number keys.
5	Used to select the drawing mode (dot setting → dot clearing → movement).
SET	Used to switch between drawing and clearing the dot where the cursor is positioned.
0 / CLR	Used to clear all the dots inside the cell.
SHIFT	Used to switch between the shift mode and drawing mode. ● ON: Shift mode ● OFF: Drawing mode (dot setting, dot clearing, movement)
INV	Used to invert the level of the dot inside the cell.
HS	Used to return to the home position at the left or right of the cursor position (alternating movement between far left and far right).
VS	Used to return to the home position above or below the cursor position (alternating movement between very top and very bottom).
ESC	Used to abort the editing and return to the previous LCD screen.

(4) Save the edited data.

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

```
Save CHR :E0   (E0-EF)
```

Fig. 4.6.5 Saving the data

② Use the number keys to input the code (E0H to EFH) of the character pattern which is to be saved.

③ Press the [SAVE] key.
The data is saved, and the LED of the [SAVE] key goes off.

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

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

CAUTION

- The list display function is used to display the lists on the display screen. Before proceeding with the list display, connect the display device to the VG-835-A, and check that the display appears properly.
- Group Name List, OPT Name List, IMG Name List and Group Data List cannot be displayed unless the PC card is installed in the generator.

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

```
Select Function: 9   (0-B)
Lists
```

Fig. 4.7.1 Selecting the function

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

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

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

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

Fig. 4.7.2 Selecting the list

Table 4.7.1 List selection method

Key	LCD display/list name	List displayed	Reference page
0	Program Data List	Used to display the program data *1 of the program numbers concerned.	p.57
1	Program Name List	Used to display a list of the program names.	p.57
2	Group Name List	Used to display a list of the group names.	p.58
3	OPT Name List	Used to display a list of the optional pattern names.	p.58
4	IMG Name List	Used to display a list of the image data names.	p.58
5	Group Data List	Used to display the group data *1 registered in the group.	p.59

*1: The program names, horizontal sync frequency, vertical sync frequency, program data enable/disable, horizontal timing, vertical timing, output condition data are displayed.

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

■ Program Data List

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

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

Fig. 4.7.3 LCD display

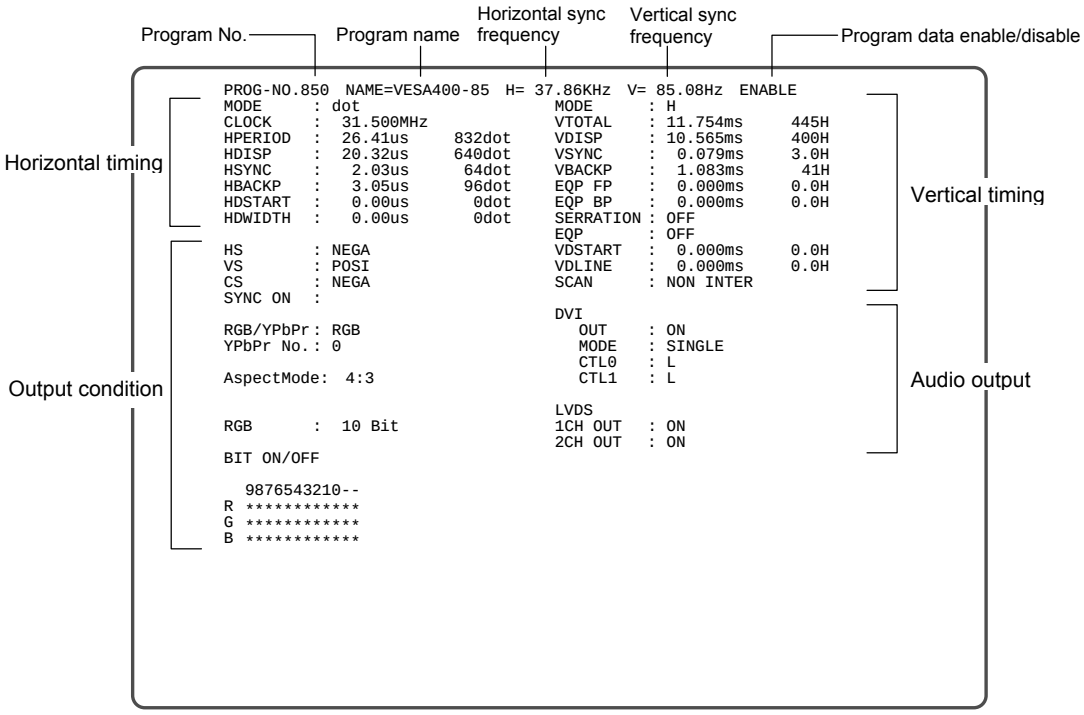


Fig. 4.7.4 Example of what is shown on the display

■ Program Name List

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

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

Fig. 4.7.5 LCD display

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

Fig. 4.7.6 Example of what is shown on the display

■ Group Name List

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

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

Fig. 4.7.7 LCD display

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

Fig. 4.7.8 Example of what is shown on the display

■ OPT Name List

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

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

```
Select OPT No (Top=40)
OPT Name List
```

Fig. 4.7.9 LCD display

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

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

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

SIZE: Number of bytes of the optional pattern data.

Fig. 4.7.10 Example of what is shown on the display

■ IMG Name List

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

```
Select IMG No (Top= 1)
IMG Name List
```

Fig. 4.7.11 LCD display

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

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

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

SIZE: Number of horizontal dots, number of vertical lines of image data

OPT-NO: Number of the optional pattern whose image is to be displayed

Fig. 4.7.12 Example of what is shown on the display

■ Group Data List

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

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

Fig. 4.7.13 Selecting the group number

(2) Use the number keys to input the group number (2 digits, 01 to 98) to display the data of that group on the display.

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

Fig. 4.7.14 LCD display

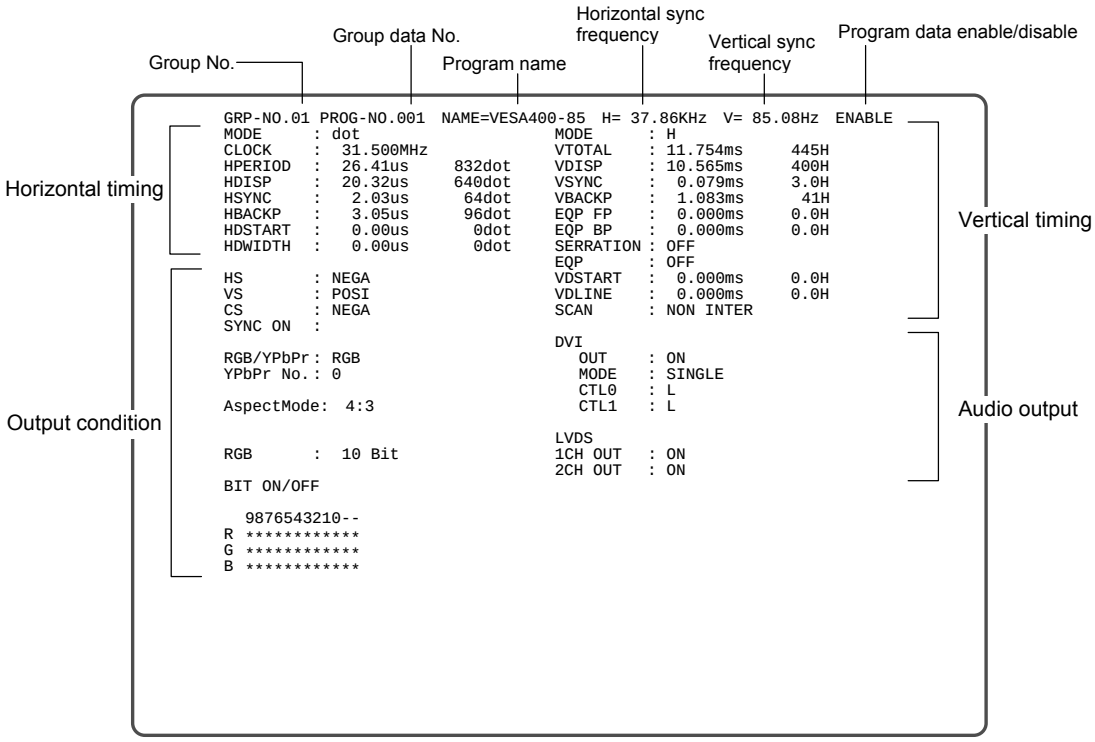


Fig. 4.7.15 Example of what is shown on the display

(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 take effect when "YPbPr" has been selected in "[3] Setting RGB/YPbPr" under "5.4.1 Settings common to all outputs" in the output condition data setting section. Select the number of the table to be used using "[4] Setting the YPbPr coefficient table No." under "5.4.1 Settings common to all outputs" in the same section.

4.8.1 YPbPr coefficient tables

The table contents are shown below.
All the values in these tables are set with up to four decimal places.

Table 4.8.1 YPbPr coefficient table

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

Table 4.8.2 Correlation with SMPTE standards for YPbPr coefficient tables

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

■ YPbPr calculation formula

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

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

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

4.8.2 How to edit the YPbPr coefficient tables

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

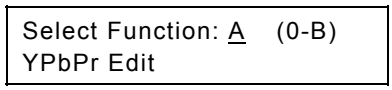


Fig. 4.8.1 Selecting the function

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

The table numbers can also be changed one at a time using the [▲] key or [▼] key.

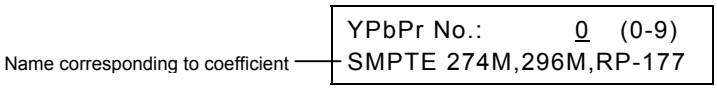


Fig. 4.8.2 Inputting the table number

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

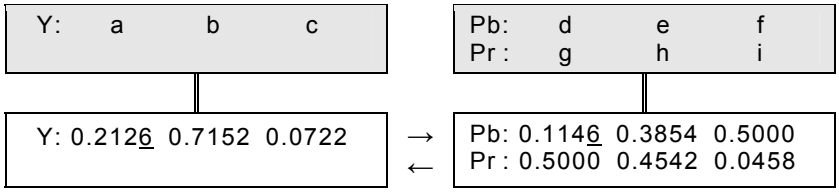


Fig. 4.8.3 Inputting the coefficients

(4) Save the edited data.

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

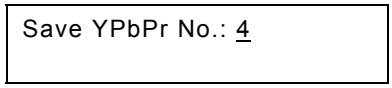


Fig. 4.8.4 Saving the data

② Use the number keys to input the number of the table (0 to 9) serving as the save destination for the edited data.

③ Press the [SAVE] key.
The data is saved and the LED of the [SAVE] key goes off.

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

CAUTION

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

4.9 Copying panel ROM data 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-835-A, and saved on PC cards.

(1) Use an RS-232C (crossover) cable to connect the VG-835-A and the existing VG model.

(2) Press the [FUNC] key, [B] key and [SET] key.

```
Select Function: B   (0-B)
ROM Copy
```

Fig. 4.9.1 Selecting the function

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

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

Fig. 4.9.2 Selecting the data copy source VG model

Table 4.9.1 Data copy source VG model selection method

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

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

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

Fig. 4.9.3 Selecting the data to be copied

Table 4.9.2 Data copy selection method

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

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

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

Fig. 4.9.4 Selecting the ROM type as the copy source

Table 4.9.3 Copy source ROM type selection method

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

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

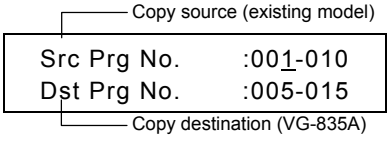


Fig. 4.9.5 Entering the copy source and destination program numbers (for program data)

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

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

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

CAUTION

If data outside the setting range of the VG-835-A is included in the copied program data, the program data concerned will be disabled.

5 TIMING DATA CONFIGURATION AND SETTING PROCEDURES

5.1 Configuration of timing data and basic operations

The timing data consists of the horizontal timing data, vertical timing data and output conditions.

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.

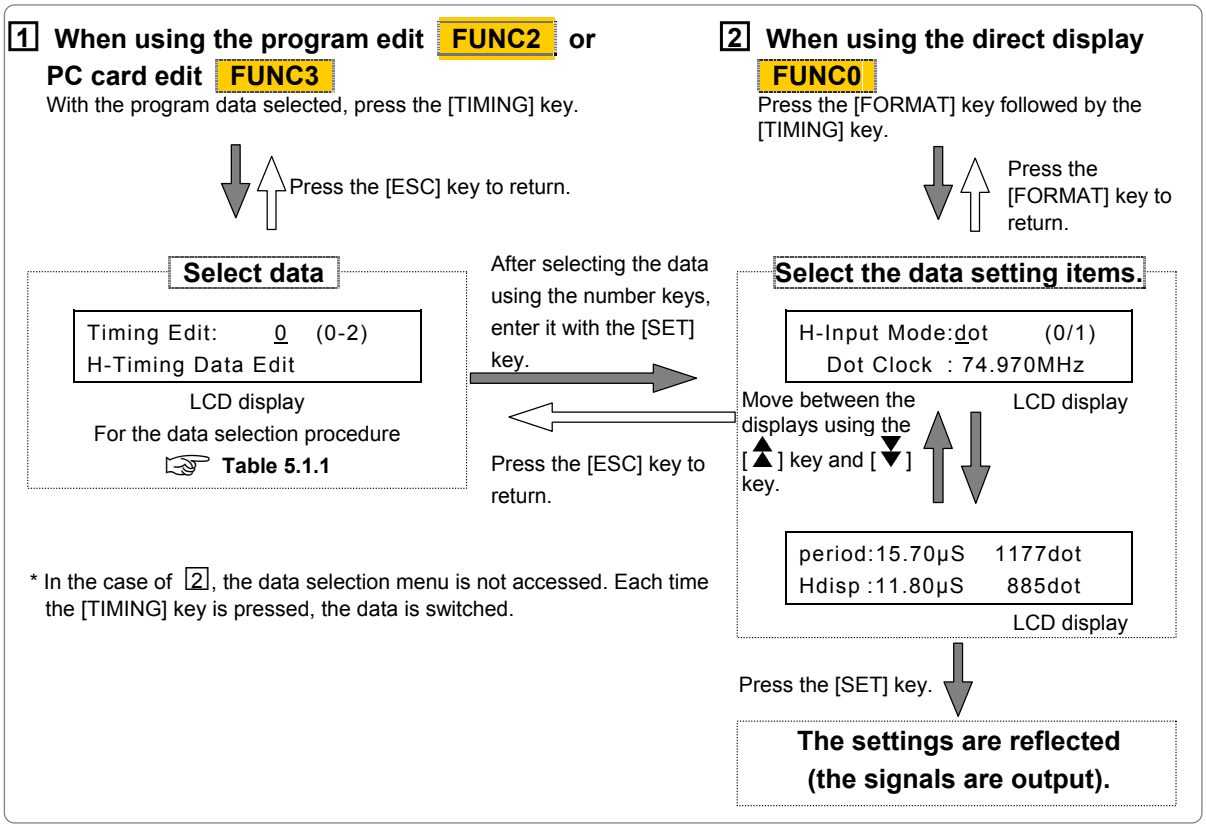
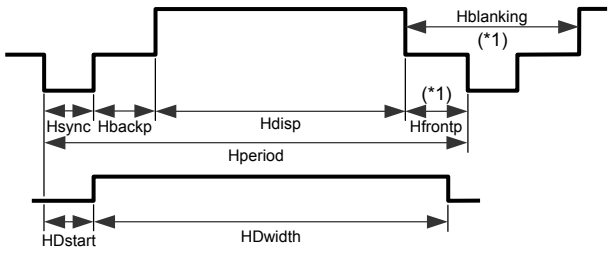


Fig. 5.1.1 Basic operations for setting the timing data

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.64	p.74
1	V-Timing Data Edit	Vertical timing	p.65	p.79
2	Output Edit	Output condition	p.66	p.85

5.1.2 Horizontal timing data configuration list



Horizontal sync frequency: 10 to 300 kHz

Timing data	Setting item	Setting range	8bit/LUT10bit mode	10bit/12bit mode	Remarks	
Horizontal timing	Input mode	µs or dots				
	Dot clock frequency	-	0.100 to 300.000 MHz	0.100 to 165.000 MHz	1 kHz increments	
	Hperiod	0.00 to 99.99 µs	128 to 8192 dot	128 to 4096 dot		
	Hdisp	0.00 to 99.99 µs	48 to 4096 dot	48 to 2048 dot		
	Hsync	0.00 to 99.99 µs	0 to 4096 dot	0 to 2048 dot		*2
	Hbackp	0.00 to 99.99 µs	0 to 4096 dot	0 to 2048 dot		
	Hfrontp	(0.00 to 99.99 µs)	(0 to 4096 dot)	(0 to 2048 dot)		*1, 3, 4
	HDstart	0.00 to 99.99 µs	0 to 4096 dot	0 to 2048 dot		*5, 6
	HDwidth					
	Hblanking	(40 to 2048 dot)				*1

*1: Hfrontp and Hblanking are calculated from the values of other setting items.
- Hfrontp = Hperiod - Hdisp - Hsync - Hbackp
- Hblanking = Hperiod - Hdisp

*2: When “0" is set for H FRONT PORCH, then set Hsync to:
- 2 dots or more when the dot clock frequency is 100.001 to 200 MHz
- 4 dots or more when the dot clock frequency is 200.001 to 250 MHz

*3: Set Hfrontp within the setting range of:
- 64 to 4096 dots when the dot clock frequency is 100.001to 200 MHz and Hperiod is set in increments of other than 2 dots
- 128 to 4096 dots when the dot clock frequency is 200.001 to 250 MHz and Hperiod is set in increments of other than 4 dots.

*4: In the interlace scanning mode, set Hfrontp to:
- 2 dots or more when the dot clock frequency is 5 to 100 MHz
- 4 dots or more when the dot clock frequency is 100.001 to 200 MHz
- 8 dots or more when the dot clock frequency is 200.001 to 250 MHz

“0” cannot be set.

*5: HDstart and HDwidth are not used by the standard VG-835-A model. They take effect only with models that support parallel outputs (option).

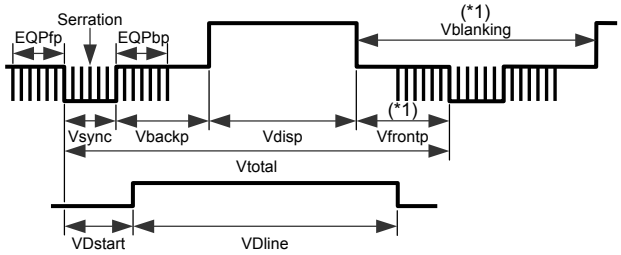
*6: The sum of HDstart and HDwidth cannot be set in excess of Hperiod.
Set the sum within the following range: (HDstart + HDwidth) ≤ Hperiod

* The dot clock frequency setting range and the increments in which the items are set differ depending on the “priority output” and “output modes” settings.

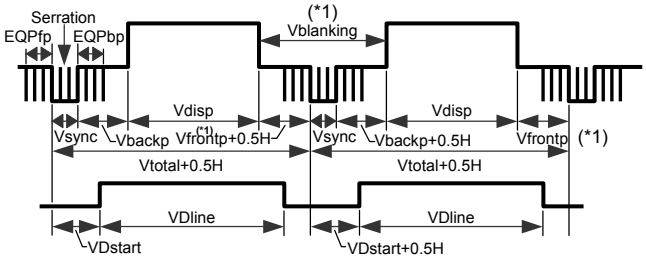
☞ Refer to “5.1.5 Valid setting items and timing restrictions for each output.”

5.1.3 Vertical timing data configuration list

● **Non-interlace (progressive) scanning**



● **Interlace scanning**



Vertical sync frequency: 10 to 150 Hz

Timing data	Setting item	Setting range	8bit/LUT10bit mode	10bit/12bit mode	Remarks	
Vertical timing	Input mode	H / ms				
	Scanning mode	Non-interlace, interlace & sync, interlace & video				
	Vtotal	6.667 to 99.999 ms	Non-interlace 4 to 8192 H	Non-interlace 4 to 4096 H	1H increments	
			Interlace scanning 4 to 4096 H	Interlace scanning 4 to 2048 H		
	Vdisp	0.000 to 99.999 ms	1 to 4096 H	1 to 2048 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	0 to 2048 H	1H increments	
	Vfrontp	(0.000 to 99.999 ms)	(0 to 4096 H)	(0 to 2048 H)		*1
	EQPfp	0.000 to 99.999 ms	0.0 to 99.0 H		0.5H increments	*2
	EQPbp					
	Serration	OFF / 0.5H / 1H / EXOR				
	EQP (on / off)	OFF / ON				
	VDstart	0.000 to 99.999 ms	0.0 to 4095.0 H		0.5H increments	*3
	VDline					*4
	Vblanking	(2H or more)				*1

*1: Vfrontp and Vblanking are calculated from the values of other setting items.
(only in non-interlace scanning mode; in the interlace scanning mode, refer to the figure above.)
*2: EQPfp, EQPbp, Serration and EQP (on/off) are made available in order to provide interchangeability with other models. They can be edited, but they are not used by the VG-835-A.
*3: VDstart and VDline are not used by the standard VG-835-A model. They take effect only for models that support parallel outputs (option).
*4: The sum of VDstart and VDline cannot be set in excess of Vtotal
Set the sum within the following range: (VDstart + VDline) ≤ Vtotal

5.1.4 Output condition data configuration list

Timing data	Setting item		Setting range
Output condition	Settings common to all outputs		
	Priority output		DVI / LVDS 2ch / LVDS 4ch / Parallel
	HS (horizontal sync signal)		Nega / Posi / OFF / CS
	VS (vertical sync signal)		Nega / Posi / OFF
	RGB/YPbPr		RGB / YPbPr
	YPbPr coefficient table number		0 to 9
	Number of RGB output bits		1 to 12bit
	Output bit ON/OFF	R0 to R11	OFF / ON
		G0 to G11	
		B0 to B11	
	Common output modes		Single Link / Dual Link
	Aspect ratio		4:3, 16:9, same as screen resolution, user setting [H 1-255]:[V 1-255]
	Black insertion function ON/OFF		OFF / ON
	Black insertion	Insertion position	Entire screen, left half, right half
		Pattern display (ON) time	0 to 255 V
		Black insertion (OFF) time	0 to 255 V
	DVI output		
	Output ON/OFF		OFF / ON
	DVI mode		Single Link / Dual Link
	CTL signals CTL0, 1		Low / High
	LVDS 2ch output		
	Output ON/OFF 1, 2CH		OFF / ON
	LVDS 2ch mode		Single Link / Dual Link
	LVDS 4ch output (❖Option: Only for models that support LVDS 4-channel output)		
	Output ON/OFF 1 to 4CH		OFF / ON
	LVDS 4ch mode		MODE0 to 6
	Parallel output (❖Option: Only for models that support parallel outputs)		
	Sync signals HD, VD, CS		Nega / Posi
	Video signals 1 to 4CH		Nega / Posi
	Clock signal (CLK)		Nega / Posi
	DISP signal		Nega / Posi
	Clock output area		Display area only/all areas
	Output ON/Hi-Z 1 to 4CH	Video signal	Hi-Z (OFF) / ON
		Clock signal	
		Sync signal	
		Power output	
	SW signals SW0 to 3		CS / VD / HD / Low / High
	Clock delay	ON/OFF	OFF / ON
		Delay time	0 to 31 [ns]
	Parallel clock mode		×1 / ×2 / ×4

5.1.5 Valid setting items and timing restrictions for each output

5.1.5.1 Concerning which setting items are valid

The valid setting items differ depending on the output bit mode and output format (DVI, LVDS 2-channel, LVDS 4-channel or parallel).
The relationship between these setting items and the output bit mode and format is shown in the table below.

★ indicates an item which is set by config edit FUNC5. All other items are set using the output condition data (timing data) in each program.

Output bit modes	Valid setting items Setting items which are valid in the 8-bit or LUT 10-bit mode are not valid in the 10-bit or 12-bit mode. Conversely, setting items which are valid in the 10-bit or 12-bit mode are not valid in the 8-bit or LUT 10-bit mode.	Related outputs			
		DVI	LVDS2ch	LVDS4ch *1	Parallel *1
8bit LUT10bit	Priority output (Program No. 1 to 849)	O	O	O	O
	★Internal program priority output (Program No.850 to 999)				
	DVI mode (Single Link / Dual Link)	O			
	LVDS 2ch mode (Single Link / Dual Link)		O		
	LVDS 4ch mode (MODE0 to 6)			O	
	★Parallel clock mode (×1 / ×2 / ×4)				O
10bit 12bit *1	DVI mode (Interleave OFF/ON)	O			
	Common output modes (Single Link / Dual Link)		O	O	O

*1: The 12-bit mode, LVDS 4-channel output and parallel output are supported only as options.

5.1.5.2 Table of dot clock frequency setting ranges by output

Output	Mode	Output bit mode			
		8bit	LUT10bit	10bit	12bit *1
DVI	Single Link	25 to 165 MHz		-	
	Dual Link	50 to 300 MHz		-	
	Interleave OFF	-		25 to 165 MHz	
	Interleave ON	-		25 to 82.5 MHz	
LVDS 2ch	Single Link	8 to 135 MHz		8 to 135 MHz	-
	Dual Link	16 to 270 MHz		16 to 165 MHz	-
	(Mode setting invalid)	-		-	8 to 135 MHz
LVDS 4ch *1	MODE0	20 to 85 MHz		-	
	MODE1, 3	40 to 170 MHz		-	
	MODE2, 4, 5, 6	80 to 300 MHz		-	
	Single Link	-		20 to 85 MHz	
	Dual Link	-		40 to 165 MHz	
Parallel *1	×1	0.1 to 100 MHz		-	
	×2	0.1 to 200 MHz		-	
	×4	0.1 to 300 MHz		-	
	Single Link	-		0.1 to 100 MHz	
	Dual Link	-		0.1 to 165 MHz	

*1: The 12-bit mode, LVDS 4-channel output and parallel output are supported only as options.

5.1.5.3 Restrictions on the dot clock frequency setting ranges and increments used for setting the horizontal timing data

The dot clock frequency setting ranges and increments in which the horizontal timing data is set differ depending on the output bit mode, output format and output mode (such as Single Link or Dual Link). Further details are provided below. (The LVDS 4-channel output and parallel output are supported only as options.)

● 8bit / LUT10bit mode

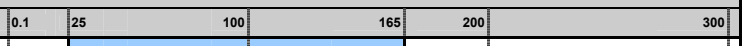
In the 8-bit or LUT 10-bit mode, the restriction values are determined by the “priority output” setting and the “mode” setting for the output selected under that setting.

1 Priority output: DVI
2 Priority output: LVDS 2ch
3 Priority output: LVDS 4ch
4 Priority output: Parallel

1 Priority output: DVI 8bit / LUT10bit mode

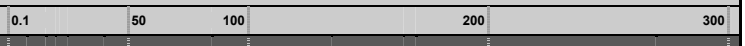
DVI mode: Single Link

Output			Frequency setting [MHz]
DVI	Single Link	25 to 165	25 – 165
	Dual Link	-	
LVDS 2ch	Single Link	8 to 135	8 – 135
	Dual Link	100 to 270	100 – 270
LVDS 4ch	MODE0	20 to 85	20 – 85
	MODE1,3	100.001 to 170	100.001 – 170
	MODE2,4,5,6	200.001 to 300	200.001 – 300
Parallel	×1	0.1 to 100	0.1 – 100
	×2	100.001 to 200	100.001 – 200
	×4	200.001 to 300	200.001 – 300
Increment for setting horizontal timing data			1dot / 2dot / 4dot



DVI mode: Dual Link

Output			Frequency setting [MHz]
DVI	Single Link	-	
	Dual Link	50 to 300	50 – 300
LVDS 2ch	Single Link	8 to 135	8 – 135
	Dual Link	16 to 270	16 – 270
LVDS 4ch	MODE0	-	
	MODE1,3	40 to 170	40 – 170
	MODE2,4,5,6	200.001 to 300	200.001 – 300
Parallel	×1	-	
	×2	0.1 to 200	0.1 – 200
	×4	200.001 to 300	200.001 – 300
Increment for setting horizontal timing data			2dot / 4dot



2 Priority output: LVDS 2ch

8bit / LUT10bit mode

LVDS 2ch mode: Single Link

Output		Frequency setting [MHz]	0.1	8	100	135	200	300
DVI	Single Link	25 to 165		25			165	
	Dual Link	100.001 to 300				100.001		300
LVDS 2ch	Single Link	8 to 135		8		135		
	Dual Link	-						
LVDS 4ch	MODE0	20 to 85		20	85			
	MODE1,3	100.001 to 170				100.001	170	
	MODE2,4,5,6	200.001 to 300					200.001	300
Parallel	×1	0.1 to 100	0.1		100			
	×2	100.001 to 200				100.001	200	
	×4	200.001 to 300					200.001	300
Increment for setting horizontal timing data			1dot			2dot		4dot

LVDS 2ch mode: Dual Link

Output		Frequency setting [MHz]	0.1	16	100	200	270	300
DVI	Single Link	25 to 165		25		165		
	Dual Link	50 to 300			50			300
LVDS 2ch	Single Link	-						
	Dual Link	16 to 270		16			270	
LVDS 4ch	MODE0	-						
	MODE1,3	40 to 170			40	170		
	MODE2,4,5,6	200.001 to 300					200.001	300
Parallel	×1	-						
	×2	0.1 to 200	0.1			200		
	×4	200.001 to 300					200.001	300
Increment for setting horizontal timing data			2dot				4dot	

3 Priority output: LVDS 4ch

8bit / LUT10bit mode

LVDS 4ch mode: MODE0

Output		Frequency setting [MHz]	0.1	20	85	100	200	300
DVI	Single Link	25 to 165		25			165	
	Dual Link	100.001 to 300				100.001		300
LVDS 2ch	Single Link	8 to 135		8			135	
	Dual Link	100.001 to 270				100.001		270
LVDS 4ch	MODE0	20 to 85		20	85			
	MODE1,3	-						
	MODE2,4,5,6	-						
Parallel	×1	0.1 to 100	0.1			100		
	×2	100.001 to 200				100.001	200	
	×4	200.001 to 300					200.001	300
Increment for setting horizontal timing data			1dot			2dot		4dot

LVDS 4ch mode: MODE1, 3

Output		Frequency setting [MHz]	0.1	40	100	170	200	300
DVI	Single Link	25 to 165		25			165	
	Dual Link	50 to 300			50			300
LVDS 2ch	Single Link	8 to 135		8			135	
	Dual Link	16 to 270		16				270
LVDS 4ch	MODE0	-						
	MODE1,3	40 to 170		40			170	
	MODE2,4,5,6	-						
Parallel	×1	-						
	×2	0.1 to 200	0.1				200	
	×4	200.001 to 300					200.001	300
Increment for setting horizontal timing data			2dot					4dot

LVDS 4ch mode: MODE2, 4, 5, 6

Output		Frequency setting [MHz]	0.1	80	100	200	300
DVI	Single Link	-					
	Dual Link	50 to 300		50			300
LVDS 2ch	Single Link	-					
	Dual Link	16 to 270		16			270
LVDS 4ch	MODE0	-					
	MODE1,3	-					
	MODE2,4,5,6	80 to 300		80			300
Parallel	×1	-					
	×2	-					
	×4	0.1 to 300	0.1				300
Increment for setting horizontal timing data			4dot				

4 Priority output: Parallel

8bit / LUT10bit mode

Parallel clock mode: ×1

Output		Frequency setting [MHz]	0.1 – 100 – 200 – 300
DVI	Single Link	25 to 165	25 – 165
	Dual Link	100.001 to 300	100.001 – 300
LVDS 2ch	Single Link	8 to 135	8 – 135
	Dual Link	100.001 to 270	100.001 – 270
LVDS 4ch	MODE0	20 to 85	20 – 85
	MODE1,3	100.001 to 170	100.001 – 170
	MODE2,4,5,6	200.001 to 300	200.001 – 300
Parallel	×1	0.1 to 100	0.1 – 100
	×2	-	
	×4	-	
Increment for setting horizontal timing data			1dot / 2dot / 4dot

Parallel clock mode: ×2

Output		Frequency setting [MHz]	0.1 – 100 – 200 – 300
DVI	Single Link	25 to 165	25 – 165
	Dual Link	50 to 300	50 – 300
LVDS 2ch	Single Link	8 to 135	8 – 135
	Dual Link	16 to 270	16 – 270
LVDS 4ch	MODE0	-	
	MODE1,3	40 to 170	40 – 170
	MODE2,4,5,6	200.001 to 300	200.001 – 300
Parallel	×1	-	
	×2	0.1 to 200	0.1 – 200
	×4	-	
Increment for setting horizontal timing data			2dot / 4dot

Parallel clock mode: ×4

Output		Frequency setting [MHz]	0.1 – 100 – 200 – 300
DVI	Single Link	-	
	Dual Link	50 to 300	50 – 300
LVDS 2ch	Single Link	-	
	Dual Link	16 to 270	16 – 270
LVDS 4ch	MODE0	-	
	MODE1,3	-	
	MODE2,4,5,6	80 to 300	80 – 300
Parallel	×1	-	
	×2	-	
	×4	0.1 to 300	0.1 – 300
Increment for setting horizontal timing data			4dot

● 10bit mode

In the 10-bit, the restriction values are determined by the “DVI mode interleaving ON/OFF” setting and the “common output mode (Single Link or Dual Link)” setting. However, when interleaving “ON” has been selected for the DVI mode, the LVDS 2-channel, LVDS 4-channel or parallel output can be output only in the Single Link mode.

DVI mode: Interleave OFF

10bit mode

Common output modes: Single Link

Output		Frequency setting [MHz]
DVI	Interleave OFF	25 to 165
	Interleave ON	-
LVDS 2ch	Single Link	8 to 135
	Dual Link	-
LVDS 4ch	Single Link	20 to 85
	Dual Link	-
Parallel	Single Link	0.1 to 100
	Dual Link	-
Increment for setting horizontal timing data		1dot (0.1 to 100) / 2dot (100 to 165)

Common output modes: Dual Link

Output		Frequency setting [MHz]
DVI	Interleave OFF	25 to 165
	Interleave ON	-
LVDS 2ch	Single Link	-
	Dual Link	16 to 165
LVDS 4ch	Single Link	-
	Dual Link	40 to 165
Parallel	Single Link	-
	Dual Link	0.1 to 165
Increment for setting horizontal timing data		2dot

DVI mode: Interleave ON

10bit mode

(The LVDS 2-channel, LVDS 4-channel and parallel outputs cannot be output in the Dual Link mode.)

Output		Frequency setting [MHz]
DVI	Interleave OFF	-
	Interleave ON	25 to 82.5
LVDS 2ch	Single Link	8 to 100
	Dual Link	-
LVDS 4ch	Single Link	20 to 85
	Dual Link	-
Parallel	Single Link	0.1 to 100
	Dual Link	-
Increment for setting horizontal timing data		1dot

● 12bit mode

In the 12-bit as in the 10-bit mode, the restriction values are determined by the “DVI mode interleaving ON/OFF” setting and the “common output mode (Single Link or Dual Link)” setting. However, when interleaving “ON” has been selected for the DVI mode, the LVDS 2-channel, LVDS 4-channel or parallel output can be output only when Single Link has been selected as the common output mode.
Furthermore, one data transfer method is used for the LVDS 2-channel output in the 12-bit mode.

DVI mode: Interleave OFF 12bit mode

Common output modes: Single Link

Output		Frequency setting [MHz]	0.1	100	165
DVI	Interleave OFF	25 to 165		25	165
	Interleave ON	-			
LVDS 2ch	-	8 to 135		8	135
LVDS 4ch	Single Link	20 to 85		20	85
	Dual Link	-			
Parallel	Single Link	0.1 to 100	0.1	100	
	Dual Link	-			
Increment for setting horizontal timing data			1dot		2dot

Common output modes: Dual Link

Output		Frequency setting [MHz]	0.1	100	165
DVI	Interleave OFF	25 to 165		25	165
	Interleave ON	-			
LVDS 2ch	-	8 to 135		8	135
LVDS 4ch	Single Link	-			
	Dual Link	40 to 165		40	165
Parallel	Single Link	-			
	Dual Link	0.1 to 165	0.1		165
Increment for setting horizontal timing data			2dot		

DVI mode: Interleave ON 12bit mode

(The LVDS 2-channel, LVDS 4-channel and parallel outputs cannot be output in the Dual Link mode.)

Output		Frequency setting [MHz]	0.1	100	165
DVI	Interleave OFF	-			
	Interleave ON	25 to 82.5		25	82.5
LVDS 2ch	-	8 to 100		8	100
LVDS 4ch	Single Link	20 to 85		20	85
	Dual Link	-			
Parallel	Single Link	0.1 to 100	0.1	100	
	Dual Link	-			
Increment for setting horizontal timing data			1dot		

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.

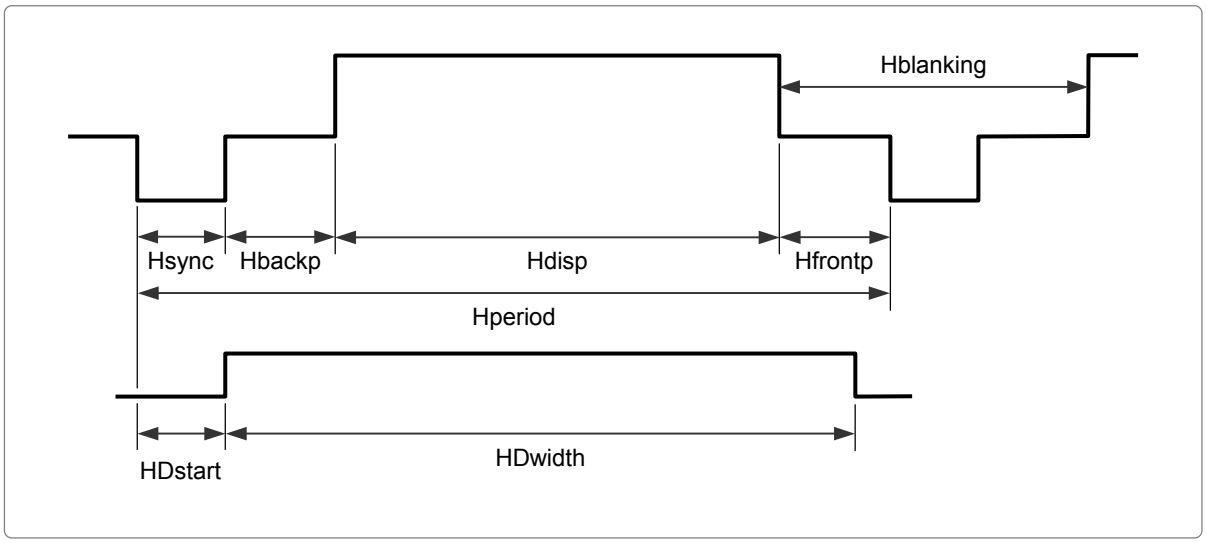


Fig. 5.2.1 Horizontal timing data

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

The dot clock frequency setting range and the increments in which the items are set differ depending on the “priority output” and “output modes” settings.
Refer to “5.1.5 Valid setting items and timing restrictions for each output.”

Table 5.2.1 Reference pages for setting details

No.	Setting item	Reference page
1	Input mode	p.75
	Dot clock frequency	
2	Hperiod	p.76
	Hdisp	
	Hblanking	
3	Hsync	p.77
	Hbackp	
	Hfrontp	
4	HDstart	p.78
	HDwidth	

5.2.2 Details of item settings

[1] Setting the input mode and dot clock frequency

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

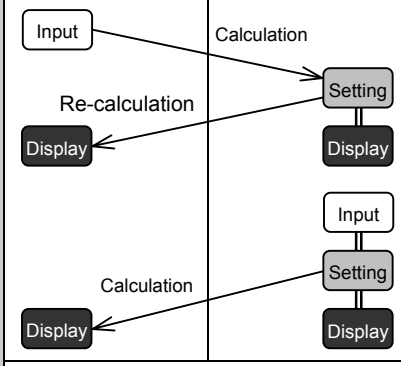
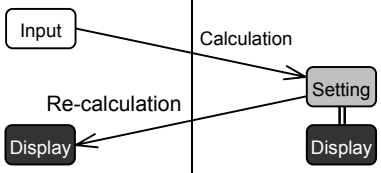
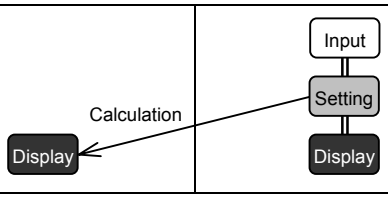
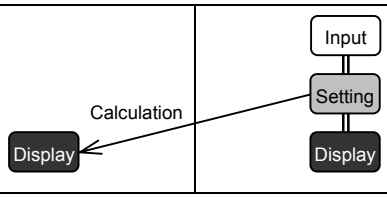
Fig. 5.2.2 Setting the input mode and dot clock frequency

Table 5.2.2 Input mode and dot clock frequency setting method

Setting item	Key	LCD display	Description
Input mode (H-Input Mode)	0	µS	µs mode: The values for the items are input in microseconds.
	1	dot	dot mode: The values for the items are input in dots.
Dot clock (Dot Clock)	Number keys	XX.XXXMHz	Setting range: In the 8-bit or LUT 10-bit mode 0.100 to 300.000 MHz In the 10-bit or 12-bit mode 0.100 to 165.000 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 (µs) or dots. If, for instance, when the dot mode has been selected, a 'dot' value is changed, the 'µs' value will be automatically calculated. However, what actually happens differs slightly depending on the input mode and setting item. Refer to the table below.

Table 5.2.3 Input modes

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

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

[2] Setting Hperiod, Hdisp and Hblanking

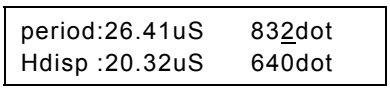


Fig. 5.2.3 Setting Hperiod and Hdisp

Table 5.2.4 Hperiod and Hdisp (Hblanking) setting method

Setting item	Key	LCD display	Description
Hperiod	Number keys	XX.XXμS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [μs], 128 to 8192 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [μs], 128 to 4096 [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.XXμS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [μs], 48 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [μs], 48 to 2048 [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 2048 [dot]

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

[3] Setting Hsync, Hbackp and Hfrontp

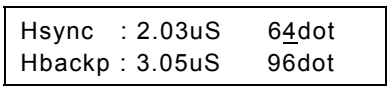


Fig. 5.2.4 Setting Hsync and Hbackp

Table 5.2.5 Hsync and Hbackp (Hfrontp) setting method

Setting item	Key	LCD display	Description
Hsync	Number keys	XX.XXμS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [μs], 0 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [μs], 0 to 2048 [dot]
Hbackp	Number keys	XX.XXμS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [μs], 0 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [μs], 0 to 2048 [dot]
Hfrontp			Hfrontp is automatically calculated from the values of Hperiod, Hdisp, Hsync and Hbackp. Calculation formula: Hfrontp = Hperiod - Hdisp - Hsync - Hbackp Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [μs], 0 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [μs], 0 to 2048 [dot]

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

CAUTION

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

[4] Setting HDstart and HDwidth

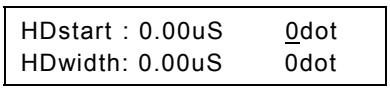


Fig. 5.2.5 Setting HDstart and HDwidth

Table 5.2.6 HDstart and HDwidth setting method

Setting item	Key	LCD display	Description
HDstart	Number keys	XX.XXµS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [µs], 0 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [µs], 0 to 2048 [dot]
HDwidth	Number keys	XX.XXµS XXXXdot	Setting range: In the 8-bit or LUT 10-bit mode 0.00 to 99.99 [µs], 0 to 4096 [dot] In the 10-bit or 12-bit mode 0.00 to 99.99 [µs], 0 to 2048 [dot]

CAUTION

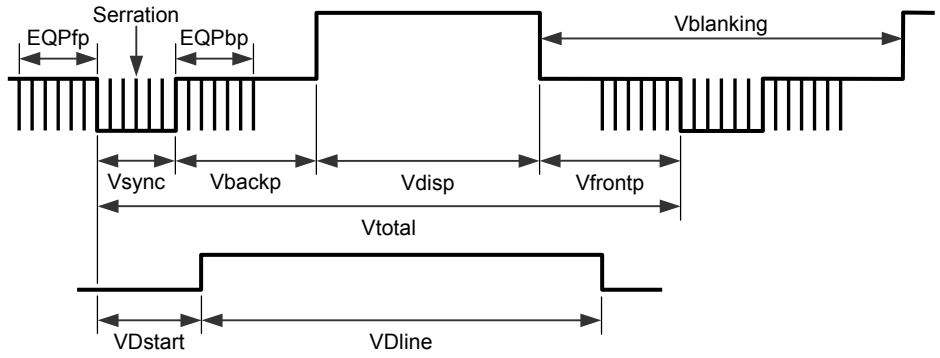
- HDstart and HDwidth are not used by the standard VG-835-A model. They take effect only with models that support parallel outputs (option).
- The sum of HDstart and HDwidth cannot be set in excess of Hperiod. Set them within the following range: [(HDstart + HDwidth) ≤ Hperiod].

5.3 Setting the vertical timing data

5.3.1 Vertical timing data

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

● In non-interlace (progressive) scanning mode



● In interlace scanning mode

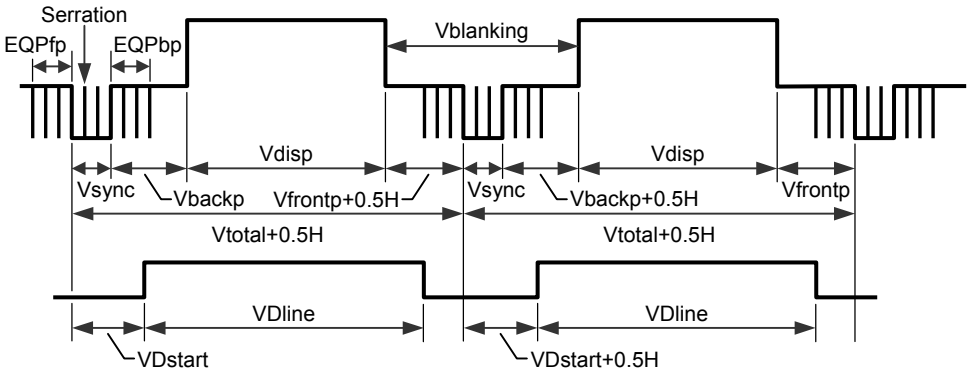


Fig. 5.3.1 Vertical timing data

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

Table 5.3.1 Reference pages for setting details

No.	Setting item	Reference page
1	Input mode	p.80
	Scanning mode	
2	Vtotal	p.81
	Vdisp	
	Vblanking	
3	Vsync	p.82
	Vbackp	
	Vfrontp	
4	EQPfp	p.83
	EQPbp	
5	Serration	p.83
	EQP (on/off)	
6	VDstart	p.84
	VDline	

5.3.2 Details of item settings

[1] Setting the input mode and scanning mode

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

Fig. 5.3.2 Setting the input mode and scanning mode

Table 5.3.2 Input mode and scanning mode setting method

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

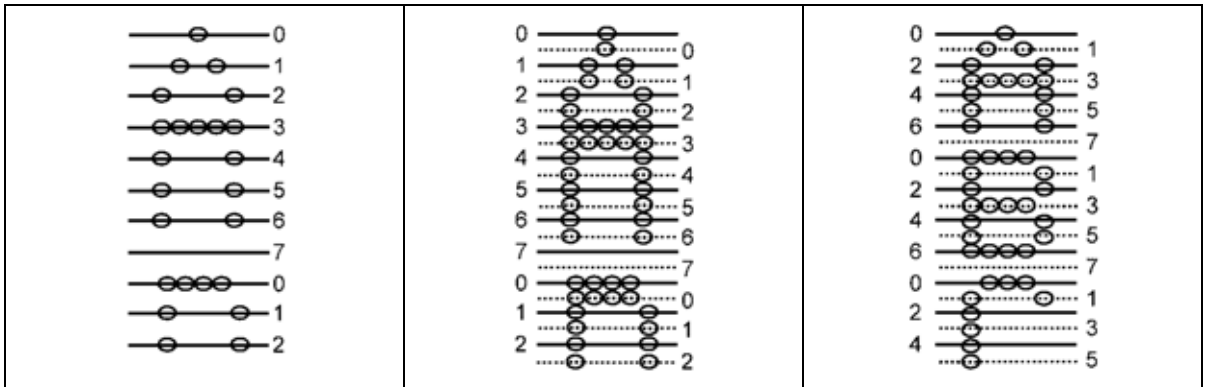
The input mode determines whether the values for the setting items are to be input in H units or milliseconds (ms).

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

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

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

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



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

Fig. 5.3.3 Differences by scanning mode

CAUTION

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

[2] Setting Vtotal, Vdisp and Vblanking

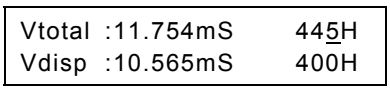


Fig. 5.3.4 Setting Vtotal and Vdisp

Table 5.3.3 Vtotal and Vdisp (Vblanking) setting method

Setting item	Key	LCD display	Description
Vtotal	Number keys	XX.XXXmS XXXXH	Setting range: During non-interlace scanning In the 8-bit or LUT 10-bit mode 6.667 to 99.999 [ms], 4 to 8192 [H] (1H increments) In the 10-bit or 12-bit mode 6.667 to 99.999 [ms], 4 to 4096 [H] (1H increments) --- During interlace scanning In the 8-bit or LUT 10-bit mode 6.667 to 99.999 [ms], 4 to 4096 [H] (1H increments) In the 10-bit or 12-bit mode 6.667 to 99.999 [ms], 4 to 2048 [H] (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: In the 8-bit or LUT 10-bit mode 0.000 to 99.999 [ms], 1 to 4096 [H] (1H increments) In the 10-bit or 12-bit mode 0.000 to 99.999 [ms], 1 to 2048 [H] (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

```
Vsync  : 0.079mS      3.0H
Vbackp: 1.083mS       41H
```

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: In the 8-bit or LUT 10-bit mode 0.000 to 99.999 [ms], 0 to 4096 [H] (1H increments) In the 10-bit or 12-bit mode 0.000 to 99.999 [ms], 0 to 2048 [H] (1H increments)
Vfrontp			Vfrontp1 is automatically calculated from the values of Vtotal, Vdisp1, Vsync1 and Vbackp1. Calculation formula: Vfrontp1 = Vtotal - Vdisp1 - Vsync1 - Vbackp1 Setting range: In the 8-bit or LUT 10-bit mode 0.000 to 99.999 [ms], 0 to 4096 [H] In the 10-bit or 12-bit mode 0.000 to 99.999 [ms], 0 to 2048 [H]

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

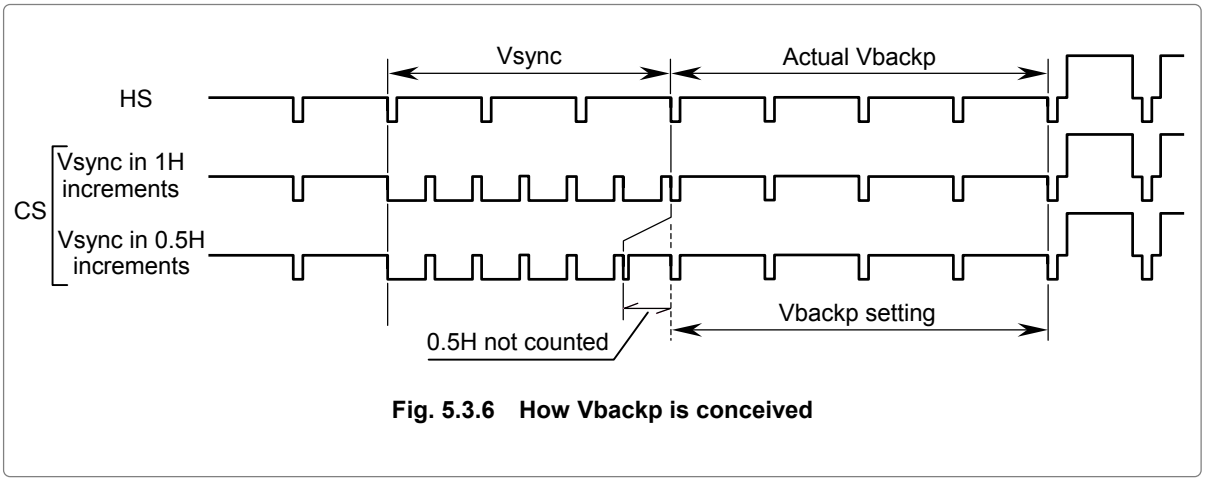


Fig. 5.3.6 How Vbackp is conceived

[4] Setting EQPfp and EQPbp

The EQPfp and EQPbp settings are made available in order to provide interchangeability with other models. They can be edited, but they are not used by the VG-835-A.

```
EQPfp : 0.000mS      0.0H
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: 0.000 to 99.999 [ms], 0.0 to 99.0 [H] (in 0.5H increments)

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

The serration and EQP (on/off) settings are made available in order to provide interchangeability with other models. They can be edited, but they are not used by the VG-835-A.

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

Fig. 5.3.8 Setting Serration and EQP (ON/OFF)

Table 5.3.6 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.

[6] Setting VDstart and VDline

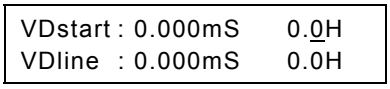


Fig. 5.3.9 Setting VDstart and VDline

Table 5.3.7 VDstart and VDline setting method

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

CAUTION

- VDstart and VDline are not used by the standard VG-835-A model. They take effect only with models that support parallel outputs (option).
- The sum of VDstart and VDline cannot be set in excess of Vtotal. Set them 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.

The output condition data contains some items which are set in common for all outputs and other items which are set for specific outputs. Still other setting are not displayed depending on the “output bit mode” (which is set by config edit FUNC5) and on whether the generator model used supports the options *1.

In the tables below, 8/LUT10 indicates items which take effect only when the 8-bit or LUT 10-bit mode is set as the output bit mode while 10/12 indicates items which take effect only when the 10-bit or 12-bit mode is set as the output bit mode.

*1: 12bit mode, LVDS 4ch output, Parallel output

Table 5.4.1 Reference pages for setting details

No.	Setting item		Reference page
Settings common to all outputs			
1	Sync signal output mode		p.86
2	HS (horizontal sync signal)		p.86
	VS (vertical sync signal)		
3	RGB / YPbPr		p.87
4	YPbPr coefficient table No.		p.87
5	Number of RGB output bits		p.88
6	Output bit ON/OFF		p.89
7	Common output modes 10/12		p.89
8	Aspect ratio		p.90
9	Black insertion function ON/OFF		p.90
	Black insertion	Insertion position	
		Pattern display (ON) time	
		Black insertion (OFF) time	

No.	Setting item		Reference page
DVI output			
1	Output ON/OFF		p.91
	DVI mode 8/LUT10		
2	CTL signals CTL0, 1		p.91
LVDS 2ch output			
1	Output ON/OFF 1, 2CH		p.92
2	LVDS 2ch mode 8/LUT10		p.92
LVDS 4ch output (❖Supported as an option)			
1	Output ON/OFF 1 to 4CH		p.93
2	LVDS 4ch mode 8/LUT10		p.93
Parallel output (❖Supported as an option)			
1	Sync signals HD, VD, CS		p.95
2	Video signals 1 to 4CH		p.95
3	Clock signal (CLK)		p.96
	DISP signal		
	Clock output area		
4	Output ON/Hi-Z 1 to 4CH	Video signals	p.96
		Clock signal	
		Sync signals	
		Power output	
5	SW signals SW0 to 3		p.97
6	Clock delay	ON/OFF	p.97
		Delay time	
7	Parallel clock mode 8/LUT10		p.98

5.4.1 Settings common to all outputs

[1] Setting the priority output

Select the priority output when executing the editing programs (No.1 to 849). The priority output setting is used for ① and ② below.

① Output to be given priority in 8-bit or LUT 10-bit mode
This setting affects the dot clock frequency setting range and the increment in which the horizontal timing data is set. (☞ Refer to "5.1.5 Valid setting items and timing restrictions for each output.")

② Port where EDID is captured when optional pattern No.0E or 2E (DDC pattern) is executed in any of the output bit modes

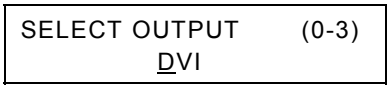


Fig. 5.4.1 Selecting the priority output

Table 5.4.2 Priority output selection method

Setting item	Key	LCD display	Description
Priority output (SELECT OUTPUT)	0	DVI	DVI
	1	PARA	Parallel *1
	2	4HEAD LVDS	LVDS 4ch *1
	3	2HEAD LVDS	LVDS 2ch

*1: The parallel and LVDS 4-channel outputs are supported only as options.

* The priority output when executing internal programs No.850 to 999 is set by "[20] Setting the internal program priority output" of config edit FUNC5.

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

This setting selects the polarity, ON or OFF, etc. for the HS and VS sync signals.

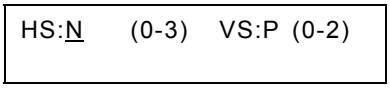


Fig. 5.4.2 Setting the sync signals (HS and VS)

Table 5.4.3 Sync signal (HS and VS) setting method

Setting item	Key	LCD display	Description
HS (horizontal sync signal)	0	N	Negative
	1	P	Positive
	2	-	OFF
	3	CS	The composite sync signal is set.
VS (vertical sync signal)	0	N	Negative
	1	P	Positive
	2	-	OFF

[3] Setting RGB/YPbPr

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

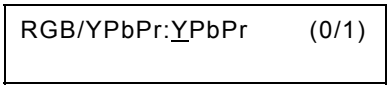


Fig. 5.4.3 Selecting RGB or YPbPr

Table 5.4.4 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.

[4] 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 “[3] Setting RGB/YPbPr.”

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

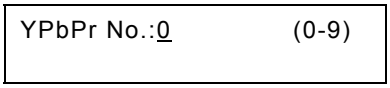


Fig. 5.4.4 Setting the YPbPr coefficient table No.

Table 5.4.5 YPbPr coefficient table No. selection method

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

[5] Setting the number of RGB output bits

This setting selects the number of bits for the video signals (RGB).
The number of bits equivalent to the bits specified from the high-order bit are set to enable (ON) in the output bit modes. The other bits are set to OFF (low).

RGB:1 Bit (1-C)

Fig. 5.4.5 Setting the number of RGB output bits

Table 5.4.6 RGB output bit number setting method

Setting item	Key	LCD display	Description		
			Output bit mode		
			8bit/LUT10bit mode	10bit mode	12bit mode
Number of RGB output bits (RGB)	1	1 Bit	2 × RGB gradation		
	2	2 Bit	4 × RGB gradation		
	3	3 Bit	8 × RGB gradation		
	4	4 Bit	16 × RGB gradation		
	5	5 Bit	32 × RGB gradation		
	6	6 Bit	64 × RGB gradation		
	7	7 Bit	128 × RGB gradation		
	8	8 Bit	256 × RGB gradation		
	9	9 Bit	No settings possible	512 × RGB gradation	
	A	10Bit		1024 × RGB gradation	
	❖Option: Only for models that support the 12-bit output mode				
	B	11Bit	No settings possible	No settings possible	2048 × RGB gradation
	C	12Bit			4096 × RGB gradation

● Example: Levels which can be output when “2 bits” has been set (4 × RGB gradation)

	Output bit value (only 2 higher bits valid)			
	00.....	01.....	10.....	11.....
8bit/LUT10bit mode	0	64	128	192
10bit mode	0	256	512	768
12bit mode	0	1024	2048	3072

* Even bits which are valid under this setting will be set to OFF if OFF has been specified for them in “[6] Setting the output bits ON or OFF.”

[6] Setting the output bits ON or OFF

This setting selects ON or OFF for each of the R, G and B bits.
Move the cursor to the bit to be set to ON or OFF, and input the setting. Use the [►] and [◄] keys to move the cursor.

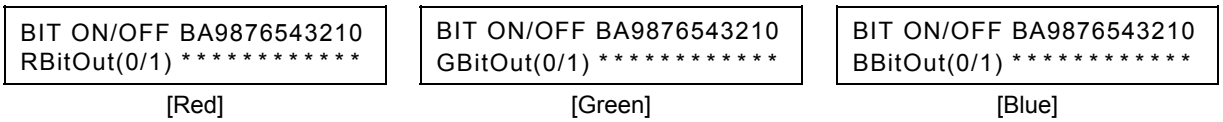


Fig. 5.4.6 Setting the output bits ON or OFF

Table 5.4.7 Output bit ON/OFF setting method

Setting item	Key	LCD display	Description
Output bit ON/OFF (BIT ON/OFF) RBitOut, GBitOut, BBitOut	0	-	The output of the specified bit is set to OFF (low)
	1	*	The output of the specified bit is set to ON.

* Even bits which have been set to ON under this setting will be set to OFF if OFF has been specified for them in "[5] Setting the number of RGB output bits."

[7] Setting the common output mode (valid for all outputs except DVI and valid in the 10-bit or 12-bit mode)

This setting selects the common output mode for the LVDS 2-channel, LVDS 4-channel or parallel outputs.
It is valid only in the 10-bit or 12-bit mode.

Fig. 5.4.7 Setting the common output mode

Table 5.4.8 Common output mode setting method

Setting item	Key	LCD display	Description
Common output modes (MODE)	0	SINGLE	The data is output in the Single Link mode.
	1	DUAL	The data is output in the Dual Link mode.

* The mode is set for each output in the 8-bit or LUT 10-bit mode.
- Refer to "[2]Setting the LVDS 2-channel mode (valid in 8-bit or LUT 10-bit mode)" in "5.4.3 LVDS 2-channel output."
- Refer to "[2]Setting the LVDS 4-channel mode (valid in 8-bit or LUT 10-bit mode)" in "5.4.4 LVDS 4-channel output."
- Refer to "[7] Setting the parallel clock mode (valid in 8-bit or LUT 10-bit mode)" in "5.4.5 Parallel output."

[8] 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 or 34 is output.

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

Fig. 5.4.8 Setting the aspect ratio

Table 5.4.9 Aspect ratio setting method

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

[9] Setting the black insertion

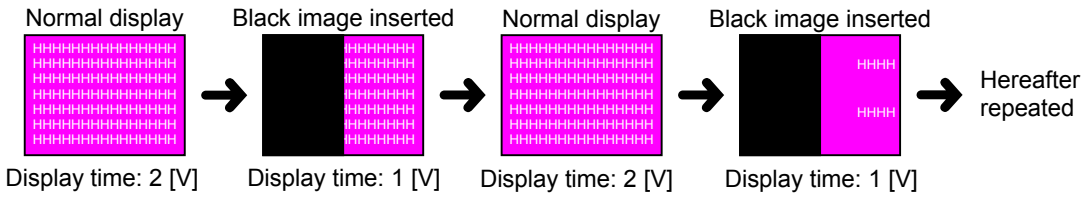
```
Insert Black Frame:OFF
Sel:All     ON:   0 OFF:   0
```

Fig. 5.4.9 Setting the black insertion

Table 5.4.10 Black insertion setting method

Setting item	Key	LCD display	Description	
Black insertion function ON/OFF (Insert Black Frame)	0	OFF	A black image is not inserted. (Normal setting)	
	1	ON	A black image is inserted in accordance with the position and time settings.	
Insertion position (Sel)	0	All	Entire screen	These select the position where the black image is to be inserted.
	1	Left	Left half of screen	
	2	Right	Right half of screen	
Pattern display time (ON)	Number keys	XXX	Setting range: 0 to 255 [V] *1	
Black insertion time (OFF)	Number keys	XXX	Setting range: 0 to 255 [V] *1	

<Example: When "ON" for the black insertion function, "Left" for the insertion position, "2" for the pattern display time, and "1" for the black insertion time have been selected>



*1: The time [V] is set in 1-frame increments (or 1-field increments during interlacing).

5.4.2 DVI output

[1] Setting the output ON/OFF and the DVI mode (valid in 8-bit or LUT 10-bit mode)

This setting selects ON or OFF for the output and the DVI mode in the 8-bit or LUT 10-bit mode.

```
DVIOUT  :ON
DVIMODE:SINGLE      (0/1)
```

Fig. 5.4.10 Setting the output ON/OFF and DVI mode [DVI]

Table 5.4.11 Output ON/OFF and DVI mode setting method [DVI]

Setting item	Key	LCD display	Description
Output ON/OFF (DVIOUT)	0	OFF	The output is set to OFF.
	1	ON	The output is set to ON.
DVI mode (DVIMODE)	0	SINGLE	The data is output in the Single Link mode.
	1	DUAL	The data is output in the Dual Link mode.

* The DVI mode in the 10-bit or 12-bit mode is set using “[21] Setting the DVI mode (valid in 10-bit or 12-bit mode)” under config edit FUNC5.

[2] Setting the CTL signal

This setting selects the output (high or low) of the CTL signal.

```
DVI CTL Output:
  CTL0:L  CTL1:L    (0/1)
```

Fig. 5.4.11 Setting the CTL signal [DVI]

Table 5.4.12 CTL signal setting method [DVI]

Setting item	Key	LCD display	Description
CTL signals CTL0, CTL1	0	L	A low CTL signal is output.
	1	H	A high CTL signal is output.

5.4.3 LVDS 2ch output

[1] Setting the output ON/OFF

This setting selects ON or OFF for the output on a channel by channel basis.

```
2HEAD LVDS OUT
1CH:ON   2CH:ON      (0/1)
```

Fig. 5.4.12 Setting the output ON/OFF [LVDS 2ch]

Table 5.4.13 Output ON/OFF setting method [LVDS 2ch]

Setting item	Key	LCD display	Description
Output ON/OFF (2HEAD LVDS OUT) 1CH, 2CH	0	OFF	The output is set to OFF.
	1	ON	The output is set to ON.

[2] Setting the LVDS 2-channel mode (valid in 8-bit or LUT 10-bit mode)

This setting selects the LVDS 2-channel mode in the 8-bit or LUT 10-bit mode.

```
2HEAD LVDS MODE:SINGLE
                (0/1)
```

Fig. 5.4.13 Setting the LVDS 2-channel mode [LVDS 2ch]

Table 5.4.14 LVDS 2-channel mode setting method [LVDS 2ch]

Setting item	Key	LCD display	Description
LVDS 2ch mode (2HEAD LVDS MODE)	0	SINGLE	The data is output in the Single Link mode.
	1	DUAL	The data is output in the Dual Link mode.

* The LVDS 2-channel mode in the 10/12-bit mode is set using “[7] Setting the common output mode (valid for all outputs except DVI and valid in the 10-bit or 12-bit mode)” under “5.4.1 Settings common to all outputs.”

5.4.4 LVDS 4ch output (❖Option: Only for models that support LVDS 4-channel output)

[1] Setting the output ON/OFF

This setting selects ON or OFF for the output on a channel by channel basis.

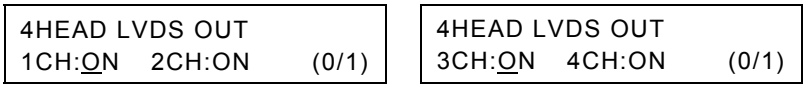


Fig. 5.4.14 Setting the output ON/OFF [LVDS 4ch]

Table 5.4.15 Output ON/OFF setting method [LVDS 4ch]

Setting item	Key	LCD display	Description
Output ON/OFF (4HEAD LVDS OUT) 1CH, 2CH, 3CH, 4CH	0	OFF	The output is set to OFF.
	1	ON	The output is set to ON.

[2] Setting the LVDS 4-channel mode (valid in 8-bit or LUT 10-bit mode)

This setting selects the LVDS 4-channel mode in the 8-bit or LUT 10-bit mode. With four channels for LVDS, the video data from the output connectors can be split, and output.

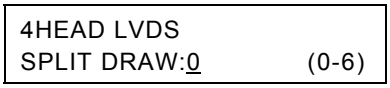


Fig. 5.4.15 Setting the LVDS 4-channel mode [LVDS 4ch]

Table 5.4.16 LVDS 4-channel mode setting method [LVDS 4ch]

Setting item	Key / LCD display	Description
LVDS 4ch mode (SPLIT DRAW)	0	MODE 0: The drawn images are output in their original form. The same data is output to channels 1, 2, 3 and 4. * This mode is equivalent to Single Link.
	1	MODE 1: The data for one dot is output to channel 1 and the data for the next dot is output to channel 2, and this is repeated. What is output to channels 3 and 4 is the same as what is output to channels 1 and 2. * This mode is equivalent to Dual Link.
	2	MODE 2: The data for the first, second, third and fourth dots is output to channels 1, 2, 3 and 4, respectively, and this is repeated.
	3	MODE 3: The left half of the screen is output to channel 1, and the right half of the screen to channel 2. What is output to channels 3 and 4 is the same as what is output to channels 1 and 2.
	4	MODE 4: One quarter each of the screen is output to channels 1, 2, 3 and 4 in sequence.
	5	MODE 5: The left half of the screen is output to channels 1 and 2, and the right half of the screen to channel 3 and 4.
	6	MODE 6: Channels 1 and 2 form a set, channels 3 and 4 form a set, and the image data is output dot by dot.

☞ Refer to the simulated screens shown for each mode and output channel. (Next page)

* The difference between MODE 5 and MODE 6 is that channels 2 and 3 are reversed.
* The LVDS 4-channel mode in the 10/12-bit mode is set using "[7] Setting the common output mode (valid for all outputs except DVI and valid in the 10-bit or 12-bit mode)" under "5.4.1 Settings common to all outputs."

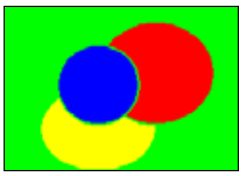
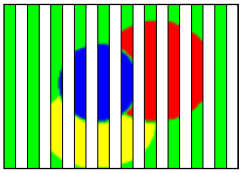
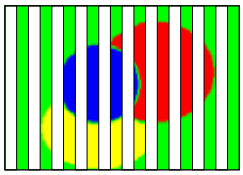
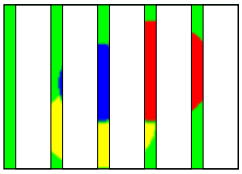
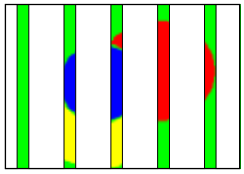
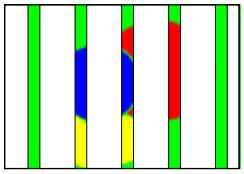
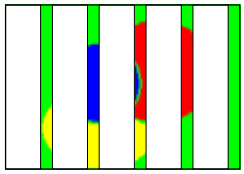
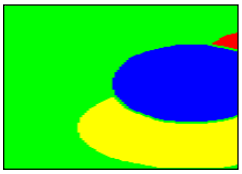
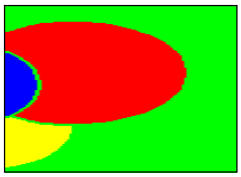
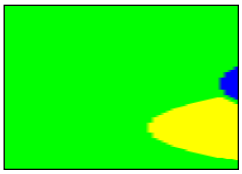
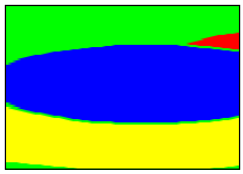
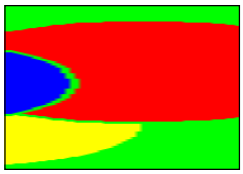
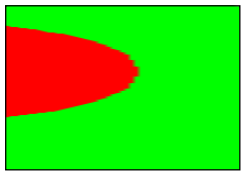
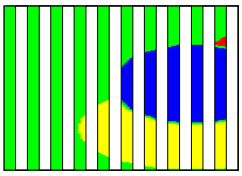
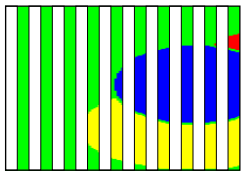
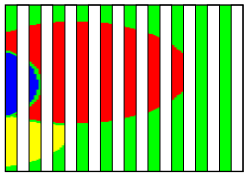
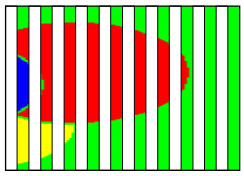
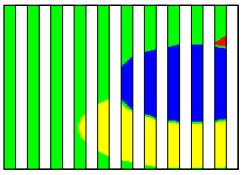
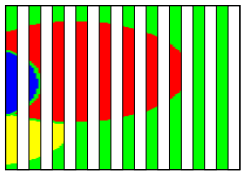
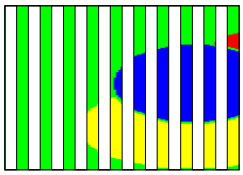
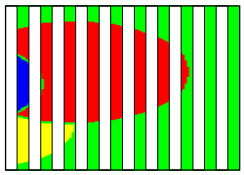
LVDS 4ch modes	Output channels			
	CH1	CH2	CH3	CH4
MODE0		SAME AS CHANNEL 1	SAME AS CHANNEL 1	SAME AS CHANNEL 1
MODE1			SAME AS CHANNEL 1	SAME AS CHANNEL 2
MODE2				
MODE3			SAME AS CHANNEL 1	SAME AS CHANNEL 2
MODE4				
MODE5				
MODE6				

Fig. 5.4.16 Simulated screens for each mode and output channel

5.4.5 Parallel output (❖Option: Only for models that support parallel outputs)

[1] Setting the sync signals (HD, VD, CS)

This setting selects the polarity of the HD, VD and CS sync signals.

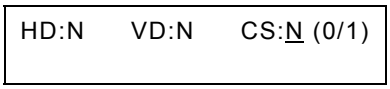


Fig. 5.4.17 Setting the sync signals (HD, VD, CS) [parallel]

Table 5.4.17 Sync signal (HD, VD, CS) setting method [parallel]

Setting item	Key	LCD display	Description
Sync signals HD, VD, CS	0	N	Negative
	1	P	Positive

* The HD, VD and CS sync signals are output from the SWx pins. Set which of these signals are to be output from the SWx pins using "[5] Setting the SW signals."
* The polarity and ON/OFF settings for the HS and VS sync signals are set using "[2] Setting the sync signals (HS and VS)" under "5.4.1 Settings common to all outputs."

[2] Setting the video signals

This setting selects the polarity of the video signals on a channel by channel basis.

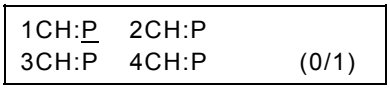


Fig. 5.4.18 Setting the video signals [parallel]

Table 5.4.18 Video signal setting method [parallel]

Setting item	Key	LCD display	Description
Video signals 1CH, 2CH, 3CH, 4CH	0	N	Negative
	1	P	Positive

[3] Setting the CLK and DISP signals

This setting selects the polarity and output area of the clock signal and the polarity of the DISP signal.

Fig. 5.4.19 Setting the CLK and DISP signals [parallel]

Table 5.4.19 CLK and DISP signal setting method [parallel]

Setting item	Key	LCD display	Description
Clock signal (CLK) DISP signal (DISP)	0	N	Negative
	1	P	Positive
Clock output area (CLKOUT)	0	DISP	The clock signal is output only in the display area.
	1	ALL	The clock signal is output in the entire area.

[4] Setting ON or high impedance (Hi-Z) for the output

This setting selects ON or OFF (Hi-Z) for the output for each channel and for each signal.

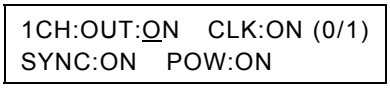


Fig. 5.4.20 Setting ON or high impedance (Hi-Z) for the output [parallel]

Table 5.4.20 Output ON or high impedance (Hi-Z) setting method [parallel]

Setting item	Key	LCD display	Description
Video signals (OUT) Clock signal (CLK) Sync signals (SYNC) *1 Power output (POW) *2	0	HiZ	The output is set to the high-impedance state (OFF).
	1	ON	The output is set to ON.
1CH, 2CH, 3CH, 4CH			

*1: Sync signals: HS, VS, DISP, SW pins
*2: Power output: VCC pins

[5] Setting the SW signals

This setting selects the signals to be output from the SW0 to SW3 pins.

CAUTION

When using trigger mode (option) is used, trigger output has priority. Refer to "3.3 [23] Trigger Mode Setting (* Option function)" for details about trigger function.

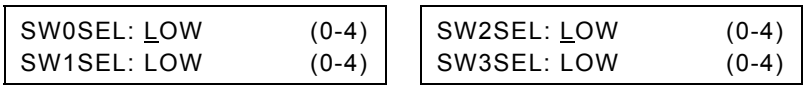


Fig. 5.4.21 Setting the SW signals [parallel]

Table 5.4.21 SW signal setting method [parallel]

Setting item	Key	LCD display	Description
SW0 to SW3 signals (SW0SEL to SW3SEL)	0	CS	Sync signals CS
	1	VD	Sync signals VD
	2	HD	Sync signals HD
	3	LOW	Fixed at low
	4	HIGH	Fixed at high

[6] Setting the clock delay

This setting selects ON or OFF for the clock delay function and the delay time.

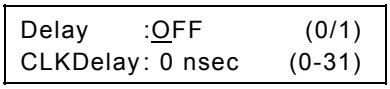


Fig. 5.4.22 Setting the clock delay [parallel]

Table 5.4.22 Clock delay setting method [parallel]

Setting item	Key	LCD display	Description
Clock delay ON/OFF (Delay)	0	OFF	The clock delay function is set to OFF.
	1	ON	The clock delay function is set to ON.
Clock delay time (CLK Delay)	Number keys	XX nsec	The delay time when the clock delay function is ON is selected. Setting range: 0 to 31 [ns]

[7] Setting the parallel clock mode (valid in 8-bit or LUT 10-bit mode)

This setting selects the parallel clock mode in the 8-bit or LUT 10-bit mode. With parallel outputs, the data can be output from the output connectors in the following modes.

```
Parallel Clock Mode:1/1
                    (0-2)
```

Fig. 5.4.23 Setting the parallel clock mode [parallel]

Table 5.4.23 Parallel clock mode setting method [parallel]

Setting item	Key	LCD display	Description
Parallel clock mode (Parallel Clock Mode)	0	1/1	×1: The drawn images are output in their original form. The same data is output to channels 1, 2, 3 and 4.
	1	1/2	×2: The data for one dot is output to channel 1 and the data for the next dot is output to channel 2, and this is repeated. What is output to channels 3 and 4 is the same as what is output to channels 1 and 2.
	2	1/4	×4: The data for the first, second, third and fourth dots is output to channels 1, 2, 3 and 4, respectively, and this is repeated.

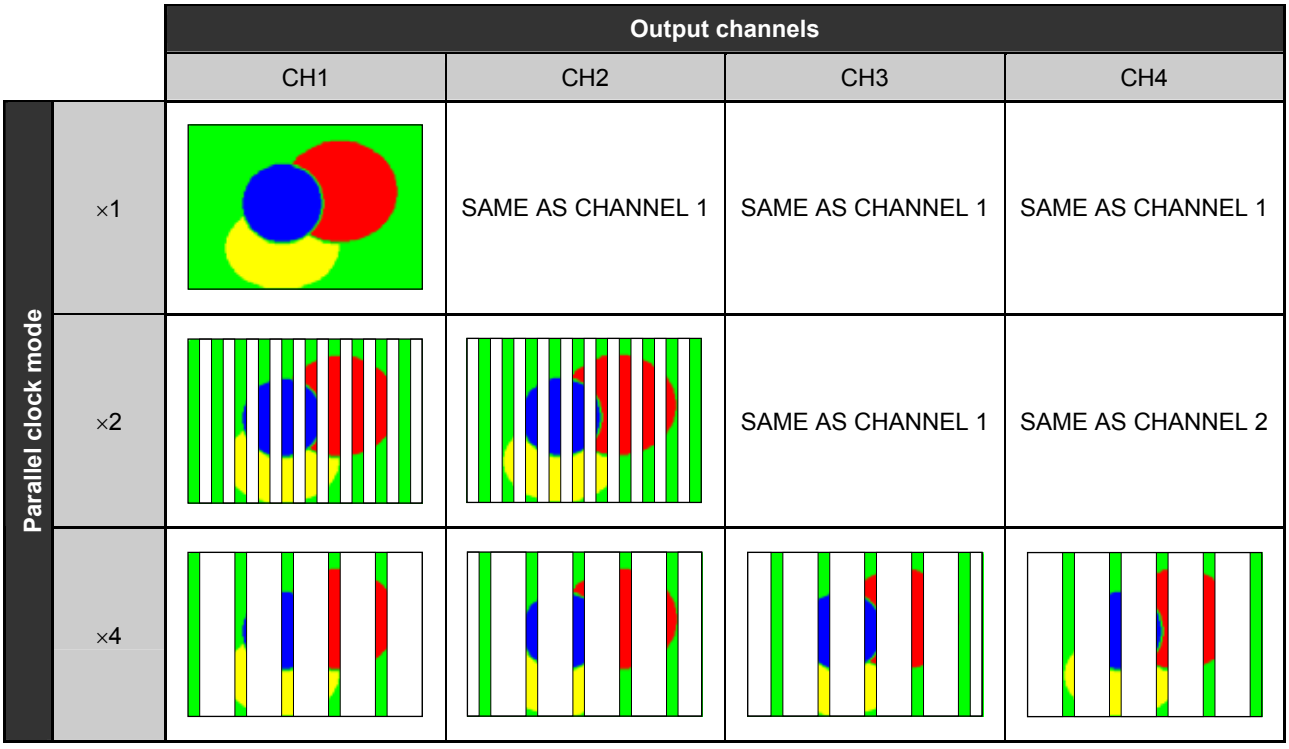


Fig. 5.4.24 Simulated screens for each mode and output channel

* The parallel output mode in the 10-bit or 12-bit mode is set using “[7] Setting the common output mode (valid for all outputs except DVI and valid in the 10-bit or 12-bit mode)” under “5.4.1 Settings common to all outputs.”

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 “[24] Setting the overlay cursor” of config edit FUNC5.

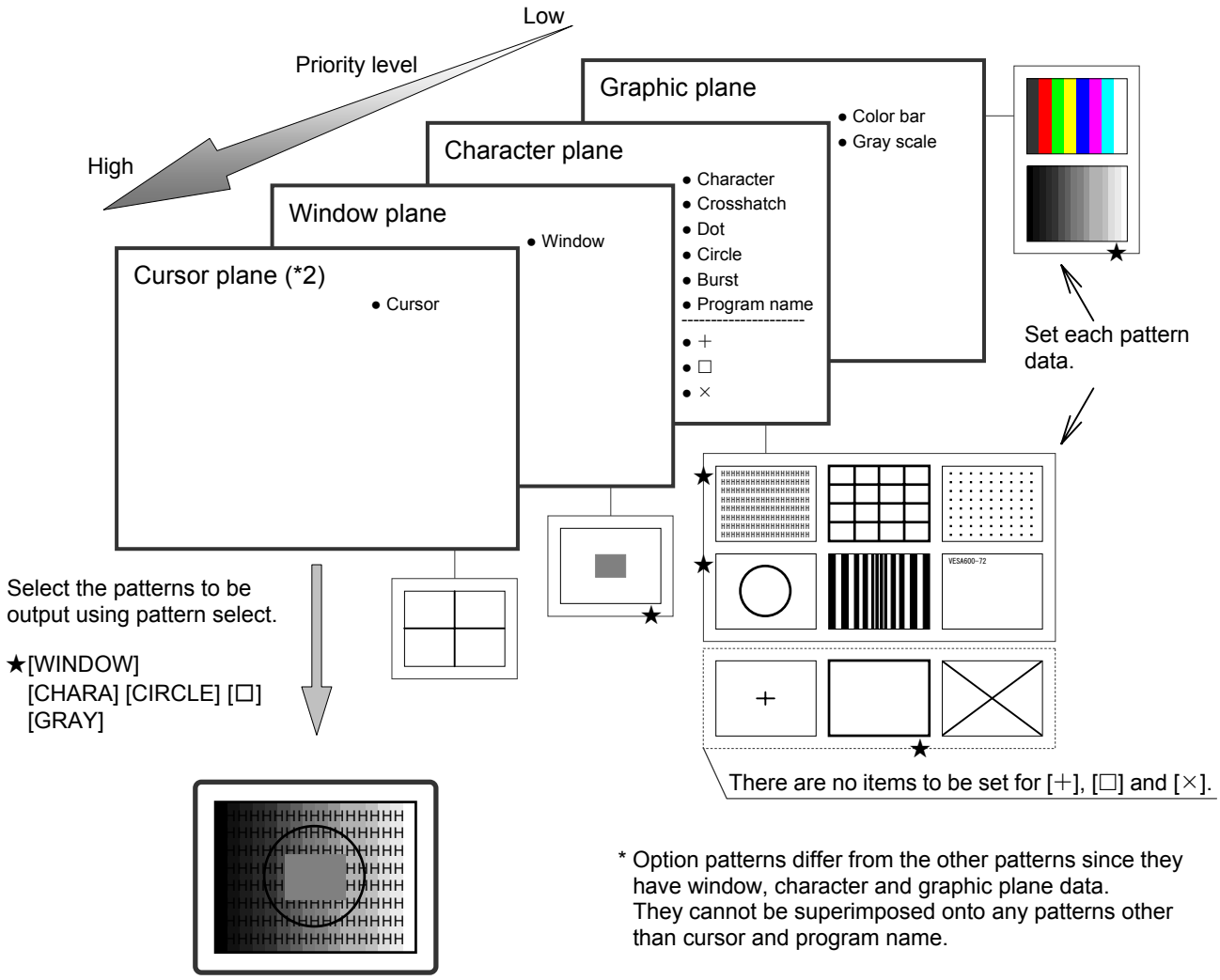


Fig. 6.1.1 Configuration of pattern data

6.1.2 Basic operations for settings

The pattern data setting menu is accessed from program edit FUNC2, PC card edit FUNC3 or direct display FUNC0.
While referring to Table 6.1.1 below, select the pattern data whose settings are to be changed, and set the data details. For the data setting items and setting procedures, refer to the page concerned in the "reference page" column of the table.

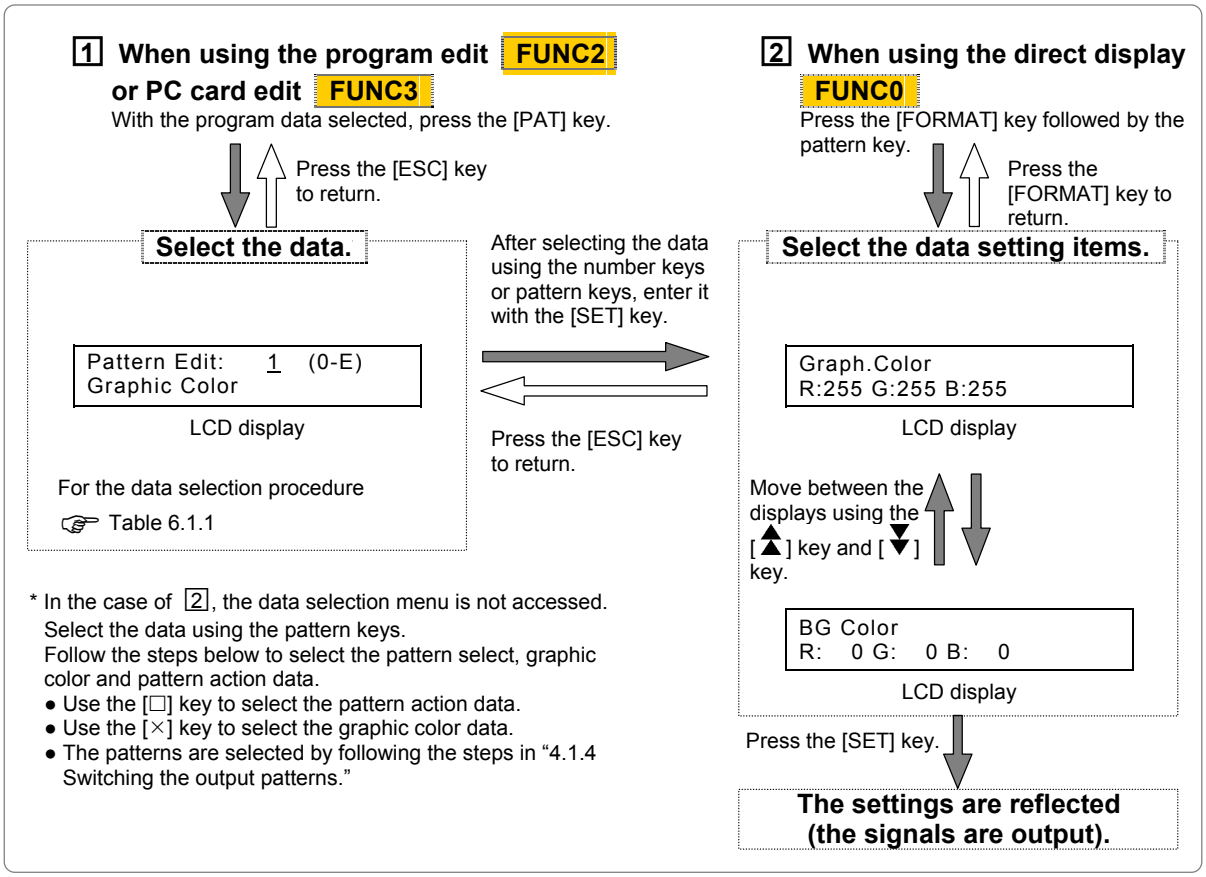


Fig. 6.1.2 Basic operations for setting the pattern data

Table 6.1.1 Pattern data selection method and reference pages

Key		LCD display	Pattern data	Reference page
Number keys	Pattern key			
0		Pattern Select	Pattern select	p.101
1		Graphic Color	Graphic color	p.101
2	CHARA	CHARA Data Edit	Character pattern	p.102
3	CROSS	CROSS Data Edit	Crosshatch pattern	p.104
4	DOTS	DOTS Data Edit	Dot pattern	p.106
5	CIRCLE	CIRCLE Data Edit	Circle pattern	p.108
6	COLOR	COLOR Data Edit	Color bar pattern	p.110
7	GRAY	GRAY Data Edit	Gray scale pattern	p.112
8	BURST	BURST Data Edit	Burst pattern	p.114
9	WINDOW	WINDOW Data Edit	Window pattern	p.115
A	OPT1	OPT1 Data Edit	Optional pattern 1	p.122
B	OPT2	OPT2 Data Edit	Optional pattern 2	
C	CURSOR	CURSOR Data Edit	Cursor pattern	p.123
D	NAME	NAME Data Edit	Program name	p.126
E		Action Edit	Pattern action	p.127

6.2 Setting the pattern select

(1) Select the pattern which is to be output.

Press the pattern key and output control key. When a pattern is selected, the LED of its corresponding key lights.

- Pattern keys: CHARA, CROSS, DOTS, CIRCLE, ＋, □, ×, COLOR, GRAY, BURST, NAME, OPT1, OPT2, WINDOW, CURSOR
- Output control key: R, G, B, INV

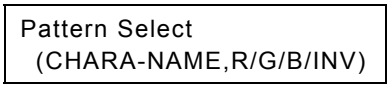


Fig. 6.2.1 Selecting the pattern

(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.

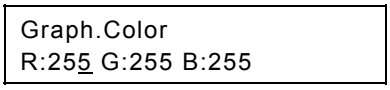


Fig. 6.3.1 Setting the graphic color

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 XXXX	In the 8-bit or LUT 10-bit mode : 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095

(2) Set the background color.

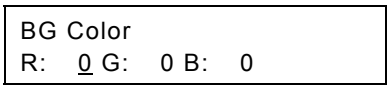


Fig. 6.3.2 Setting the background color

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	In the 8-bit or LUT 10-bit mode : 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095

6.4 Setting the character pattern

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

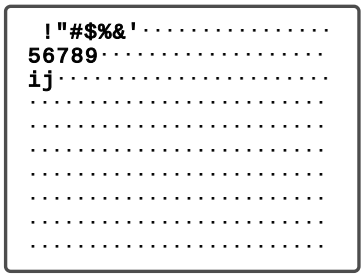
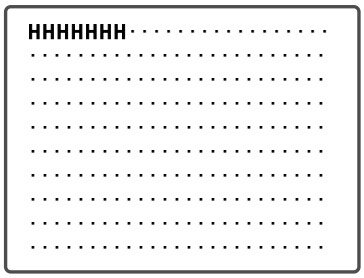
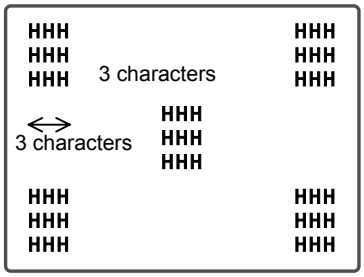
---

(1) Set the format and font.

```
Format:Chara List   (0-2)
Font:7*9            (0-2)
```

Fig. 6.4.1 Setting the format and font

Table 6.4.1 Format and font setting method

Setting item	Key	LCD display	Description
Format (Format)	0	Chara List	Character list The character pattern (20H to DFH) specified by “Font” is repeatedly displayed. 
	1	All 1 Chara	All one character The character pattern (character pattern or user character pattern) specified by “Character code” is repeatedly displayed. 
	2	Corner&Center	Corner & center The character pattern (character pattern or user character pattern) specified by “Character code” is displayed in the layout shown in the figure on the right. 

Setting item	Key	LCD display	Description	
Font (Font)	0	5*7	5 × 7	The character pattern set (20H to DFH) to be used in selected. ☞ “9.1.4 Character pattern data”
	1	7*9	7 × 9	
	2	16*16	16 × 16	

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

```
Code: 48[H]     (20H-FFH)
Cell: 16*16     (1-255)
```

Fig. 6.4.2 Setting the character code and cell size

Table 6.4.2 Character code and cell size setting method

Setting item	Key	LCD display	Description
Character code (Code)	Input using number keys (+ [SHIFT] key) or input from the display *1	XX [X]	This sets the character pattern to be displayed in the all one character or corner & center format. Setting range: 20 to FF
Cell size (Cell) H*V	Number keys	XXX*XXX	This sets the display size of one character. Setting range: 1 to 255 [dot]

*1: There are two ways to input the characters: input the character codes “20H to DFH” directly or select the characters from the display (refer to “2.4 How to input characters from the display”). However, characters cannot be input from the display if they have been edited using direct display FUNC0.

● Correlation between the font and cell size

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

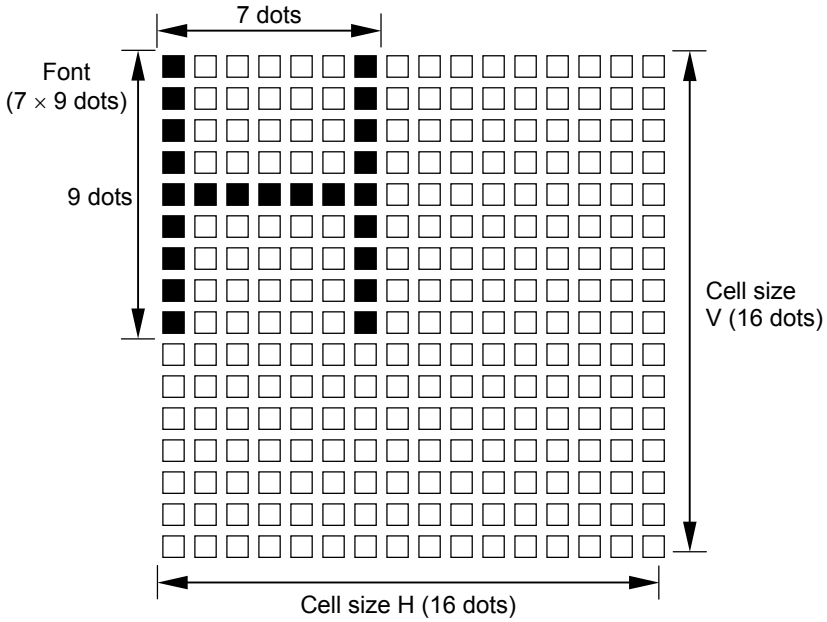


Fig. 6.4.3 Correlation between font and cell size

6.5 Setting the crosshatch pattern

The following items are set for the crosshatch pattern data.
(1) Mode and format
(2) Interval and line width

---

(1) Set the mode and format.

```
Mode:Line              (0/1)
Format:from Center     (0/1)
```

Fig. 6.5.1 Setting the mode and format

Table 6.5.1 Mode and format setting method

Setting item	Key	LCD display	Description	
Mode (Mode)	0	Line	Line mode: A number of crosshatch lines is used to specify the interval.	
	1	dot	Dot mode: The number of dots between the crosshatch patterns is used to specify the interval.	
Format (Format)	0	from Center	Center of screen	In the dot mode, the point to start the drawing is selected. (This item is invalid in the line mode.)
	1	from LeftTop	Top left of screen	

(2) Set the H and V interval and line width.

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

Fig. 6.5.2 Setting the interval and line width

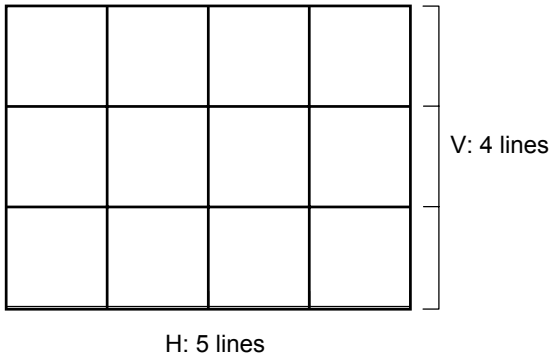
Table 6.5.2 Interval and line width setting method

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

*1: The crosshatch in the H (or V) direction is not displayed if “0” is set for the H (or V) interval.

● Correlation between interval and mode

<Example 1>
Line mode
Interval H=5/V=4



<Example 2>
Dot mode
Interval H=300/V=250
Format: From top left

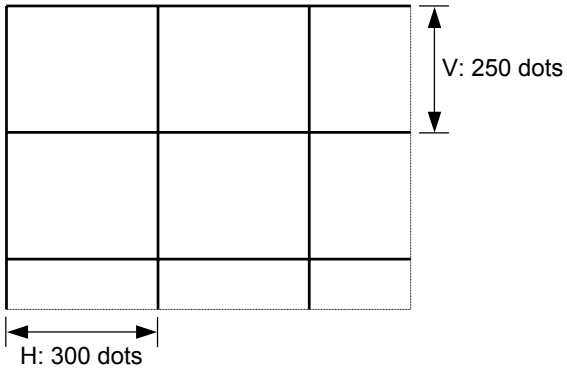


Fig. 6.5.3 Correlation between interval and mode

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

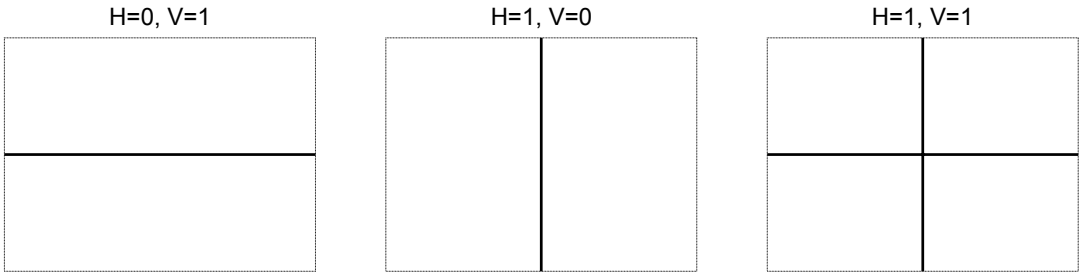


Fig. 6.5.4 Correlation between interval H and V

● Concerning the screen center

When “from center” is set as the format in the dot mode, the crosshatch pattern is displayed after the screen center is calculated. When both the number of dots and number of lines to be displayed are set to odd numbers, the screen center can be calculated, but when they are set to even numbers, the point which is the first dot to the right of the center and the first line below it is used as the actual screen center.

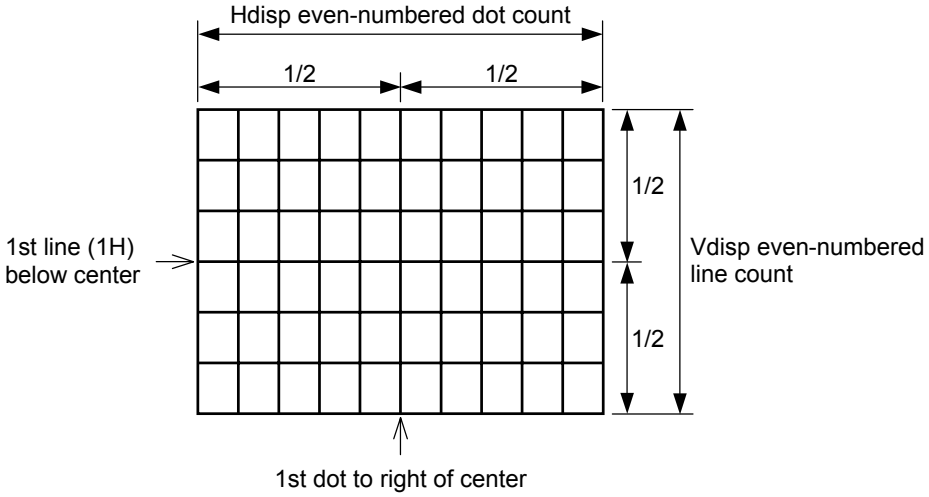


Fig. 6.5.5 Screen center

6.6 Setting the dot pattern

The following items are set for the dot pattern data.
(1) Mode and format
(2) Interval, dot size and dot type

---

(1) Set the mode and format.

```
Mode:Line              (0/1)
Format:from Center     (0/1)
```

Fig. 6.6.1 Setting the mode and format

Table 6.6.1 Mode and format setting method

Setting item	Key	LCD display	Description	
Mode (Mode)	0	Line	Line mode: A number of dot pattern lines is used to specify the interval.	
	1	dot	Dot mode: The number of dots between the dots is used to specify the interval.	
Format (Format)	0	from Center	Center of screen	In the dot mode, the point to start the drawing is selected. (This item is invalid in the line mode.)
	1	from LeftTop	Top left of screen	

(2) Set the H and V intervals and the dot pattern size and type.

```
Interval:H=   20 V=   20
Size: 1dot Type:Rect(0/1)
```

Fig. 6.6.2 Setting the interval, dot pattern size and type

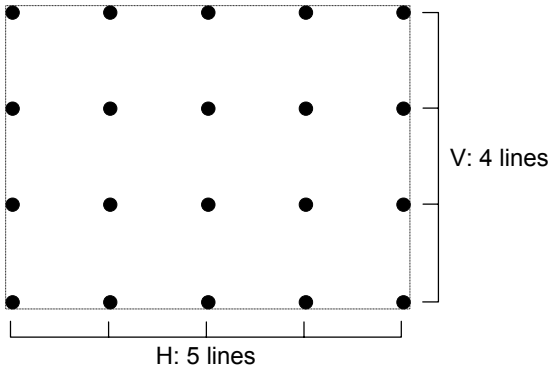
Table 6.6.2 Interval, dot pattern size and type setting method

Setting item	Key	LCD display	Description
Interval (Interval) H, V	Number keys	XXXX	Line mode: The number of dot patterns is set. Dot mode: The number of dots between dots is set. Setting range: 0 to 9999 *1
Size (Size)	Number keys	XX dot	Setting range: 1 to 15 [dot]
Type (Type)	0	Crcl	This draws dots in the shape of a circle whose diameter is the designated size.
	1	Rect	This draws dots in the shape of a square, one side of which is the designated size.

*1: The dot pattern is not displayed if “0" is set for H or V.

● Correlation between interval and mode

<Example 1>
Line mode
Interval H=5/V=4



<Example 2>
Dot mode
Interval H=300/V=250
Format:from LeftTop

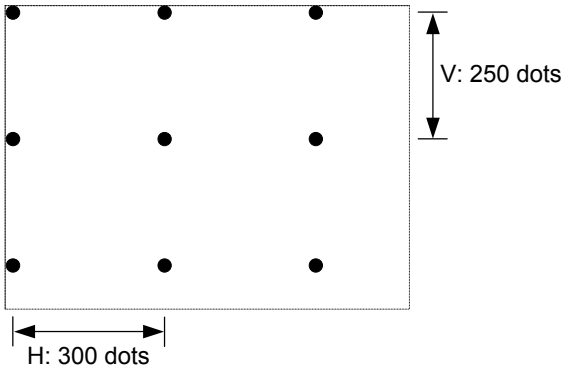


Fig. 6.6.3 Correlation between interval and mode

● When interval H and V are set to “1:1”

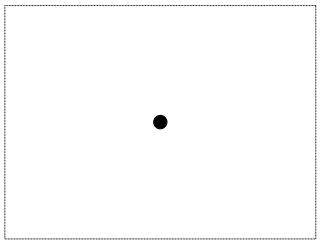


Fig. 6.6.4 Correlation between interval H and V

● Concerning the screen center

When “from center" is set as the format in the dot mode, the crosshatch pattern is displayed after the screen center is calculated. When both the number of dots and number of lines to be displayed are set to odd numbers, the screen center can be calculated, but when they are set to even numbers, the point which is the first dot to the right of the center and the first line below it is used as the actual screen center.

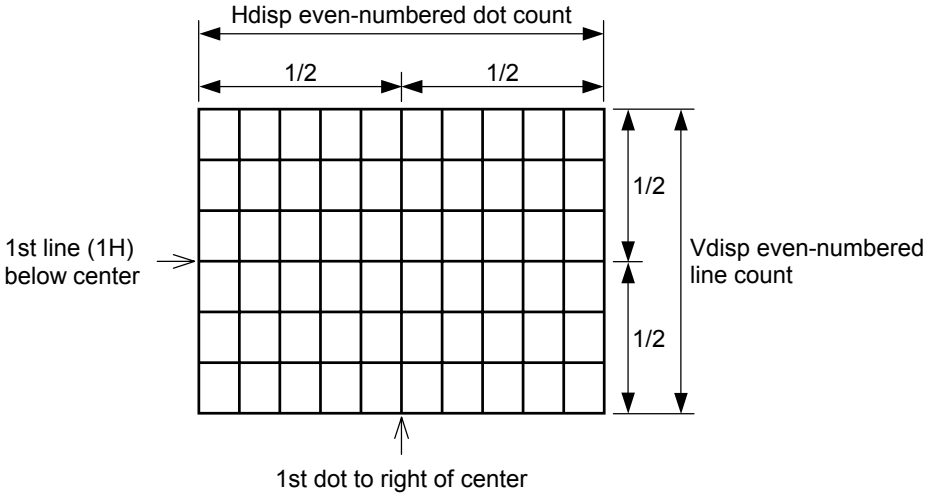


Fig. 6.6.5 Screen center

6.7 Setting the circle pattern

The format and aspect ratio are set for the circle pattern data.

Set the format and aspect ratio of the display.

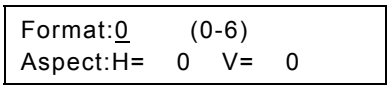


Fig. 6.7.1 Setting the format and aspect ratio

Table 6.7.1 Format and aspect ratio setting method

Setting item	Key	LCD display	Description
Format (Format)	0		Format 0 ● Single circle ● Center: 1/2H, 1/2V ● Radius: 1/3V
	1		Format 1 ● Concentric circles 1 ● Center: 1/2H, 1/2V ● Radius (from center): 1/6V, 1/3V, 1/2V, 1/2H
	2		Format 2 ● Format 1 + (4 circles with 1/6V radius)
	3		Format 3 ● Concentric circles 2 ● Center: 1/2H, 1/2V ● Radius (from center): addition of other circles inside 1/6V, 1/3V, 1/2V circles whose radii are 1/2 of the original 3
	4		Format 4 ● Consecutive circles with 1/6V radius ● Circles are displayed symmetrically both horizontally and vertically with the center (1/2H, V/2V) serving as the reference.
	5		Format 5 ● Single circle painted out ● Center: 1/2H, 1/2V ● Radius: 1/3V
	6		Format 6 ● 5 circles with 1/6V radius painted out
Aspect ratio (Aspect) H, V	Number keys	XXX	Setting range: 0 to 255 *1

*1: Perfectly round circles are always displayed regardless of the display resolution by setting the aspect ratio of the monitor. For example: H=4 and V=3 are set for an NTSC monitor (4:3), and H=16 and V=9 are set for an HDTV monitor (16:9). Perfectly round circles will not be drawn if “0" is set for H or V. (This is to ensure compatibility with generators in Astrodesign’s existing VG series.)

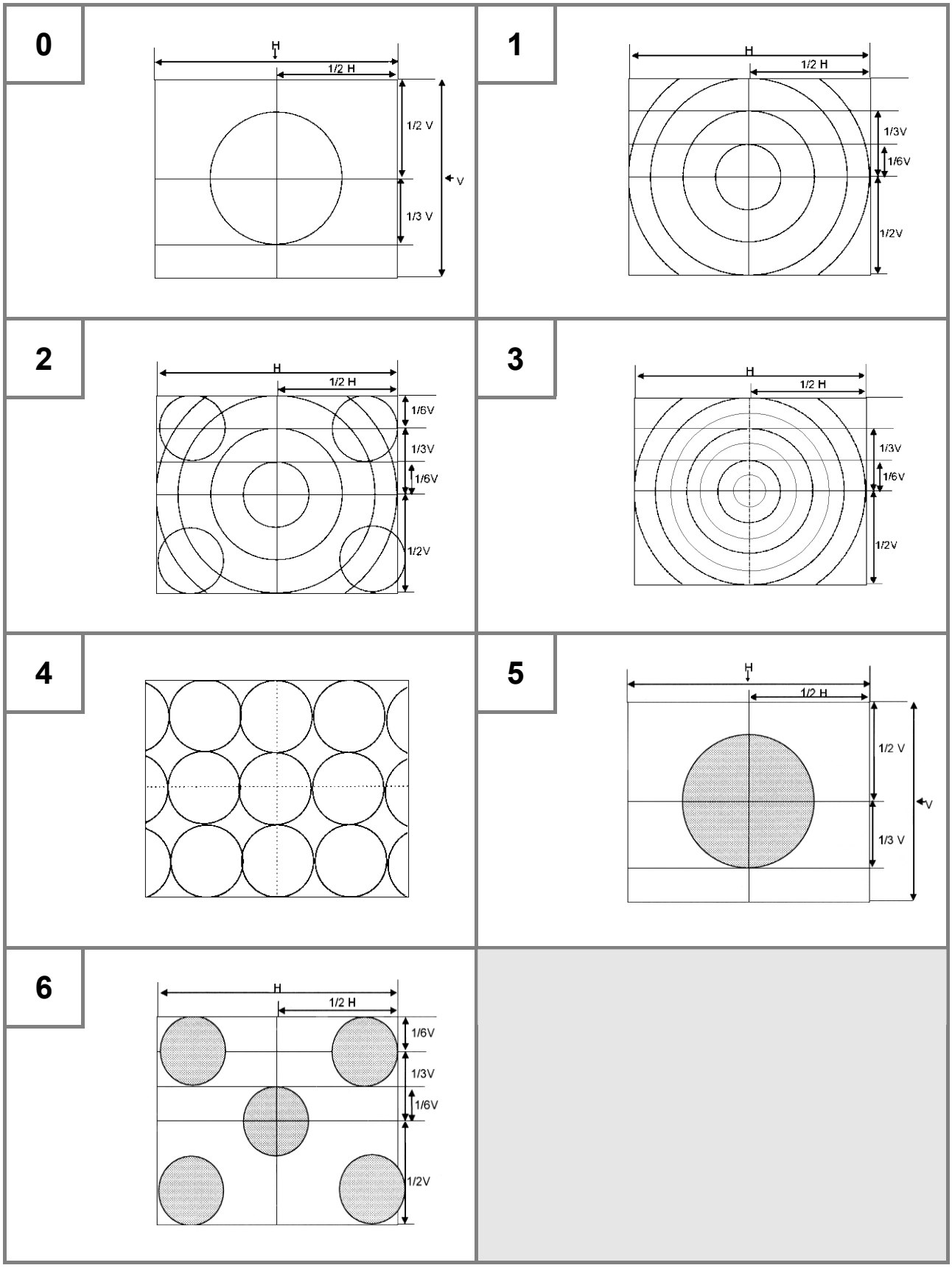


Fig. 6.7.2 Formats

6.8 Setting the color bar pattern

The following items are set for the color bar pattern data.
(1) Mode and direction
(2) Number of repetitions and interval
(3) Color layout

---

(1) Set the mode and direction.

Mode:%	(0/1)
Direction:Hor	(0-3)

Fig. 6.8.1 Setting the mode and direction

Table 6.8.1 Mode and direction setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: A percentage is specified for the interval.
	1	dot	Dot mode: A number of dots is specified for the interval.
Direction (Direction)			The pattern is repeated in the designated direction in accordance with the settings for "number of repetitions," "interval" and "color layout."
	0	Hor	Horizontal direction * The V interval is ignored. Horizontal direction C0 | 1 | 2 | ~ | F | C0
	1	Ver	Vertical direction * The H interval is ignored. C0 1 2 ≀ F C0 Vertical direction
	2	Hor&V	The pattern is repeated horizontally, and when the corner is reached, it is continued onto the next line which is obtained through division by the V interval. Horizontal direction C0 | 1 | 2 | ~ | E | F | C0 1 | 2 | 3 | ~ | F | C0 | 1 2 | 3 | 4 | ~ | C0 | 1 | 2
	3	Ver&H	The pattern is repeated vertically, and when the corner is reached, it is continued onto the next column which is obtained through division by the H interval. C0 | 1 | 2 1 | 2 | 3 2 | 3 | 4 ≀ | ≀ | ≀ E | F | C0 F | C0 | 1 C0 | 1 | 2 Vertical direction

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

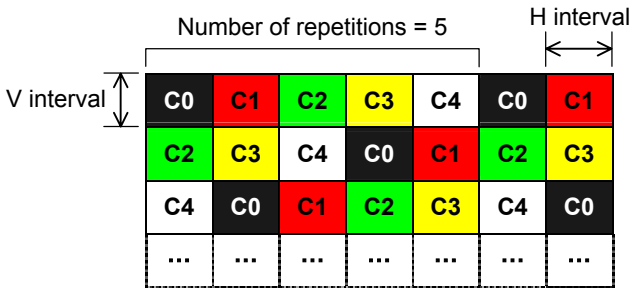
```
Repeat  :16          (1-16)
Interval :H=   6.3 V=   6.3
```

Fig. 6.8.2 Setting the number of repetitions and interval

Table 6.8.2 Number of repetitions and interval setting method

Setting item	Key	LCD display	Description
Number of repetitions (Repeat)	Number keys	XX	This sets the number of colors. Setting range: 1 to 16
Interval (Interval) H, V	Number keys	XXX.X	In the % mode Setting range: 0.0 to 100.0 [%]
		XXXX	In the dot mode Setting range: 1 to 9999 [dot]

<Example: For direction 2 (H & V)>



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

```
C0:_    1:R   2: G   3:RG
C4:   B 5:R B 6: GB 7:RGB
```

```
C8:_    9:R   A: G   B:RG
CC:   B D:R B E: GB F:RGB
```

Fig. 6.8.3 Setting the color layout

Table 6.8.3 Color layout setting method

Setting item	Key	LCD display	Color
Color layout C0 to CF	0		None
	1	R	Red
	2	G	Green
	3	RG	Red, green
	4	B	Blue
	5	RB	Red, blue
	6	GB	Green, blue
	7	RGB	Red, green, blue

6.9 Setting the gray scale pattern

The following items are set for the gray scale pattern data.
(1) Mode and direction
(2) Number of repetitions and intervals
(3) Level layout

---

(1) Set the mode and direction.

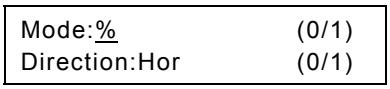


Fig. 6.9.1 Setting the mode and direction

Table 6.9.1 Mode and direction setting method

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: The intervals are designated as a percentage.
	1	dot	Dot mode: The intervals are designated as a number of dots.
Direction (Direction)			The pattern is repeated in the designated direction according to the settings for the number of repetitions, intervals and level layout.
	0	Hor	The pattern is repeated in the horizontal direction, and when it arrives at a corner, it continues on the next line which has been divided by the V interval.
	1	Ver	The pattern is repeated in the vertical direction, and when it arrives at a corner, it continues on the next column which has been divided by the H interval.

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

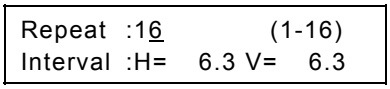


Fig. 6.9.2 Setting the number of repetitions and intervals

Table 6.9.2 Number of repetitions and interval setting method

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

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

L0: 0 1: 17 2: 34 3: 51 L4: 68 5: 85 6:102 7:119	L8:136 9:153 A:170 B:187 LC:204 D:221 E:238 F:255

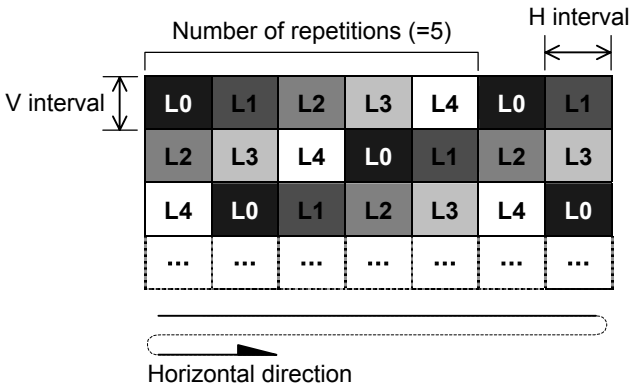
Fig. 6.9.3 Setting the level layout

Table 6.9.3 Level layout setting method

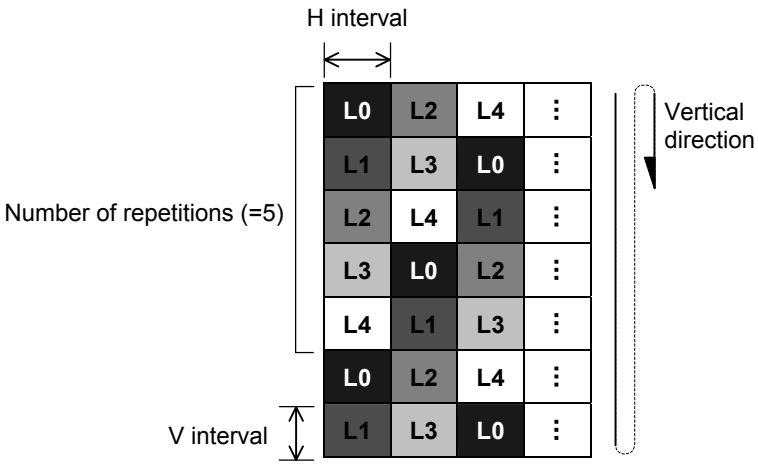
Setting item	Key	LCD display	Setting range
Level layout L0 to LF	Number keys	XXX XXXX	In the 8-bit or LUT 10-bit mode : 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095

● **Relationship between directions, number of repetitions and intervals**

<Example 1: When the “0” (Hor) is set for the direction>



<Example 2: When the “1” (Ver) is set for the direction>



6.10 Setting the burst pattern

The format, interval and step are set for the burst pattern data.

Set the format, interval and step for the burst pattern data.

```
Format:L->R          (0-3)
Interval: 5      Step= 1 dot
```

Fig. 6.10.1 Setting the format, interval and step

Table 6.10.1 Format, interval and step setting method

Setting item	Key	LCD display	Description
Format (Format)	0	L->R	The pattern is increased from left to right.
	1	L<-R	The pattern is increased from right to left.
	2	L<-C->R	The pattern is increased from the center to the left and right.
	3	L->C<-R	The pattern is increased from the left and right to the center.
Interval (Interval)	Number keys	XX	The number of vertical lines with same thickness which are to be displayed is set as the interval. Setting range: 1 to 99 [dot]
Step (Step)	Number keys	XX dot	The increment by which the line thickness is to be increased is set as the step. Setting range: 0 to 99 [dot]

<Example: When 0 is set for the format, 5 for the interval and 1 for the step>

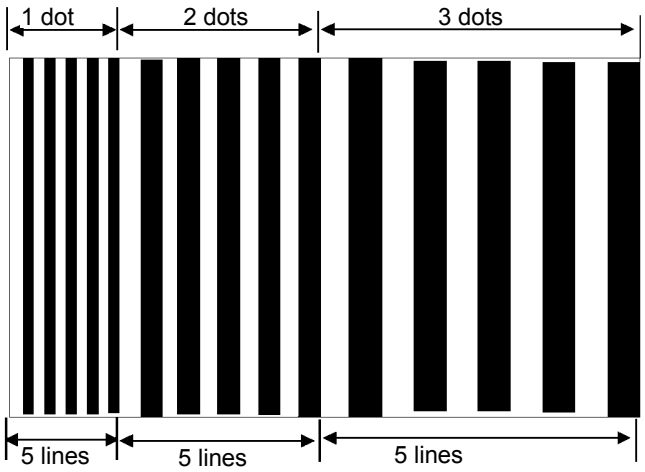


Fig. 6.10.2 Example of burst pattern setting

6.11 Setting the window pattern

The following items are set for the window pattern data.
(1) Mode and format
(2) Width and window color (RGB)
(3) Format-related items (flicker interval, scrolling speed, level change speed)
(4) Window center position (format E only)
(5) Display time and RGB level (only when flicker interval “8 (4LEVEL)” has been selected for formats 0-7 or E)

---

(1) Set the mode and format.

Fig. 6.11.1 Setting the mode and format

Table 6.11.1 Mode and format setting

Setting item	Key	LCD display	Description
Mode (Mode)	0	%	% mode: The widths (horizontal, vertical) are set as a percentage.
	1	dot	Dot mode: The widths (horizontal, vertical) are set as a number of dots.
Format (Format)			
			The window pattern is divided into the designated number. Flicker operation can be set.
	0	1 WINDOW	Format 0: 1 window
	1	4 WINDOW	Format 1: 4 windows (2×2)
	2	9 WINDOW	Format 2: 9 windows (3×3)
	3	16 WINDOW	Format 3: 16 windows (4×4)
	4	25 WINDOW	Format 4: 25 windows (5×5)
	5	64 WINDOW	Format 5: 64 windows (8×8)
	6	V3 WINDOW	Format 6: 3 windows in a vertical row (1×3)
	7	H3 WINDOW	Format 7: 3 windows in a horizontal row (3×1)
			The window pattern is scrolled in the designated direction. (1 window)
	8	LR SCROLL	Format 8: Horizontal scrolling (left and right)
	9	UD SCROLL	Format 9: Vertical scrolling (up and down)
	A	R SCROLL	Format A: Scrolling to the right
	B	L SCROLL	Format B: Scrolling to the left
	C	U SCROLL	Format C: Scrolling up
	D	D SCROLL	Format D: Scrolling down
	E	User POS	Format E: The position of the window can be designated.
	F	WIN-LEVEL	Format F: The window RGB level can be varied automatically by operating the A, B, C, E or F key when direct display FUNC0 is executed. (1 window) ☞ “4.1.6 Changing the window RGB levels“

[Format diagrams] ☞ Next page

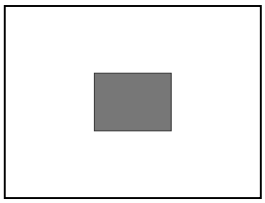
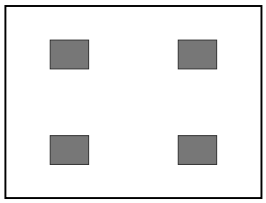
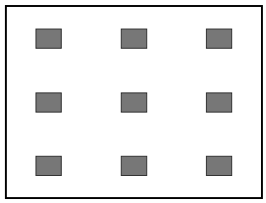
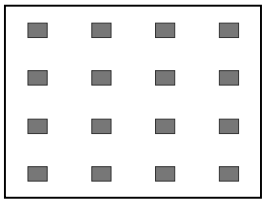
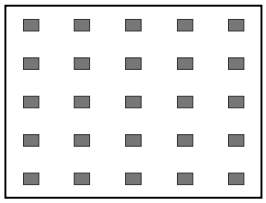
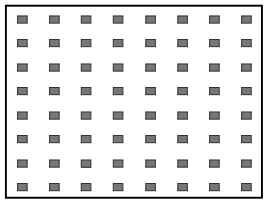
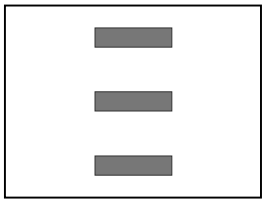
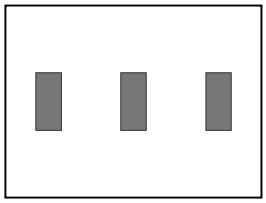
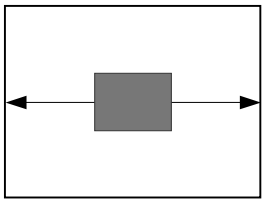
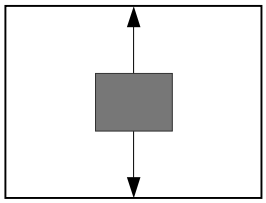
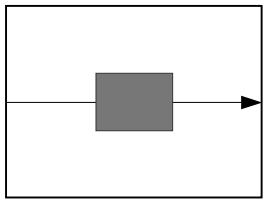
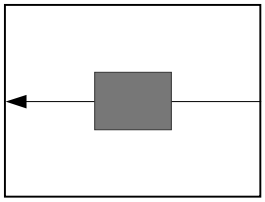
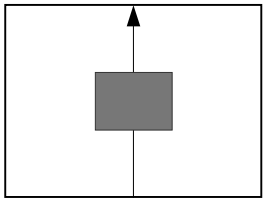
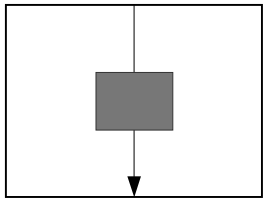
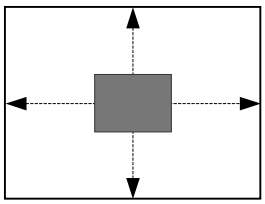
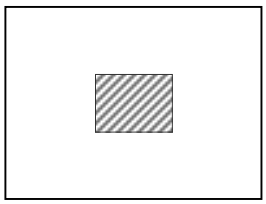
0 1 window 	**1** 4 windows 	**2** 9 windows 
3 16 windows 	**4** 25 windows 	**5** 64 windows 
6 3 windows in a vertical row 	**7** 3 windows in a horizontal row 	
8 Horizontal scrolling (left and right) 	**9** Vertical scrolling (up and down) 	**A** Scrolling to the right 
B Scrolling to the left 	**C** Scrolling up 	**D** Scrolling down 
E Window position designation 	**F** Window RGB level change 	

Fig. 6.11.2 Formats

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

```
Width:H= 20.0 V= 20.0
R:255   G:255   B:255
```

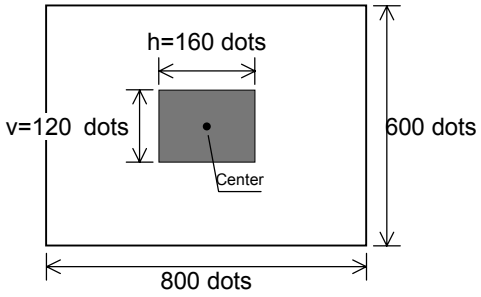
Fig. 6.11.3 Setting the horizontal and vertical widths and the window color

Table 6.11.2 Horizontal and vertical width and window color setting method

Setting item	Key	LCD display	Setting range
Width (Width) H, V	Number keys	XXX.X	In the % mode : 0.0 to 100.0 [%]
		XXXX	In the dot mode : 1 to 9999 [dot]
Window color R, G, B	Number keys	XXX XXXX	In the 8-bit or LUT 10-bit mode : 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095

● Examples of H, V width settings (when H width = 160 dots or 20%, V width = 120 dots or 20%)

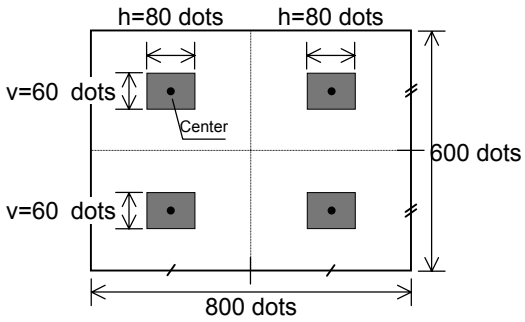
<Example 1: When format 0 (1 window) is used>



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

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

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



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

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

* When the window is to be divided, the total for all the windows is set.

(3) Perform the settings related to the selected format. These settings differ from one format to another.

- With formats 0 to 7 or E: Flicker interval. (The higher the value set, the longer the interval.)
- With formats 8 to D: Scrolling speed. (The higher the value set, the faster the speed.)
- With format F: Level change speed. (The higher the value set, the slower the speed.)

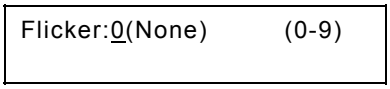


Fig. 6.11.4 Performing the format-related settings

Table 6.11.3 Flicker interval setting method

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

Table 6.11.4 Scrolling speed setting method

Formats 8 to D				
Setting item	Key	LCD display	Description	
Scrolling speed (Flicker)	0	1V: 1 dot	1 dot	The pattern is moved by the designated number of dots in 1V (once per V period).
	1	1V: 2 dots	2 dots	
	2	1V: 3 dots	3 dots	
	3	1V: 4 dots	4 dots	
	4	1V: 8 dots	8 dots	
	5	1V: 16 dots	16 dots	
	6	1V: 32 dots	32 dots	
	7	1V: 64 dots	64 dots	

Table 6.11.5 Level change speed setting method

Formats F				
Setting item	Key	LCD display	Description	
Level change speed (Flicker)	0	1V: 1 level	1V (once per V period)	The RGB level is changed by one level at the designated time.
	1	2V: 1 level	2V	
	2	3V: 1 Level	3V	
	3	4V: 1 Level	4V	
	4	5V: 1 Level	5V	
	5	6V:1Level	6V	
	6	7V:1Level	7V	
	7	8V:1Level	8V	

* The time [V] is set in 1-frame increments (or 1-field increments during interlacing).

(4) Set the window center position (but only for format E).

```
Format-E #1( 20.0, 20.0)
   Pos     #2( 80.0, 80.0)
```

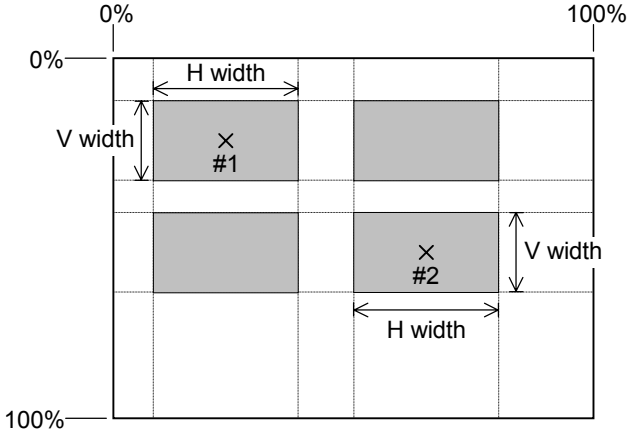
Fig. 6.11.5 Setting the window center position

Table 6.11.6 Window center position setting method

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

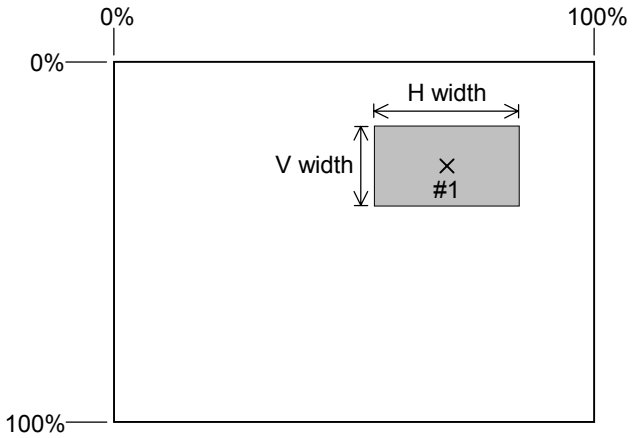
● When #2 is not (0,0)

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



● When #2 is (0,0)

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



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

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

Fig. 6.11.6 Setting the display time

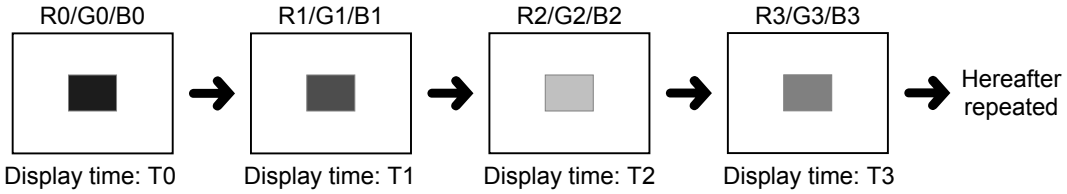
```
R0: 255 G0: 255 B0: 255
R1: 240 G1: 240 B1: 240
```

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

Fig. 6.11.7 Setting the RGB levels (4 levels)

Table 6.11.7 Display time and RGB level setting method

Setting item	Key	LCD display	Setting range
Display time T0 to 3	Number keys	XXX	0 to 255 [V] *1
RGB level R0 to 3 / G0 to 3 / B0 to 3	Number keys	XXX XXXX	In the 8-bit or LUT 10-bit mode: 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095



*1: The time [V] is set in 1-frame increments (or 1-field increments during interlacing).

⑹ (❖ 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 T0 to 15	Number keys	XXX	0 to 999 [V]
RGB level R0 to 15 / G0 to 15 / B0 to 15	Number keys	XXX XXXX	8bit/LUT10bit mode : 0 to 255 10bit mode : 0 to 1023 12bit mode : 0 to 4095

6.12 Setting the optional patterns

CAUTION

Optional patterns cannot be combined with any other patterns.

The “optional pattern No.” is set for the optional pattern data.
The same method is used to set option patterns 1 (OPT1) and 2 (OPT2).

Set the number of the optional pattern to be displayed.

Optional pattern 1

OPT1-NO: 0 (00-BF)

Optional pattern 2

OPT2-NO:25 (00-BF)

Fig. 6.12.1 Setting the optional pattern number

Table 6.12.1 Optional pattern No. setting method

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

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

For details on the internal optional patterns (00H to 3FH), refer to the “9.1.2 Optional pattern data” list (p.152).

* For user-created optional patterns No.40H to 7FH, the source codes are created using a C language-like syntax, and compiled and registered using the Windows software (SP-8848) supplied.
For image data No.1 to 64, SP-8848 is used to register the image data created by any tool into optional pattern No.80H to BFH. For further details, refer to the operating instructions of the SP-8848 or Help.
* The internal optional patterns No.00H to 3FH cannot be edited or copied.

6.13 Setting the cursor pattern

The following items are set for the cursor pattern data.
(1) Format and position display mode
(2) Flicker interval and movement step
(3) Cursor color and background color

---

(1) Set the format and position display mode.

Format:Cross	(0-5)
Pos.Disp:OFF	(0-4)

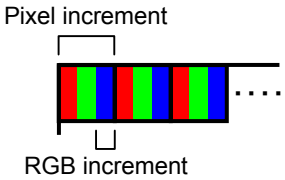
Fig. 6.13.1 Setting the format and position display mode

Table 6.13.1 Format setting method

Setting item	Key	LCD display	Description	
Format (Format)	0	5*5	For setting a cross-shaped cursor consisting of 5 horizontal dots and 5 vertical dots.	Normal mode
	1	Cross	For setting a cross-shaped cursor which fills the entire screen.	
	2	V-Line	For setting a vertical line as the cursor.	
	3	5*5 (RGB)	For setting a cross-shaped cursor consisting of 5 horizontal dots and 5 vertical dots.	Sub-pixel mode
	4	Cross (RGB)	For setting a cross-shaped cursor which fills the entire screen.	
	5	V-Line (RGB)	For setting a vertical line as the cursor.	

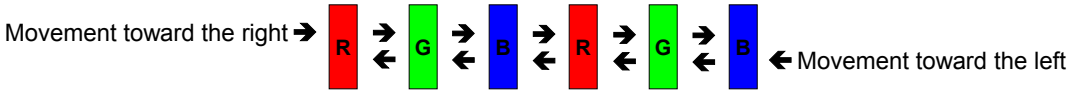
Cursor shapes

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



Normal mode: The cursor moves in 1-pixel increments.
The cursor color is displayed in the color which has been set.

Sub-pixel mode: The cursor moves in the RGB increments which make up the individual pixels.
The cursor color is displayed in the sequence of R→G→B when the cursor moves toward the right and in the sequence of B→G→R when the cursor moves toward the left.



[Position display mode setting] Next page

Table 6.13.2 Position display mode setting method

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

● Home point coordinates

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

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

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

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

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

(2) Set the flicker interval and movement step.

```
Flicker :0(None)      (0-7)
Step   :10 dot        (0-2)
```

Fig. 6.13.2 Setting the flicker interval and movement step

Table 6.13.3 Flicker interval and movement step setting method

Setting item	Key	LCD display	Description	
Flicker interval (Flicker)	0	0 (None)	No flicker	
	1	1 (1V)	1V (once per V period)	Flicker occurs at the designated interval.
	2	2 (2V)	2V	
	3	3 (4V)	4V	
	4	4 (8V)	8V	
	5	5 (16V)	16V	
	6	6 (32V)	32V	
	7	7 (64V)	64V	
Movement step (Step)	0	1 dot	1 dot	The cursor moves in increments of the designated number of dots.
	1	10 dots	10 dots	
	2	100 dots	100 dots	

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

```
 R:255    G:255    B:255
BR:127   BG:127   BB:127
```

Fig. 6.13.3 Setting the cursor color and background color

Table 6.13.4 Cursor color and background color setting method

Setting item	Key	LCD display	Setting range
Cursor color R, G, B	Number keys	XXX XXXX	In the 8-bit or LUT 10-bit mode: 0 to 255 In the 10-bit mode : 0 to 1023 In the 12-bit mode : 0 to 4095
Background color BR, BG, BB			

6.14 Setting the program name

The display position, font and program name are set for the program name data.

Set the display position, font and program name.

```
Pos:L-T      Font:5*7
XXXXXXXXXX
```

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

Table 6.14.1 Display position, font and program name setting method

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

*1: There are two ways to input program names: input the character codes "20H to DFH" directly or select the characters from the display (refer to "2.4 How to input characters from the display"). However, names cannot be input from the display if they have been edited using direct display FUNC0.

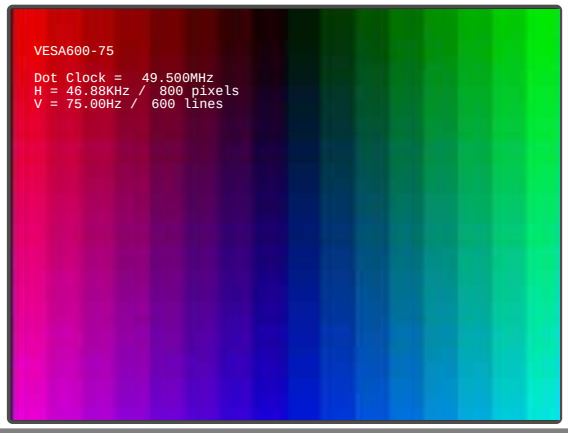
* When the [NAME] key has been selected, the program name, dot clock frequency, horizontal sync frequency, vertical sync frequency, Hdisp and Vdisp are shown or only the program name is shown on the display depending on the FUNC5 NAME display setting. For details on the setting method, refer to "[4] Setting the NAME display mode". "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.

● Example of display

Display position: Top left of the screen

Program name

Dot Clock = Dot clock frequency
H = Horizontal sync frequency/Hdisp
V = Vertical sync frequency/Vdisp



6.15 Setting pattern action

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).

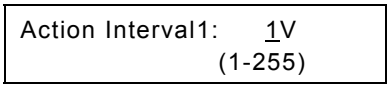


Fig. 6.15.1 Setting the execution interval

Table 6.15.1 Execution interval setting method

Setting item		Key	LCD display	Setting range
Execution interval	Action Interval1	Number keys	XXX V	1 to 255
	Action Interval2, 3, 4	Number keys	XXX V	0 to 255 (0: when no interval is going to be used)

* When Action Interval 2, 3 or 4 is used, the conditions set will be repeated in sequence from 1.
(Example: When a value other than “0” has been set for Action Interval 2 or 3 , the following will be repeated: Active Interval 1 → 2 → 3 → 1 → 2 → 3 ....)
By means of this setting, a number of different types of scrolling such as simulated 2-3 pulldown can be performed. For normal scrolling, set “0" for Action Interval 2, 3 and 4.

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

● What is 2-3 pull-down?

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

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

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

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

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

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

*1: For details on the simple moving picture, refer to “6.15.2 Concerning the simple moving picture function.”

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

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

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

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

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

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

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

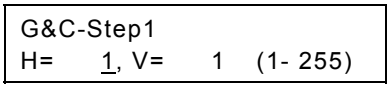


Fig. 6.15.4 Setting the graphic plane and character plane scrolling step

Table 6.15.4 Graphic plane and character plane scrolling step setting method

Setting item		Key	LCD display	Setting range
Scrolling step in H direction, V direction	G&C-Step1	Number keys	XXX	H : 1 to 255 [dot] V : 1 to 255 [H]
				* Set the frame size for simple moving picture. H : 1 to 4095 [dot] V : 1 to 4095 [H]
	G&C-Step2, 3, 4	Number keys	XXX	H : 0 to 255 [dot] (0: when no step is going to be used) V : 0 to 255 [H]

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

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

Fig. 6.15.5 Setting the number of simple moving picture repetitions

Table 6.15.5 Number of simple moving picture repetition setting method

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

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

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

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

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

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

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

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

CAUTION

Palette scrolling is valid only in the 8-bit or LUT 10-bit mode.

(7) Set the window scrolling direction and step.

```
W-Dir    :L          (1-9)
W-Step1 :  1         (1-255)
```

Fig. 6.15.7 Setting the window scrolling direction and step

Fig. 6.15.7 Window scrolling direction and step setting method

Setting item		Key	LCD display	Description	
Scrolling direction (W-Dir)		1	L-D	The window is scrolled toward the bottom left.	Scrolling is executed in the designated direction.
		2	D	The window is scrolled downward.	
		3	R-D	The window is scrolled toward the bottom right.	
		4	L	The window is scrolled toward the left.	
		6	R	The window is scrolled toward the right.	
		7	L-U	The window is scrolled toward the top left.	
		8	U	The window is scrolled upward.	
		9	R-U	The window is scrolled toward the top right.	
Scrolling step	W-Step1	Number keys	XXX	The step is the same for the horizontal and vertical directions. Setting range: 1 to 255	
	W-Step2, 3, 4	Number keys	XXX	The step is the same for the horizontal and vertical directions. Setting range: 0 to 255 (0: when no step is going to be used)	

* When Action Interval2-4 is used for the execution interval, choose a W-Step2-4 setting which corresponds. When conducting normal scrolling, set “0” for W-Step2-4.

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

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

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

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

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

CAUTION

Palette scrolling is valid only in the 8-bit or LUT 10-bit mode.

6.15.2 Concerning the simple moving picture function

This function enables simple moving pictures to be displayed by drawing a multiple number of pictures in the drawing area and moving the display start coordinates.
Provided as an example here is a description of the display method used for 640 × 480 9-frame simple moving pictures.

(1) Create the images.

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

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

(3) Set the program data.

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

① Set the number of the optional pattern registered in (2) as “optional pattern 1” or “optional pattern 2.”
② Select the optional pattern (OPT1 or OPT2) using “pattern select.”
③ Set the execution interval (Action Interval 1), graphic plane scrolling (G-SCR), scrolling direction (G-Dir), scrolling step (G&C-Step1) and number of simple moving picture repetitions (G-Repeat) using “Pattern action.”

- Action Interval 1: Set the time interval during which the frame is to be moved in V increments.
- Scrolling (G-SCR): Select “ON."
- Scrolling direction (G-Dir): Select “Mov."
- Scrolling step (G&C-Step1):
  Set the frame size. In this case, it is “H=640” and “V=480.”
- Number of simple moving picture repetitions (G-Repeat):
  Set the number of times the frames are to be moved in the horizontal and vertical direction. In this case, it is “H=3” and “V=3.”

CAUTION

Set scroll steps H and V to correspond with the number of dots for H disp and number of lines (H) for V disp in the timing data. (Refer to “5.1 Configuration of timing data and basic operations.”) If they do not correspond, the image may be displayed out of position.

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

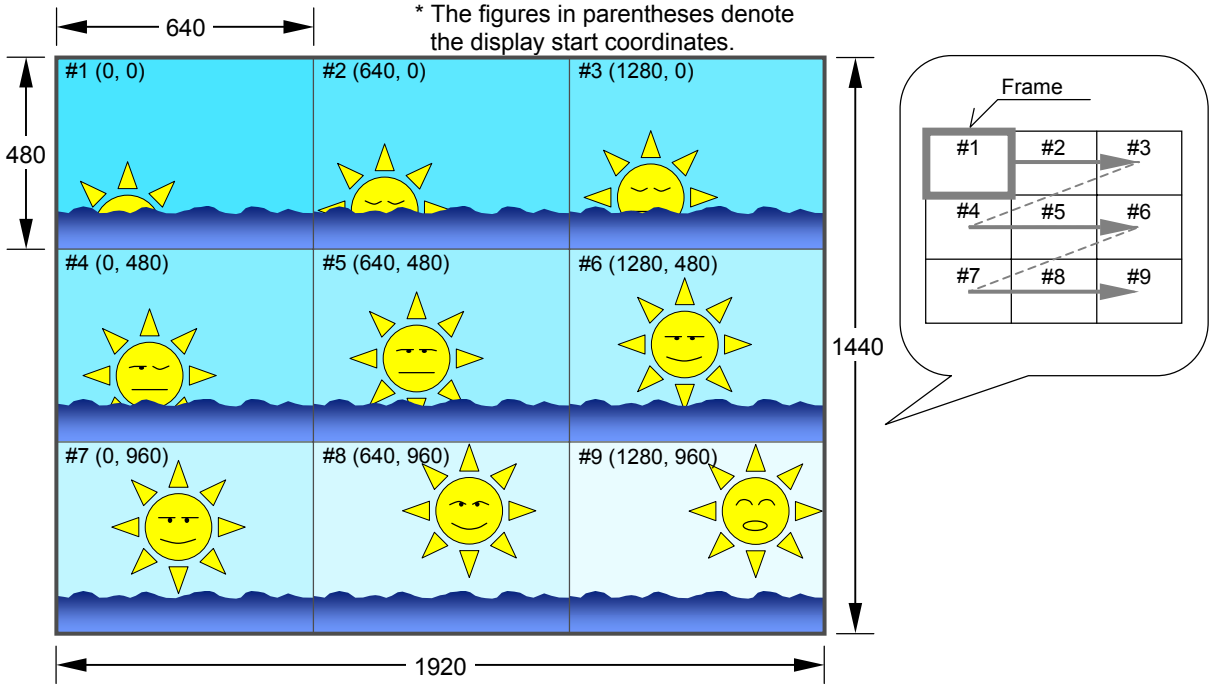


Fig. 6.15.9 Example of images for simple moving pictures

7 SELF-CHECK

7.1 Concerning the self-check

The VG-835-A has a function (self-check function) that makes it possible to determine whether the hardware devices are functioning properly.

CAUTION

Turn the power off when exiting the self-check.

7.1.1 How to start up the self-check

Turn on the power of the VG-835-A while pressing the [▲] 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-835-A Self Check Mode ROM Version : 5.00
		Hardware	BOARD REV: 00C73019h BOARD TYPE: 00010103h
		LVDS 2ch output	IB-558 10B LVDS: 10.01
(2)	Version information of Optional output board	LVDS 4ch output	IB-548 4ch LVDS: 03.01
		Parallel output	IB-549 4ch PARA: 02.FF
		Trigger output	IB-549-T Trigger: 01.01
(3)	Optional function support information	12bit output	12bit :Enable
		Window 16 Level	Window 16Level Flicker: Enable
(4)	Additional pattern support information*1 (Option)		Pattern 001 :ON Pattern 002 :ON ・ ・ ・
(5)	Other information of the unit	Serial Number	S/N :XXXXXXXX
		MAC address	MAC: XX:XX:XX:XX:XX:XX

***1) 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-835-A.	p.134
PC card check	For checking the PC card.	p.135
RS-232C check	For checking the RS-232C loopback.	p.136
Flash ROM check	For checking the internal flash ROM.	p.137
Flash ROM initialization	For initializing the internal flash ROM.	p.138

* If the [ESC] key is pressed during any of the checks, the check is aborted, and the check item selection screen returns to the display.

7.2 Key check

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

```
Select Item      : 0 (0-4)
Key Check
```

Fig. 7.2.1 Selecting key check

(2) Press the key to be checked.

```
Key Check (ESC=end)
Push Any Key
```

Fig. 7.2.2 Selecting the key

The pressed key now appears on the LCD screen. (Example: [▲] key)

```
Key Check (ESC=end)
KEY=INC
```

Fig. 7.2.3 Displaying the results

7.3 PC card check

CAUTION

A PC card is required for this check. Ensure that the card has been inserted correctly before conducting the check.

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

```
Select Item      : 1 (0-4)
Mem-Card Check
```

Fig. 7.3.1 Selecting PC card check

(2) Press the [SET] key.

```
Mem-Card Check
                        OK?
```

Fig. 7.3.2 Verifying the check

(3) Press the [SET] key.

```
Mem-Card Check
Really OK? or Press ESC
```

Fig. 7.3.3 Executing the check

The PC card check is now executed.

① While the card is being checked, the screen shown below appears on the LCD.

```
Memory Card Checking...
```

Fig. 7.3.4 Check in progress

② When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

```
MemCard Check OK
      ESC ==>end
```

Fig. 7.3.5 Check completed

NOTE

The error buzzer sounds if an error has occurred. The screen shown below appears on the LCD.

```
Memory Card Checking...
E29:M-Card UnFormated
```

7.4 RS-232C check

CAUTION

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

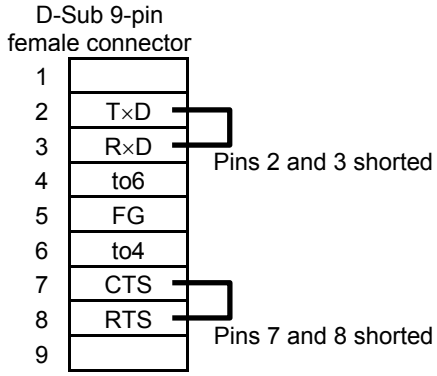


Fig. 7.4.1 Connector

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

```
Select Item      : 2 (0-4)
RS232C(LoopBack)
```

Fig. 7.4.2 Selecting RS-232C check

RS-232C loopback is executed.

```
RS-232C Check
OK : R=rr W=ww
```

Read data — Write data

Fig. 7.4.3 Executing the check

(2) When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

```
RS-232C Check OK
     ESC ==> end
```

Fig. 7.4.4 Check completed

NOTE

The error buzzer sounds if an error has occurred. The check is aborted (the 20H to 7FH codes are checked). The screen shown below appears on the LCD.

```
RS-232C Check
ERR : R=rr W=ww
```

7.5 Flash ROM check

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

```
Select Item      : 3 (0-4)
Flash-ROM Check
```

Fig. 7.5.1 Selecting Flash ROM check

(2) Press the [SET] key.

The internal flash ROM is checked.

```
Flash ROM Checking...
```

Fig. 7.5.2 Executing the check

(3) When the check is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

```
Flash ROM Check OK
      ESC ==> end
```

Fig. 7.5.3 Check completed

NOTE

The error buzzer sounds if an error has occurred. The check is aborted. The screen shown below appears on the LCD.

```
Flash ROM Check : Verify
Error message
```

7.6 Flash ROM initialization

CAUTION

When this operation is performed, the contents of the internal flash ROM will be initialized to the factory setting.

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

```
Select Item       : 4 (0-4)
Flash-ROM Init.
```

Fig. 7.6.1 Selecting Flash ROM initialization

(2) Press the [SET] key.

```
Flash ROM Init.
Restore cofing data. OK?
```

Fig. 7.6.2 Executing the initialization

The internal flash ROM is initialized.

(3) When the initialization is completed, the screen shown below appears on the LCD. Three seconds later, the check item selection screen returns to the display.

```
Flash ROM Init. OK
      ESC ==> end
```

Fig. 7.6.3 Initialization completed

8 REMOTE CONTROL

By connecting the RB-614C or RB-649 remote control box, the VG-835-A 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 “10.5.1 Restrictions on functions used by SP-8848, RB-614C and RB-749.”)

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

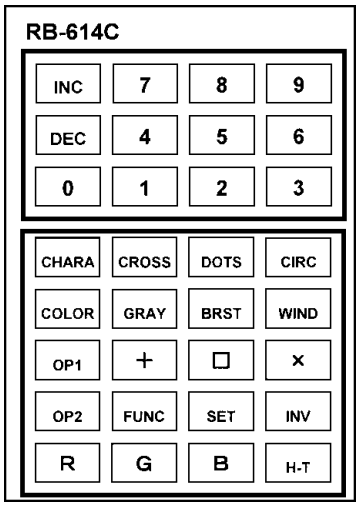


Fig. 8.1.1 RB-614C

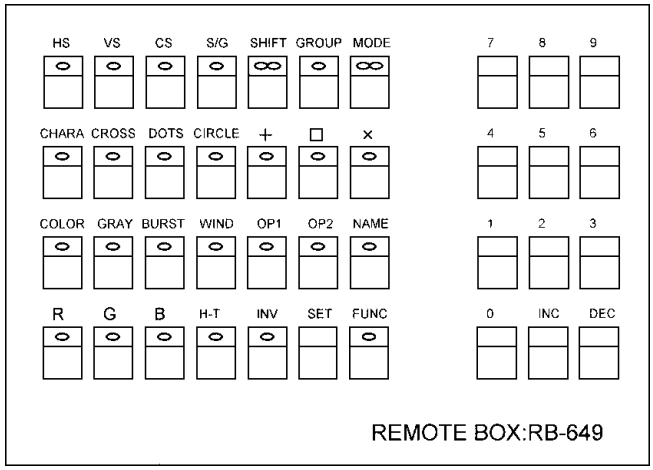


Fig. 8.1.2 RB-649

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-835-A.

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-835-A/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
FORMAT	-	-
NAME	-	NAME
USER to ▶ (*2)	-	-
PROG, TIMING, PAT	-	MODE (*4)
(*3)	H-T	GROUP
HS/CS, VS, G/S	-	HS, VS, CS, S/G
YPbPr	-	-
R/R-Y, G/Y, B/B-Y	R, G, B	R, G, B
INV	INV	INV
FUNC	FUNC	FUNC
ESC	-	-
SHIFT	-	SHIFT
SET	SET	SET
0 to 9	0 to 9	0 to 9
⏫	INC	INC
⏬	DEC	DEC

*1: CHARA, CROSS, DOTS, CIRCLE, ＋, □, ×, COLOR, GRAY, BURST, WINDOW, OPT1, OIPT2
*2: USER, SAVE, LEVEL, ◄, ►
*3: The [H-T] key on the RB-614C and the [GROUP] key on the RB-649 are equivalent on the VG-835 to the front panel keys or on the RB-1848 to the [ESC] key which changes the group numbers using direct display FUNC0. (Refer to “4.1.3 Changing the group numbers.”)
*4: The [MODE] key on the RB-649 works as follows in the direct display mode.
- Lighted (red, green): All the program data is executed.
- Lighted (red): Only the timing data is executed.
- Lighted (green): Only the pattern data is executed.

9 REFERENCE

This chapter contains information on the following subjects.

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 × 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 indicates the tri-level sync signal output, but this signal plays no role with the VG-835-A.
* pN : “N” indicates the number of the YPbPr coefficient table.

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
850	37.861	85.080	31.500	640×400	Prog	N	P	RGB	VESA400-85	Character list 7×9	Character List
851	37.861	72.809	31.500	640×480	Prog	N	N	RGB	VESA480-72	OPT27 (Song of Youth)	Words
852	37.500	75.000	31.500	640×480	Prog	N	N	RGB	VESA480-75	Character 1 (H 5×7 / 10×14)	H Character 1
853	35.156	56.250	36.000	800×600	Prog	P	P	RGB	VESA600-56	Character 1 (H 7×9/14×18)	H Character 2
854	37.879	60.317	40.000	800×600	Prog	P	P	RGB	VESA600-60	Character 1 (H 16×16/32×32)	H Character 3
855	48.077	72.188	50.000	800×600	Prog	P	P	RGB	VESA600-72	Character 2 (H 5×7/10×14)	H Character 4
856	48.363	60.004	65.000	1024×768	Prog	N	N	RGB	VESA768-60	Character 2 (H 7×9/14×18)	H Character 5
857	56.476	70.069	75.000	1024×768	Prog	N	N	RGB	VESA768-70	Character 2 (H 16×16/32×32)	H Character 6
858	60.023	75.029	78.750	1024×768	Prog	P	P	RGB	VESA768-75	Character 1 (@ 7×9/14×18)	@ Character
859	79.976	75.025	135.000	1280×1024	Prog	P	P	RGB	VESA1024-75	Character 1 (Chinese character "KU" 7×9/14×18)	Chinese Chara 1
860	91.146	85.024	157.500	1280×1024	Prog	P	P	RGB	VESA1024-85	Character 1 (Chinese character "BI" 7×9/64×64)	Chinese Chara 2
861	75.000	60.000	162.000	1600×1200	Prog	P	P	RGB	VESA1200-60	Character 1 (Chinese character "AI" 7×9/64×64)	Chinese Chara 3
862	81.250	65.000	175.500	1600×1200	Prog	P	P	RGB	VESA1200-65	Character 1 (chessboard 16×16/16×16)	1 dot ON/OFF
863	87.500	70.000	189.000	1600×1200	Prog	P	P	RGB	VESA1200-70	Character me (#1 18×18)	me Character 1
864	93.750	75.000	202.500	1600×1200	Prog	P	P	RGB	VESA1200-75	Character me (VESA specifications 18×18)	me Character 2
865	100.000	80.000	216.000	1600×1200	Prog	P	P	RGB	VESA1200-80	OPT0B (character edge H)	H Character Line
866	106.250	85.000	229.500	1600×1200	Prog	P	P	RGB	VESA1200-85	OPT0C (character edge O)	O Character Line
867	98.214	70.053	236.500	1800×1350	Prog	N	P	RGB	VESA1350-70		
868	18.435	49.825	16.260	720×350	Prog	N	N	RGB	MDA	1-dot width crosshatch (H=5,V=5)	1 line Cross5×5
869	15.746	60.098	14.360	640×200	Prog	N	N	RGB	CGA	2-dot width crosshatch (H=5,V=5)	2 line Cross5×5
870	21.855	59.713	16.260	640×350	Prog	N	N	RGB	EGA	OPT23 (ANSI pattern Ver Reso)	ANSI Pattern (V)
871	30.478	59.996	24.870	640×400	Prog	N	N	RGB	PGA	2-dot width crosshatch (H=8,V=8)	2 line Cross8×8
872	31.467	50.026	28.320	720×350	Prog	N	N	RGB	VGA-TEXT350-50	1-dot width crosshatch (H=10,V=8)	1 line Cross10×8
873	31.467	59.937	28.320	720×350	Prog	N	N	RGB	VGA-TEXT350-60	2-dot width crosshatch (H=10,V=8)	2 line Cross10×8
874	31.467	70.082	28.320	720×350	Prog	N	N	RGB	VGA-TEXT350-70	1-dot width crosshatch (H=16,V=12)	1 line Cross16×12
875	31.467	50.026	28.320	720×400	Prog	N	N	RGB	VGA-TEXT400-50	2-dot width crosshatch (H=16,V=12)	2 line Cross16×12
876	31.467	59.937	28.320	720×400	Prog	N	N	RGB	VGA-TEXT400-60		
877	31.467	70.082	28.320	720×400	Prog	N	N	RGB	VGA-TEXT400-70	Burst (Format 0)	Burst 1
878	31.469	50.030	25.175	640×350	Prog	N	N	RGB	VGA350-50	Burst (Format 1)	Burst 2
879	31.469	59.940	25.175	640×350	Prog	N	N	RGB	VGA350-60	Burst (Format 2)	Burst 3

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
880	31.469	70.086	25.175	640×350	Prog	N	N	RGB	VGA350-70	Burst (Format 3)	Burst 4
881	31.469	50.030	25.175	640×400	Prog	N	N	RGB	VGA400-50		
882	31.469	59.940	25.175	640×400	Prog	N	N	RGB	VGA400-60	OPT10 (sine wave scroll)	Sign Wave Scroll
883	31.469	70.086	25.175	640×400	Prog	N	N	RGB	VGA400-70	OPT11 (multi burst)	Multi Burst
884	31.469	50.030	25.175	640×480	Prog	N	N	RGB	VGA480-50	OPT12 (10 steps & 1/10 MHz)	1/10MHz × 10step
885	31.469	59.940	25.175	640×480	Prog	N	N	RGB	VGA480-60	Circle (Format 0)	Circle 1
886	35.156	56.160	36.000	800×600	Prog	N	N	RGB	S-VGA-56	Circle (Format 1)	Circle 2
887	48.077	72.188	50.000	800×600	Prog	N	N	RGB	S-VGA-72	Circle (Format 2)	Circle 3
888	46.875	75.000	49.500	800×600	Prog	N	N	RGB	S-VGA-75	Circle (Format 3)	Circle 4
889	48.077	59.797	65.000	1024×768	Prog	N	N	RGB	XGA-60	Circle (Format 4)	Circle 5
890	53.946	66.110	71.640	1024×768	Prog	N	N	RGB	XGA-66	Circle (Format 5)	Circle 6
891	56.476	70.069	75.000	1024×768	Prog	N	N	RGB	XGA-70	Circle (Format 6)	Circle 7
892	60.680	57.030	100.000	1280×1024	Prog	N	N	RGB	SXGA-57		
893	63.498	59.678	106.930	1280×1024	Prog	N	N	RGB	SXGA-60A	Window (Format 0, Flicker 0)	Window 1
894	63.750	59.747	110.160	1280×1024	Prog	N	N	RGB	SXGA-60B	Window (Format 1, Flicker 0)	Window 2
895	63.719	59.999	109.470	1280×1024	Prog	N	N	RGB	SXGA-60C	Window (Format 2, Flicker 0)	Window 3
896	78.907	74.161	132.880	1280×1024	Prog	N	N	RGB	SXGA-70	Window (Format 3, Flicker 0)	Window 4
897	74.627	59.941	160.000	1600×1200	Prog	N	N	RGB	UXGA1200-60	Window (Format 4, Flicker 0)	Window 5
898	107.422	85.053	220.000	1600×1200	Prog	N	N	RGB	UXGA1200-85A	Window (Format 5, Flicker 0)	Window 6
899	106.481	85.049	230.000	1600×1200	Prog	N	N	RGB	UXGA1200-85B	Window (Format 8, Flicker 7)	Moving Window 1
900	107.422	80.046	220.000	1600×1280	Prog	N	N	RGB	UXGA1280-80A	Window (Format 9, Flicker 7)	Moving Window 2
901	106.481	80.061	230.000	1600×1280	Prog	N	N	RGB	UXGA1280-80B	Window (Format E, Flicker 7)	Moving Window 3
902	106.402	80.001	238.340	1600×1280	Prog	N	N	RGB	UXGA1280-80C	Window (Format F, Flicker 0)	Window Level
903	109.821	80.396	246.000	1600×1280	Prog	N	N	RGB	UXGA1280-82	Window (Format 0, Flicker 1)	Flicker Window 1
904	35.522	86.958	44.900	1024×768	Int	N	N	RGB	IBM 8514A	Window (Format 0, Flicker 3)	Flicker Window 2
905	63.359	59.999	89.120	1024×1024	Prog	N	N	RGB	IBM 5080	Window (Format 0, Flicker 5)	Flicker Window 3
906	29.581	73.130	24.020	640×754	Int	N	N	RGB	IBM 5550	Window (Format 0, Flicker 7)	Flicker Window 4
907	63.364	60.003	111.520	1280×1024	Prog	N	N	RGB	IBM 6000		
908	15.714	59.978	6.380	323×246	Prog	N	N	RGB	NAVIGATION	Color bar (horizontal, 8 colors × 1)	Color Bar 1
909	35.000	66.667	30.240	640×480	Prog	N	N	RGB	Mac 480-66A	Color bar (horizontal, 8 colors × 2)	Color Bar 2

Internal program data PG1 No.880-909

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
910	34.967	66.603	31.330	640×480	Prog	N	N	RGB	Mac 480-66B	Color bar (vertical, 8 colors × 1)	Color Bar 3
911	48.828	66.888	50.000	800×600	Prog	N	N	RGB	Mac 600-66	Color bar (vertical, 8 colors × 2)	Color Bar 4
912	49.722	74.546	57.280	832×624	Prog	N	N	RGB	Mac 624-57	Color bar (horizontal, H=0.1%)	Color Bar 5
913	48.780	59.561	64.000	1024×768	Prog	N	N	RGB	Mac 768-60	Color bar (vertical, V=0.1%)	Color Bar 6
914	60.241	74.927	80.000	1024×768	Prog	N	N	RGB	Mac 768-75	OPT06 (color temperature)	Color Temp.
915	68.681	75.062	100.000	1152×870	Prog	N	N	RGB	Mac 870-75	OPT2D (random 256 colors)	Random 256 Color
916	24.823	56.416	21.050	640×400	Prog	N	N	RGB	NEC PC9801	OPT2A (256-color block “color” character)	256 Color Chara
917	32.857	79.847	47.840	1120×750	Int	N	N	RGB	NEC PC9801XL	OPT00 (256-block color)	256 Block Color
918	50.019	60.047	78.430	1120×750	Prog	N	N	RGB	NEC 768-60A	OPT03 (8 colors & 16 gray)	8Color & 16Gray
919	56.476	70.069	75.000	1024×768	Prog	N	N	RGB	NEC 768-70	Gray scale (4 steps)	Gray 4 step
920	64.603	59.929	107.500	1280×1024	Prog	N	N	RGB	NEC 1024-60	Gray scale (horizontal 8 gradations)	Gray 8 step (H)
921	74.882	69.853	127.000	1280×1024	Prog	N	N	RGB	NEC 1024-70	Gray scale (horizontal 16 gradations)	Gray 16 step (H)
922	78.855	74.112	135.000	1280×1024	Prog	N	N	RGB	NEC 1024-75	OPT1B (horizontal 32 gradations of gray)	Gray 32 step (H)
923	48.363	60.078	65.000	1024×768	Prog	N	N	RGB	NEC 768-60B	OPT1C (horizontal 64 gradations of gray)	Gray 64 step (H)
924	61.795	65.950	92.940	1152×900	Prog	N	N	RGB	SUN 900-66	OPT2B (horizontal linear gradation ramp)	Linear H Ramp
925	71.732	76.068	105.590	1152×900	Prog	N	N	RGB	SUN 900-76	Gray scale (vertical 8 gradations)	Gray 8 step (V)
926	70.838	84.031	92.940	1024×800	Prog	N	N	RGB	SUN 800-84	Gray scale (vertical 16 gradations)	Gray 16 step (V)
927	81.130	76.107	135.000	1280×1024	Prog	N	N	RGB	SUN 1024-76	OPT36 (RGBW horizontal linear ramp)	RGBW Ramp 1
928	63.384	60.023	107.500	1280×1024	Prog	N	N	RGB	SONY NEWS	OPT37 (RGBW vertical linear ramp)	RGBW Ramp 2
929	78.855	74.112	135.000	1280×1024	Prog	N	N	RGB	SONY 1024-74	OPT2C (vertical linear gradation ramp)	Linear V Ramp
930	78.855	74.112	135.000	1280×1024	Prog	N	N	RGB	SONY 1024-74	OPT01 (64-gradation block gray/white → black)	Gray 64 Block 1
931	48.485	59.637	64.000	1024×768	Prog	N	N	RGB	SGI Indigo768-60	OPT02 (64-gradation block gray/black → white)	Gray 64 Block 2
932	77.014	72.382	130.000	1280×1024	Prog	N	N	RGB	SGI Indigo1024-70	OPT34 (circle & crosshatch)	Circle & Cross
933	63.899	59.999	107.350	1280×1024	Prog	N	N	RGB	SGI IRIS4D	OPT0D (crosstalk width 90%)	Cross Talk 90%
934	63.331	59.973	108.170	1280×1024	Prog	N	N	RGB	HP 9000t1	OPT21 (crosstalk width 60%)	Cross Talk 60%
935	78.125	72.005	135.000	1280×1024	Prog	N	N	RGB	HP 9000t2	Black solid	Black
936	54.000	60.000	69.120	1024×864	Prog	N	N	RGB	VAX 768-60	White solid	RGB
937	70.660	66.473	119.840	1280×1024	Prog	N	N	RGB	VAX 1024-66	Red solid	R
938	60.046	75.057	78.780	1024×768	Prog	N	N	RGB	Fujitsu FMV 1024-75	Green solid	G
939	80.662	100.828	108.410	1024×768	Prog	N	N	RGB	Fujitsu FMV 1024-100	Blue solid	B

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
940	79.698	74.833	134.370	1280×1024	Prog	N	N	RGB	Fujitsu FMV5166	Magenta solid	R-B
941	80.381	75.122	135.040	1280×1024	Prog	N	N	RGB	Fujitsu FMV5133	Yellow solid	R-G
942	63.738	60.017	108.100	1280×1024	Prog	N	N	RGB	Fujitsu SIGMA	Cyan solid	G-B
943	78.160	71.640	135.060	1280×1024	Prog	N	N	RGB	HITACHI SXGA	Dot (H=20, V=20)	Dot H20 / V20
944	26.354	59.896	22.770	640×400	Prog	N	N	RGB	Panasonic M550	Dot (H=60, V=60)	Dot H60 / V60
945	46.875	75.000	49.500	800×600	Prog	P	P	RGB	VESA600-75	OPT00 (256-block color)	256 Block Color
946					Prog	N	N	RGB		OPT09 (crosshatch & circle & character)	Total Test
947	31.473	59.948	28.640	746×471	Prog	N	N	RGB	ASTRO SC-2025	OPT26 (SMPTE color version)	SMPTE RP133 COL
948	64.000	59.981	115.210	1400×1050	Prog	N	N	RGB	SXGA+	OPT30 (window & edge)	Window & Edge
949	94.643	59.599	265.010	2048×1536	Prog	N	N	RGB	QXGA	OPT0A (circle & line)	Circle & Line
950	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC (*p3)	Window (Format 0, Flicker 0, 2-3 pulldown)	2-3 pull-down Window 1
951	33.750	60.000	74.250	1920×1080	Int	P	P	YPbPr	1080i (*3,*p0)	Window (Format 0, Flicker 0, 2-3 pulldown)	2-3 pull-down Window 1
952					Prog	N	N	RGB		Black solid	Black
953					Prog	N	N	RGB		White solid	RGB
954					Prog	N	N	RGB		Red solid	R
955					Prog	N	N	RGB		Green solid	G
956	31.216	49.986	46.200	1170×1168	Int	N	N	RGB	MEDICAL-1I	Blue solid	B
957	31.216	50.026	46.200	1170×584	Prog	N	N	RGB	MEDICAL-1N	Magenta solid	R-B
958	30.692	60.003	36.830	947×946	Int	N	N	RGB	MEDICAL-2I	Yellow solid	R-G
959	30.692	60.062	36.830	947×473	Prog	N	N	RGB	MEDICAL-2N	Cyan solid	G-B
960	37.927	85.039	35.500	720×400	Prog	N	P	RGB	VESA400-88	OPT00 (256-block color)	256 Block Color
961	112.500	90.000	243.000	1600×1200	Prog	N	N	RGB	1200-90	OPT1A (ANSI Pattern Setup)	ANSI Pattern (S)
962					Prog	N	N	RGB		OPT30 (window & edge)	Window & Edge
963	63.981	60.020	108.000	1280×1024	Prog	P	P	RGB	VESA1024-60	OPT19 (65-step gradation gray scale V)	Gray 64 step (V)
964	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	SECAM (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
965	31.471	59.944	34.240	864×480	Prog	N	N	RGB	W-VGA	OPT05 (color bar & crosshatch)	Color & Cross
966	37.879	60.317	53.940	1072×600	Prog	N	N	RGB	W-SVGA	OPT07 (pairing)	Pairing
967	48.363	60.004	87.440	1376×768	Prog	N	N	RGB	W-XGA	OPT08 (crosshatch & circle & gray)	Cross & Circle
968	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC (*p3)	OPT0F (NTSC color bar)	NTSC Color Bar
969	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar

Internal program data PG1 No.940-969

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
970	67.500	60.000	148.500	1920×1080	Prog	P	P	YPbPr	1080P (*3,*p0)	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
971	67.433	59.940	148.352	1920×1080	Prog	P	P	YPbPr	1080P (*3,*p0)	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
972	33.750	60.000	74.250	1920×1080	Int	P	P	YPbPr	1080i (*3,*p0)	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
973	33.716	59.940	74.176	1920×1080	Int	P	P	YPbPr	1080i (*3,*p0)	OPT17 (SMPTE RP27.1)	SMPTE PR27.1
974	33.750	60.000	74.250	1920×1035	Int	P	P	YPbPr	1035i (*3,*p1)	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
975	33.716	59.940	74.176	1920×1035	Int	P	P	YPbPr	1035i (*3,*p1)	OPT26 (SMPTE color version)	SMPTE RP133 COL
976	45.000	60.000	74.250	1280×720	Prog	P	P	YPbPr	720P (*3,*p0)	OPT1D (ANSI Pattern Contrast)	ANSI Pattern (C)
977	44.955	59.940	74.176	1280×720	Prog	P	P	YPbPr	720P (*3,*p0)	OPT1E (gray scale + circle)	Gray & Circle
978	31.469	59.940	27.000	720×483	Prog	N	N	YPbPr	483P (*p2) (NTSC PROG.)	OPT29 (crosshatch & marker)	Cross & Marker
979	31.250	50.000	27.000	720×576	Prog	N	N	YPbPr	PAL*2 (*p2) (PAL PROG.)	OPT26 (SMPTE color version)	SMPTE RP133 COL
980	83.640	60.000	204.750	1792×1344	Prog	N	P	RGB	VESA1344-60	OPT35 (chessboard & window)	Checker & Window
981	83.640	60.000	204.750	1792×1344	Prog	N	P	RGB	VESA1344-60	OPT22 (ANSI Pattern Hor Reso)	ANSI Pattern (H)
982	86.333	59.995	218.250	1856×1392	Prog	N	P	RGB	VESA1392-60	OPT33 (19×15 crosshatch & marker)	D.Y.Test
983	86.333	59.995	218.250	1856×1392	Prog	N	N	RGB	VESA1392-60	OPT32 (3 gradation window)	TTL test
984	90.000	60.000	234.000	1920×1440	Prog	P	P	RGB	VESA1440-60	OPT16 (SMPTE color bar)	SMPTE Color Bar
985	90.000	60.000	234.000	1920×1440	Prog	N	P	RGB	VESA1440-60	OPT28 (timing chart)	Timing Chart
986					Prog	N	N	RGB			
987					Prog	N	N	RGB		Center & edge	Center & Edge
988					Prog	N	N	RGB		Edge & diagonal line	Diagonal & Edge 1
989					Prog	N	N	RGB		Edge & diagonal line & center	Diagonal & Edge 2
990					Prog	N	N	RGB		OPT24 (display position adjuster)	Display Position
991					Prog	N	N	RGB		OPT00 (256-block color)	256 Block Color
992					Prog	N	N	RGB			
993					Prog	N	N	RGB		Moving bar	Moving Bar
994	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-M (*p3)	OPT0F (NTSC color bar)	NTSC Color Bar
995	31.469	59.940	25.175	640×480	Prog	N	N	RGB	VGA480-60		
996	31.469	59.940	25.175	640×480	Prog	N	N	RGB	VGA480-60	OPT80 (image data #1 display)	IMG Disp #1
997	48.077	72.188	50.000	800×600	Prog	P	P	RGB	VESA600-72	OPT81 (image data #2 display)	IMG Disp #2
998	56.476	70.069	75.000	1024×768	Prog	N	N	RGB	VESA768-70	OPT82 (image data #3 display)	IMG Disp #3
999	79.976	75.025	135.000	1280×1024	Prog	P	P	RGB	VESA1024-75	OPT83 (image data #4 display)	IMG Disp #4

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
850	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-J 4:3 (*p3)	OPT2B (horizontal linear gradation ramp)	Linear H Ramp
851	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-J 16:9 (*p3)	OPT2C (vertical linear gradation ramp)	Linear V Ramp
852	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-J LB (*p3)	OPT36 (RGBW horizontal linear ramp)	RGBW Ramp1
853	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL 4:3 (*p2)	OPT37 (RGBW vertical linear ramp)	RGBW Ramp2
854	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL 16:9 (*p2)	OPT38 (horizontal ramp scroll)	Ramp Scroll (H)
855	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL LB (*p2)	OPT39 (vertical ramp scroll)	Ramp Scroll (V)
856	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	SECAM 4:3 (*p2)	OPT3A (diagonal ramp scroll)	Ramp Scroll (D)
857	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	SECAM 16:9 (*p2)	OPT3B (vertical loopback linear ramp)	Turn V Ramp
858	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	SECAM LB (*p2)	OPT3C (RGBW horizontal loopback linear ramp)	RGBW Ramp 4
859	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-M (*p3)	OPT3D (horizontal-vertical ramp)	H-V Ramp
860	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	NTSC-443 (*p3)	OPT3F (full-step horizontal ramp)	H Ramp1
861	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	PAL-M (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
862	15.734	59.940	13.500	712×484	Int	N	N	YPbPr	PAL-60 (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
863	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL-N (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
864	15.625	50.000	13.500	702×574	Int	N	N	YPbPr	PAL-Nc (*p2)	OPT0F (NTSC color bar)	NTSC Color Bar
865					Prog	N	N	RGB		OPT16 (SMPTE color bar)	SMPTE Color Bar
866	31.469	59.940	27.000	720×483	Prog	N	N	YPbPr	NTSC PROG. (*p2)	100%, 100% color bar	100%, 100% color bar
867	31.469	59.940	27.000	720×483	Prog	N	N	YPbPr	NTSC PROG. W (*p2)	75%, 75% color bar	75%, 75% color bar
868	31.469	59.940	27.000	720×483	Prog	N	N	YPbPr	NTSC PROG. LB (*p2)	OPT25 (SMPTE RP133)	SMPTE RP133 MONO
869	31.250	50.000	27.000	720×576	Prog	N	N	YPbPr	PAL PROG. (*p2)	OPT26 (SMPTE color version)	SMPTE RP133 COL
870	31.250	50.000	27.000	720×576	Prog	N	N	YPbPr	PAL PROG. W (*p2)	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3
871	31.250	50.000	27.000	720×576	Prog	N	N	YPbPr	PAL PROG. LB (*p2)	OPT2B (horizontal linear gradation ramp)	Linear Ramp (H)
872					Prog	N	N	RGB		64-step gradation gray scale	Gray 64 step
873	67.500	60.000	148.500	1920×1080	Prog	P	P	YPbPr	1920×1080@60p (*3*p0)	32-step gradation gray scale	Gray 32 step
874	67.433	59.940	148.352	1920×1080	Prog	P	P	YPbPr	1920×1080@59.94p (*3*p0)	16-step gradation gray scale	Gray 16 step
875	56.250	50.000	148.500	1920×1080	Prog	P	P	YPbPr	1920×1080@50p (*3*p0)	8-step gradation gray scale	Gray 8 step
876	33.750	30.000	74.250	1920×1080	Prog	P	P	YPbPr	1920×1080@30p (*3*p0)	4-step gradation gray scale	Gray 4 step
877	33.716	29.970	74.176	1920×1080	Prog	P	P	YPbPr	1920×1080@29.97p (*3*p0)	OPT13 (gamma correction ramp wr=2.5)	Gamma Ramp 1
878	28.125	25.000	74.250	1920×1080	Prog	P	P	YPbPr	1920×1080@25p (*3*p0)	OPT14 (gamma correction ramp r=2.0)	Gamma Ramp 2
879	27.000	24.000	74.250	1920×1080	Prog	P	P	YPbPr	1920×1080@24p (*3*p0)	OPT15 (gamma correction ramp r=0.5)	Gamma Ramp 3

Internal program data PG2 No.850-879

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
880	26.973	23.976	74.176	1920×1080	Prog	P	P	YPbPr	1920×1080@23.98p (*3*p0)	OPT2C (vertical linear gradation ramp)	Linear V Ramp
881	33.750	60.000	74.250	1920×1080	Int	P	P	YPbPr	1920×1080@60i (*3*p0)	OPT2B (horizontal linear gradation ramp)	Linear H Ramp
882	33.716	59.940	74.176	1920×1080	Int	P	P	YPbPr	1920×1080@59.94i (*3*p0)	OPT2C (vertical linear gradation ramp)	Linear V Ramp
883	28.125	50.000	74.250	1920×1080	Int	P	P	YPbPr	1920×1080@50i (*3*p0)	Vertical 16-step gradation gray scale	Gray 16 step (V)
884	33.750	60.000	74.250	1920×1080	Int	P	P	YPbPr	1920×1080@30sf (*3*p0)	Vertical 8-step gradation gray scale	Gray 8 step (V)
885	33.716	59.940	74.176	1920×1080	Int	P	P	YPbPr	1920×1080@29.97sf (*3*p0)	Vertical 4-step gradation gray scale	Gray 4 step (V)
886	28.125	50.000	74.250	1920×1080	Int	P	P	YPbPr	1920×1080@25sf (*3*p0)	OPT38 (horizontal ramp scroll)	Ramp scroll (H)
887	27.000	48.000	74.250	1920×1080	Int	P	P	YPbPr	1920×1080@24sf (*3*p0)	OPT39 (vertical ramp scroll)	Ramp scroll (V)
888	26.973	47.952	74.176	1920×1080	Int	P	P	YPbPr	1920×1080@23.98sf (*3*p0)	Moving bar	Moving bar
889					Prog	N	N	RGB		OPT3A (diagonal ramp scroll)	Ramp scroll (diagonal)
890	45.000	60.000	74.250	1280×720	Prog	P	P	YPbPr	1280×720@60p (*3*p0)	Black solid	Black
891	44.955	59.940	74.176	1280×720	Prog	P	P	YPbPr	1280×720@59.94p (*3*p0)	White solid	RGB
892	37.500	50.000	74.250	1280×720	Prog	P	P	YPbPr	1280×720@50p (*3*p0)	Red solid	R
893	22.500	30.000	74.250	1280×720	Prog	P	P	YPbPr	1280×720@30p (*3*p0)	Green solid	G
894	22.478	29.970	74.176	1280×720	Prog	P	P	YPbPr	1280×720@29.97p (*3*p0)	Blue solid	B
895	18.750	25.000	74.250	1280×720	Prog	P	P	YPbPr	1280×720@25p (*3*p0)	Magenta solid	RB
896	18.000	24.000	74.250	1280×720	Prog	P	P	YPbPr	1280×720@24p (*3*p0)	Yellow solid	RG
897	17.982	23.976	74.176	1280×720	Prog	P	P	YPbPr	1280×720@23.98p (*3*p0)	Cyan solid	GB
898	33.750	60.000	74.250	1920×1035	Int	P	P	YPbPr	1920×1035@60i (*3*p1)	1-dot checker	1dot Checker
899	33.716	59.940	74.176	1920×1035	Int	P	P	YPbPr	1920×1035@59.94i (*3*p1)	OPT3C (RGBW horizontal loopback linear ramp)	RGBW Ramp 4
900	31.250	50.000	74.250	1920×1080	Int	N	N	YPbPr	SMPTE295Mi (*p1)	Sub-pixel checker	Sub-pixel Checker
901	62.500	50.000	148.500	1920×1080	Prog	N	N	YPbPr	SMPTE295Mp (*p1)	OPT00 (256-color block color)	256 Block Color
902	31.250	50.000	48.000	1280×1152	Int	P	P	YPbPr	AUS 1152i (*p1)	Moving window 1	Moving Window 1
903	31.250	50.000	72.000	1920×1080	Int	P	N	YPbPr	AUS 1080i (*p1)	Moving window 2	Moving Window 2
904					Prog	N	N	RGB		Moving window 3	Moving Window 3
905					Prog	N	N	RGB		Flicker window 1	Flicker Window 1
906					Prog	N	N	RGB		Flicker window 2	Flicker Window 2
907					Prog	N	N	RGB		Flicker window 3	Flicker Window 3
908					Prog	N	N	RGB		Flicker window 4	Flicker Window 4
909	31.469	59.940	25.175	640×480	Prog	N	N	RGB	EIA640×480p@59.94	OPT2A (256-color block “color” character)	256 Color Chara

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
910	31.500	60.000	25.200	640×480	Prog	N	N	RGB	EIA640×480p@60	OPT2D (random 256-color color bars)	Random 256 Color
911	31.469	59.940	27.000	720×480	Prog	N	N	RGB	EIA720×480p@59.94	OPT01 (64-step gradation block gray scale white -> black)	Gray 64 Block 1
912	31.500	60.000	27.027	720×480	Prog	N	N	RGB	EIA720×480p@60	OPT02 (64-step gradation block gray scale black -> white)	Gray 64 Block 2
913	31.469	59.940	27.000	720×480	Prog	N	N	RGB	EIA720×480pW@59.94	OPT03 (8 color bar & 16 gray scale)	8 Color & 16 Gray
914	31.500	60.000	27.027	720×480	Prog	N	N	RGB	EIA720×480pW@60	OPT04 (gray scale & crosshatch)	Gray & Cross
915	44.955	59.939	74.175	1280×720	Prog	P	P	RGB	EIA1280×720p@59.94	OPT05 (color bar & crosshatch)	Color & Cross
916	45.000	60.000	74.250	1280×720	Prog	P	P	RGB	EIA1280×720p@60	OPT06 (color temperature)	Color Temp.
917	33.716	59.939	74.175	1920×1080	Int	P	P	RGB	EIA1920×1080i@59.94	OPT07 (pairing)	Pairing
918	33.750	60.000	74.250	1920×1080	Int	P	P	RGB	EIA1920×1080i@60	OPT08 (crosshatch & circle & gray)	Cross & Circle
919					Prog	N	N	RGB		OPT09 (crosshatch & circle & character)	Total Test
920					Prog	N	N	RGB		OPT0A (circle & line)	Circle & Line
921					Prog	N	N	RGB		OPT0B (character edge H)	H Character Line
922					Prog	N	N	RGB		OPT0C (character edge O)	O Character Line
923	67.432	59.939	148.350	1920×1080	Prog	P	P	RGB	EIA1920×1080p@59.94	OPT0D (crosstalk width 90%)	Cross Talk 90%
924	67.500	60.000	148.500	1920×1080	Prog	P	P	RGB	EIA1920×1080p@60	OPT21 (crosstalk width 60%)	Cross Talk 60%
925	31.250	50.000	27.000	720×576	Prog	N	N	RGB	EIA720×576p@50	OPT10 (sine wave scroll)	Sign Wave Scroll
926	31.250	50.000	27.000	720×576	Prog	N	N	RGB	EIA720×576pW@50	OPT11 (multi burst)	Multi Burst
927	37.500	50.000	74.250	1280×720	Prog	P	P	RGB	EIA1280×720p@50	OPT12 (10 steps & 1/10 MHz)	1/10MHz × 10step
928	28.125	50.000	74.250	1920×1080	Int	P	P	RGB	EIA1920×1080i@50	OPT17 (SMPTE PR27.1)	SMPTE PR27.1
929	31.469	59.940	25.175	640×480	Prog	N	N	RGB	EIA640×480p@59.94	OPT18 (vertical 32-step gradation gray scale)	Gray 32 step (V)
930	31.469	59.940	25.175	640×480	Prog	N	N	RGB	EIA640×480p@59.94	OPT19 (vertical 64-step gradation gray scale)	Gray 64 step (V)
931	56.250	50.000	148.500	1920×1080	Prog	P	P	RGB	EIA1920×1080p@50	OPT1A (ANSI Pattern Setup)	ANSI Pattern (S)
932	26.973	23.976	74.175	1920×1080	Prog	P	P	RGB	EIA1920×1080p@23.97	OPT1D (ANSI Pattern Contrast)	ANSI Pattern (C)
933	27.000	24.000	74.250	1920×1080	Prog	P	P	RGB	EIA1920×1080p@24	OPT2F (256 gray & RGBW color bar superimposed)	256 Gray & Color
934	28.125	25.000	74.250	1920×1080	Prog	P	P	RGB	EIA1920×1080p@25	OPT1E (gray scale & circle)	Gray & Circle
935	33.716	29.970	74.175	1920×1080	Prog	P	P	RGB	EIA1920×1080p@29.97	OPT20 (corner & center point marker)	Corner & Center
936	33.750	30.000	74.250	1920×1080	Prog	P	P	RGB	EIA1920×1080p@30	OPT24 (display position adjuster)	Display Position
937					Prog	N	N	RGB		OPT27 (song of youth)	Words
938					Prog	N	N	RGB		OPT28 (timing chart)	Timing Chart
939					Prog	N	N	RGB		OPT0E (DDC pattern - EDID display)	DDC Func5

Internal program data PG2 No.910-939

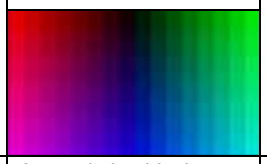
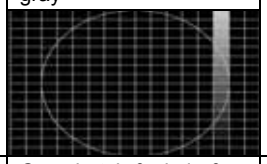
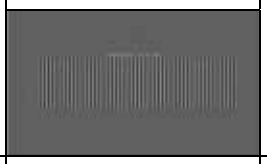
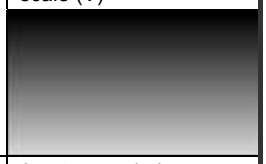
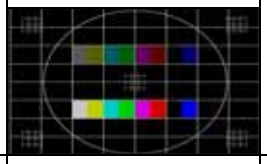
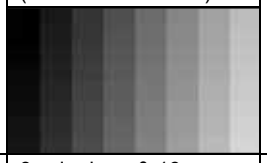
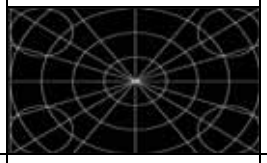
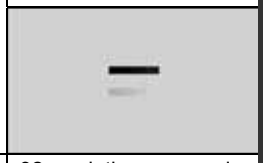
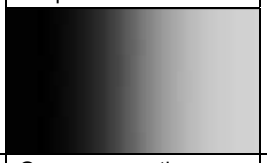
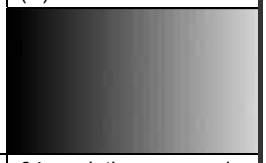
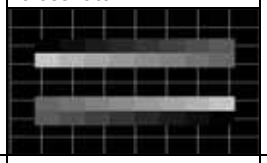
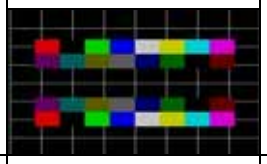
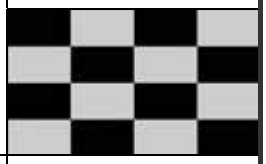
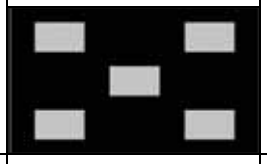
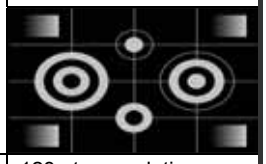
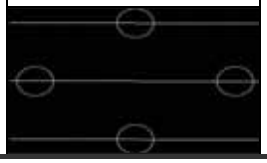
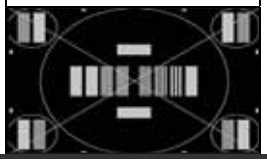
Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
940	37.861	85.080	31.500	640×350	Prog	P	N	RGB	VESA640×350@85	OPT23 (ANSI pattern vertical resolution)	ANSI Pattern (V)
941	37.861	85.080	31.500	640×400	Prog	N	P	RGB	VESA640×400@85	OPT22 (ANSI pattern horizontal resolution)	ANSI Pattern (H)
942	37.927	85.039	35.500	720×400	Prog	N	P	RGB	VESA720×400@85	Character list 7×9	Character List
943	31.469	59.940	25.175	640×480	Prog	N	N	RGB	VESA640×480@60	Character 1 (H 5×7 / 10×14)	H Character 1
944	37.861	72.809	31.500	640×480	Prog	N	N	RGB	VESA640×480@72	Character 1 (H 7×9 / 14×18)	H Character 2
945	37.500	75.000	31.500	640×480	Prog	N	N	RGB	VESA640×480@75	Character 1 (H 16×16 / 32×32)	H Character 3
946	43.269	85.008	36.000	640×480	Prog	N	N	RGB	VESA640×480@85	Character 2 (H 5×7 / 10×14)	H Character 4
947	31.020	60.000	33.750	848×480	Prog	P	P	RGB	VESA848×480@60	Character 2 (H 7×9 / 14×18)	H Character 5
948	35.156	56.250	36.000	800×600	Prog	P	P	RGB	VESA800×600@56	Character 2 (H 16×16 / 32×32)	H Character 6
949	37.879	60.317	40.000	800×600	Prog	P	P	RGB	VESA800×600@60	Character 1 (Chinese character “BI” 7×9 / 64×64)	Chinese Chara 1
950	48.077	72.188	50.000	800×600	Prog	P	P	RGB	VESA800×600@72	Character me (#1 18×18)	me Character 1
951	46.875	75.000	49.500	800×600	Prog	P	P	RGB	VESA800×600@75	Character me (VESA specifications 18×18)	me Character 2
952	53.674	85.061	56.250	800×600	Prog	P	P	RGB	VESA800×600@85	Burst (Format 0)	Burst 1
953	35.522	86.958	44.900	1024×768	Int	P	P	RGB	VESA1024×768@43	Burst (Format 1)	Burst 2
954	48.363	60.004	65.000	1024×768	Prog	N	N	RGB	VESA1024×768@60	Burst (Format 2)	Burst 3
955	56.476	70.069	75.000	1024×768	Prog	N	N	RGB	VESA1024×768@70	Burst (Format 3)	Burst 4
956	60.023	75.029	78.780	1024×768	Prog	P	P	RGB	VESA1024×768@75	Circle (Format 0)	Circle 1
957	68.677	84.997	94.500	1024×768	Prog	P	P	RGB	VESA1024×768@85	Circle (Format 1)	Circle 2
958	67.500	75.000	108.000	1152×864	Prog	P	P	RGB	VESA1152×864@75	Circle (Format 2)	Circle 3
959	47.396	59.995	68.250	1280×768	Prog	P	N	RGB	VESA1280×768@60	Circle (Format 3)	Circle 4
960	47.776	59.870	79.500	1280×768	Prog	N	P	RGB	VESA1280×768@60	Circle (Format 4)	Circle 5
961	60.289	74.893	102.250	1280×768	Prog	N	P	RGB	VESA1280×768@75	Circle (Format 5)	Circle 6
962	68.633	84.837	117.500	1280×768	Prog	N	P	RGB	VESA1280×768@85	Circle (Format 6)	Circle 7
963	60.000	60.000	108.000	1280×960	Prog	P	P	RGB	VESA1280×960@60	Window (Format 0, Flicker 0)	Window 1
964	85.938	85.002	148.500	1280×960	Prog	P	P	RGB	VESA1280×960@85	Window (Format 1, Flicker 0)	Window 2
965	63.981	60.020	108.000	1280×1024	Prog	P	P	RGB	VESA1280×1024@60	Window (Format 2, Flicker 0)	Window 3
966	79.976	75.025	135.000	1280×1024	Prog	P	P	RGB	VESA1280×1024@75	Window (Format 3, Flicker 0)	Window 4
967	91.146	85.024	157.500	1280×1024	Prog	P	P	RGB	VESA1280×1024@85	Window (Format 4, Flicker 0)	Window 5
968	47.712	60.015	85.500	1360×768	Prog	P	P	RGB	VESA1360×768@60	Window (Format 5, Flicker 0)	Window 6
969	64.744	59.948	101.000	1400×1050	Prog	P	N	RGB	VESA1400×1050@60	Window (Format 8, Flicker 7)	Moving Window 1

Program No.	Horizontal frequency [KHz]	Vertical frequency [Hz]	Dot clock frequency [MHz]	No. of display dots (H×V)	Int / Prog	Sync polarity		Color difference	Timing data name	Pattern data	Pattern data name
						H	V				
970	65.317	59.978	121.750	1400×1050	Prog	N	P	RGB	VESA1400×1050@60	Window (Format 9, Flicker 7)	Moving Window 2
971	82.278	74.867	156.000	1400×1050	Prog	N	P	RGB	VESA1400×1050@75	Window (Format E, Flicker 7)	Moving Window 3
972	93.881	84.960	179.500	1400×1050	Prog	N	P	RGB	VESA1400×1050@85	Window (Format F, Flicker 7)	Window Level
973	75.000	60.000	162.000	1600×1200	Prog	P	P	RGB	VESA1600×1200@60	Window (Format 0, Flicker 1)	Flicker Window 1
974	81.250	65.000	175.500	1600×1200	Prog	P	P	RGB	VESA1600×1200@65	Window (Format 0, Flicker 3)	Flicker Window 2
975	87.500	70.000	189.000	1600×1200	Prog	P	P	RGB	VESA1600×1200@70	Window (Format 0, Flicker 5)	Flicker Window 3
976	93.750	75.000	202.500	1600×1200	Prog	P	P	RGB	VESA1600×1200@75	Window (Format 0, Flicker 7)	Flicker Window 4
977	106.250	85.000	229.500	1600×1200	Prog	P	P	RGB	VESA1600×1200@85	Window (Format 0, Flicker 0, 2-3 pull-down)	2-3 pull-down Window 1
978	83.640	60.000	204.750	1792×1344	Prog	N	P	RGB	VESA1792×1344@60	Dot (H=20, V=20)	Dot H20/V20
979	106.270	74.997	261.000	1792×1344	Prog	N	P	RGB	VESA1792×1344@75	Dot (H=60, V=60)	Dot H60/V60
980	86.333	59.995	218.250	1856×1392	Prog	N	P	RGB	VESA1856×1392@60	0% Window	0% Window
981	112.500	75.000	288.000	1856×1392	Prog	N	P	RGB	VESA1856×1392@75	5% Window	5% Window
982	74.038	59.950	154.000	1920×1200	Prog	P	N	RGB	VESA1920×1200@60	10% Window	10% Window
983	74.556	59.885	193.250	1920×1200	Prog	N	P	RGB	VESA1920×1200@60	20% Window	20% Window
984	94.038	74.930	245.250	1920×1200	Prog	N	P	RGB	VESA1920×1200@75	30% Window	30% Window
985	107.184	84.932	281.250	1920×1200	Prog	N	P	RGB	VESA1920×1200@85	40% Window	40% Window
986	90.000	60.000	234.000	1920×1440	Prog	N	P	RGB	VESA1920×1440@60	50% Window	50% Window
987	112.500	75.000	297.000	1920×1440	Prog	N	P	RGB	VESA1920×1440@75	60% Window	60% Window
988					Prog	N	N	RGB		70% Window	70% Window
989					Prog	N	N	RGB		80% Window	80% Window
990					Prog	N	N	RGB		90% Window	90% Window
991					Prog	N	N	RGB		100% Window	100% Window
992					Prog	N	N	RGB		OPT80 (image data #1 display)	IMG Disp #1
993					Prog	N	N	RGB		OPT81 (image data #2 display)	IMG Disp #2
994					Prog	N	N	RGB		OPT82 (image data #3 display)	IMG Disp #3
995					Prog	N	N	RGB		OPT83 (image data #4 display)	IMG Disp #4
996					Prog	N	N	RGB		OPT84 (image data #5 display)	IMG Disp #5
997					Prog	N	N	RGB		OPT85 (image data #6 display)	IMG Disp #6
998					Prog	N	N	RGB		OPT86 (image data #7 display)	IMG Disp #7
999					Prog	N	N	RGB		OPT87 (image data #8 display)	IMG Disp #8

Internal program data PG2 No.970-999

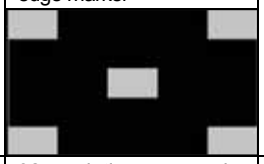
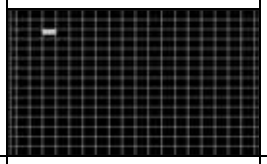
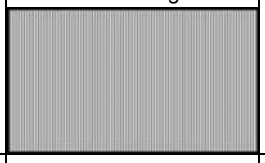
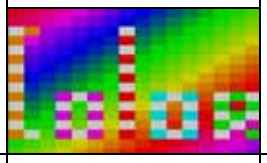
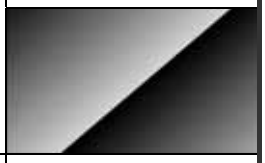
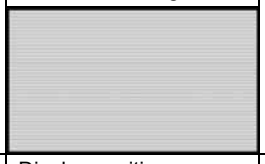
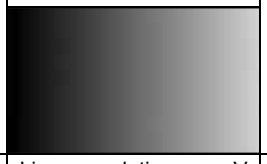
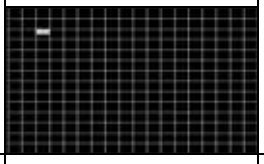
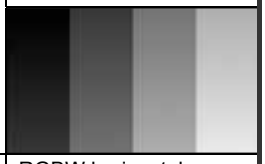
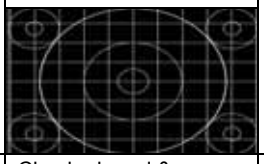
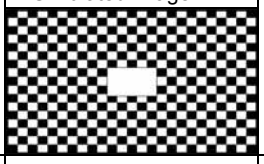
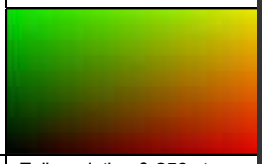
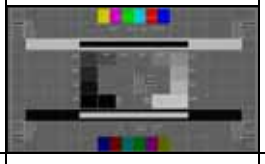
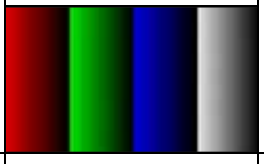
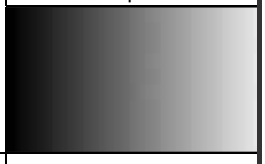
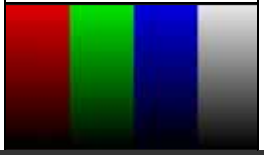
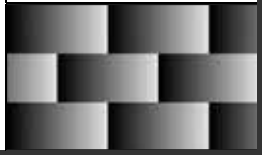
9.1.2 Optional pattern data

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

No.	Pattern	No.	Pattern	No.	Pattern	No.	Pattern
00	256-color block color 	**08**	Crosshatch & circle & gray 	**10**	Sine wave scroll 	**18**	32-step gradation gray scale (V) 
01	64-gradation block gray (from white to black) 	**09**	Crosshatch & circle & character 	**11**	Multi burst 	**19**	64-step gradation gray scale (V) 
02	64-gradation block gray (from black to white) 	**0A**	Circle & line 	**12**	10 steps & 1/10 MHz 	**1A**	ANSI pattern (Setup) 
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**	ANSI pattern (Contrast) 
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 gradation gray scale (H) 

*1: Refer to “9.1.2.1 Concerning the DDC patterns (No.0E, 2E).”

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

No.	Pattern	No.	Pattern	No.	Pattern	No.	Pattern
20	Corner & center point marker 	**28**	Timing chart 	**30**	Center, corner window & edge marker 	**38**	Ramp scroll (H) *2 
21	Crosstalk (width 60%) 	**29**	Crosshatch & marker 	**31**	32-gradation gray scale (H) 	**39**	Ramp scroll (V) *2 
22	ANSI pattern (Hor Reso) * Simulated image 	**2A**	256-color block color “Color” letters 	**32**	3-gradation window 	**3A**	Ramp scroll (diagonal) *2 
23	ANSI pattern (Ver Reso) * Simulated image 	**2B**	Linear gradation ramp H direction *2 	**33**	19×15 crosshatch & marker 	**3B**	Vertical loopback linear ramp *2 
24	Display position adjuster 	**2C**	Linear gradation ramp V direction *2 	**34**	Crosshatch & circle 	**3C**	RGBW horizontal loopback linear ramp *2 
25	SMPTE RP-133 	**2D**	Random 256-color color bar 	**35**	Checkerboard & window * Simulated image 	**3D**	Different color H-V direction ramp *2, 3 
26	SMPTE color version 	**2E**	DDC pattern *1 (binary) 	**36**	RGBW horizontal direction linear ramp *2 	**3E**	Full gradation & 256-step gradation horizontal direction ramp *2 
27	Song of youth 	**2F**	256 gray & RGBW color bar superimposed (full color) 	**37**	RGBW vertical direction linear ramp *2 	**3F**	Full step horizontal direction ramp *2 

*1: Refer to “9.1.2.1 Concerning the DDC patterns (No.0E, 2E).”
*2: Refer to “9.1.2.2 Concerning the full-step gradation patterns (No.2B, 2C, 36 to 3F).”
*3: Refer to “9.1.2.3 Concerning the multi-color H-V direction ramp (No.3D).”

9.1.2.1 Concerning the DDC patterns (No.0E, 2E)

If a DDC pattern is executed when “Enable” is set for “[9] Setting the DDC pattern” of config edit FUNC5, EDID is captured from the receiver (such as a display) connected to the port selected as the “priority output” setting, and displayed.

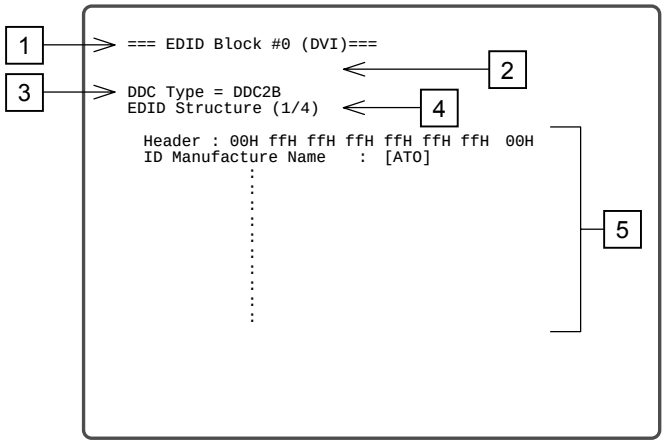
The priority output is set using “[20] Setting the internal program priority output” of config edit FUNC5

or using “
[1] Setting the priority output” under “5.4.1 Settings common to all outputs” in the output condition data setting section.

Optional patterns No.0E and 2E serve as DDC patterns. Pattern No.0E is shown as a GUI display; pattern No.2E is shown as a hexadecimal display.

The contents of the GUI display and hexadecimal display are as shown below.

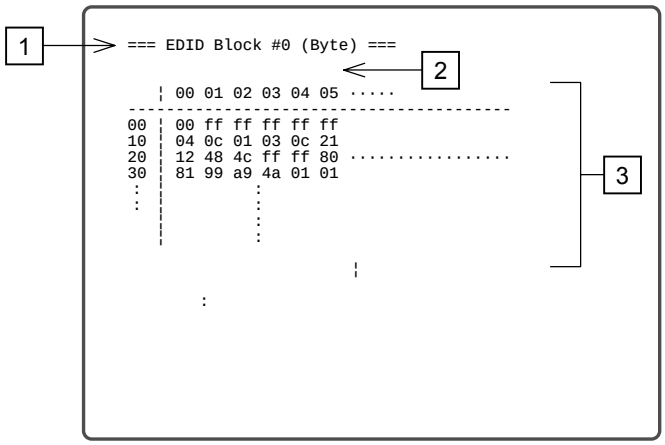
● GUI display of EDID (optional pattern No.0E)



No.	Display contents
1	Block number of EDID
2	Details of EDID error (appears only when an error has occurred)
3	DDC type
4	Number of pages in block indicated at 1
5	Contents of EDID (GUI display)

* Switch between the pages using the [►] and [◄] keys.

● Hexadecimal display of EDID (optional pattern No.2E)



No.	Display contents
1	Block number of EDID
2	Details of EDID error (appears only when an error has occurred)
3	Contents of EDID (hexadecimal display)

* Switch between the pages using the [►] and [◄] keys.

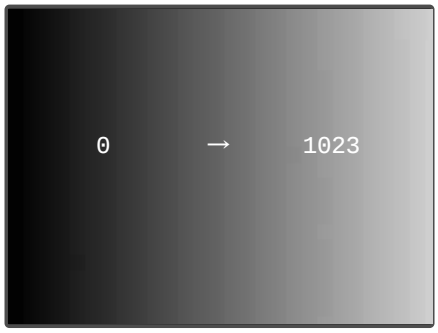
* If it is not possible to obtain the EDID because the receiver was not connected to the specified port or for some other reason, the above displays do not appear, and “EDID Read Error” is indicated at the top left of the display instead.

9.1.2.2 Concerning the full-step gradation patterns (No.2B, 2C, 36 to 3F)

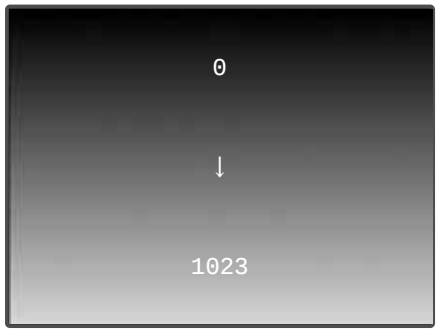
Optional patterns No.2B, 2C and 36 to 3F are output linearly in accordance with the output bit mode established. Shown below are examples indicating level changes in the 10-bit mode.

8bit/LUT10bit mode→256-step gradation | 10bit mode→1024-step gradation | 12bit mode→4096-step gradation

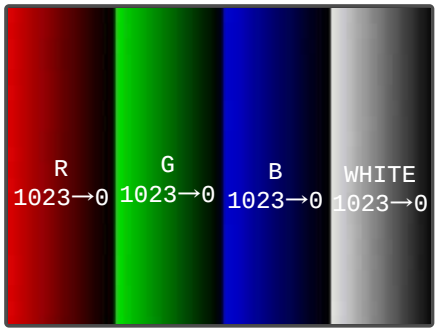
No.2B



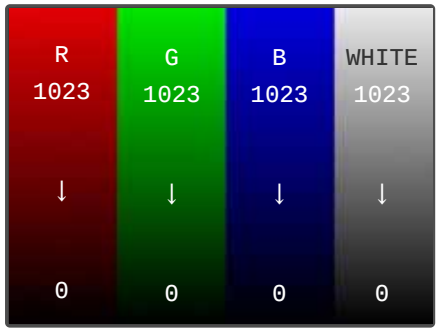
No.2C



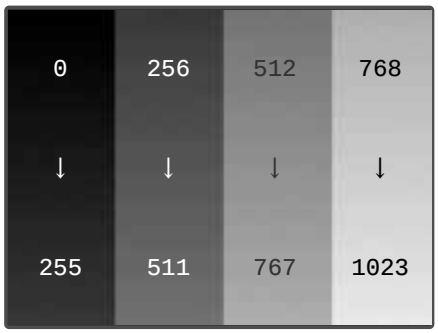
No.36



No.37

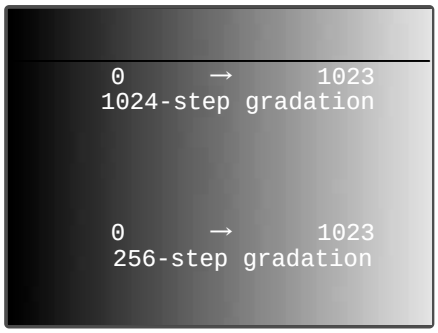


No.3B



No.3C

No.3E



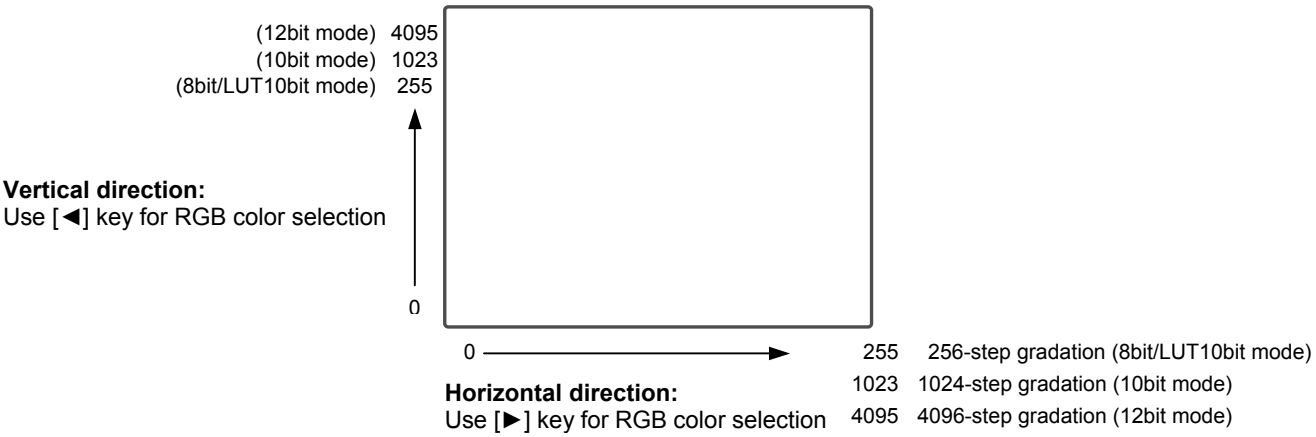
The 256-step gradation always applies for the bottom level no matter which output bit mode is established.

No.3F (when Hdisp is 500 dots)

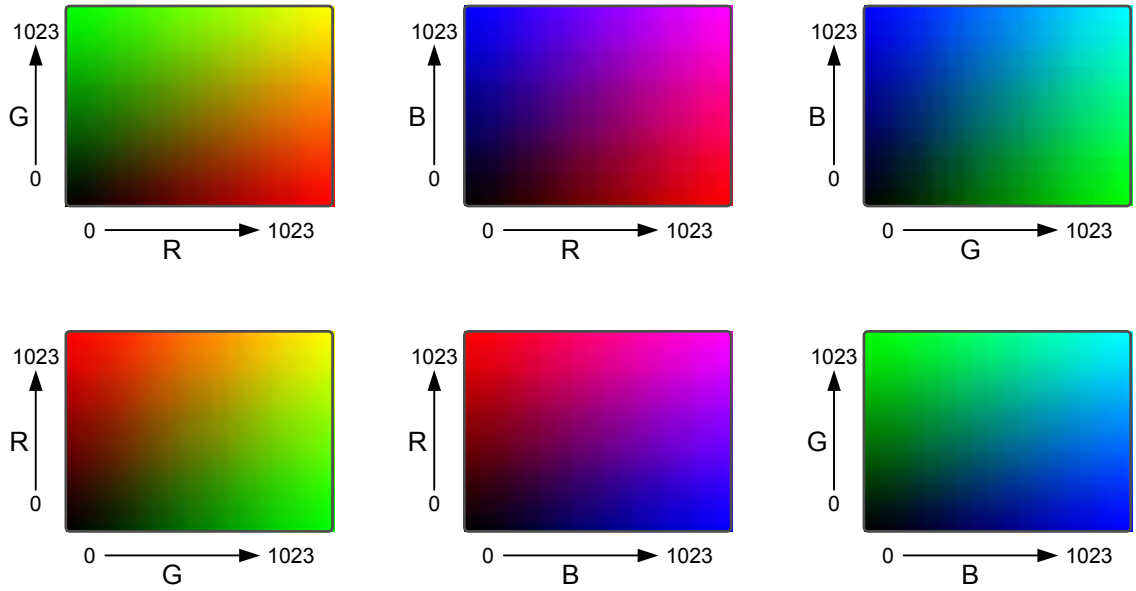
1step / 1dot

9.1.2.3 Concerning the multi-color H-V direction ramp (No.3D)

Optional pattern No.3D is a full-step gradation pattern. It is output linearly in accordance with the output bit mode established. The ramp colors are changed in the horizontal direction using the [►] key and in the vertical direction using the [◄] key. The following six patterns can be displayed.



<Patterns which can be displayed (levels in the 10-bit mode)>

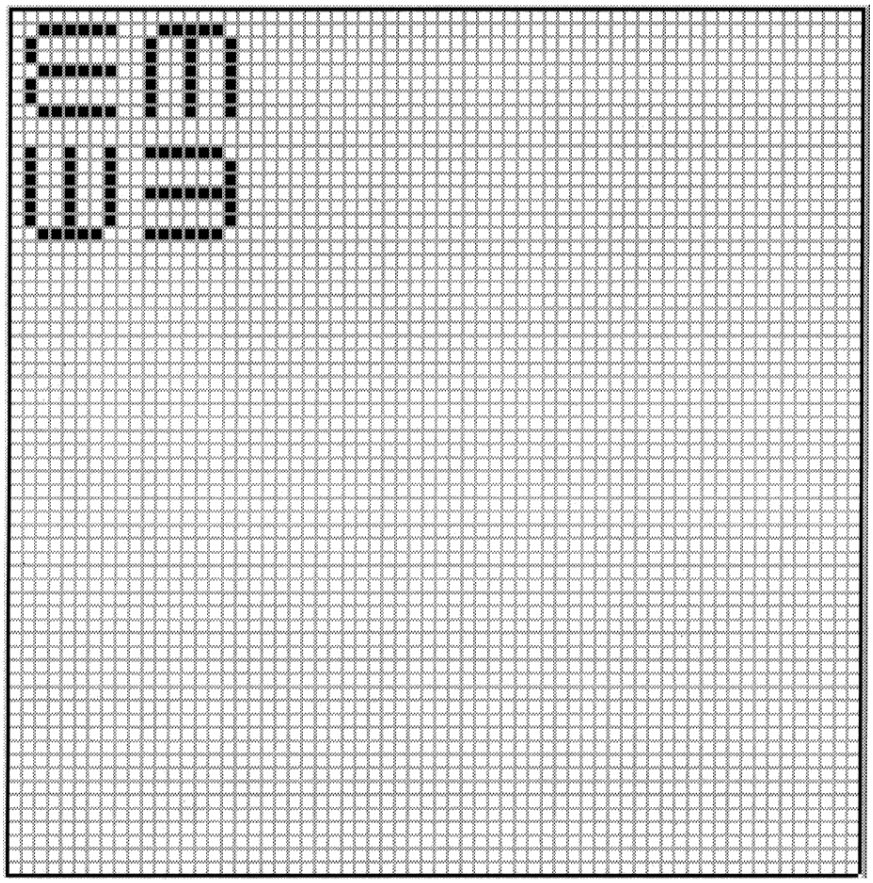


9.1.3 User character pattern data

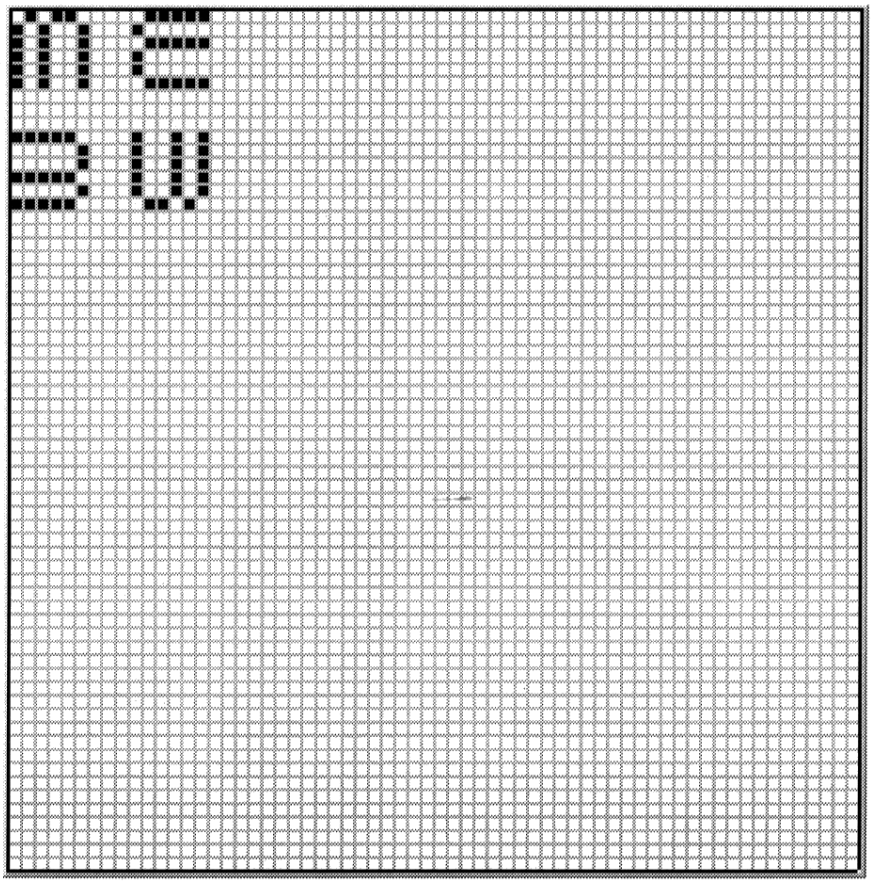
Code (H)	Description	Cell size	Reference page
F0	Letters “me” #1	18 × 18	p.158
F1	Letters “me” #2 (VESA specifications)	18 × 18	p.158
F2	Chinese character “AI”	64 × 64	p.159
F3	Chinese character “BI”	64 × 64	p.159
F4	Chinese character “TAKA”	32 × 32	p.160
F5	Chinese character “KIRI”	32 × 32	p.160
F6	Chinese character “KEN”	32 × 32	p.161
F7	Burst	64 × 64	p.161
F8			
F9			
FA			
FB			
FC			
FD			
FE			
FF			

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

F0H

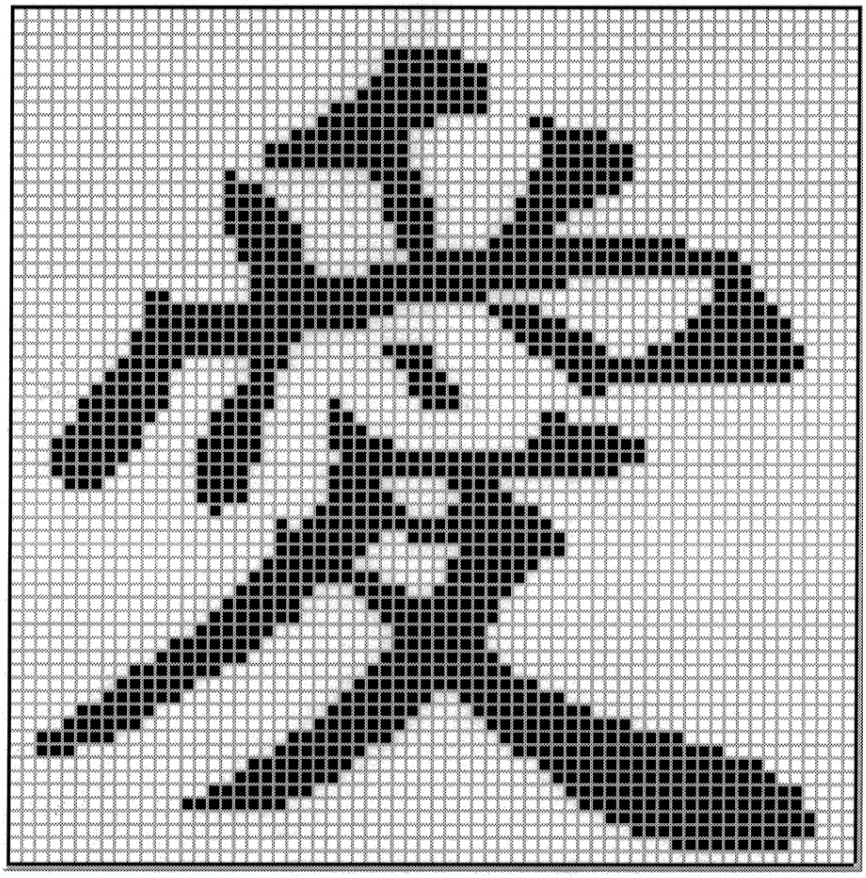


F1H

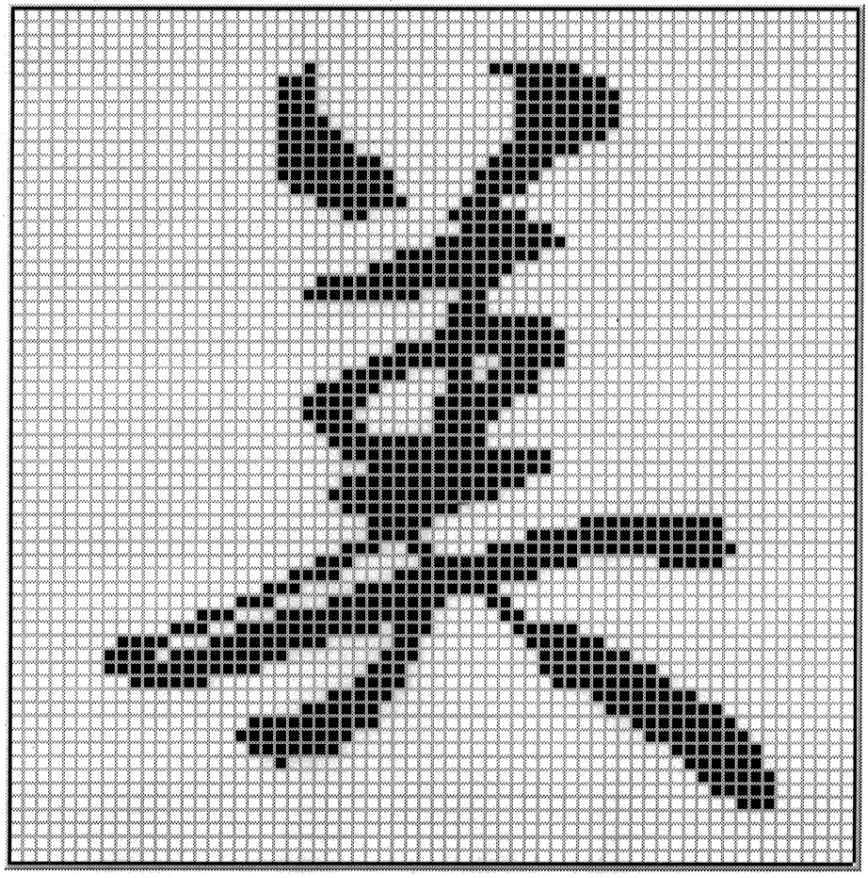


■ F2H [Chinese character “AI”]/F3H [Chinese character “BI”]

F2H

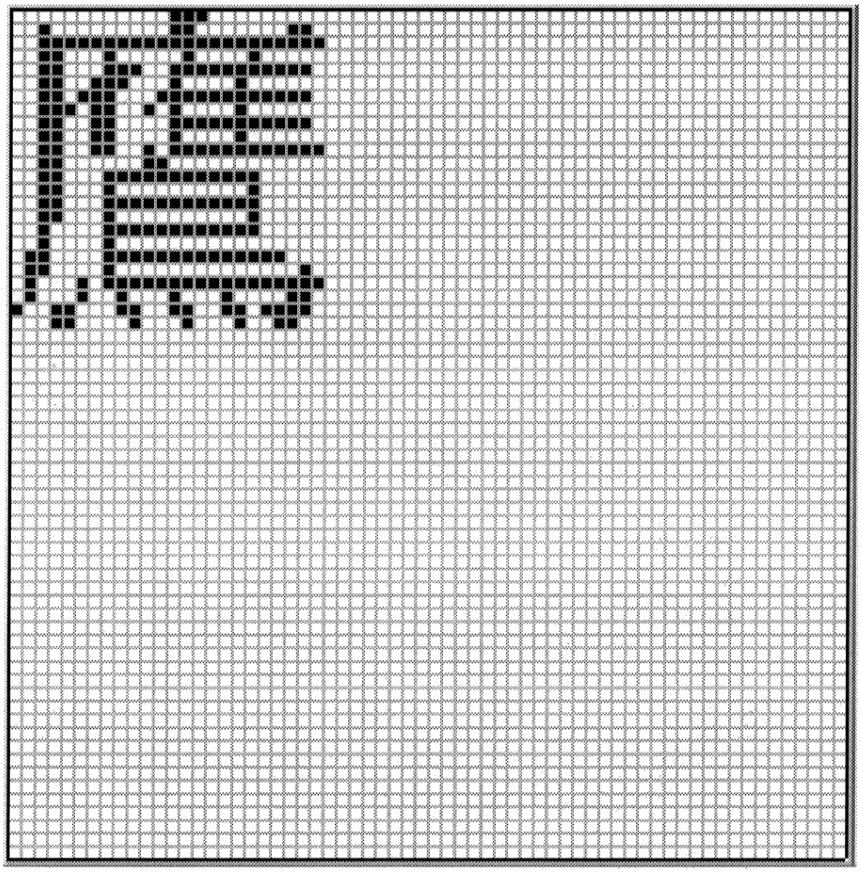


F3H

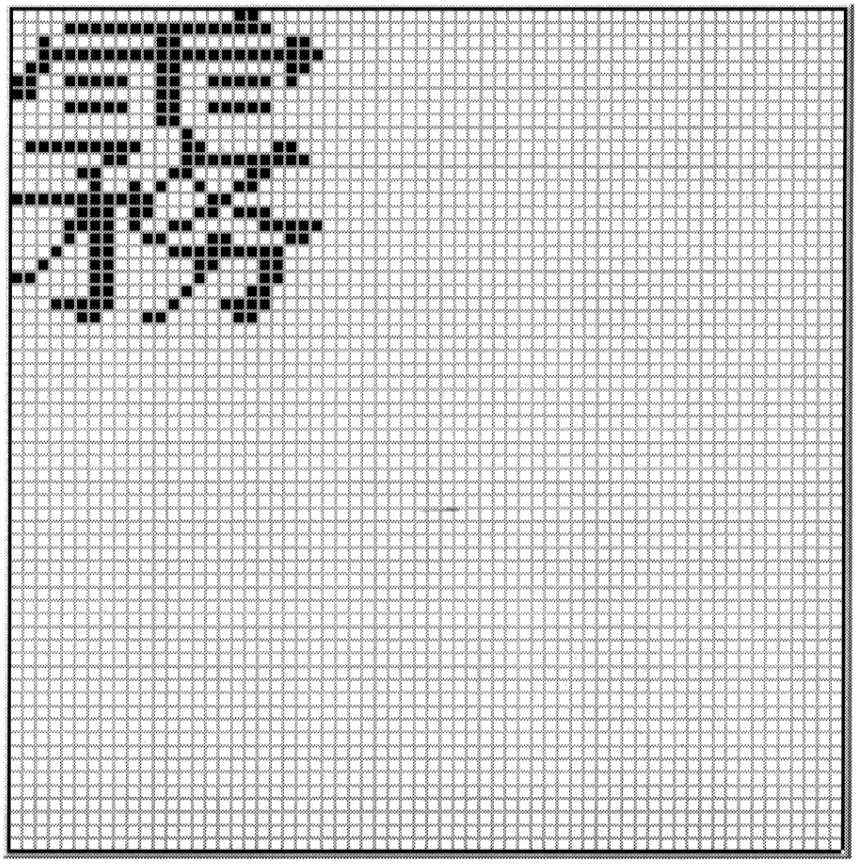


■ F4H [Chinese character “TAKA”]/F5H [Chinese character “KIRI”]

F4H

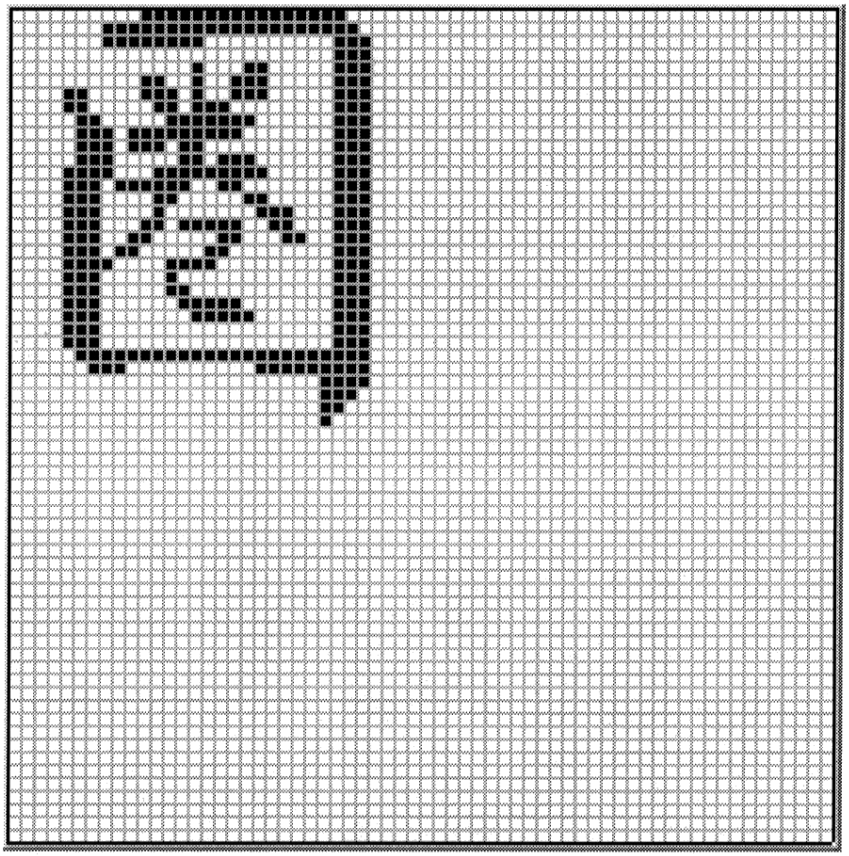


F5H

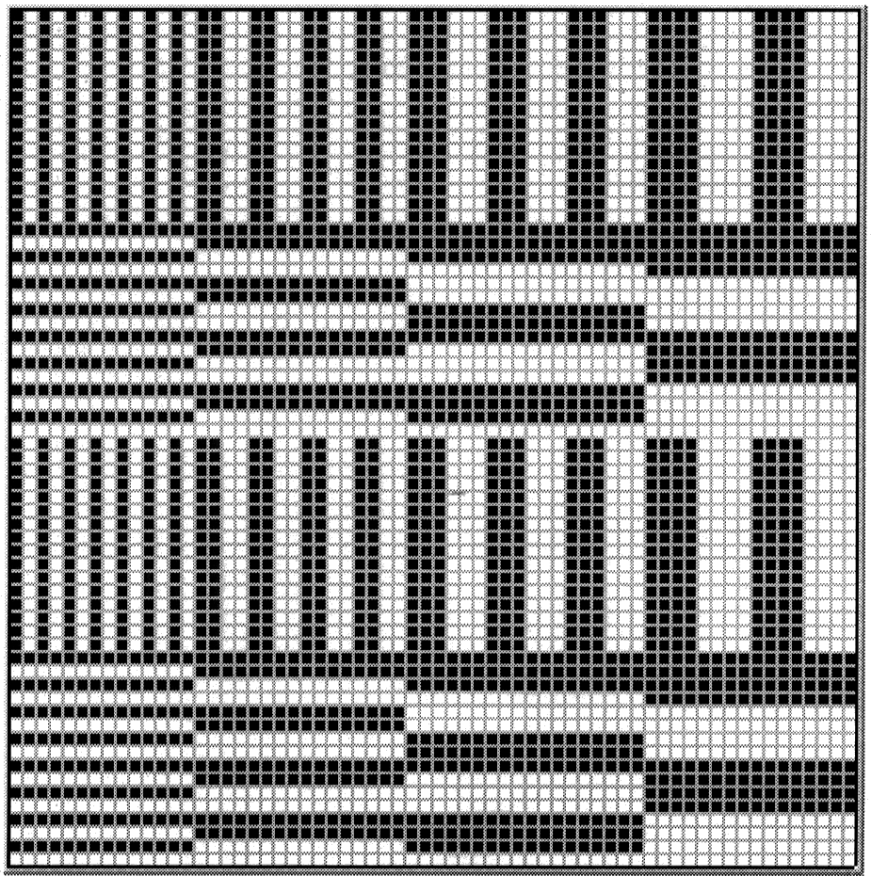


■ F6H [Chinese character “KEN”]/F7H [Burst]

F6H

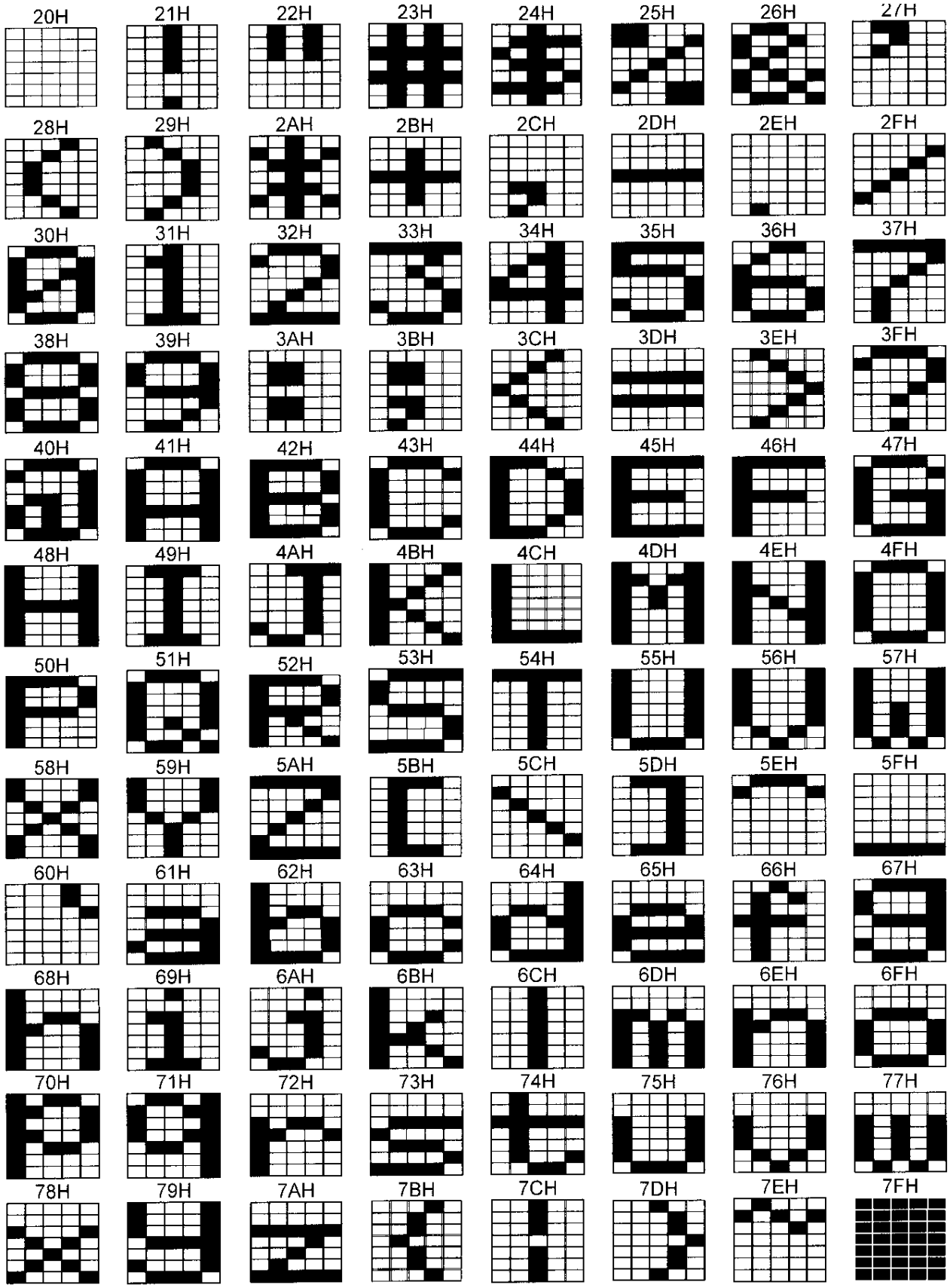


F7H

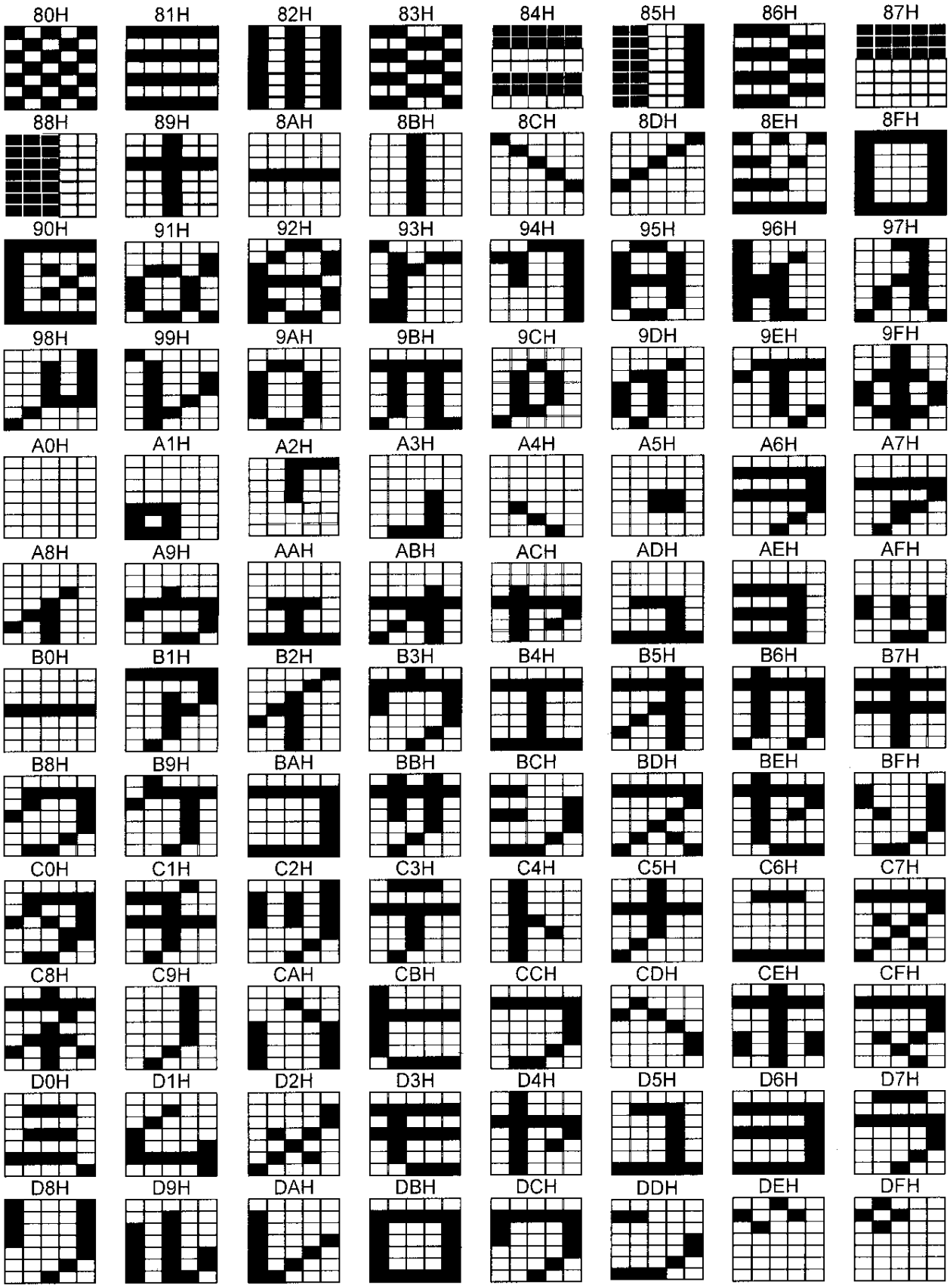


9.1.4 Character pattern data

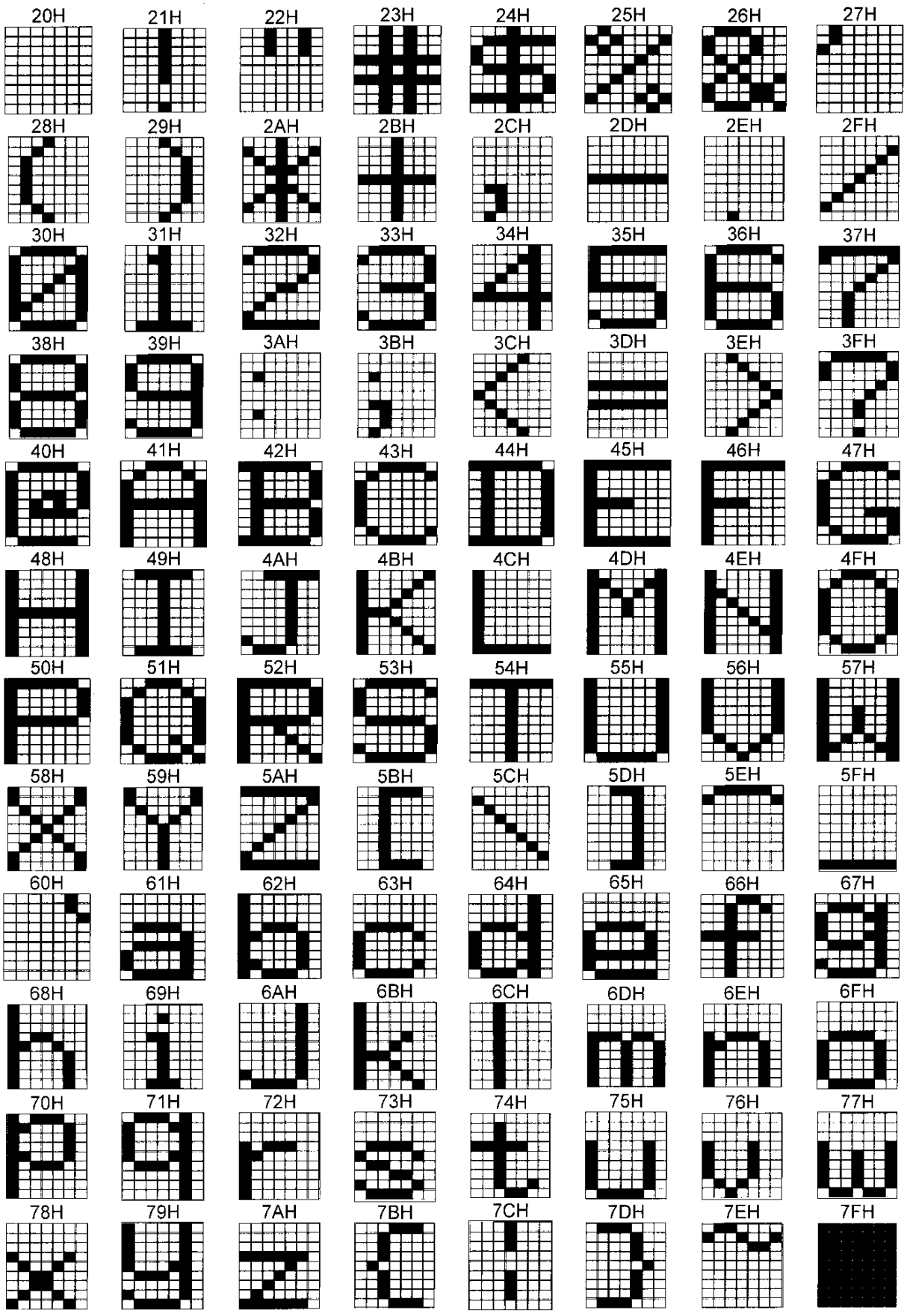
■ **5 × 7 character pattern table (1 of 2)**



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

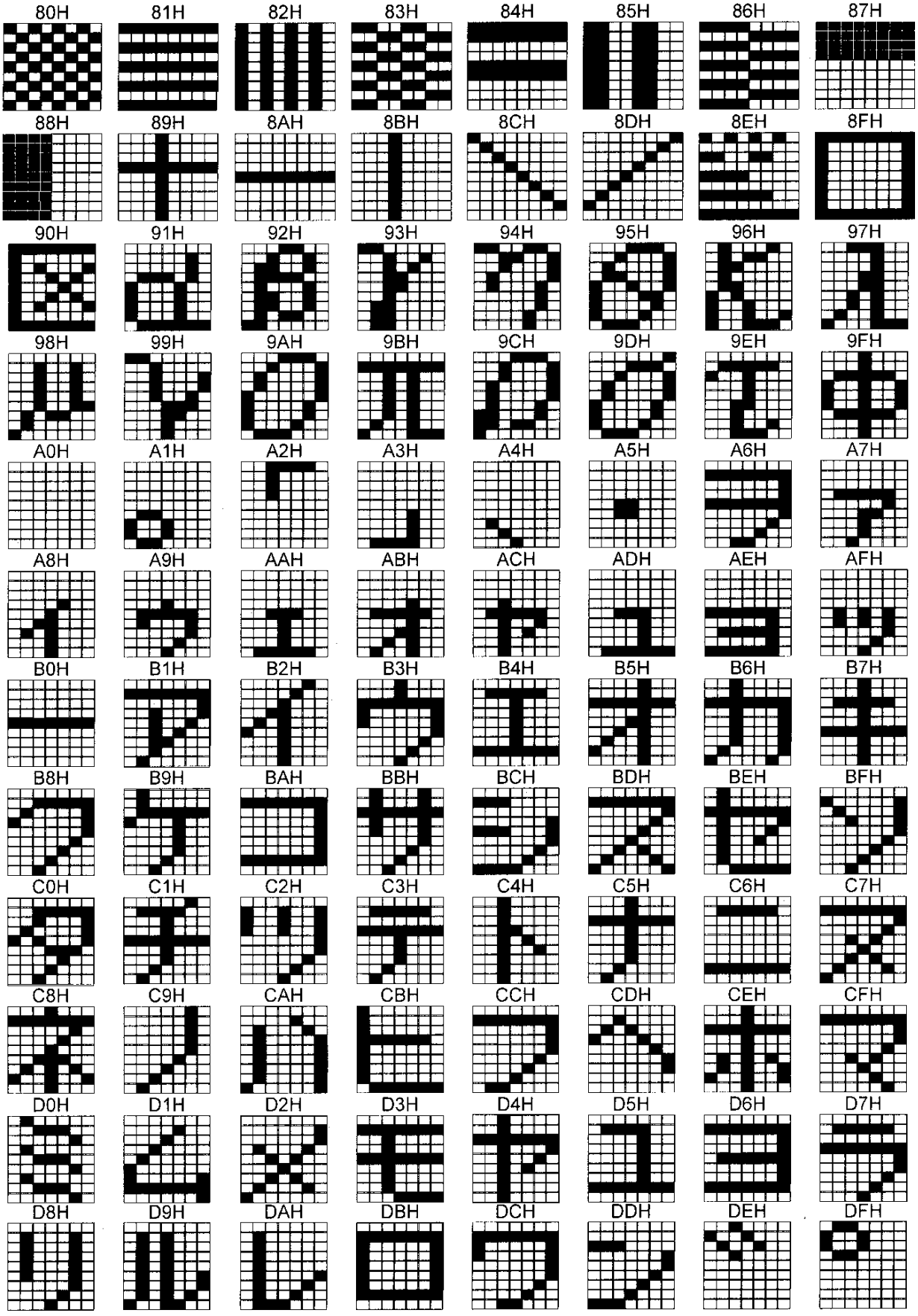


■ 7 × 9 character pattern table (1 of 2)

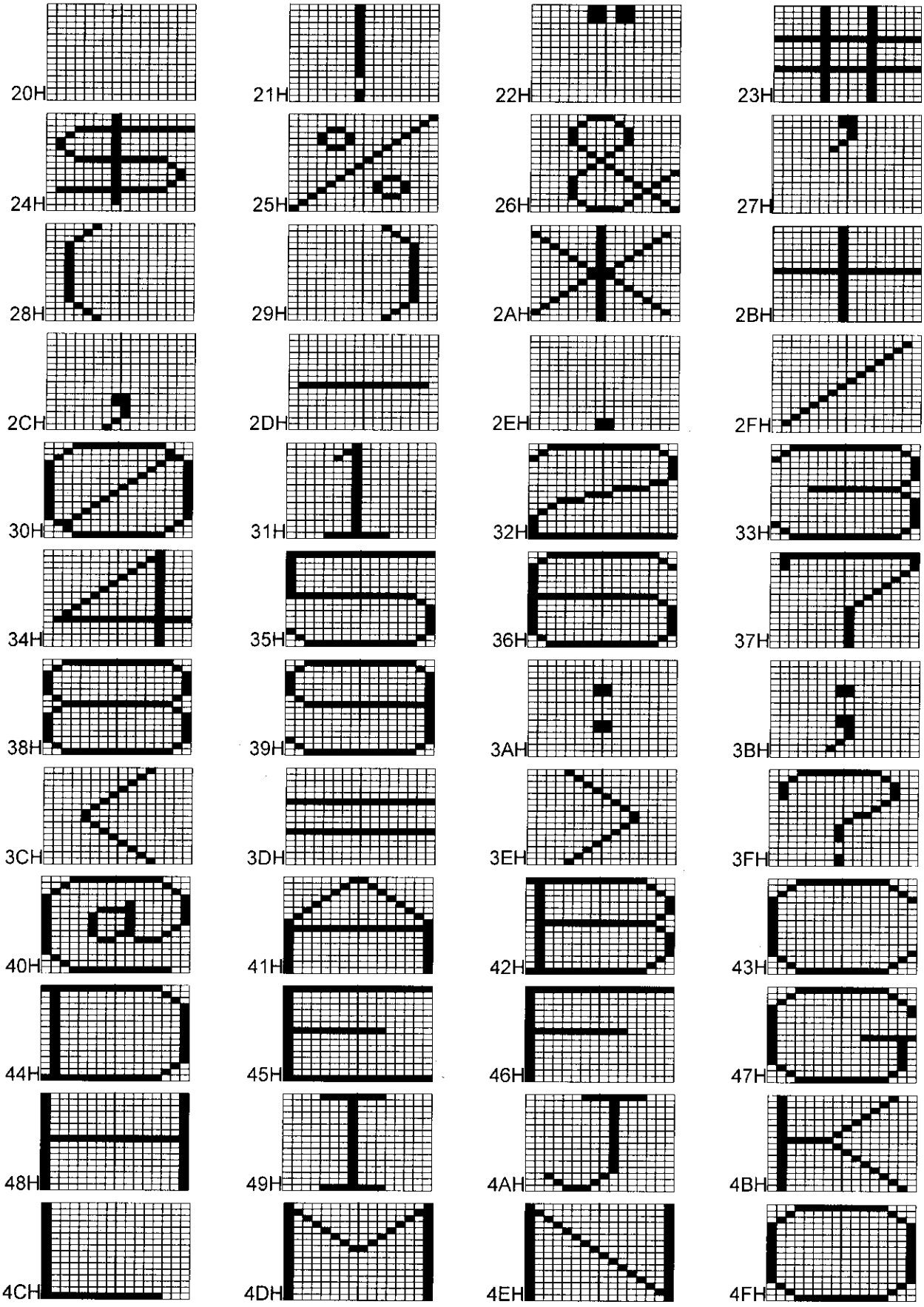


■ 7 × 9 character pattern table (2 of 2)

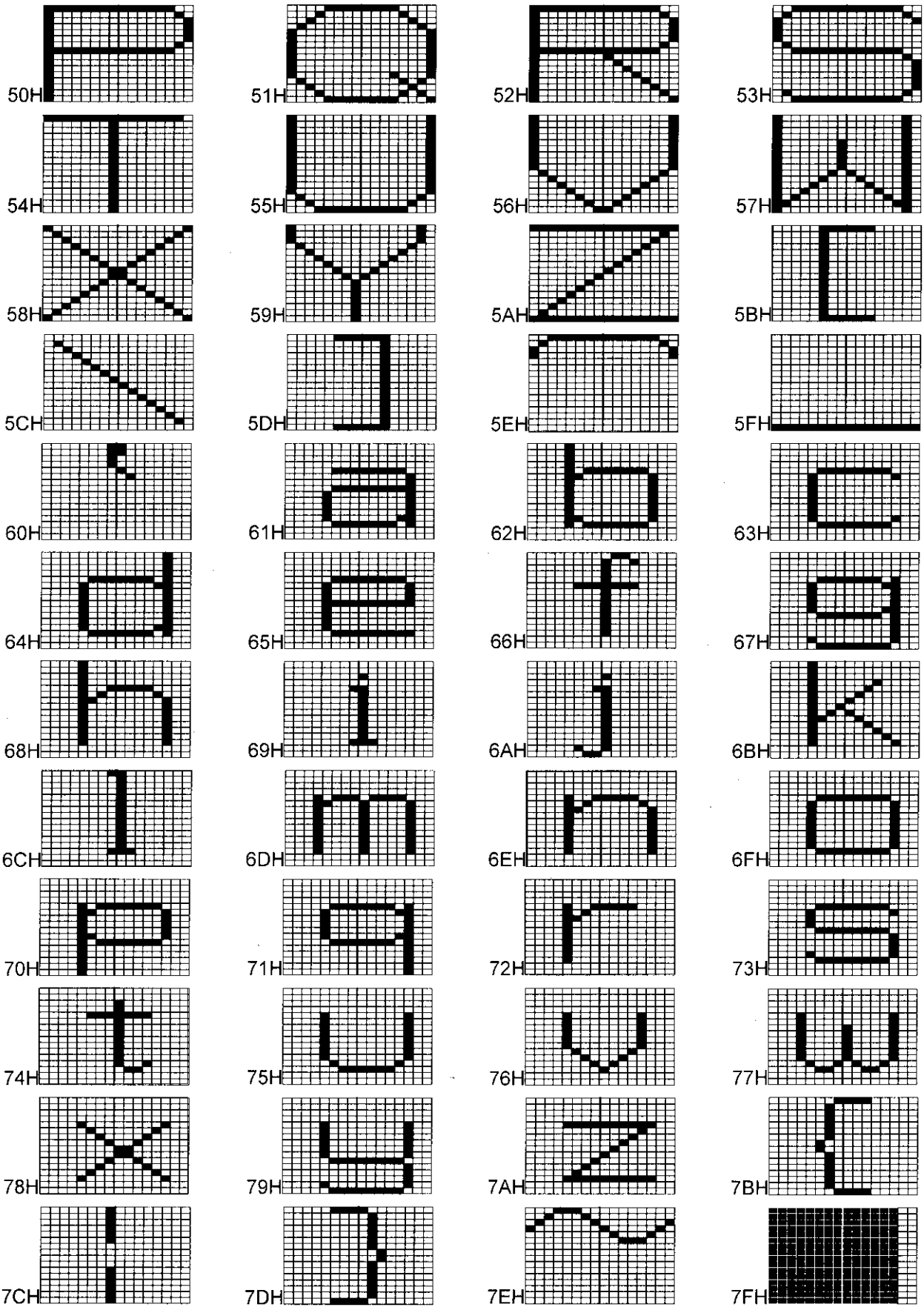
* 8 × 9 dots are used for 80H to 8FH.



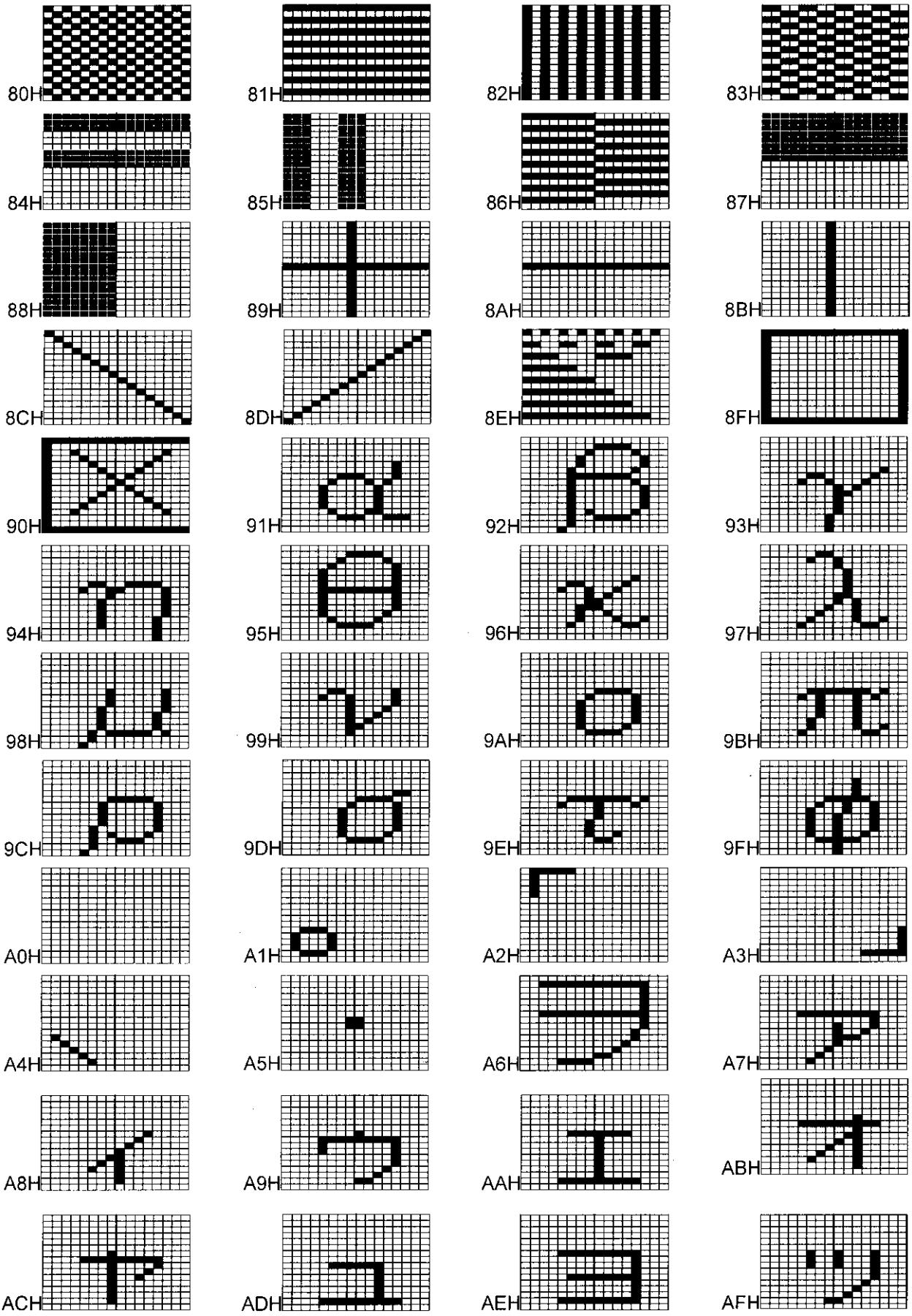
■ 16 × 16 character pattern table (1 of 4)



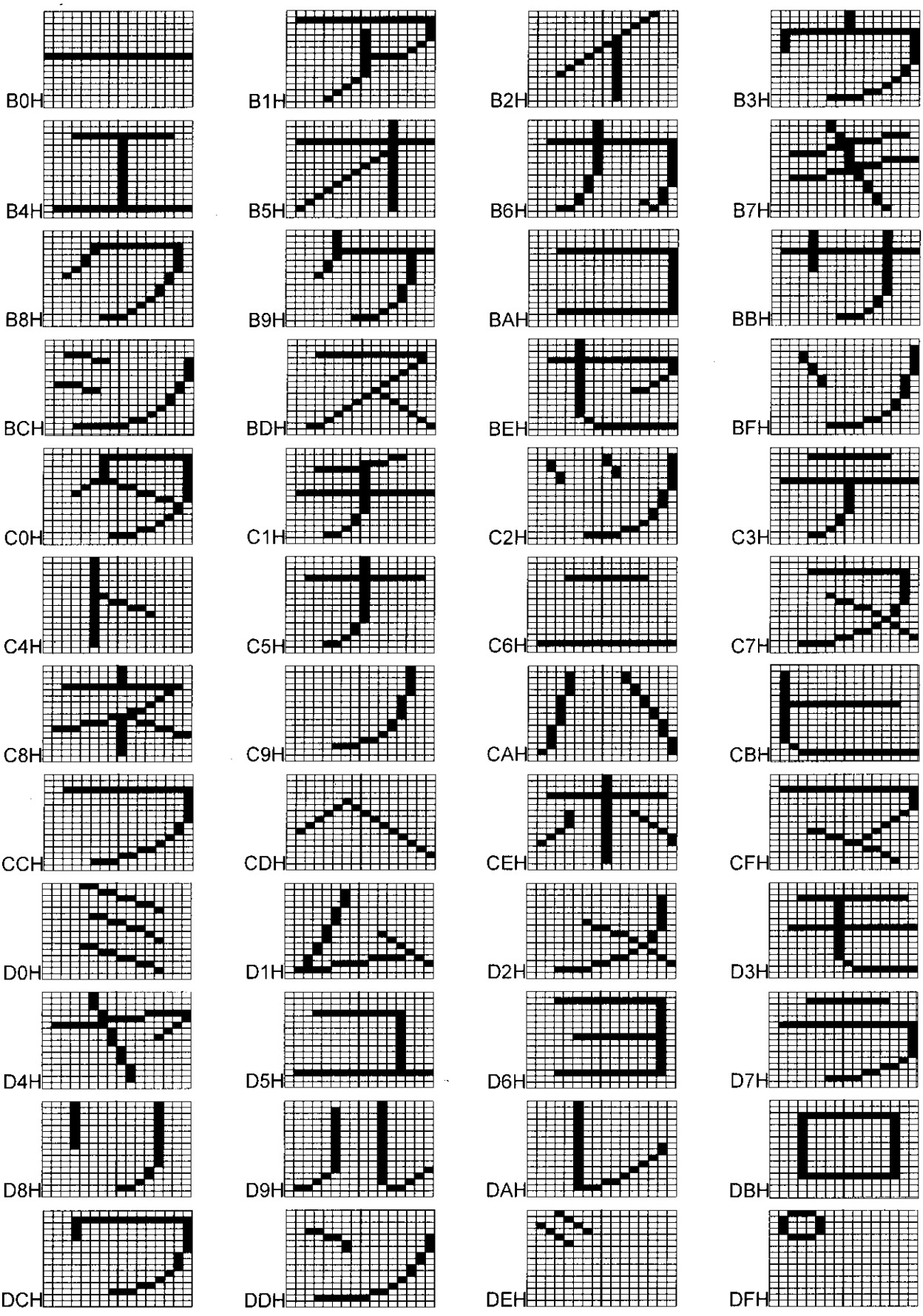
■ 16 × 16 character pattern table (2 of 4)



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



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



9.2 Concerning PC cards

9.2.1 PC cards which can be used

Use the CF card provided with the VG-835-A as the PC card, and use the PC card adapter which is also provided. Any trouble or malfunctioning in operation caused by the use of any other cards is not covered by the warranty.

CAUTION

PC cards come with many different specifications. Use of a PC card whose operation has not been verified, therefore, may result in a failure or instability in read/write operations.

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.

■ 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
  - prgext002.vgd : Extension program data
  - prgext003.vgd : Extension program data
- autodisp.vgd : Auto display data
- group001.vgd : Group data
- group002.vgd : Group data
- group003.vgd : Group data
- opt001.vgd : Optional pattern data
- opt002.vgd : Optional pattern data
- opt003.vgd : Optional pattern data
- opt016.vgd : Optional pattern data
- optname001.vgd : Optional pattern name data
- optname002.vgd : Optional pattern name data
- optname003.vgd : Optional pattern name data
- optname016.vgd : Optional pattern name data
- uchardata0E0.vgd : Character data
- uchardata0E1.vgd : Character data
- uchardata0E2.vgd : Character data

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-835-A because some of its data has been deleted by the PC in error, proceed to initialize the card (p.51) using PC card copy FUNC4. (If this is done, however, all the data remaining on the card will be erased.)

Code (H)	Error message	Description	Remedial action
00	Panel ROM Unsetted	The PC card has not been inserted.	Insert the PC card correctly.
01	Prog No Disabled	The number of the program which was input turns out to have been set to “Disable" when the program was executed.	Input the number of the program which is set to “Enable."
02	DotClk over	Dot clock in the horizontal timing data is outside the setting range.	Check the setting range.
03	Hfp over	Hfrontp in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod ≥ Hsync + Hbackp + Hdisp)
05	HD over	HDstart + HDwidth in the horizontal timing data is outside the setting range.	Check the setting range. (Hperiod ≥ HDstart + HDwidth)
07	Hperiod over	HPeriod in the horizontal timing data is outside the setting range.	Check the setting range.
08	Hdisp over	Hdisp in the horizontal timing data is outside the setting range.	
09	Hsync over	Hsync in the horizontal timing data is outside the setting range.	
0A	Hbp over	Hbackp in the horizontal timing data is outside the setting range.	
0B	Hblank over	Hblanking in the horizontal timing data is outside the setting range.	
0C	Hfreq over	The horizontal sync frequency in the horizontal timing data is outside the setting range.	
0D	H-TIM data NG	Error other than those described above in the horizontal timing data.	
10	OUTPUT data error	Error in the output condition data.	Check the data.
11	CHR data error	Error in the character pattern data.	
12	CROSS data error	Error in the crosshatch pattern data.	
13	DOTS data error	Error in the dot pattern data.	
14	CRCL data error	Error in the circle pattern data.	
15	BRST data error	Error in the burst pattern data.	
16	WIND data error	Error in the window pattern data.	
17	COLBAR data error	Error in the color bar pattern data.	
18	PARAMETER error	Error in a parameter in the terminal mode.	
19	DATA error	Error in the data in the terminal mode.	
1A	SYNC data error	The sync signal has not been set.	Set the sync signal.

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.	

Code (H)	Error message	Description	Remedial action
40	Vtotal over	Vtotal in the vertical timing data is outside the setting range.	Check the setting range.
41	Vdisp over	Vdisp in the vertical timing data is outside the setting range.	
42	Vsync over	Vsync in the vertical timing data is outside the setting range.	
43	Vbp over	Vbackp in the vertical timing data is outside the setting range	
44	Vfp over	Vfrontp in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal ≥ Vsync + Vbackp + Vdisp)
45	Vblank over	Vblanking in the vertical timing data is outside the setting range.	Check the setting range.
46	Vfreq over	The vertical sync frequency in the vertical timing data is outside the setting range.	
47	VD over	VDstart + VDline in the vertical timing data is outside the setting range.	Check the setting range. (Vtotal ≥ VDstart + VDline)
48	EQPfp over	EQPfp in the vertical timing data is outside the setting range.	Check the setting range.
49	EQPbp over	EQPbp in the vertical timing data is outside the setting range.	
4A	V-TIM data NG	Error other than those described above in the vertical timing data.	
4B	DDC1 Timeout	A data timeout has occurred in DDC1.	
4C	DDC1 ACK error	ACK was not received in DDC1.	
4D	EDID Tim error	A response from EDID was not received.	
4E	DDC2 ACK error	ACK was not received in DDC2.	
51	Move Action Not Exe	The value of Hdisp or Vdisp in the timing data does not match the frame size setting in the simple moving pictures.	Check the setting.
52	EDID Header error	Error in the EDID header.	
53	EDID Check Sum error	EDID checksum error.	
54	EDID Headr & Chk Sum err	Errors in both the EDID header and checksum.	
60 to 62	File system err	Reserved	
63	Not free area	The data to be copied onto the PC card is over 16 Mbytes.	
64	DMA Error	An error occurred during pattern output.	A failure may have occurred. Contact the manufacturer.
65	Data Not Registed	An attempt was made to copy PC card data but the copy source file was not found.	
66	Video Board Busy	An error occurred on the video output board.	A failure may have occurred. Contact the manufacturer.

■ Error codes 67H and up

Code (H)	Error message	Description		Remedial action
67	M-CARD Size Over	An attempt was made to copy all the data on a PC card data but the card capacity was exceeded.		Use a card with a capacity of 128MB or less.
68	M-CARD Size Differ	An attempt was made to copy all the data on a PC card but the capacities of the copy source and copy destination cards were different.		Use cards with the same capacity.
69	BMP Size Over	The bitmap size is too large.		Use a bitmap of 4000 × 4000 or less.
81	OPT-Prog. not Exist	Errors which occur when user-generated optional patterns are executed	The user-generated optional pattern does not exist.	
82	Variables Stack Err	Variable stack error.		
83	Register Stack Err	Register stack error.		
84	Call Stack Error	Function stack error.		
85	Illegal Instruction	Illegal instruction code.		
86	Divide by Zero	An attempt was made to divide a number by zero.		
87	Math Error	An error has occurred in a floating decimal point calculation.		

10 SPECIFICATIONS AND CHECKPOINTS

10.1 Main specifications

10.1.1 Output

			Output bit mode			
			8bit	LUT10bit	10bit	12bit *1
Dot clock frequency			0.1 to 300MHz (1 kHz increments)		0.1 to 165MHz (1 kHz increments)	
	DVI	Single Link	25 to 165MHz		-	
		Dual Link	50 to 300MHz		-	
		Interleave OFF	-		25 to 165MHz	
		Interleave ON	-		25 to 82.5MHz	
	LVDS 2ch	Single Link	8 to 135MHz		8 to 135MHz	-
		Dual Link	16 to 270MHz		16 to 165MHz	-
		12bit OUT	-		-	8 to 135MHz
	LVDS 4ch *1	MODE0	20 to 85MHz		-	
		MODE1, 3	40 to 170MHz		-	
		MODE2, 4, 5, 6	80 to 300MHz		-	
		Single Link	(Equivalent to MODE 0)		20 to 85MHz	
		Dual Link	(Equivalent to MODE 1)		40 to 165MHz	
	Parallel *1	×1	0.1 to 100MHz		-	
		×2	0.1 to 200MHz		-	
		×4	0.1 to 300MHz		-	
		Single Link	(Equivalent to ×1)		0.1 to 100MHz	
		Dual Link	(Equivalent to ×2)		0.1 to 165MHz	
Horizontal frequency			10 to 300KHz Max. 8192 dots		10 to 300KHz Max. 4096 dots	
Vertical frequency			10 to 150Hz Max. 4096 lines		10 to 150Hz Max. 2048 lines	
Video memory			4096 dots×4096 dots		2048 dots×2048 dots	
Number of colors which can be generated			24bit output Approx. 16.77 million colors (256-step gradation×RGB)	30bit output Approx. 16.77 million colors (256-step gradation×RGB)	30bit output Approx. 1 billion colors (1024-step gradation×RGB)	36bit output Approx. 68.7 billion colors (4096-step gradation×RGB)
Scanning			Non-interlace, interlace & sync, interlace & video			
Other				Same as for the 8-bit mode except for LVDS 2ch	No palette scrolling possible	

*1: The output 12-bit mode, LVDS 4-channel output and parallel output are supported only as options.
*2: The drawing of optional pattern No.10 (sine wave scroll) is fixed.

10.1.2 External interfaces

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

10.1.3 General ratings

Supply voltage	AC100 to 120V, AC200 to 240V
Power line frequency	50Hz / 60Hz
Power consumption	90VA MAX
Dimensions	430 (W) × 88 (H) × 320 (D) mm (excluding protrusions)
Weight	Approx. 6 kg
Operating temperature	5 to 40°C
Storage temperature	-10 to 60°C
Humidity	30 to 85%RH (no condensation)

10.2 Concerning the DDC/VCC power supply

DDC power is supplied to the DVI and LVDS outputs of the VG-835-A, and VCC power is supplied to the parallel output.

- DVI output ····· 0.5A
- LVDS 2ch output ····· 1A total for channels 1 and 2
- LVDS 4ch output ····· 1A total for channels 1, 2, 3 and 4
- Parallel output (4ch) ····· 1A total for channels 1, 2, 3 and 4

The DCC/VCC power is output as shown below.

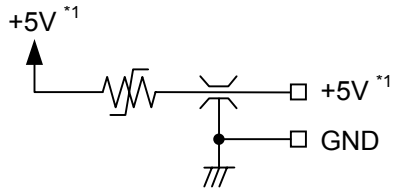


Fig. 10.2.1 DDC/VCC power supply output circuit

*1: The voltage supplied differs depending on the output connector.

- DVI output ····· Fixed at 5V
- LVDS output ····· 5V/3.3V switchable using a switch on the rear panel
- Parallel output ····· 5V/3.3V/2.5V switchable using a switch on the rear panel

CAUTION

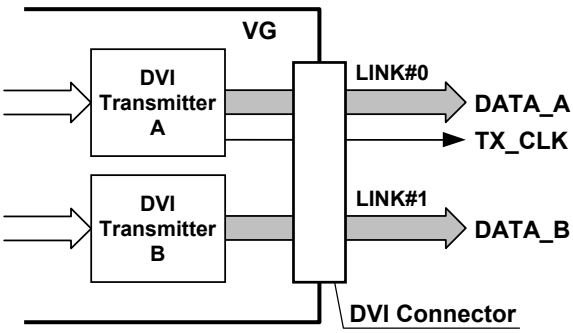
- Although an overcurrent protection device is installed in the DDC/VCC power supply, avoid using the generator at a current level which exceeds the rating.
- Under no circumstances must power be supplied as the DDC/VCC power from the device connected to the generator. If a device is connected, both the VG-835-A and the device connected to it may malfunction.

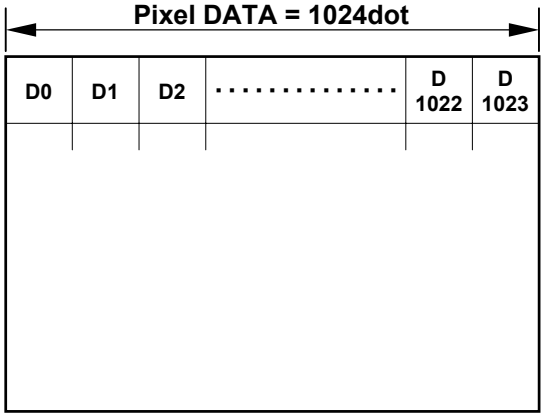
10.3 DVI, LVDS and parallel output specifications

10.3.1 DVI output

10.3.1.1 Data transfer methods

The data transfer method at the DVI output is described here using a resolution of 1024 × 768 and a dot clock frequency of 75 MHz as an example.



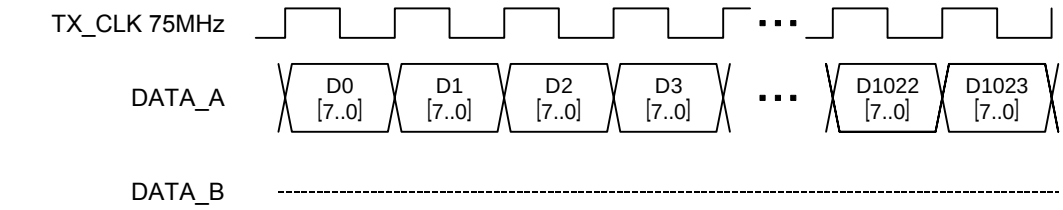


* The timing diagrams below are graphical representations of the data transfer.

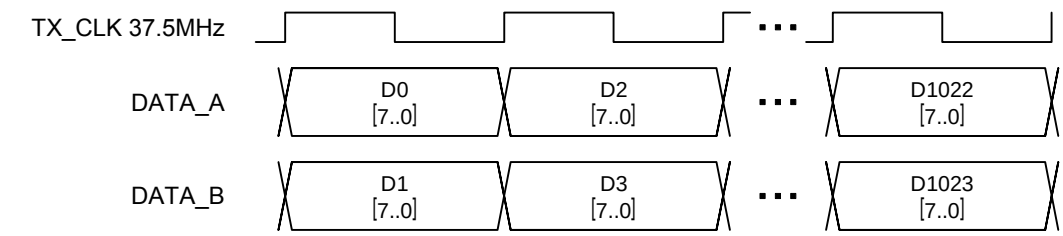
8bit / LUT10bit mode

The data is transferred using the regular Panel Link method.

Single Link



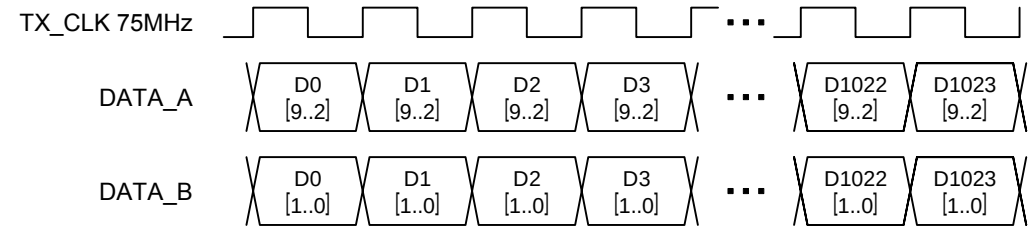
Dual Link



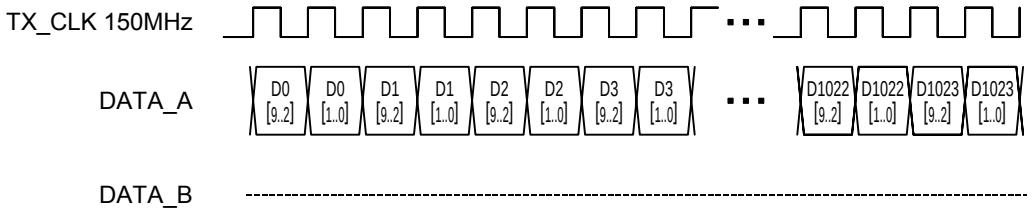
10bit mode

In the “interleave OFF” state, Dual Link is used to transfer the multi-gradation data. The 8 higher bits are sent from LINK#0 and the remaining lower bits are sent from LINK#1.
In the “interleave ON” state, the dot clock frequency is doubled, and the 8 higher bits and remaining lower bits are transferred alternately within Single Link.

Interleave OFF



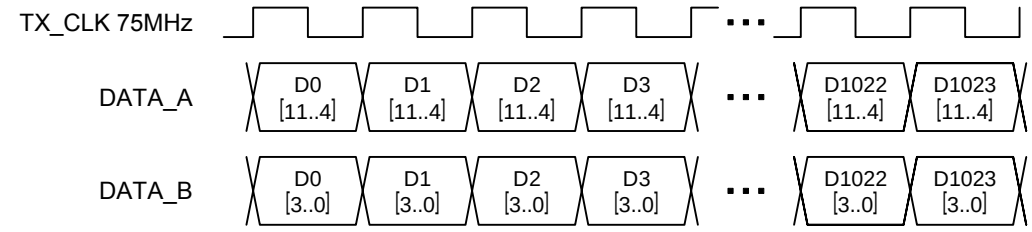
Interleave ON



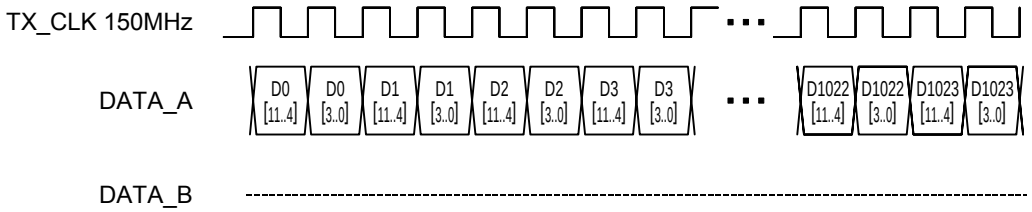
12bit mode

The same transfer method as in the 10-bit mode is used.

Interleave OFF



Interleave ON



10.3.1.2 Data array

	8bit / LUT10bit mode		10bit mode		12bit mode	
	Single Link	Dual Link	Interleave OFF	Interleave ON	Interleave OFF	Interleave ON
LINK#0	BIT7	BIT7 (EVEN)	BIT9	BIT9 / 1	BIT11	BIT11 / 3
	BIT6	BIT6 (EVEN)	BIT8	BIT8 / 0	BIT10	BIT10 / 2
	BIT5	BIT5 (EVEN)	BIT7	BIT7 / -	BIT9	BIT9 / 1
	BIT4	BIT4 (EVEN)	BIT6	BIT6 / -	BIT8	BIT8 / 0
	BIT3	BIT3 (EVEN)	BIT5	BIT5 / -	BIT7	BIT7 / -
	BIT2	BIT2 (EVEN)	BIT4	BIT4 / -	BIT6	BIT6 / -
	BIT1	BIT1 (EVEN)	BIT3	BIT3 / -	BIT5	BIT5 / -
	BIT0	BIT0 (EVEN)	BIT2	BIT2 / -	BIT4	BIT4 / -
LINK#1	-	BIT7 (ODD)	BIT1	-	BIT3	-
	-	BIT6 (ODD)	BIT0	-	BIT2	-
	-	BIT5 (ODD)	-	-	BIT1	-
	-	BIT4 (ODD)	-	-	BIT0	-
	-	BIT3 (ODD)	-	-	-	-
	-	BIT2 (ODD)	-	-	-	-
	-	BIT1 (ODD)	-	-	-	-
	-	BIT0 (ODD)	-	-	-	-

10.3.1.3 Connector pin layout

- Connector : DVI-I (74320-1004) made by Morex
- Output : TMDS

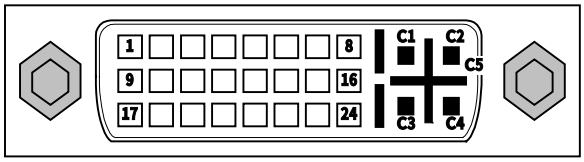


Fig. 10.3.1 Pin layout

Table 10.3.1 Pin numbers

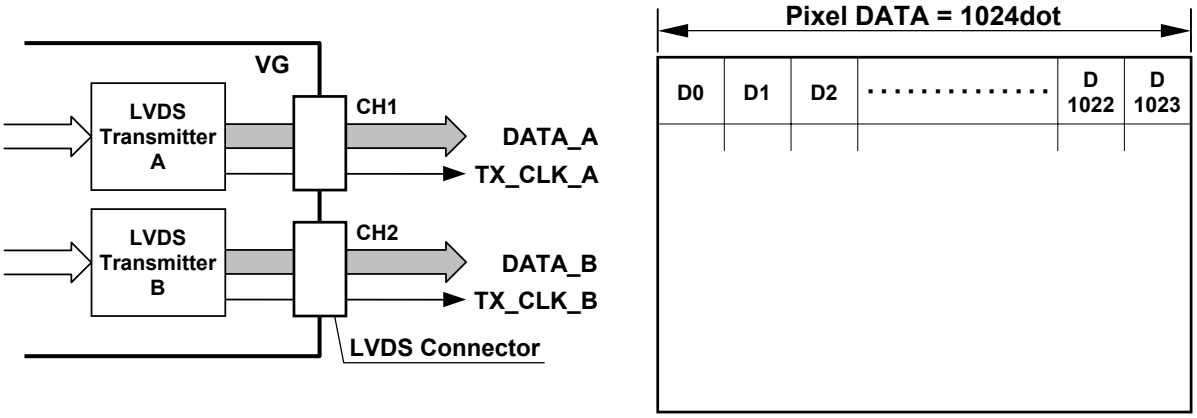
Pin.No	Input/output signal		Pin.No	Input/output signal	Pin.No	Input/output signal
1	TMDS DATA2-		9	TMDS DATA1-	17	TMDS DATA0-
2	TMDS DATA2+		10	TMDS DATA1+	18	TMDS DATA0+
3	TMDS DATA2/4 G		11	TMDS DATA1/3 G	19	TMDS DATA0/5 G
4	TMDS DATA4-		12	TMDS DATA3-	20	TMDS DATA5-
5	TMDS DATA4+		13	TMDS DATA3+	21	TMDS DATA5+
6	DDC CLK		14	+5V (DDC power) *2	22	TMDS CLK G
7	DDC DATA		15	Ground	23	TMDS CLK+
8	Analog Vsync	*1	16	SENSE	24	TMDS CLK-
C1	Analog Red					
C2	Analog Green					
C3	Analog Blue					
C4	Analog Hsync					
C5	Analog Ground					

*1: Analog outputs are not supported.
*2: The maximum supply current of the DDC power supply is 0.5A. Refer to “10.2 Concerning the DDC/VCC power supply.”

10.3.2 LVDS 2ch output

10.3.2.1 Data transfer methods

The data transfer method at the LVDS 2-channel output is described here using a resolution of 1024 × 768 and a dot clock frequency of 75 MHz as an example.



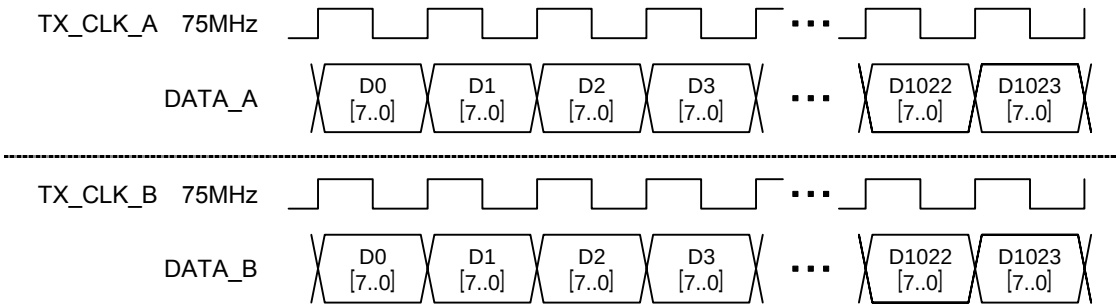
* The timing diagrams below are graphical representations of the data transfer.

8bit mode

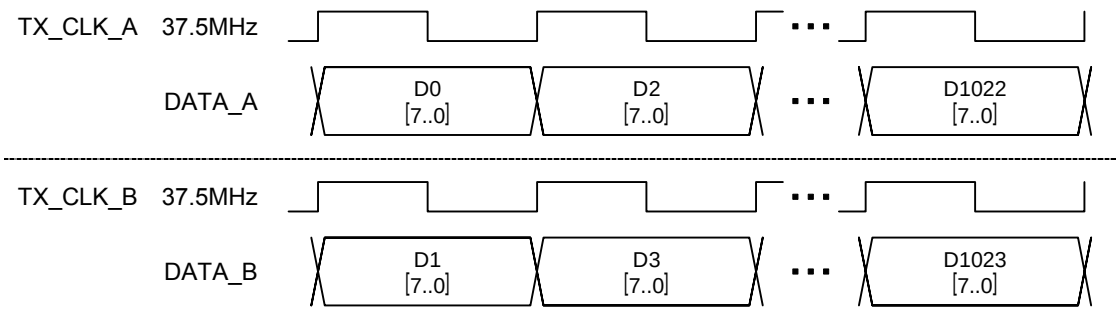
The data is transferred using regular Single Link or Dual Link.

Single Link

The same data output by channel 1 is output by channel 2.



Dual Link

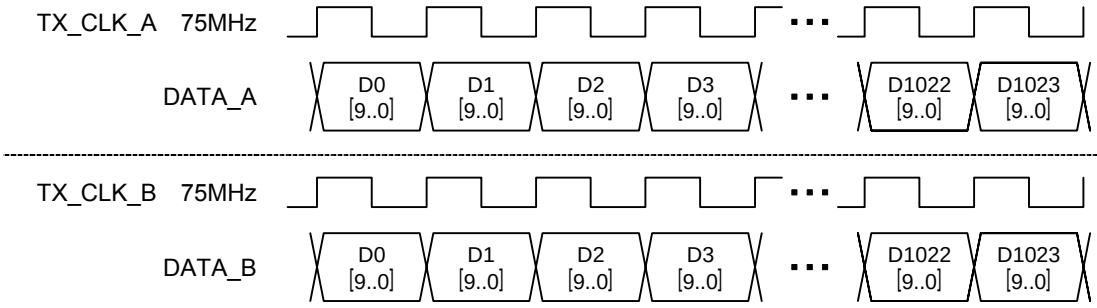


10bit / LUT10bit mode

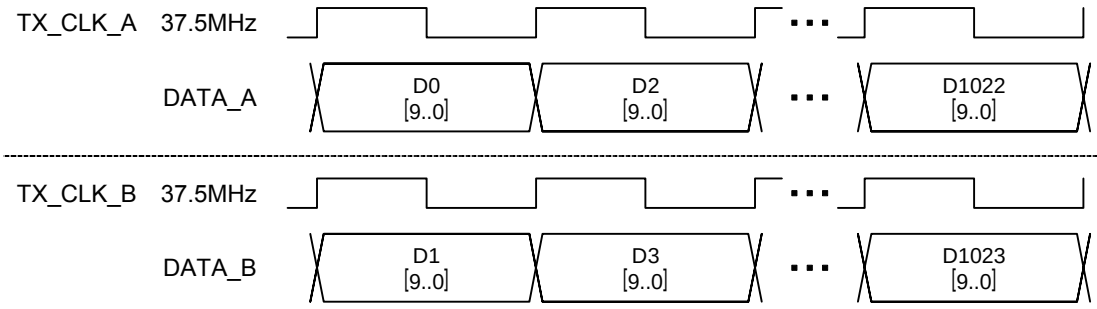
As in the 8-bit mode, the data is transferred using regular Single Link or Dual Link.

Single Link

The same data output by channel 1 is output by channel 2.

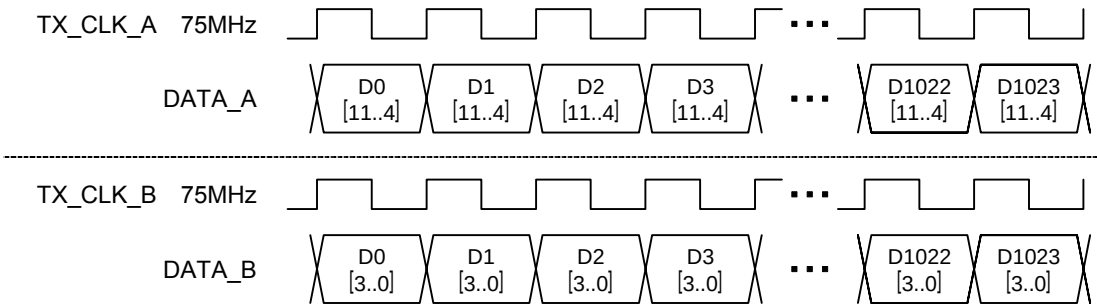


Dual Link



12bit mode

Using Dual Link, the 8 higher bits are transferred from channel 1 and the remaining 4 lower bits are transferred from channel 2. (The Single Link/Dual Link settings are invalid.)



10.3.2.2 Data array

Available as data arrays are DEF1 (DISM standard type) and DEF2 (OpenLDI standard type) inside the VG-835-A as well as USER (1, 2 and 3) which can be set as desired by the user.

* DEF1, DEF2 and USER1-3 are selected and the USER1-3 settings are performed using "[19] Setting the LVDS 2-channel bit change" under config edit FUNC5.

Differential signals		8bit mode			10bit / LUT10bit mode			12bit mode					
		DEF1	DEF2	USER	DEF1	DEF2	USER	DEF1		DEF2		USER	
	Data No.							CH1	CH2	CH1	CH2	CH1	CH2
TA	TA0	R2	R0	R(X)	R4	R0	R(X)	R6	L	R4	L	R(X)	L
	TA1	R3	R1	R(X)	R5	R1	R(X)	R7	L	R5	L	R(X)	L
	TA2	R4	R2	R(X)	R6	R2	R(X)	R8	R0	R6	L	R(X)	R(X)
	TA3	R5	R3	R(X)	R7	R3	R(X)	R9	R1	R7	L	R(X)	R(X)
	TA4	R6	R4	R(X)	R8	R4	R(X)	R10	R2	R8	R0	R(X)	R(X)
	TA5	R7	R5	R(X)	R9	R5	R(X)	R11	R3	R9	R1	R(X)	R(X)
	TA6	G2	G0	G(X)	G4	G0	G(X)	G6	L	G4	L	G(X)	L
TB	TB0	G3	G1	G(X)	G5	G1	G(X)	G7	L	G5	L	G(X)	L
	TB1	G4	G2	G(X)	G6	G2	G(X)	G8	G0	G6	L	G(X)	G(X)
	TB2	G5	G3	G(X)	G7	G3	G(X)	G9	G1	G7	L	G(X)	G(X)
	TB3	G6	G4	G(X)	G8	G4	G(X)	G10	G2	G8	G0	G(X)	G(X)
	TB4	G7	G5	G(X)	G9	G5	G(X)	G11	G3	G9	G1	G(X)	G(X)
	TB5	B2	B0	B(X)	B4	B0	B(X)	B6	L	B4	L	B(X)	L
	TB6	B3	B1	B(X)	B5	B1	B(X)	B7	L	B5	L	B(X)	L
TC	TC0	B4	B2	B(X)	B6	B2	B(X)	B8	B0	B6	L	B(X)	B(X)
	TC1	B5	B3	B(X)	B7	B3	B(X)	B9	B1	B7	L	B(X)	B(X)
	TC2	B6	B4	B(X)	B8	B4	B(X)	B10	B2	B8	B0	B(X)	B(X)
	TC3	B7	B5	B(X)	B9	B5	B(X)	B11	B3	B9	B1	B(X)	B(X)
	TC4	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS	HS
	TC5	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS	VS
	TC6	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE	DE
TD	TD0	R0	R6	R(X)	R2	R6	R(X)	R4	L	R10	R2	R(X)	L
	TD1	R1	R7	R(X)	R3	R7	R(X)	R5	L	R11	R3	R(X)	L
	TD2	G0	G6	G(X)	G2	G6	G(X)	G4	L	G10	G2	G(X)	L
	TD3	G1	G7	G(X)	G3	G7	G(X)	G5	L	G11	G3	G(X)	L
	TD4	B0	B6	B(X)	B2	B6	B(X)	B4	L	B10	B2	B(X)	L
	TD5	B1	B7	B(X)	B3	B7	B(X)	B5	L	B11	B3	B(X)	L
	TD6	L	L	L	L	L	L	L	L	L	L	L	L
TE	TE0	L	L	L	R0	R8	R(X)	L	L	L	L	L	L
	TE1	L	L	L	R1	R9	R(X)	L	L	L	L	L	L
	TE2	L	L	L	G0	G8	G(X)	L	L	L	L	L	L
	TE3	L	L	L	G1	G9	G(X)	L	L	L	L	L	L
	TE4	L	L	L	B0	B8	B(X)	L	L	L	L	L	L
	TE5	L	L	L	B1	B9	B(X)	L	L	L	L	L	L
	TE6	L	L	L	L	L	L	L	L	L	L	L	L

☞ Refer to "Fig. 10.3.2 Timing diagram of differential signals."

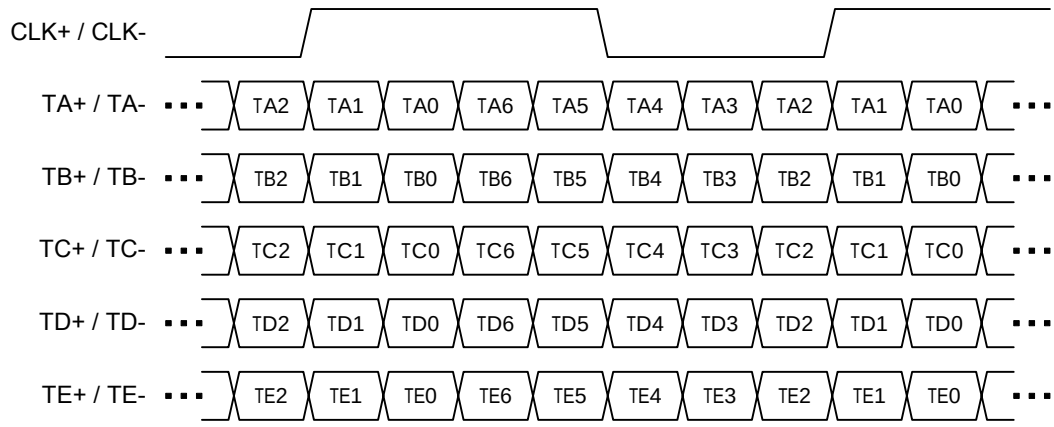


Fig. 10.3.2 Timing diagram of differential signals

10.3.2.3 Connector pin layout

- Connector: MDR 10226-1210-VE made by 3M

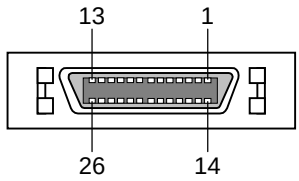


Fig. 10.3.3 Pin layout

Table 10.3.2 Pin numbers

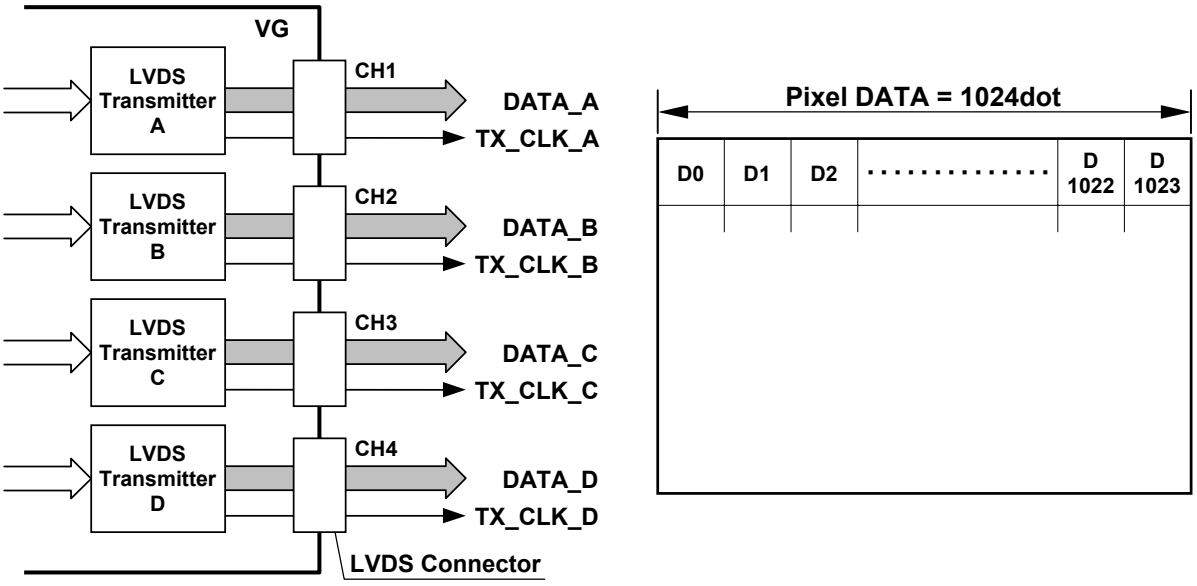
Pin.No	Input/output signal	Pin.No	Input/output signal
1	GND	14	TA-
2	TAG	15	TA+
3	DISPEN	16	GND
4	TB-	17	TBG
5	TB+	18	DDCSDA
6	TC-	19	TCG
7	TC+	20	TE-
8	TEG	21	TE+
9	DDCSCL	22	TCLK-
10	TCLKG	23	TCLK+
11	+5V / +3.3V (DDC power) *1	24	+5V / +3.3V (DDC power) *1
12	TD-	25	TDG
13	TD+	26	GND

*1: The 5V/3.3V selector switch is located on the rear panel. (Refer to “1.6.2 VG-835-A rear panel.”) The total maximum supply current of the DDC power supply for channels 1 and 2 is 1A. Refer to “10.2 Concerning the DDC/VCC power supply.”

10.3.3 LVDS 4ch output (❖Option: Only for models that support LVDS 4-channel output)

10.3.3.1 Data transfer methods

The data transfer method at the LVDS 4-channel output is described here using a resolution of 1024 × 768 and a dot clock frequency of 80 MHz as an example.



* The timing diagrams below are graphical representations of the data transfer.

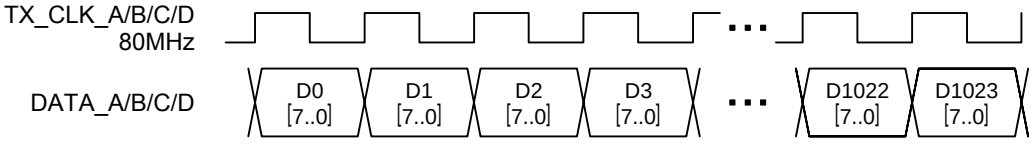
8bit / LUT10bit mode

The data is transferred using the MODE 0 to MODE 6 method.
For what the screen output for each channel in each mode looks like, refer to "[2] Setting the LVDS 4-channel mode (valid in 8-bit or LUT 10-bit mode)" in "5.4.4 LVDS 4ch output."

- In MODE 0, the same data is output to all channels 1, 2, 3 and 4.
- In MODE 1 and MODE 3, the same data output from channel 1 is output from channel 3, and the same data output from channel 2 is output from channel 4.
- In MODE 2, MODE 4, MODE 5 and MODE 6, the data output from channels 1, 2, 3 and 4 is all different.

MODE0

The images are output in their original form. The same data is output from channels 1, 2, 3 and 4. (This mode is equivalent to Single Link.)

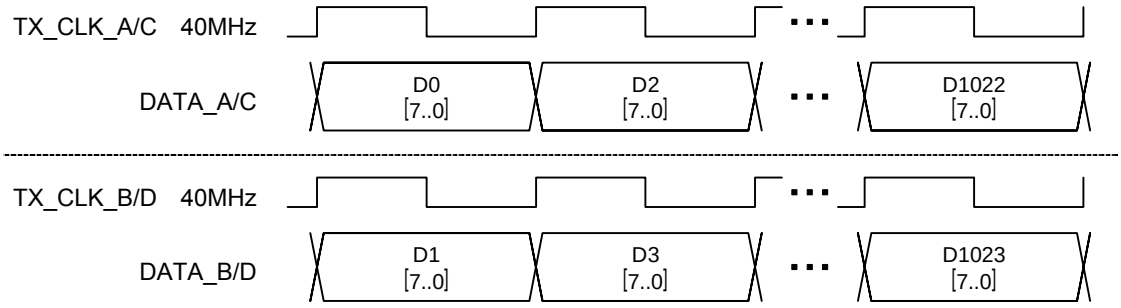


For details on MODE 1 to MODE 6 ☞ Next page ~

8bit / LUT10bit mode Continued

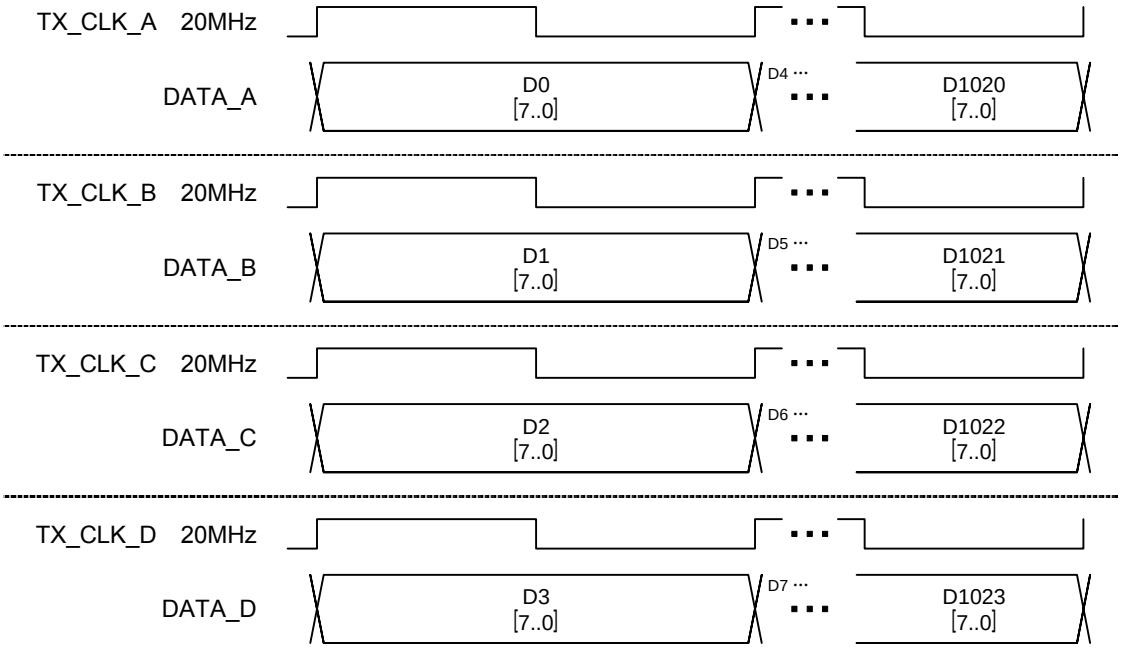
MODE1

The data for one dot is output from channel 1 and the data for the next dot is output from channel 2, and this is repeated. The same data is output from channels 1 and 2 and from channels 3 and 4. (This mode is equivalent to Dual Link.)



MODE2

The data for the first, second, third and fourth dots is output from channels 1, 2, 3 and 4, respectively, and this is repeated.

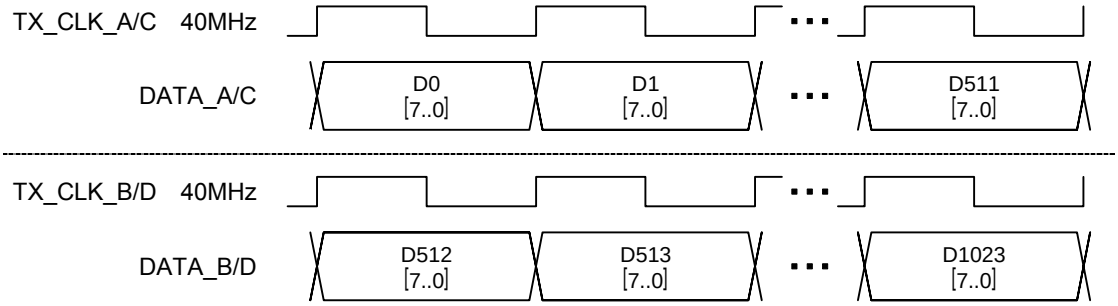


For details on MODE 3 to MODE 6 ☞ Next page ~

8bit / LUT10bit mode Continued

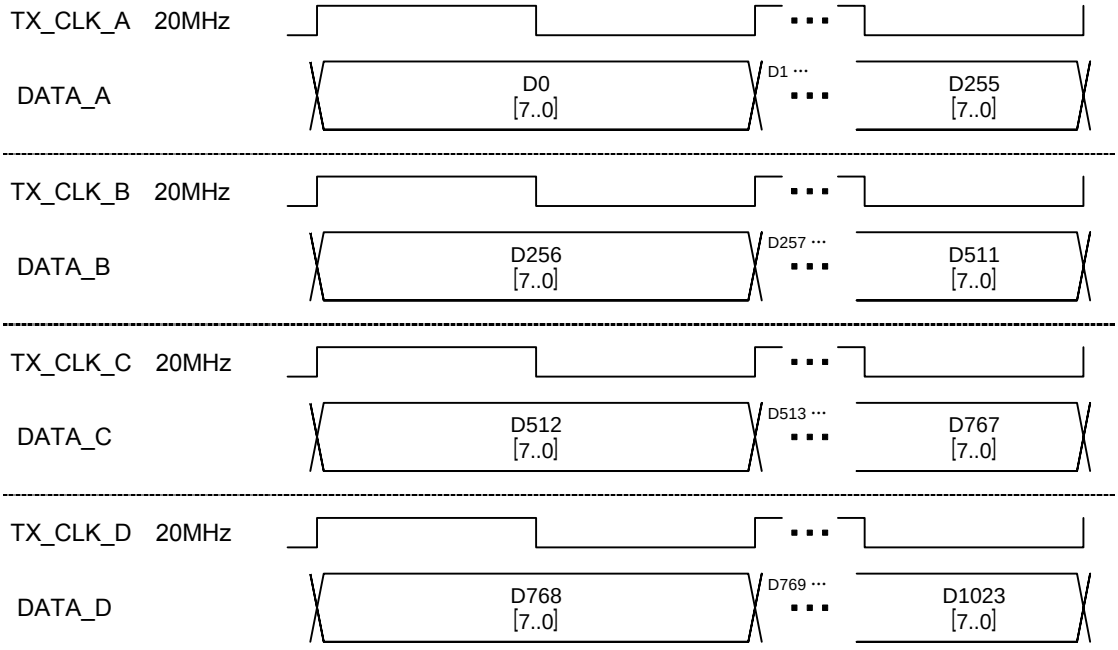
MODE3

The left half of the screen is output to channel 1, and the right half of the screen to channel 2. The same data is output by channels 1 and 2 and by channels 3 and 4. (This mode is equivalent to Dual Link.)



MODE4

One quarter each of the screen is output to channels 1, 2, 3 and 4 in sequence.

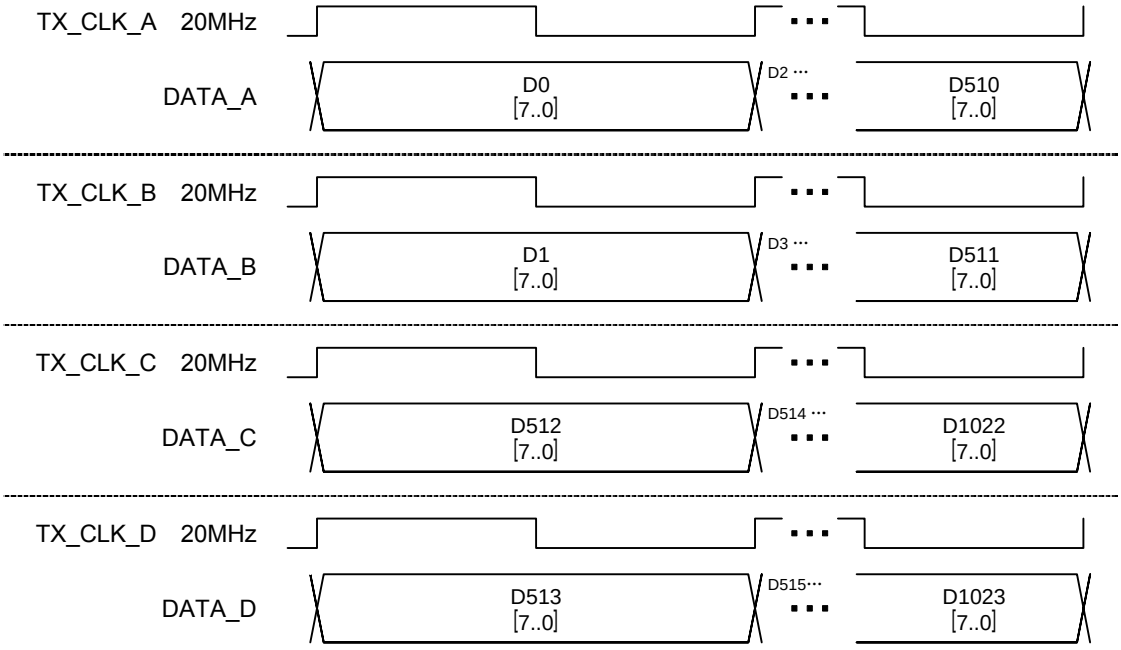


For details on MODE 5 and MODE 6 ☞ Next page

8bit / LUT10bit mode Continued

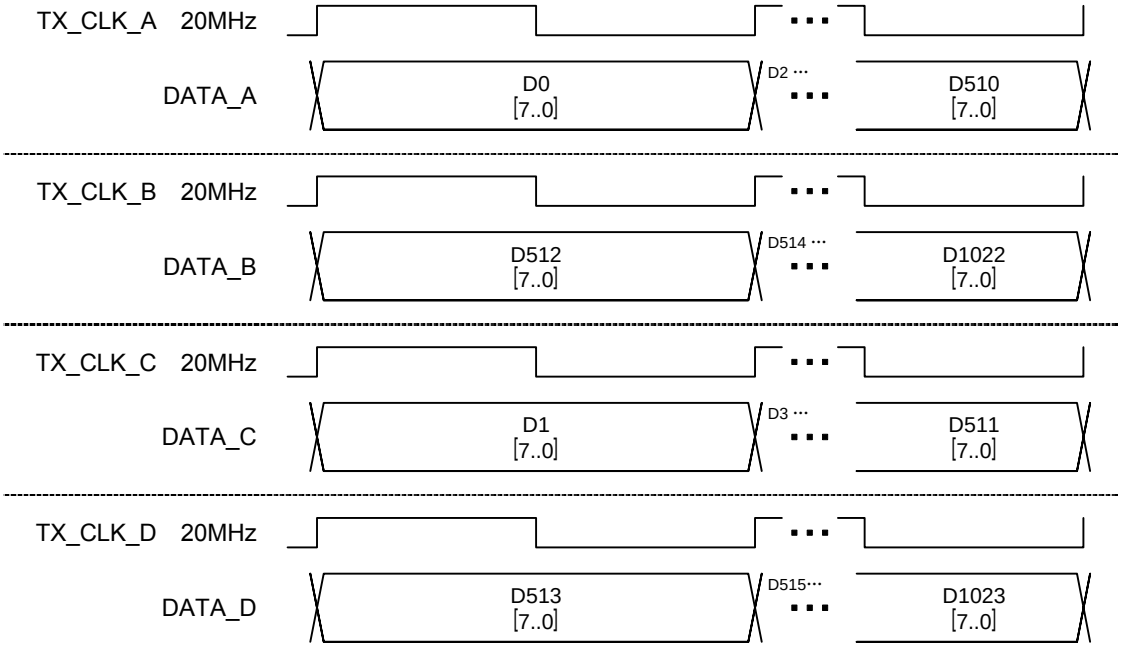
MODE5

The left half of the screen is output to channels 1 and 2, and the right half of the screen to channel 3 and 4.



MODE6

Channels 1 and 2 form a set, channels 3 and 4 form a set, and the image data is output dot by dot.

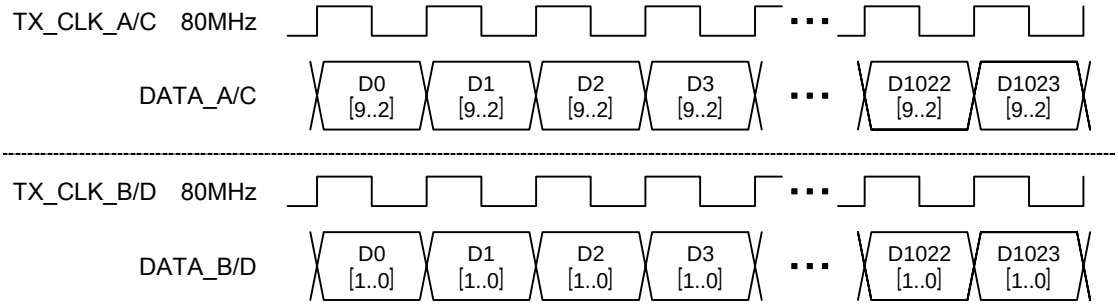


10bit mode

The multi-gradation data is transferred using two channels. Single Link and Dual Link are available as the transfer methods.

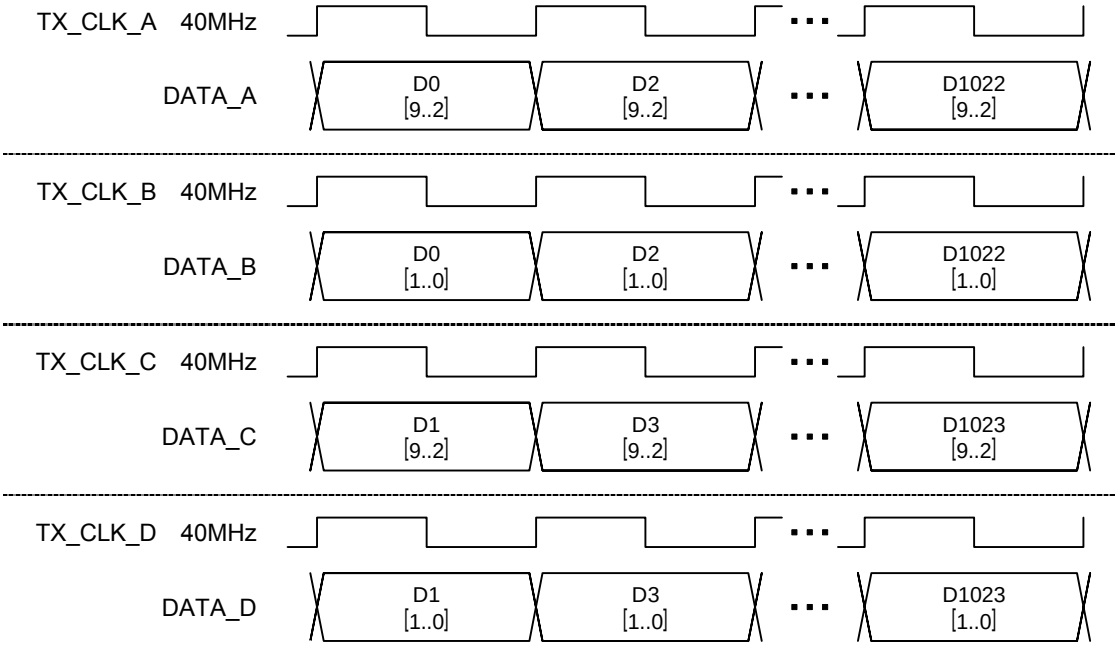
Single Link

The 8 higher bits are transferred from channel 1 and the remaining 2 lower bits from channel 2. The same data output by channel 1 is output by channel 3, and the same data output by channel 2 is output by channel 4.



Dual Link

The 8 higher bits are transferred from channels 1 and 3 and the remaining 2 lower bits from channels 2 and 4.

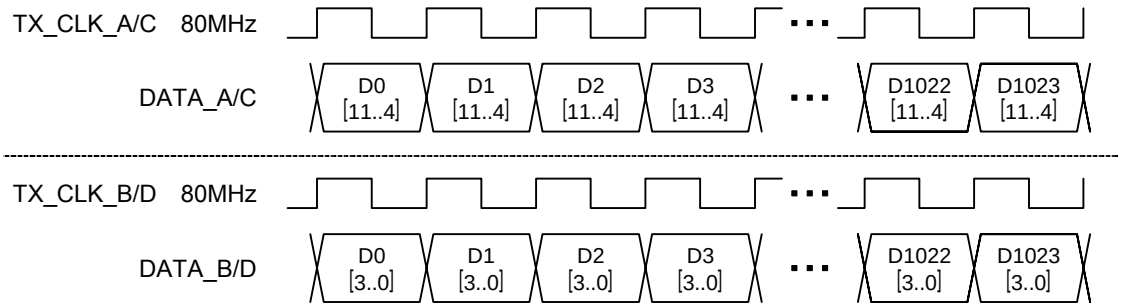


12bit mode

The multi-gradation data is transferred using two channels. Single Link and Dual Link are available as the transfer methods.

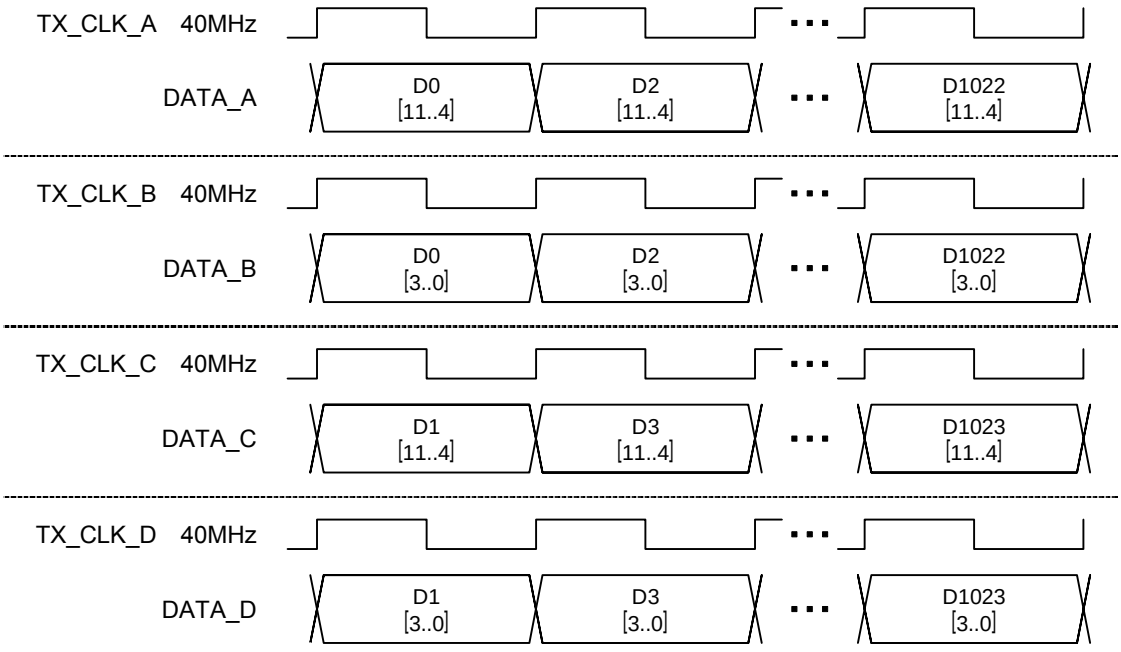
Single Link

The 8 higher bits are transferred from channel 1 and the remaining 4 lower bits from channel 2. The same data output by channel 1 is output by channel 3, and the same data output by channel 2 is output by channel 4.



Dual Link

The 8 higher bits are transferred from channels 1 and 3 and the remaining 4 lower bits from channels 2 and 4.



10.3.3.2 Data array

Available as the data arrays are DISM (DISM standard type) and OLDI (OpenLDI standard type) inside the VG-835-A as well as USER (1, 2 and 3) which can be set as desired by the user.

* DISM, OLDI and USER1-3 are selected and the USER1-3 settings are performed using “[17] Setting the LVDS 4-channel bit change (❖Option: Only for models that support LVDS 4-channel output)” under config edit FUNC5.

Differential signals		8bit / LUT10bit mode			10bit mode					
		DISM	OLDI	USER	DISM		OLDI		USER	
	Data No.				CH1 / 3	CH2 / 4	CH1 / 3	CH2 / 4	CH1 / 3	CH2 / 4
TA	TA0	R2	R0	R(X)	R4	L	R2	L	R(X)	L
	TA1	R3	R1	R(X)	R5	L	R3	L	R(X)	L
	TA2	R4	R2	R(X)	R6	L	R4	L	R(X)	L
	TA3	R5	R3	R(X)	R7	L	R5	L	R(X)	L
	TA4	R6	R4	R(X)	R8	R0	R6	L	R(X)	R(X)
	TA5	R7	R5	R(X)	R9	R1	R7	L	R(X)	R(X)
	TA6	G2	G0	G(X)	G4	L	G2	L	G(X)	L
TB	TB0	G3	G1	G(X)	G5	L	G3	L	G(X)	L
	TB1	G4	G2	G(X)	G6	L	G4	L	G(X)	L
	TB2	G5	G3	G(X)	G7	L	G5	L	G(X)	L
	TB3	G6	G4	G(X)	G8	G0	G6	L	G(X)	G(X)
	TB4	G7	G5	G(X)	G9	G1	G7	L	G(X)	G(X)
	TB5	B2	B0	B(X)	B4	L	B2	L	B(X)	L
	TB6	B3	B1	B(X)	B5	L	B3	L	B(X)	L
TC	TC0	B4	B2	B(X)	B6	L	B4	L	B(X)	L
	TC1	B5	B3	B(X)	B7	L	B5	L	B(X)	L
	TC2	B6	B4	B(X)	B8	B0	B6	L	B(X)	B(X)
	TC3	B7	B5	B(X)	B9	B1	B7	L	B(X)	B(X)
	TC4	HS	HS	HS	HS	HS	HS	HS	HS	HS
	TC5	VS	VS	VS	VS	VS	VS	VS	VS	VS
	TC6	DE	DE	DE	DE	DE	DE	DE	DE	DE
TD	TD0	R0	R6	R(X)	R2	L	R8	R0	R(X)	R(X)
	TD1	R1	R7	R(X)	R3	L	R9	R1	R(X)	R(X)
	TD2	G0	G6	G(X)	G2	L	G8	G0	G(X)	G(X)
	TD3	G1	G7	G(X)	G3	L	G9	G1	G(X)	G(X)
	TD4	B0	B6	B(X)	B2	L	B8	B0	B(X)	B(X)
	TD5	B1	B7	B(X)	B3	L	B9	B1	B(X)	B(X)
	TD6	L	L	L	L	L	L	L	L	L

* DISM: DISM standard type; OLDI: OpenLDI standard type; USER: user setting

Differential signals		12bit mode					
		DISM		OLDI		USER	
	Data No.	CH1 / 3	CH2 / 4	CH1 / 3	CH2 / 4	CH1 / 3	CH2 / 4
TA	TA0	R6	L	R4	L	R(X)	L
	TA1	R7	L	R5	L	R(X)	L
	TA2	R8	R0	R6	L	R(X)	R(X)
	TA3	R9	R1	R7	L	R(X)	R(X)
	TA4	R10	R2	R8	R0	R(X)	R(X)
	TA5	R11	R3	R9	R1	R(X)	R(X)
	TA6	G6	L	G4	L	G(X)	L
TB	TB0	G7	L	G5	L	G(X)	L
	TB1	G8	G0	G6	L	G(X)	G(X)
	TB2	G9	G1	G7	L	G(X)	G(X)
	TB3	G10	G2	G8	G0	G(X)	G(X)
	TB4	G11	G3	G9	G1	G(X)	G(X)
	TB5	B6	L	B4	L	B(X)	L
	TB6	B7	L	B5	L	B(X)	L
TC	TC0	B8	B0	B6	L	B(X)	B(X)
	TC1	B9	B1	B7	L	B(X)	B(X)
	TC2	B10	B2	B8	B0	B(X)	B(X)
	TC3	B11	B3	B9	B1	B(X)	B(X)
	TC4	HS	HS	HS	HS	HS	HS
	TC5	VS	VS	VS	VS	VS	VS
	TC6	DE	DE	DE	DE	DE	DE
TD	TD0	R4	L	R10	R2	R(X)	R(X)
	TD1	R5	L	R11	R3	R(X)	R(X)
	TD2	G4	L	G10	G2	G(X)	G(X)
	TD3	G5	L	G11	G3	G(X)	G(X)
	TD4	B4	L	B10	B2	B(X)	B(X)
	TD5	B5	L	B11	B3	B(X)	B(X)
	TD6	L	L	L	L	L	L

10.3.3.3 Connector pin layout

● Connector: MDR 10226-1210-VE made by 3M

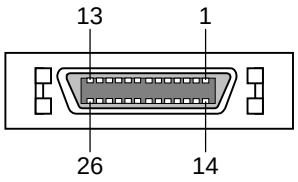


Fig. 10.3.4 Pin layout

Table 10.3.3 Pin numbers

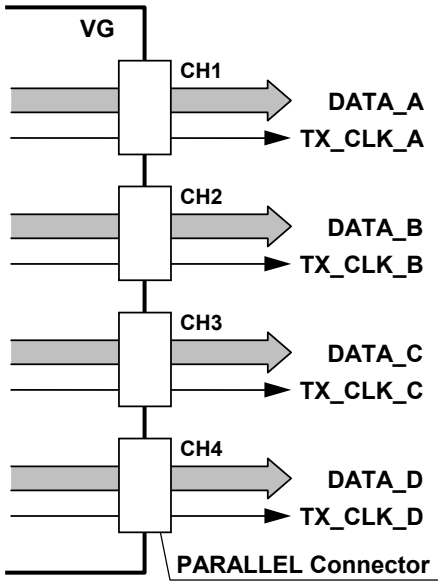
Pin.No	Input/output signal	Pin.No	Input/output signal
1	GND	14	TA-
2	TAG	15	TA+
3	DISPEN	16	GND
4	TB-	17	TBG
5	TB+	18	DDCSDA
6	TC-	19	TCG
7	TC+	20	NC
8	NC	21	NC
9	DDCSCL	22	TCLK-
10	TCLKG	23	TCLK+
11	+5V / +3.3V (DDC power) *1	24	+5V / +3.3V (DDC power) *1
12	TD-	25	TDG
13	TD+	26	GND

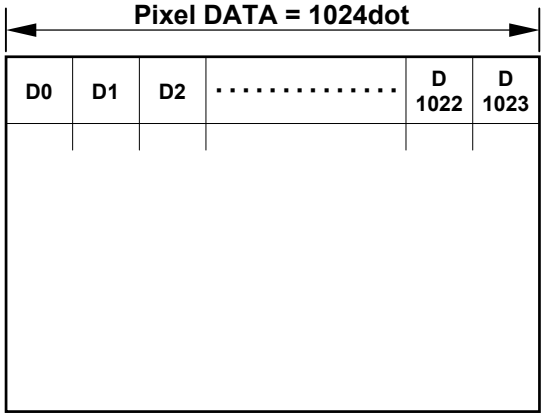
*1: The 5V/3.3V selector switch is located on the rear panel.
The total maximum supply current of the DDC power supply for channels 1 to 4 is 1A. Refer to “10.2 Concerning the DDC/VCC power supply.”

10.3.4 Parallel output (❖Option: Only for models that support parallel outputs)

10.3.4.1 Data transfer methods

The data transfer method at the parallel output is described here using a resolution of 1024 × 768 and a dot clock frequency of 80 MHz as an example.





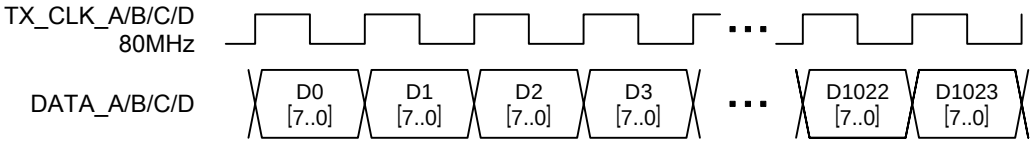
* The timing diagrams below are graphical representations of the data transfer. ☞ Next page ~

8bit / LUT10bit mode

The data is transferred in the ×1, ×2 or ×4 clock mode.
For details on what the screen which is output by each channel in each clock mode looks like, refer to “[7] Setting the parallel clock mode (valid in 8-bit or LUT 10-bit mode)” in “5.4.5 Parallel output.”

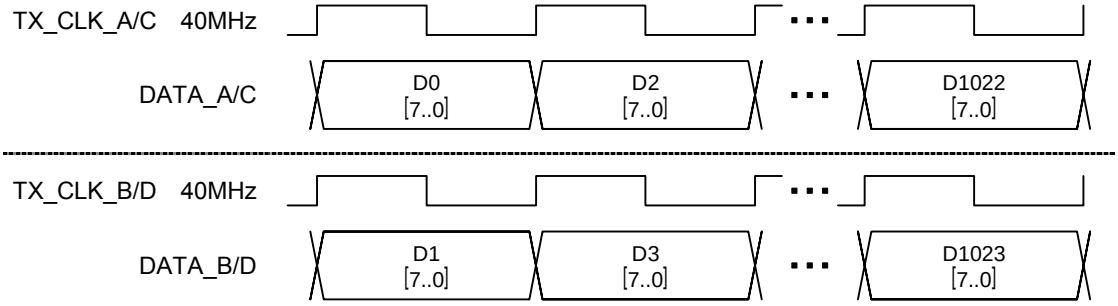
×1

The images are output in their original form. The same data is output to channels 1, 2, 3 and 4.



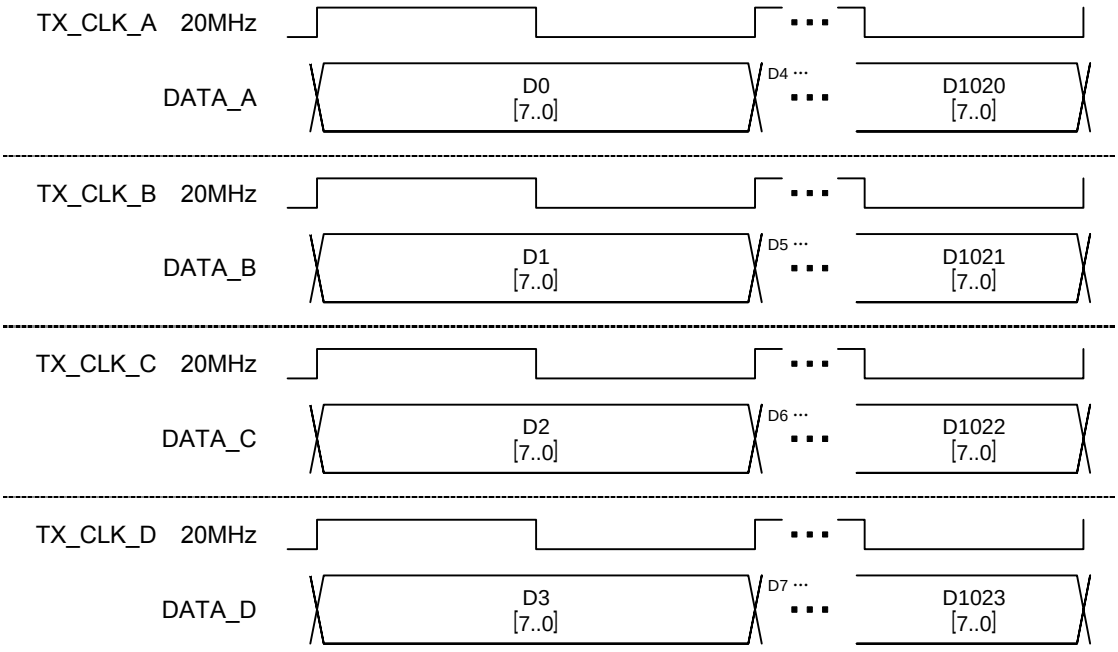
×2

The data for one dot is output from channel 1 and the data for the next dot is output from channel 2, and this is repeated. The same data output by channel 1 is output by channel 3, and the same data output by channel 2 is output by channel 4.



×4

The data for the first, second, third and fourth dots is output from channels 1, 2, 3 and 4, respectively, and this is repeated.

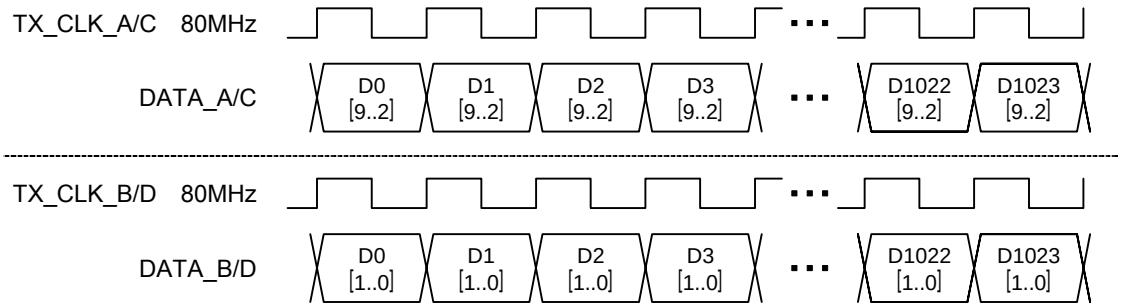


10bit mode

The multi-gradation data is transferred using two channels. Single Link and Dual Link are available as the transfer methods.

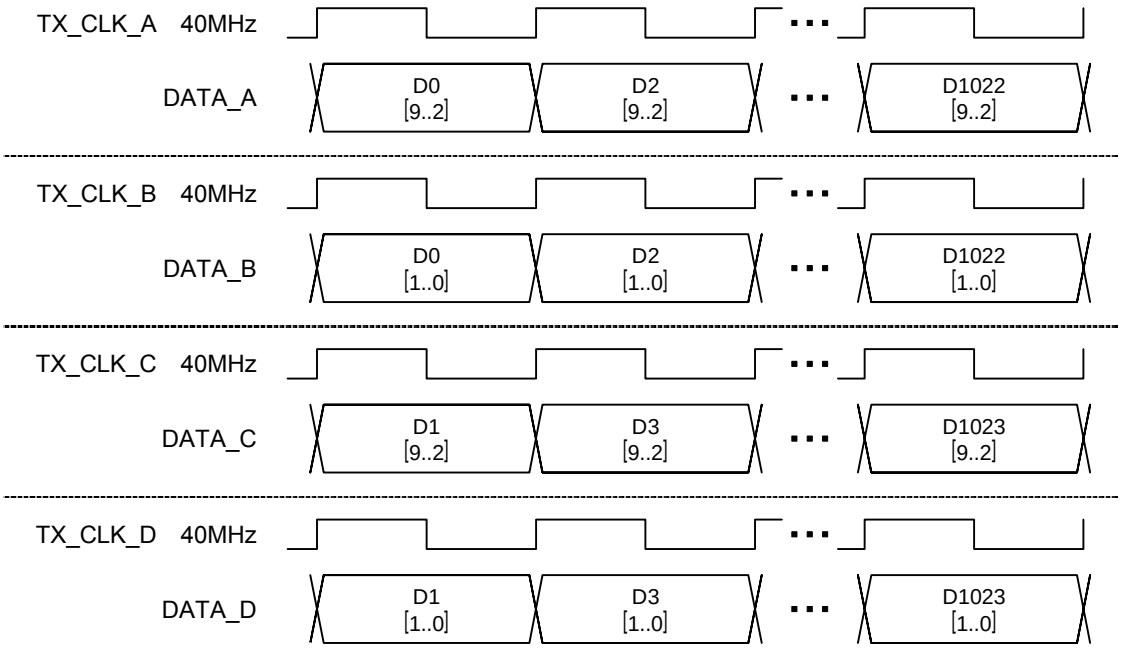
Single Link

The 8 higher bits are transferred from channel 1 and the remaining 2 lower bits from channel 2. The same data output by channel 1 is output by channel 3, and the same data output by channel 2 is output by channel 4.



Dual Link

The 8 higher bits are transferred from channels 1 and 3 and the remaining 2 lower bits from channels 2 and 4.

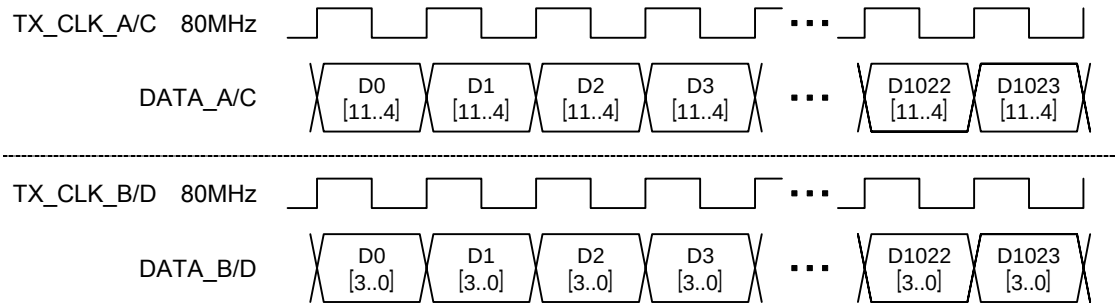


12bit mode

The multi-gradation data is transferred using two channels. Single Link and Dual Link are available as the transfer methods.

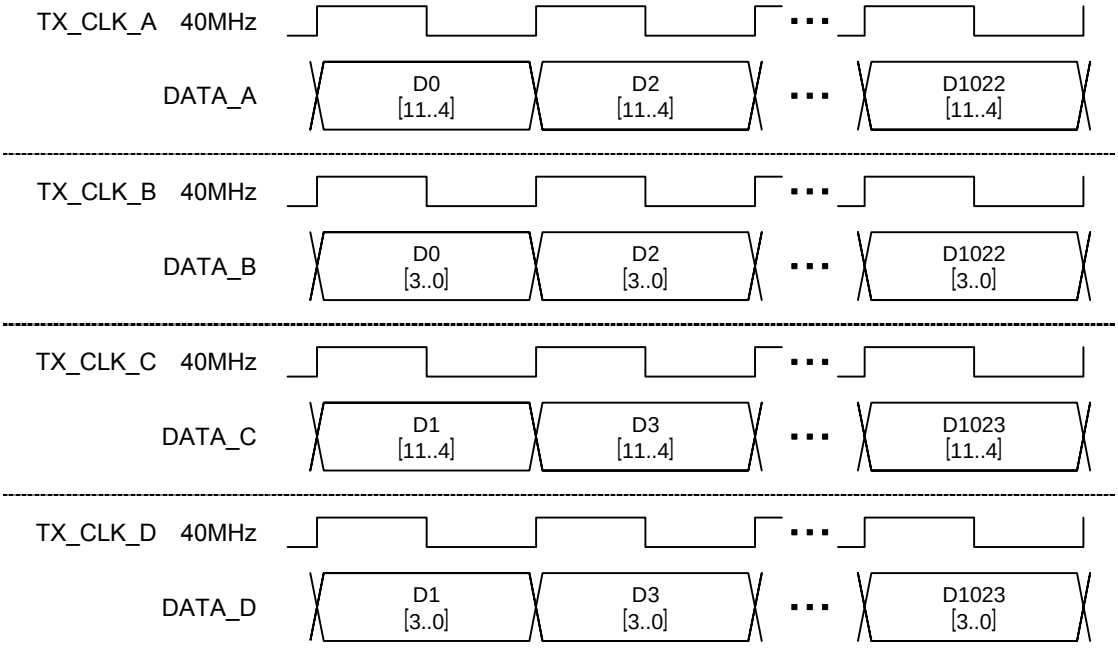
Single Link

The 8 higher bits are transferred from channel 1 and the remaining 4 lower bits from channel 2. The same data output by channel 1 is output by channel 3, and the same data output by channel 2 is output by channel 4.



Dual Link

The 8 higher bits are transferred from channels 1 and 3 and the remaining 4 lower bits from channels 2 and 4.



10.3.4.2 Data array

Pin.No	8bit / LUT10bit mode	10bit mode		12bit mode	
	CH1 / 2 / 3 / 4	CH1 / 3	CH2 / 4	CH1 / 3	CH2 / 4
35	R0	R2	-	R4	-
36	R1	R3	-	R5	-
37	R2	R4	-	R6	-
38	R3	R5	-	R7	-
39	R4	R6	-	R8	R0
40	R5	R7	-	R9	R1
41	R6	R8	R0	R10	R2
42	R7	R9	R1	R11	R3
43	G0	G2	-	G4	-
44	G1	G3	-	G5	-
45	G2	G4	-	G6	-
46	G3	G5	-	G7	-
47	G4	G6	-	G8	G0
48	G5	G7	-	G9	G1
49	G6	G8	G0	G10	G2
50	G7	G9	G1	G11	G3
51	VCC	VCC	VCC	VCC	VCC
52	VCC	VCC	VCC	VCC	VCC
53	GND	GND	GND	GND	GND
54	GND	GND	GND	GND	GND
55	HSx	HSx	HSx	HSx	HSx
56	VSx	VSx	VSx	VSx	VSx
57	DISPx	DISPx	DISPx	DISPx	DISPx
58	SWx	SWx	SWx	SWx	SWx
59	B0	B2	-	B4	-
60	B1	B3	-	B5	-
61	B2	B4	-	B6	-
62	B3	B5	-	B7	-
63	B4	B6	-	B8	B0
64	B5	B7	-	B9	B1
65	B6	B8	B0	B10	B2
66	B7	B9	B1	B11	B3
67	GND	GND	GND	GND	GND
68	CLK	CLK	CLK	CLK	CLK

10.3.4.3 Connector pin layout

- Connector: MINI D (half-pitch pin type) 68pin

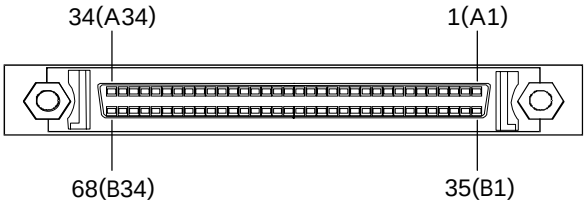


Fig. 10.3.5 Pin layout

Table 10.3.4 Pin numbers

CH1				CH2				CH3				CH4			
No.	Signal	No.	Signal	No.	Signal	No.	Signal	No.	Signal	No.	Signal	No.	Signal	No.	Signal
1	(GND)	35	RA0	1	(GND)	35	RB0	1	(GND)	35	RC0	1	(GND)	35	RD0
2	(GND)	36	RA1	2	(GND)	36	RB1	2	(GND)	36	RC1	2	(GND)	36	RD1
3	(GND)	37	RA2	3	(GND)	37	RB2	3	(GND)	37	RC2	3	(GND)	37	RD2
4	(GND)	38	RA3	4	(GND)	38	RB3	4	(GND)	38	RC3	4	(GND)	38	RD3
5	(GND)	39	RA4	5	(GND)	39	RB4	5	(GND)	39	RC4	5	(GND)	39	RD4
6	(GND)	40	RA5	6	(GND)	40	RB5	6	(GND)	40	RC5	6	(GND)	40	RD5
7	(GND)	41	RA6	7	(GND)	41	RB6	7	(GND)	41	RC6	7	(GND)	41	RD6
8	(GND)	42	RA7	8	(GND)	42	RB7	8	(GND)	42	RC7	8	(GND)	42	RD7
9	(GND)	43	GA0	9	(GND)	43	GB0	9	(GND)	43	GC0	9	(GND)	43	GD0
10	(GND)	44	GA1	10	(GND)	44	GB1	10	(GND)	44	GC1	10	(GND)	44	GD1
11	(GND)	45	GA2	11	(GND)	45	GB2	11	(GND)	45	GC2	11	(GND)	45	GD2
12	(GND)	46	GA3	12	(GND)	46	GB3	12	(GND)	46	GC3	12	(GND)	46	GD3
13	(GND)	47	GA4	13	(GND)	47	GB4	13	(GND)	47	GC4	13	(GND)	47	GD4
14	(GND)	48	GA5	14	(GND)	48	GB5	14	(GND)	48	GC5	14	(GND)	48	GD5
15	(GND)	49	GA6	15	(GND)	49	GB6	15	(GND)	49	GC6	15	(GND)	49	GD6
16	(GND)	50	GA7	16	(GND)	50	GB7	16	(GND)	50	GC7	16	(GND)	50	GD7
17	VCC	51	VCC	17	VCC	51	VCC	17	VCC	51	VCC	17	VCC	51	VCC
18	VCC	52	VCC	18	VCC	52	VCC	18	VCC	52	VCC	18	VCC	52	VCC
19	GND	53	GND	19	GND	53	GND	19	GND	53	GND	19	GND	53	GND
20	GND	54	GND	20	GND	54	GND	20	GND	54	GND	20	GND	54	GND
21	(GND)	55	HS0	21	(GND)	55	HS1	21	(GND)	55	HS2	21	(GND)	55	HS3
22	(GND)	56	VS0	22	(GND)	56	VS1	22	(GND)	56	VS2	22	(GND)	56	VS3
23	(GND)	57	DISP0	23	(GND)	57	DISP1	23	(GND)	57	DISP2	23	(GND)	57	DISP3
24	(GND)	58	SW0	24	(GND)	58	SW1	24	(GND)	58	SW2	24	(GND)	58	SW3
25	(GND)	59	BA0	25	(GND)	59	BB0	25	(GND)	59	BC0	25	(GND)	59	BD0
26	(GND)	60	BA1	26	(GND)	60	BB1	26	(GND)	60	BC1	26	(GND)	60	BD1
27	(GND)	61	BA2	27	(GND)	61	BB2	27	(GND)	61	BC2	27	(GND)	61	BD2
28	(GND)	62	BA3	28	(GND)	62	BB3	28	(GND)	62	BC3	28	(GND)	62	BD3
29	(GND)	63	BA4	29	(GND)	63	BB4	29	(GND)	63	BC4	29	(GND)	63	BD4
30	(GND)	64	BA5	30	(GND)	64	BB5	30	(GND)	64	BC5	30	(GND)	64	BD5
31	(GND)	65	BA6	31	(GND)	65	BB6	31	(GND)	65	BC6	31	(GND)	65	BD6
32	(GND)	66	BA7	32	(GND)	66	BB7	32	(GND)	66	BC7	32	(GND)	66	BD7
33	GND	67	GND	33	GND	67	GND	33	GND	67	GND	33	GND	67	GND
34	(GND)	68	CLK	34	(GND)	68	CLK	34	(GND)	68	CLK	34	(GND)	68	CLK

10.3.4.4 VCC power output/digital output level selector switch

Parallel output connectors have been added to the rear panel of the VG-835-A to enable output to a model that supports parallel output signals.
The VCC power output level of the parallel output signals can be selected using the selector switch on the left of the connectors while their digital output level can be set to 5V, 3.3V or 2.5V using the selector switch on the right.

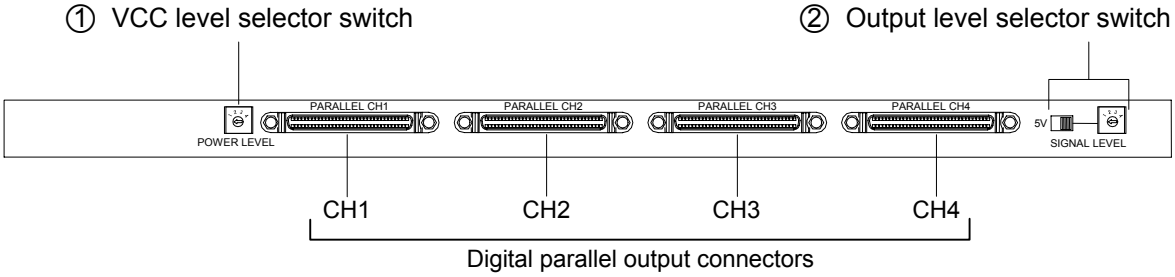


Fig. 10.3.6 Rear panel (parallel output connectors)

① VCC level selector switch

This is used to set the VCC level of the parallel output signals.

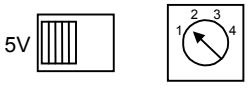
POWER LEVEL

Switch setting	VCC level
1	5V
2	3.3V
3	2.5V
4	-

* The total maximum supply current for channels 1 to 4 is 1A. Refer to “10.2 Concerning the DDC/VCC power supply.”

② Output level selector switch

This is used to set the output signal level of the parallel output signals.



SIGNAL LEVEL

5V selector switch setting	Rotary switch setting	Output level
Left	-	5V
Right	1	3.3V
	2	
	3	2.5V
	4	-

10.3.4 Trigger output (❖Option : only for the model that supports trigger output)

10.3.4.1 Connector pin layout

● Connector : MINI D (Half Pitch Pin Type) 68pin

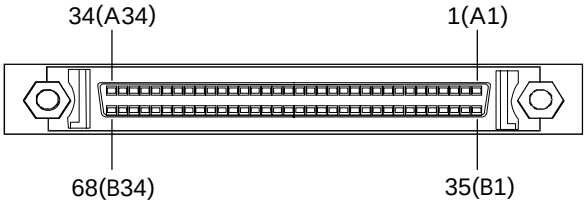


Fig. 10.3.7 Pin layout

Table 10.3.5 Pin number

CH1							
No.	Signal	No.	Signla	No.	Signal	No.	Signal
1	(GND)	35	SW0	1	VCC	35	VCC
2	(GND)	36	SW1	2	GND	36	GND
3	(GND)	37	SW2	3	GND	37	GND
4	(GND)	38	SW3	4	(GND)	38	(Reserve)
5	(GND)	39	(Reserve)	5	(GND)	39	(Reserve)
6	(GND)	40	(Reserve)	6	(GND)	40	(Reserve)
7	(GND)	41	(Reserve)	7	(GND)	41	(Reserve)
8	(GND)	42	(Reserve)	8	(GND)	42	(Reserve)
9	(GND)	43	(Reserve)	9	(GND)	43	(Reserve)
10	(GND)	44	(Reserve)	10	(GND)	44	(Reserve)
11	(GND)	45	(Reserve)	11	(GND)	45	(Reserve)
12	(GND)	46	(Reserve)	12	(GND)	46	(Reserve)
13	(GND)	47	(Reserve)	13	(GND)	47	(Reserve)
14	(GND)	48	(Reserve)	14	(GND)	48	(Reserve)
15	(GND)	49	(Reserve)	15	(GND)	49	(Reserve)
16	(GND)	50	(Reserve)	16	GND	50	GND
17	VCC	51	VCC	17	(GND)	51	(Reserve)

10.3.4.2 Output specification

● Output level : +5V(TTL)

● Output device : 74CBT16233 equivalent

10.4 External interface connector pin layouts

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

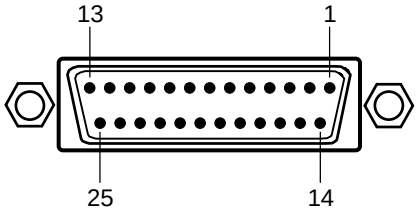


Fig. 10.4.1 Pin layout

Table 10.4.1 Pin numbers

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

*1: “I” or “O” is as input to or output from the VG-835-A.
*2: The control signals of these pins are used by Astrodesign. Under no circumstances must any connections be made to these pins.
*3: When fabricating a remote control unit, ground pin 21, and use the key matrix of the RB-614C.

As shown on the next page, the signals and remote control box (RB-1848, RB-614C, RB-649: optional accessory) key contacts are arranged in the form of a matrix.

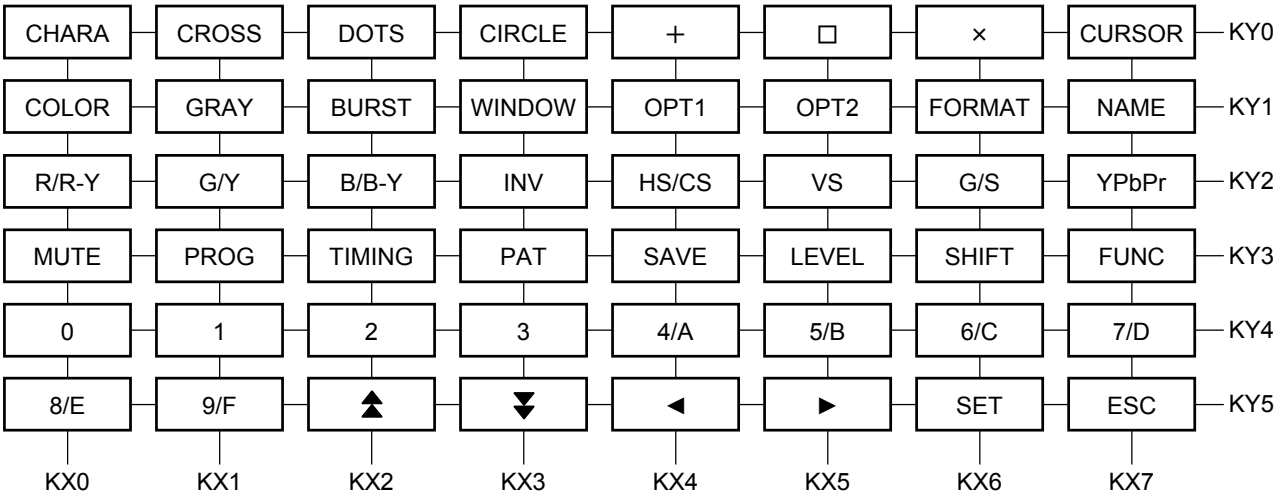


Fig. 10.4.2 RB-1848 key matrix

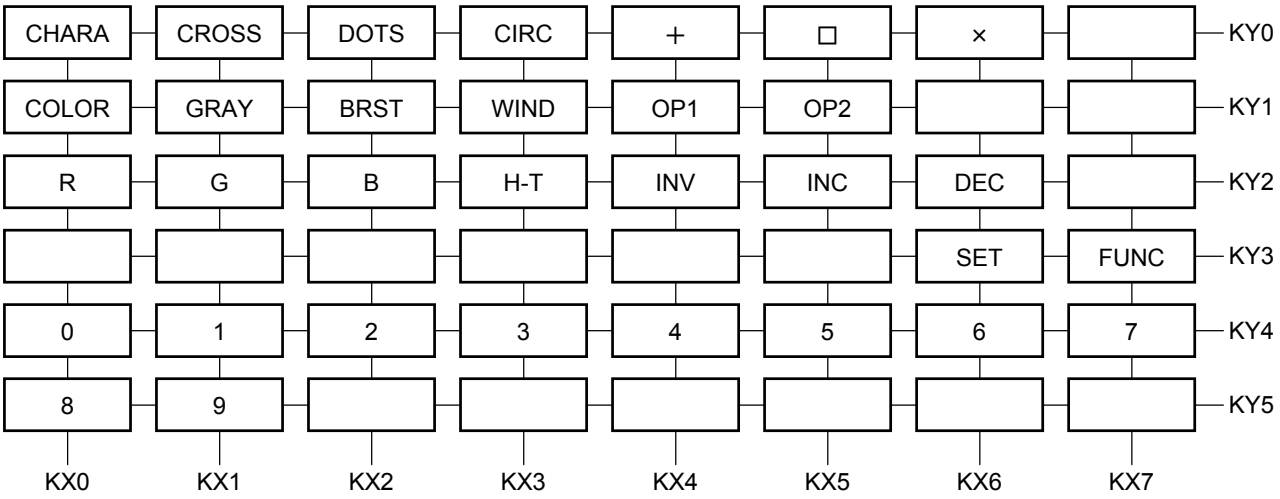


Fig. 10.4.3 RB-614C key matrix

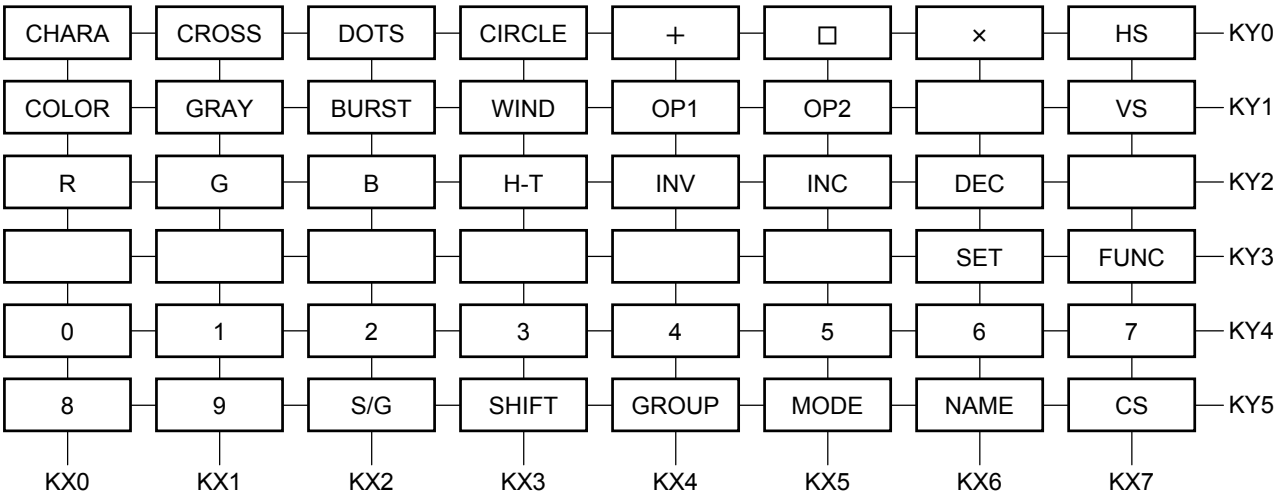


Fig. 10.4.4 RB-649 key matrix

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

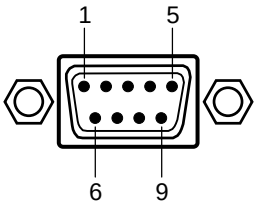


Fig. 10.4.5 Pin layout

Table 10.4.2 Pin numbers

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

10.5 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”.

10.5.1 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	●			
Self-check	●			

*1: The only function of config edit FUNC5 which can be set by the SP-8848 is “[22] Setting the internal program table.” However, the data which has been set cannot be saved.

*2: In the case of the RB-614C and RB-649, the keys corresponding to some of the functions which can be used are not featured on these remote control boxes, and so these items are not supported. (For instance, the boxes do not have a [LEVEL] key so the video output level cannot be changed using direct display FUNC0.) For the differences between the keys on these two boxes and the keys on the RB-1848 remote control box, refer to “8.1.3 Concerning the key operations.”

10.5.2 Concerning the optional functions

The output 12-bit mode, LVDS 4-channel output and parallel output are supported only as options. They are not supported by the standard VG-835-A model. Contact Astrodesign for more details on how to support these options.

10.5.3 Differences between models (VG-835 and 835-A)

The VG-835 and 835-A models differ as follows.

Item			VG-835	VG-835-A
Output bit mode (config edit FUNC5)	LUT10bit mode		Not supported	Supported as a standard feature
	12bit mode		Not supported	Supported as an option *1
LVDS 2-channel output dot clock frequency restrictions	8bit mode / LUT10bit mode	Single Link	20 to 90MHz	8 to 135MHz
		Dual Link	40 to 180MHz	16 to 270MHz
	10bit mode	Single Link	20 to 90MHz	8 to 135MHz
		Dual Link	40 to 165MHz	16 to 165MHz

*1: Contact an Astrodesign sales representative for more details on how to support these options.

Main functions

FUNC 0 SET
Direct display p.25
Output
VG-835-A

(Group No.0)
8 5 0 (Number keys, 3 digits)
Number of program selected and executed
Direct display mode

(Group No.1 to 99)
0 1 (Number keys, 2 digits)
Number of group selected and executed
Group display mode

Signal output

ESC
Group number changed p.28

LEVEL
Video output levels changed p.33

CHARA CROSS DOTS CIRCLE
+ □ × CURSOR
COLOR GRAY BURST WINDOW
OPT1 OPT2 NAME
Output patterns switched p.28

HS/CS VS G/S YPbPr
R/R-Y G/Y B/B-Y INV
SHIFT
Output video signals, sync signals switched p.33

(When cursor is displayed)
0 Screen display method changed
1 Blinking speed changed
2 Cursor moved (↓)
3 Cursor shape, mode changed
4 Cursor moved (←)
5 Movement step changed
6 Cursor moved (→)
8 Cursor moved (↑)
Cursor operations p.29

(When a window is displayed)
A Auto up
B Auto down
C Changes stopped
E 1 level up
F 1 level down
Window RGB levels changed p.32

FORMAT +
7 ↖ 8 ↑ 9 ↗
4 ← 5 Stop 6 →
1 ↙ 2 ↓ 3 ↘
Scrolling p.34

FORMAT
TIMING
Horizontal timing data
Vertical timing data
Output conditions
Timing data settings performed p.35, 57

FORMAT
CHARA CROSS DOTS CIRCLE
COLOR GRAY BURST WINDOW
OPT1 OPT2 NAME CURSOR
Character patterns to cursor patterns
□ Pattern action
× Graphic color
Pattern data settings performed p.35, 93

↑ or ↓ or → or ←
Setting item of each data selected or changed
SET
Settings reflected (in signals output)

FUNC 2 SET
Program edit p.37

FUNC 3 SET
PC card edit p.37
Edit
PC Card
Save

8 5 0 (Number keys, 3 digits)
Number of program selected
→ or ←
Program enable/disable
Program name
HDCP enable/disable
Settings performed

TIMING 0~2 SET
0 Horizontal timing data
1 Vertical timing data
2 Output conditions
Timing data settings performed p.57

PAT 0~E SET
0 Pattern select
E Pattern action
Pattern data settings performed p.93

↑ or ↓ or → or ←
Setting item of each data selected or changed
SET
Settings reflected (in signals output)

SAVE (LED blinks)
SAVE (LED off)
Settings saved

FUNC 5 SET
Config edit p.11
Set Up
VG-835-A

↑ or ↓ or → or ←
System setting item selected
SET
Settings reflected
SAVE (LED blinks) SAVE (LED off)
Settings saved

Timing data

0	Horizontal timing data	p.68
1	Vertical timing data	p.73
2	Output conditions	p.79

Pattern data

0		Pattern select	p.95
1		Graphic color	p.95
2	or CHARA	Character pattern	p.96
3	or CROSS	Crosshatch pattern	p.98
4	or DOTS	Dot pattern	p.100
5	or CIRCLE	Circle pattern	p.102
6	or COLOR	Color bar pattern	p.104
7	or GRAY	Gray scale pattern	p.106
8	or BURST	Burst pattern	p.108
9	or WINDOW	Window pattern	p.109
A	or OPT1	Optional pattern 1	p.115
B	or OPT2	Optional pattern 2	p.115
C	or CURSOR	Cursor pattern	p.116
D	or NAME	Program name	p.119
E		Pattern action	p.120

Other functions

FUNC 1 SET
Auto display p.36

FUNC 4 SET
PC card copy p.39

FUNC 6 SET
Group data edit p.46

FUNC 8 SET
Character edit p.48

FUNC 9 SET
List display p.50

FUNC A SET
YPbPr coefficient table edit p.54

FUNC B SET
Panel ROM copy p.56

VG-835-A Instruction Manual

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