VG-852

Instruction Manual

Ver. 1.0

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Astrodesign, Inc.

CONTENTS

FOREWORD

Thank you for purchasing the model VG-852 video signal generator.
This manual provides details on how to operate the VG-852 and the precautions to be taken when doing so.
Since improper handling may lead to accidents, we recommend that you take the time to read through this manual before attempting to operate the VG-852: the information provided will ensure that you will operate the VG-852 properly.
After reading through the manual, keep it in a safe place for future reference.

SAFETY PRECAUTIONS

⚠ WARNINGS

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 bundle it with other cords for use. This may cause a fire.
- Do not place heavy objects on top of the power cord. This 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, electrical shock or malfunctioning.

⚠ HANDLING CAUTIONS

Concerning the installation and operating locations

- Install the generator in a stable location (Using the generator installed perpendicularly may generate heat which will cause the generator's temperature to rise and which, in turn, may give rise to trouble.)

Concerning impact

- This is a precision instrument and, as such, subjecting it to impact may cause malfunctioning. Take special care when moving the generator.

Before connecting the VG-852 to the display

- Connect the frame grounds on the VG-852 and display before connecting the two units using the signal cables.
  (Use the accessory FG cable.)
  * See figure below Fig. 0-1

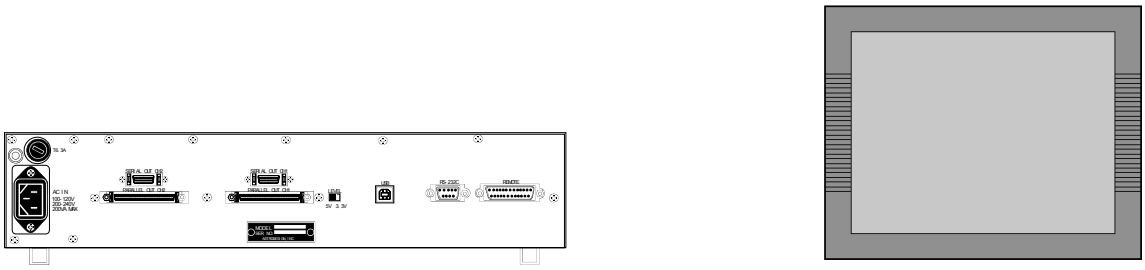
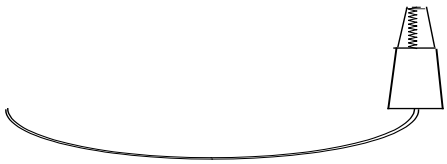


Fig. 0-1



Connect to the frame ground on the VG-852.

Use a crocodile clip for the connection to the frame ground on the display.

Connection between the frame grounds makes the output part and other extremely costly parts of the VG-852 less susceptible to damage. Taking this precaution is particularly important when the display is a newly developed model.

When disconnecting the VG-852 from the display

- First disconnect the connecting cable, and disconnect the frame ground last.

Handling the memory cards/panel ROMs

- The POWER switch on the front panel must always be used to turn on the power of the VG-852 when a memory card or panel ROM has already been installed. Turning on the power by plugging in the AC power cord may damage the memory card or panel ROM.

When problem of accuracy occurs

- Leave the VG-852 standing for 10 to 15 minutes after having turned on the power in order to allow the VG-852 to stabilize before operating it.

When trouble or malfunctioning occurs

- In the unlikely event that trouble or malfunctioning should occur, first disconnect the power cord and contact your dealer or an Astrodesign sales representative.

CHAPTER 1 OVERVIEW OF VG-852

1-1 Introduction

The VG-852 is the latest top-of-the-line model in Astrodesign's existing VG series of digital output signal generators (VG-825, VG-826A, VG-827). Not only does it enable panel ROMs of the existing models in the series to be used but the employment of a new flash memory card as the program memory yields some advantages such as an extended program capacity and the ability to save natural images. While maintaining compatibility with the existing models in the VG series, this generator has been developed to provide greater diversity in patterns and enhanced operational ease and to pursue the ultimate in digital video technology through the embodiment of some completely new concepts. It shows its true colors as a powerful tool to support R&D operations, production, inspections, etc. associated with not only LCDs but also PDPs, LEDs and other display devices equipped with a digital interface.

1-2 Features

(1) Ultra-wide frequency range for dot clock signals

The VG-852 generates dot clock signals with frequencies up to 100 MHz in the parallel output 1/1 clock mode and up to 200 MHz in the 1/2 clock mode. This upper limit is extended to 130 MHz in the serial output (see Note) 1/1 clock mode and 260 MHz in the 1/2 clock mode.
U-XGA class timing data is also supported.

Note: These are the speeds which are guaranteed by the circuit design. They will be supported after the market launch of the devices concerned.

(2) Two types of signals output simultaneously

Two types of digital signals, an RGB parallel digital output (TTL) signal and low-voltage serial digital output (panel link or LVDS) signal, can be output at the same time.

(3) Enhanced freedom for pattern settings and scroll function added

Over and above the existing basic inspection patterns, a function (usable for natural images as well) for scrolling in 1-dot increments vertically and horizontally, which comes in handy for assessing panels, has been added. It is also possible to vary the output video level in real time.

(4) Memory cards used to store program data

In addition to the conventional panel ROMs, memory cards are provided as a standard feature. A total of 850 programs can be entered on each memory card. Furthermore, by using the software program which is provided as a standard accessory, computer screen displays and natural images can also be stored.

(5) Internal sample data

A total of 150 sets of timing data and pattern data are entered as sample data inside the VG. They can be combined in any way for outputting signals. This function comes in handy when no panel ROMs or memory cards are available. It also makes it possible to use the sample data when program data is to be edited.

(6) Editing and entry software program compatible with Windows 95 provided as standard feature

The generator comes with an editing and entry software program (SP-8024) which runs in Windows 95 or 98 as a standard accessory, and a function that enables users to prepare any new patterns is supported through the use of this program. It is now easier to set and enter timing and pattern data, and natural images (in 256 colors) can also be entered.

Note: The USB interface is supported by Windows 98 only.

(7) Functions for controlling external equipment

It is now possible to control the signals which are output from the VG and also control external equipment by providing a large number of general-purpose switches and by controlling the VG by means of a personal computer.

(8) Wide range of functions related to operation

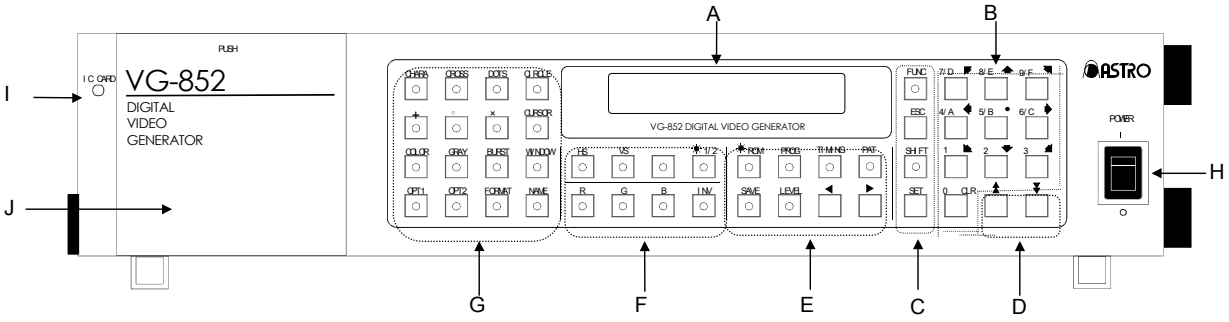
- Patterns can easily be changed while the direct display function is being used.
- Sync signals can be set ON or OFF manually using a panel key.
- In addition to the RS-232C interface, a USB interface has been provided for external control purposes.
- The optional RB-614C or RB-649 may be used as a remote control box.
- Group display and auto display functions are available.
- Program data, etc. can be listed for perusal.

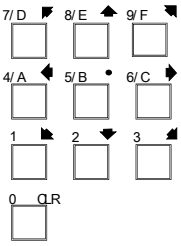
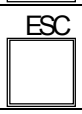
1-3 Panel parts and their functions

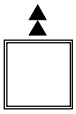
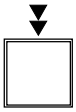
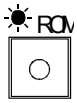
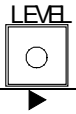
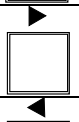
Some of the keys described below may assume different functions depending on the function and mode concerned. For details on how to use these keys, refer to the description of the operations provided in the chapters concerned.

1-3-1 Front panel

Fig. 1-1



A	 LCD (liquid crystal) display (24 characters × 2-line display)	The setting menus, program numbers, timing data, etc. appear on this display.
B	 keys	The ten number keys are used to input data. Using them in conjunction with the SHIFT key enables hexadecimal input from A to F. Depending on the setting item, the keys may have functions other than inputting numbers.
C	 key	Press this to change the function.
	 key	Press this to abort the current processing.
	 key	Press this to switch the number key input from decimal to hexadecimal. When the LED is lighted, hexadecimal input from A to F is enabled.
	 key	Press this to execute a function or program data. When editing program data, it is used to execute the set program data.

D	 key	This increments by 1 the program number in the direct display or group display mode. When program data or pattern data is edited, press it to return the LCD display menu to the previous page.
	 key	This decrements by 1 the program number in the direct display or group display mode. When program data or pattern data is edited, press it to advance the LCD display menu to the next page.
E	 key	Use this to select the memory card or panel ROM during execution or editing of the program data, etc. When the LED is lighted, the panel ROM is selected.
	 key	Press this to execute all the program data (timing and pattern data) in the direct display mode.
	 key	Press this to execute only the timing data in the direct display mode. During editing, press it to edit the horizontal/vertical timing and output condition data.
	 key	Press this to execute only the pattern data in the direct display mode. During editing, press it to edit the pattern data.
	 key	Press this to save the edited data in the memory card or panel ROM during the editing processes.
	 key	Press this to change the video signal output level in the direct display mode.
	 key	Use this to move the cursor on the LCD to the next item.。
	 key	Use this to move the cursor on the LCD to the previous item.

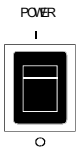
Output control keys

F	HS key	This is used to set the HS signal output to ON or OFF (it is ON when the LED is lighted). SHIFT When the LED is lighted HS The polarity is reversed by pressing the key (negative when the LED is lighted).
	VS key	This is used to set the VS signal output to ON or OFF (it is ON when the LED is lighted). SHIFT When the LED is lighted VS The polarity is reversed by pressing the key (negative when the LED is lighted).
	1/2 key	This is used to select the clock output mode (1/2 mode when the LED is lighted).
	R key	This is used to set the R signal output to ON or OFF (it is ON when the LED is lighted).
	G key	This is used to set the G signal output to ON or OFF (it is ON when the LED is lighted).
	B key	This is used to set the B signal output to ON or OFF (it is ON when the LED is lighted).
	INV key	This is used to reverse the R/G/B signal output (it is reversed when the LED is lighted).

Pattern keys

Press these keys to set the pattern outputs to ON or OFF. They are also used to select patterns during panel ROM data editing.

G	CHARA	key	Character	COLOR	key	Color bar
	CROSS	key	Crosshatch	GRAY	key	Gray scale (or half tone)
	DOTS	key	Dot	BURST	key	Burst
	CIRCLE	key	Circle	WINDOW	key	Window
	+	key	Center marker	OPT1	key	Optional pattern 1
	□	key	Edge marker	OPT2	key	Optional pattern 2
	×	key	Diagonal line	FORMAT	key	Press this to change the contents of the pattern data selected by NAME from CHARA.
	CURSOR	key	Cursor	NAME	key	Program name 0 0

H	POWER switch 	* The POWER switch on the front panel must be used to turn on the generator's power. Turning on the power by plugging in the AC power cord may damage the memory card or panel ROM.
I	IC CARD	This lights while memory card data is being accessed. Do not insert or remove the memory card while it is lighted. Otherwise, the memory card may be damaged.

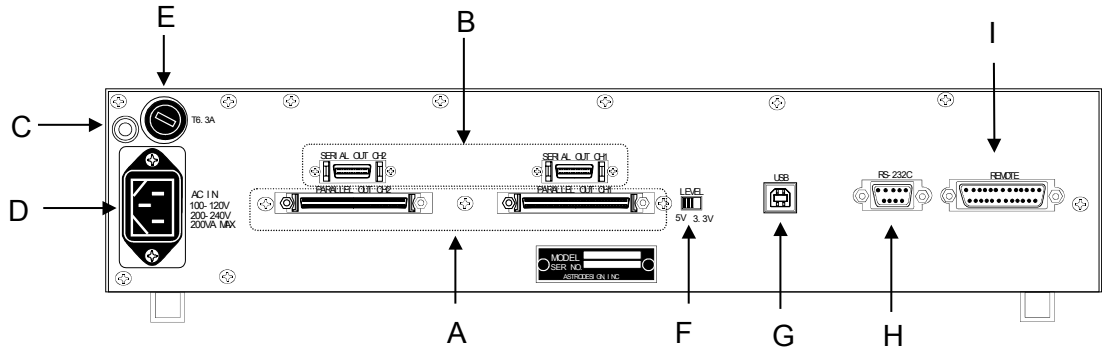
J The lid opens when the top area is pressed.

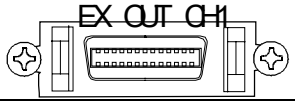
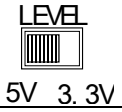
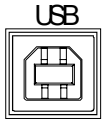
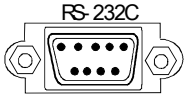
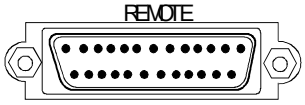
The panel ROM socket, memory card slot and DIP switches are found inside.

Panel ROM socket	To install a panel ROM, pull the lever toward you, check the panel ROM direction, insert the panel ROM and push the lever back in. The panel ROM may be damaged if it is inserted the wrong way round.
Memory card slot	Insert the memory card in the direction indicated by the arrow on the top of the card. Insert it firmly until it is completely inserted.
DIP switches	Refer to 3-2-2 for the DIP switch settings.

1-3-2 Rear panel

Fig. 1-2



A		**Digital parallel output connectors CH1, CH2 (68 pins)** Refer to Section 9-5 on connector pin layouts for its pin layout.
B		**Digital serial output connectors CH1, CH2 (26 pins)** Refer to Section 9-5 on connector pin layouts for its pin layout.
C		**Frame ground (FG)** Connect this frame ground to the frame ground of the unit which is connected to the VG-852.
D		**AC input socket** This supports a voltage from 100V to 120V or 200V to 240V.
E		**Fuse** A slow-blow 6.3A 250V fuse is used.
F		**Digital output level selector switch** This is used to set the digital output level to 5V or 3.3V.
G		**USB connector** This is used to control the VG-852 from the external computer (personal computer, etc.). (This is supported by Windows 98 only.)
H		**RS-232C connector (9-pin female)** This is used to control the VG-852 from an external computer (personal computer, etc.). Refer to Section 9-5 on connector pin layouts for its pin layout.
I		**Remote connector (25-pin female)** This is used to connect an optional remote control box (RB-649 or RB-614C) to operate the generator by remote control. Refer to Section 9-5 on connector pin layouts for its pin layout.

1-4 Description of abbreviations

(1) Output signals

HS	Horizontal sync signal
VS	Vertical sync signal
CS	Composite sync signal
HT	Half-tone
RHT,GHT,BHT	Red, green, blue half-tone
CLK	Dot clock
EQP(EQ－PULSE)	Equalizing pulse
SERR	Serrated pulse
CV	Composite video sync signal
HD	Horizontal direct drive pulse
VD	Vertical direct drive pulse

(2) Operation

PROG	Program
PAT SEL	Pattern select
OUTPUT	Output condition
PAT	Pattern
FUNC	Function

1-5 Differences from existing models

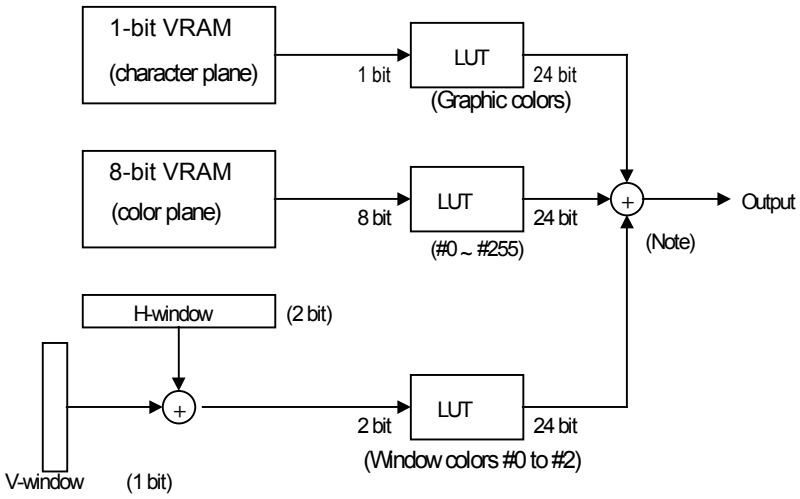
Item	Description	
Internal optional pattern (Note 1)	Existing models	The OPT1 and OPT2 optional patterns are in separate groups. Patterns 00 to 1F are selected in each group.
	VG-852	The OPT1 and OPT2 optional patterns are in the same group. Patterns 00 to 3F are selected. (Refer to Section 10-2 on internal optional patterns.)
Internal user characters	Existing models	None
	VG-852	Patterns F0 to FF are selected. (Refer to Section 10-3 on internal user character data.)
Remote control box	Existing models	Data can be edited using the RB-649.
	VG-852	Data cannot be edited using the RB-649 or RB-614C.
NRZ/RZ	This is not supported by the VG-852. It can be set to ensure compatibility of the program data with an existing model but it will be ignored when it is executed by the VG-852. (Refer to Section 4-4.)	
External control (Note 2)	Existing models	Possible with RS-232C only. (9600 bps, data length = 7 bits, stop bit = 1, parity = none)
	VG-852	Both the RS-232C and USB interfaces can be used. Selection is made using the DIP switches. (Refer to Section 3-2-2 on the operating modes established by DIP switch settings.) The RS-232C baud rate and other parameters can be set by Func-5. (Refer to Section 3-3-6 on the config edit function (Func-5).)
CPC function	This is not supported by the VG-852. It must be re-created by an optional pattern prepared by the user.	
Group data/auto display data when panel ROM (58C65P) is used	Only data in programs with 2-digit program numbers can be saved in the panel ROM (58C65P). If a 3-digit program number is entered, the first digit will be ignored.	

Note 1:	Optional pattern numbers are not interchangeable. Be careful is required when using an existing panel ROM.

Note 2:	The terminal commands of existing models can be used but the functions expanded for the VG-852 cannot be used. All terminal commands can be called from the C program by using the library in the software program provided.

1-6 Video memory and LUT

The video memory and LUT in the VG-852 are configured as below.



The video memory consists of a 1-bit VRAM, 8-bit VRAM, and a horizontal 2-bit/vertical 1-bit window line buffer.

VRAM	Types of patterns	Description
1-bit VRAM (character plane)	CHARA, CROSS, DOTS, CIRCLE, ＋, □, ×, CURSOR, BURST, NAME	No limits imposed on resolution by dot clock.
8-bit VRAM (color plane)	COLOR, GRAY, Image data display	The horizontal resolution differs according to the dot clock mode. ● When 1/1 mode is established: 1 drawn dot corresponds to 1 display dot. ● When 1/2 mode is established: 1 drawn dot corresponds 2 display dots.
Window line buffer	WINDOW	This consists of a horizontal 1-bit/vertical 1-bit line buffer.

Note:

The sequence of priority for the 1-bit VRAM, 8-bit VRAM and window outputs is shown below.

A 1-bit VRAM
B window
C 8-bit VRAM

The output colors are determined in accordance with the above sequence of priority for parts where two or three of the above overlap.

CHAPTER 2 MEMORY CARDS/PANEL ROMS

2-1 VG-852 internal data

The following data is contained in the E-PROM inside the main unit of the VG-852.

	Internal E-PROM of VG-852
Number of program data	150 (850 to 999)
Number of user characters	16 (F0H to FFH)
Number of optional patterns	64 (00H to 3FH)

As with the memory card or panel ROM data, this data can be used as execution data or as edit/copy source data. For further details, refer to Chapter 10 on internal data.

2-2 Functions of the memory card/panel ROM

Program data, group data, user characters and auto display data can be entered or edited on the memory card and panel ROM. Furthermore, user-created optional patterns and image data can be entered on the memory card.
Program data (× 150: #850 to #999) has been entered in the E-PROM inside the main unit of the VG-852: the data cannot be edited and saved.
Customized timing and pattern data can be created by editing and entering data on the memory card and panel ROM.

The panel ROM data is compatible with the panel ROMs in existing VG models. Panel ROMs with data already entered can be used as is.
However, with functions (data) which were expanded from a model in the existing VG series, the data cannot be entered into the panel ROM of the VG-852.
It is recommended that the memory card be used so that the functions of the VG-852 will be used to the full. The memory card is recommended to use for the full use of VG-852 functions.

Note:	Unless otherwise noted, any mention of "memory card" hereafter will include the panel ROM as well. The phrase "memory card" should therefore be read as "memory card and panel ROM" from this point in the text onward.

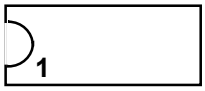
2-3 Memory card/panel ROM types and main differences

(1) Types of memory cards/panel ROMs

The following 10 types of memory cards can be used with the VG-852.

Flash memory cards made by Fujitsu	MB98A81063-15 (1MB), MB98A81183-15 (2MB), MB98A81273-15 (4MB), MB98A81373-15 (8MB), MB98A81473-15 (16MB), MB98A81573-15 (32MB)
Flash memory cards made by Hitachi Maxell	EF-2M-TB (2MB), EF-4M-TB (4MB), EF-8M-TB (8MB), EF-16M-TB (16MB)

The following three types of panel ROMs can be used with the VG-852.



Insert the panel ROM (EEPROM or EPROM) in the direction shown on the left.

EEPROM (Hitachi): HN58C65P-10 (64Kb, 100ns standard panel ROM)
HN58V65AP－10 (64Kb, 100ns standard panel ROM)
HN58C256P－10 (64Kb, 100ns standard panel ROM)
HN58C256P－20 (64Kb, 100ns standard panel ROM)

EPROM (any makers): 2764 (64Kb, 250ns)

EEPROM (Astrodesign): Optional AH-3000 (512Kb, 250ns expansion panel ROM)

(2) Differences between memory cards/panel ROMs

Table 2-1

	HN58C65P－10 HN58V65AP－10 2764 (*1)	HN58C256P	AH-3000	Memory card
Number of programs which can be entered	40 (1～40)	160 (See next section)	320 (See next section)	849 (1～849)
Number of characters in a program name	8 characters	8 characters	8 characters	20 characters
Number of user characters which can be entered	4 (E0H～E3H)	8 (E0H～E7H)	15 (E0H～EEH)	16 (E0H～EFH)
Number of groups which can be entered (*2)	2 (1～2)	40 (1～40)	8 (1～8)	32 (1～32)
Number of characters in a group name	--	--	--	20 characters
Number of user-created optional patterns which can be entered	--	--	--	64 (40H～7FH)
Number of image data which can be entered (*3)	--	--	--	Depends on card capacity (*3)

*1)	Since data cannot be written into the 2764 (EPROM) by the VG-852, use the HN58C65P-25 as the master to write the data with a ROM writer.
*2)	As regards the number of groups, refer to the section on the group data edit function in Chapter 3. Only data in programs with 2-digit program numbers can be saved in the panel ROM (58C65P, 58V65AP).
*3)	The number of image data which can be entered is calculated as follows. Number of sectors usable as image data = Card capacity/128 KB - 3 (1 sector = 128 KB, 3 sectors cannot be used by images) Number of sectors used for the data of one image = (Number of horizontal dots of image x number of vertical lines of image + 784 + 131071)/131072 (decimal places rounded off)
*4)	Users can prepare and enter any patterns by using the SP-8024 (VG-852 control software program). For further details, refer to SP-8024 on-line help and "how to prepare user optional patterns."
*5)	The image data is displayed by executing OPT-80 to BF. OPT-80 |~ Image data #1 displayed OPT-81 ~ Image data #2 displayed : : OPT-BF ~ Image data #64 displayed

2-4 Precautions for using AH-3000/HN58C256P

(1) AH-3000 program numbers

The AH-3000 has a capacity which enables 320 programs to be entered. It is divided into 1) an area equivalent to 40 programs of the standard panel ROM and 2) an expansion area equivalent to the remaining 280 of the 320 programs. As for the program numbers applying when the AH-3000 is installed as the panel ROM, numbers 001 to 040 apply for the programs in the standard area and numbers 500 to 779 apply for the programs in the expansion area.

(2) HN58C256P program numbers

The HN58C256P panel ROM has a capacity which enables 160 programs to be entered. It is divided into 1) an area equivalent to 40 programs of the standard panel ROM and 2) an expansion area equivalent to the remaining 120 of the 160 programs. As for the program numbers applying when the HN58C256P is installed as the panel ROM, numbers 001 to 040 apply for the programs in the standard area and numbers 501 to 540, 601 to 640, and 701 to 740 apply for the programs in the expansion area.

2-5 Configuration of program data

The data of one program is divided into the blocks listed in Table 2-1.

Table 2-2

Valid/invalid	Denotes whether program data is valid or invalid	
Timing data	H-Timing	Horizontal timing data
	V-Timing	Vertical timing data
	OUTPUT	Output condition data
Pattern data	Pattern Select	Pattern select data
	Graphic Color	Graphics color data
	CHARA	Character pattern data
	CROSS	Crosshatch pattern data
	DOTS	Dot pattern data
	CIRCLE	Circle pattern data
	COLOR	Color bar pattern data
	GRAY	Gray scale pattern data
	BURST	Burst pattern data
	WINDOW	Window pattern data
	OPT1	Optional pattern #1 data
	OPT2	Optional pattern #2 data
	CURSOR	Cursor pattern data
	NAME	Program name data
Action data	ACTION	Pattern action data

Each of some of the blocks is divided into a number of pages, and each page has a number of data items. One page corresponds to one screen display. Use the ▼ key to display the next page and the ▲ key to display the previous page. Use the ◄ and ► keys to select the data items. The cursor on the LCD display is moved by pressing the ◄ and ► keys.

Note:	The cursor will not move when there is only one item. When items cover only one page, the display will not change even when the ▲ or ▼ key is pressed.

CHAPTER 3 SOFTWARE CONFIGURATION AND OPERATION

3-1 Software configuration

The software used to operate this unit consists of the following functions. Each function is established by pressing the [FUNC] key, a number key from [0] to [9] and the [SET] key in this order.

Table 3-1 Operation software

Function No.	Name of function	Description and use
0	Direct display	When a program number is input, signals are output in accordance with the data contained in the program. (*1) This function is used for adjustments and inspections conducted on production lines, etc.
1	Auto display	Programs are executed repeatedly and automatically in accordance with the delay times and program number setting sequence entered in the memory card/panel ROM. This function is used for demonstrations and service life testing.
2	Program edit	The program data is changed temporarily, and signals are output according to the changed data. (The changes cannot be saved.) This function is used for testing and evaluation by personnel in development or engineering divisions.
3	Card/ROM edit	The program data is edited and entered. This function is used when preparing memory card/panel ROM data.
4	Card/ROM copy	Data on the memory card or panel ROM is copied. Copy between cards or ROMs is possible.
5	Config edit	This function is used to set the execution mode, etc. of the VG-852. Copy between cards or ROMs is possible.
6	Group data edit	Group numbers and program numbers are entered in the memory card/panel ROM. This function is used when entering group display data.
8	Character edit	User character data is edited and entered. This function is used when entering group display data.
9	List display	The data which has been entered is displayed on a display. This function is used when entering group display data.

(*1) The group display execution mode is established when the group number is set using config edit (Func-5).

3-2 Operating modes when the power is switched on

3-2-1 Operating modes established by key operation

The operating mode changes in accordance with the following operations when the VG-852 unit's power is turned on.

Operation	Operating mode
Power is turned on with no keys pressed.	Normal mode. The direct display or group display function is executed.
Power is turned on while the SET key is pressed.	The auto display function is executed. The auto display data is read from the device (memory card or panel ROM) which was selected using config edit (Func-5), and executed.
Power is turned on while the ▲▲ key is pressed.	The unit is started up in the self-diagnosis mode.

3-2-2 Operating modes established by DIP switch settings

- The highlighted areas in the table below denote the factory settings of the DIP switches.
- To change a setting, be sure to turn off the power first, select a setting listed in the table, and turn the power back on. (Changes made to the DIP switch settings after the power has been turned on may be ignored.)

Table 3-2

SW No.	Function	ON/OFF operation		
SW1	Terminal mode port selection	ON	:	The terminal mode is executed at the RS-232C port.
		OFF	:	The terminal mode is executed at the USB port.
SW2	Key lock selection	ON	:	The key lock function is not used.
		OFF	:	The key lock function is activated.
SW3	OPT2 operation mode	ON	:	Same patterns are displayed for OPT-No.0 to 1F as OPT1.
		OFF	:	Operation mode for OPT-No.0 to 1F is the same as with existing VG models.
SW4	Level selection when HS/VS/CS are OFF	ON	:	Low level is set.
		OFF	:	High level is set.
SW5	Not used	ON	:	Leave this switch at the factory setting.
SW6	Not used	ON	:	Leave this switch at the factory setting.
SW7	Reserved	ON	:	Leave this switch at the factory setting.
SW8	Reserved	ON	:	Leave this switch at the factory setting.

*1) Activating the key lock function limits the functions which can be executed using the front panel controls. Only the following functions can be selected. (All other functions will not be executed.)

A. Direct display (Func-0)

B. Card/ROM copy (Func-4)

C. List display (Func-9)

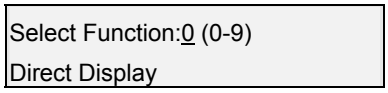
3-3 Operation methods for each function

3-3-1 Direct display function (Func-0)

The program data inside the VG-852 or the program data entered in the memory card/panel ROM is executed simply by inputting the number of the program containing the data.

(1) Function selection display

Fig. 3-1



<<Key operations>> FUNC 0 SET

Note:	If a group number other than 0 has been set in the config setting, the group display function is established. (Refer to the group display and config settings.)

(2) Initial display

Fig. 3-2

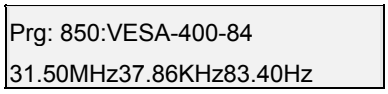
(3) Once this function has been established, the designated program data is executed simply by using the number keys to input the program number (3 digits). The program number can also be selected using the [up] (increment) key or [down] (decrement) key.

This function is automatically established when the unit's power is turned on.

<<Key operations>> Example: 850 (or ▲ (increment) key)

<Display after program execution>

Fig. 3-3



Description of LCD displays

850	Number of program executed.
VESA-400-84	Program name (first 16 characters only are displayed)
31.50MHz	Dot clock frequency
37.86KHz	Horizontal frequency
83.40Hz	Vertical frequency

(4) Executing all the program data, executing time data only and executing pattern data only

The execution mode is switched as shown below using the **PROG**, **TIMING** or **PAT** key. The key functions are the same as those described above.

PROG key	The PROG-LED lights. All the program data (timing + pattern data) is executed.
TIMING key	The TIMING-LED lights. Only the timing data is executed.
PAT key	The PAT-LED lights. Only the pattern data is executed.

(5) Selecting patterns using the pattern keys

Using the pattern keys from **CHARA** through **NAME**, only the display patterns can be selected while the timing data remains unchanged. The output pattern is the pattern which has been set in the executed program data.

CHARA key	Characters
CROSS key	Crosshatch
DOTS key	Dots
CIRCLE key	Circle
+ key	Center marker
□ key	Edge marker
× key	Diagonal line
CURSOR key	Cursor
COLOR key	Color bar
GRAY key	Gray scale

BURST key	Burst
WINDOW key	Window
OPT1 key	Optional pattern 1
OPT2 key	Optional pattern 2
NAME key	Program name

(6) R/G/B output on/off, inversion and HS/VS/CS/GS output on/off

The output can be selected using the keys shown below.

R G B key	R/G/B signal output on/off (output on when LED lights).
INV key	R/G/B signal output inversion (output inverted when LED lights).
HS VS CS key	HS/VS/CS output on/off (output on when LED lights); polarity is inverted when SHIFT-LED lights (negative when LED lights).
G/S key	Green on Sync signal output on/off (output on when LED lights).

(7) Selecting the clock output mode

The clock output mode can be selected using the 1/2 key.

When the 1/2-LED is off	The 1/1 mode is set as the clock output mode.
When the 1/2-LED is on	The 1/2 mode is set as the clock output mode.

(8) Selecting the memory card or panel ROM

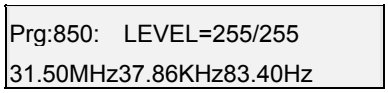
The memory card or panel ROM can be selected using the ROM key.

When the ROM-LED is off	Program data is read from the memory card.
When the ROM-LED is on	Program data is read from the panel ROM.

(9) Changing the output video level

When the [LEVEL] key is pressed, the LEVEL-LED lights, the LCD display changes to what is shown below, and the output video level is displayed.

Fig. 3-4



The output video level can be set with 3 digits using the number keys.

The output video level can be changed using the [▲] (increment) key or [▼] (decrement) key. The maximum level is displayed on the right and the current level on the left.

The variable range and number of steps differ according to the number of bits for the RGB (video) signals in the output conditions (refer to editing the output condition data in Section 4-4).

(Examples: Range = 0--255, steps = 1 with 8 bits; range = 0--192, steps = 64 with 2 bits)

(10) Changing the pattern data

When the FORMAT key is pressed, the FORMAT-LED lights, and the data of the currently selected pattern can be changed. Pressing a pattern key while the FORMAT-LED is lighted initiates a change to the editing screen for the corresponding pattern data. Pressin□ a pattern (+, or × key) with no pattern data initiates a change to the graphic color editing screen.

For details on the LCD displays and operations, refer to editing the pattern data in Section 5-2.

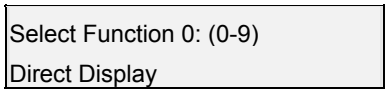
3-3-2 Group display mode

In the group display mode, signal output is executed in the same way as with direct display on the basis of the group information entered in the memory card/panel ROM.

Note:	Use function 6 to enter the data settings.

(1) Function selection display

Fig. 3-5



<<Key operations>> [FUNC] [0] [SET]

Note:	Operation is executed in exactly the same way as with direct display (Func-0). If a group data number other than 0 has been set in the config setting, the group number designated by the above operation is executed in the group display mode.

Note:	The group data is read out from the memory card or panel ROM, whichever is selected using the [ROM] key, and this data is executed.

Group display does not function if there is no memory card or panel ROM.

(2) Initial display

Fig. 3-6

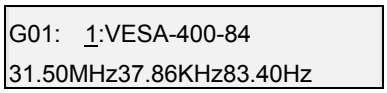
(3) Once this function has been established, the program data entered as the designated group data is executed simply by using the number keys to input the group data number (3 digits).

The group data number can also be selected using the ▲ (increment) key or ▼ (decrement) key.

<<Key operations>> Example: 001 (or ▲ (increment) key)

<Display after program execution>

Fig. 3-7



Description of LCD displays

G01	Number of group selected by config setting; this indicates that the group display mode is now established.
1	Executed group data No.
VESA-400-84	Program name (first 16 characters only are displayed)
31.50MHz	Dot clock frequency
37.86KHz	Horizontal frequency
83.40Hz	Vertical frequency

(4) Outputting the SW (general-purpose) signals

By setting GSW0/1 (Stt/End) for the group data, ON and OFF are selected for the SW signal output by referencing the Stt status when (or immediately before) the group display execution is commenced and by referencing the End status when (or immediately after) the last group data number program is executed.

Note:	Refer to the sections on the group data edit function and on editing the output condition data.

(5) Other functions

The other functions are the same as for direct display.

(6) Changing the group number

The following display appears when the [ESC] key is pressed during direct display or group display execution.

Fig. 3-8

```
Group No.:   0   (00-40)
```

The designated group number is executed by inputting the group number with 2 digits and pressing the [SET] key. Instead of inputting the group number, the [▲] (increment) key or [▼] (decrement) key can be used to select the group number.

3-3-3 Auto display function (Func-1)

(1) Function selection display

Fig. 3-9

```
Select Function:1 (0-9)
Auto Display
```

<<Key operations>> [FUNC] [1] [SET]

(2) Initial display

Fig. 3-10

```
A.Disp Delay:   0sec
000-000 000-000 000-000
```

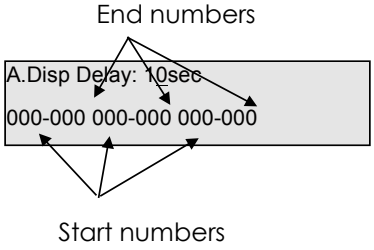
(3) First, set the delay time. Use the [0] to [9] number keys to input a number with up to 3 digits (0 to 999). Up to 999 seconds (16 min. 39 sec.) can be set. The cursor is moved to the next item by pressing the [►] key.

Fig. 3-11

```
A.Disp Delay: 10sec
000-000 000-000 000-000
```

(4) Next, set the numbers of the programs to be executed by auto display. Since the execution is divided into 3 blocks, the programs to be executed consecutively can be divided into three. Auto display execution is ignored if zeros are input for the start or end number.

Fig. 3-12



Note 1: When the AH-3000 is used, 01 to 40 and 500 to 779 can be set as the program numbers.

Note 2: When the HN58C256P is used, 01 to 40, 501 to 540, 601 to 640 and 701 to 740 can be set as the program numbers.

(5) Press the [SET] key to execute auto display.

(6) To stop auto display

Press the [ESC] at any time during execution to stop auto display, and the display shown in Fig. 3-11 is restored.

(7) Saving the auto display data

Press the [SAVE] key. While the auto display data is edited, the SAVE-LED lights, and the auto display data is saved. Upon completion of saving, the SAVE-LED goes off.

3-3-4 Card/panel ROM edit function (Func-3)

(Operations are the same as for the program edit function (Func-2).)

(1) Function selection display

Fig. 3-13

```
Select Function:3 (0-9)
Card/ROM Edit
```

or

```
Select Function:2 (0-9)
Program Edit
```

<<Key operations>> The initial display of function 3 appears when the [FUNC], [3] and [SET] keys are pressed.

(2) Initial display

Fig. 3-14

```
Prog No:  1 Enable (0/1)
ASTRO AK
```

(3) Selecting the program number

Input the number of the program to be edited in this status.

A. Input a 3-digit number from 001 to 999 using the [0] to [9] number keys. (Input "001" for program No.01.)

When the AH-3000 is used, input a number from 001 to 040 or 500 to 779.

When the HN58C256P is used, input a number from 001 to 040, 501 to 540, 601 to 640 or 701 to 740.

Note 1:	Input can be completed using the [SET] key when the program number is less than 3 digits.

Note 2:	The error buzzer sounds when a memory card with no data entered is installed and a program number is input.
Note 3:	The data is read out from the device (memory card or panel ROM) selected by the [ROM] key.

B. When the program number is input, the name of the program whose number has been input and "Enable" are displayed.

C. When the [▶] key is pressed to move the cursor to the "Enable" position, the Enable/Disable status can be changed using the [1] (Enable) or [0] (Disable) key.

Note:	"Disable" is set in order to prohibit the use of specific program numbers in the memory card. Normally, set "Enable".

(4) Entering the program name

The name of a program can be input by pressing the [▶] key to move the cursor to the line below. To input characters, the cursor is then moved using the using the [▲] key or [▼] key to input the character code which is set one character at a time. (Up to 20 characters can be input but only the first 8 characters will be entered in the panel ROM.)

* Characters can also be input from the display screen. For details, refer to Section 3-3-10.

(5) Entering the program data

After setting enable/disable for the program and setting the program name (or leaving the settings unchanged), press the [SAVE] key. The SAVE-LED flashes, and the following display appears on the LCD.

Fig. 3-15

```
Save Program No:  1
ASTRO AK
```

When the number and name of the program to be saved are set and press the [SAVE] key again, the program data is saved in the memory card. (The LED goes off once the data has been saved.)

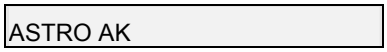
Note 1:	Program data entry can be called on the screens of this edit function.
Note 2:	Data cannot be entered using the program edit function (Func-2).
Note 3:	The data is saved in the device (memory card or panel ROM) selected by the [ROM] key.

(6) To enter the timing or pattern data edit mode

Display which appears when program data is called using the [TIMING] or [PAT] key

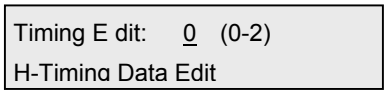
Fig. 3-16

```
Save Program No:  1
```



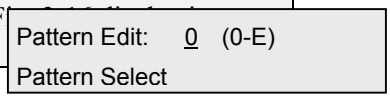
Press the **TIMING** key while the Fig. 3-16 display is shown, the following display appears instead, and the timing data edit mode is established. Refer to Chapter 4 for the subsequent operations.

Fig. 3-17 →



When the PAT key is pressed while the Fig. 3-16 display is shown, the following display appears instead, and the pattern data edit mode is established. Refer to Chapter 5 for the subsequent operations.

Fig. 3-18 →



Note: The respective edit mode can be established as desired by pressing the **TIMING** or **PAT** key while the F… shown.

(7) Checking the setting data operation

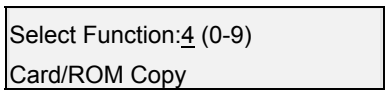
When the **SET** key is pressed on the timing or pattern edit screens, the setting data concerned is executed. (This operation can be checked if a display has been connected to the generator.)

(8) To edit the data in another program, press the **PROG** key after editing and saving the data in one program, return to the Fig. 3-7 status, and repeat the same operations.

3-3-5 Card/panel ROM copy function (Func-4)

(1) Function selection display

Fig. 3-19



<<Key operations>> The initial display of function 4 appears when the **FUNC**, **4** and **SET** keys are pressed.

(2) Initial display

Fig. 3-20

```
Card/ROM Copy Sel:0(0-A)
All Copy
```

(3) Select the type of copying operation to be performed using the [0] to [A] keys.

[0]	All Copy	For copying all the data in the memory card or panel ROM.
[1]	1 Prog Data Copy	For copying program data in 1-program increments.
[2]	1 Prog Tim Data Copy	For copying timing data in 1-program increments.
[3]	1 Prog Pat Data Copy	For copying pattern data in 1-program increments.
[4]	BLK Prog Data Copy	For copying program data in increments of multiple blocks.
[5]	CHR Data Copy	For copying user character data in 1-character units.
[6]	IMG Data Copy	For copying image data in 1-data increments.
[7]	OPT Data Copy	For copying user optional pattern data in 1-data increments.
[8]	Group Data Copy	For copying group data in 1-group increments.
[9]	Auto Data Copy	For copying auto display data.
[A]	Card/ROM Erase	For erasing all the data in the memory card or panel ROM. (Note)

Note:	Memory cards are formatted using the [A] key. *Format memory cards before using a new one.*

(4) Copying internal sample timing data

When using the PRG or BLK copying function, a program number from 850 to 999 can be designated as the copy source, and the data can be copied in the memory card accordingly.

Note:	An error occurs when a program number from 850 to 999 is designated as the copy destination.

(5) When ALL copy has been selected

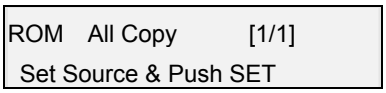
All the data can be copied between memory cards or panel ROMs of the same type.

(5-1) Copying all the data between panel ROMs of the same type

A. Press the **ROM** key and turn on the ROM-LED.

B. Install the ROM serving as the copy source into the socket, and press the **SET** key.

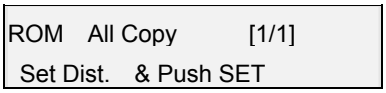
Fig. 3-21



All the data in the copy source panel ROM is read into the RAM inside the VG-852.

C. When the following display appears, install the panel ROM serving as the copy destination into the socket, and press the **SET** key.

Fig. 3-22



The data is now written into the copy destination.
(The "Writing" display appears. It takes several minutes for the copying to be completed.)

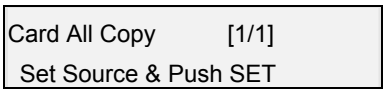
D. When the display shown in Fig. 3-21 appears, copying is completed.
The data of another ROM can now be copied.

(5-2) Copying all the data between memory cards of the same type

A. Press the ROM key and turn off the ROM-LED.

B. Install the memory card serving as the copy source, and press the **SET** key.

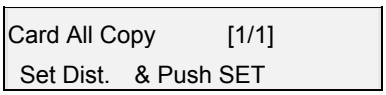
Fig. 3-23



All the data in the copy source memory card is read into the RAM inside the VG-852.

C. When the following display appears, install the memory card serving as the copy destination into the socket, and press the **SET** key.

Fig. 3-24



The data is now written into the copy destination.
(The "Writing" display appears. It takes several minutes for the copying to be completed.)

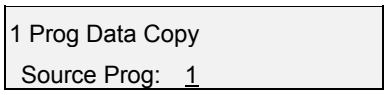
D. When the display shown in Fig. 3-23 appears, copying is completed.
The data of another memory card can now be copied.

Note:	[1/1], [1/2], etc. represent the "current copy session/total number of copy sessions."

(6) When PRG copy is selected (same for timing data and pattern data copying)

A. Input the number of the program serving as the copy source, and press the SET key.

Fig. 3-25

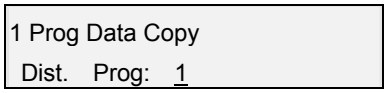


Note:	The internal program data in program numbers 850 to 999 can be designated.

B. Designate the number of the program serving as the copy destination, and press the SET key. (When copying data into another memory card/panel ROM, change over to the memory card/panel ROM serving as the copy destination, and press the SET key.)

The data is now written into the copy destination.

Fig. 3-26



C. Copying is completed when the display shown in Fig. 3-25 is restored.

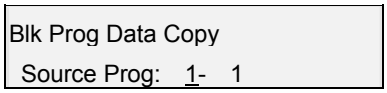
The data in another program number can now be copied.

Note:	Data can be copied from a memory card to panel ROM or vice versa. Before pressing the SET key, press the ROM key to select memory card or panel ROM.

(7) When BLK copy is selected

A. Input the range of the program numbers serving as the copy source, and press the SET key.

Fig. 3-27

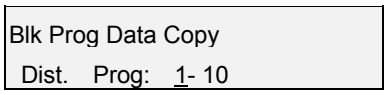


Note:	The internal program data in program numbers 850 to 999 can be designated.

B. Designate the range of the program numbers serving as the copy destination, and press the SET key. (When copying data into another memory card/panel ROM, change over to the memory card/panel ROM serving as the copy destination, and press the SET key.)

The data is now written into the copy destination.

Fig. 3-28



C. Copying is completed when the display shown in Fig. 3-27 is restored.

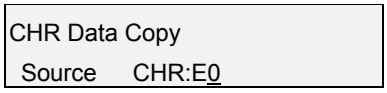
The data in other program numbers can now be copied.

Note:	Data can be copied from a memory card to panel ROM or vice versa. Before pressing the SET key, press the ROM key to select memory card or panel ROM.

(8) When CHR copy is selected

A. Input the user character code (E0H ~ EFH, F0H ~ FFH) of the copy source, and press the SET key.

Fig.3-29

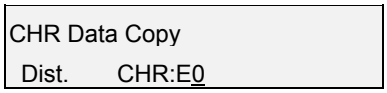


Note:	The internal user character data within the F0H to FFH range can be designated.

B. Designate the user character code (E0H |~ EFH) of the copy destination, and press the SET key. (When copying data into another memory card/panel ROM, change over to the memory card/panel ROM serving as the copy destination, and press the SET key.)

The data is now written into the copy destination.

Fig. 3-30



Note:	The internal user character data within the F0H to FFH range cannot be designated as the copy destination.

C. Copying is completed when the display shown in Fig. 3-29 is restored.

Another user character can now be copied.

Note:	Data can be copied from a memory card to panel ROM or vice versa. Before pressing the SET key, press the ROM key to select memory card or panel ROM.

(9) When IMG copy is selected

A. Input the image number (1 to 64) of the copy source, and press the SET key.

Fig. 3-31

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

B. Designate the image number (1 to 64) of the copy destination, and press the SET key. (When copying image data into another memory card, change over to the memory card serving as the copy destination, and press the SET key.)
The image is now written into the copy destination.

Fig. 3-32

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

C. Copying is completed when the display shown in Fig. 3-31 is restored.
Other image data can now be copied.

Note:	Image data can be copied only from one memory card to another memory card.

(10) When OPT copy is selected

A. Input the optional pattern data number (40H to 7FH) of the copy source, and press the SET key.

Fig. 3-33

```
OPT Data Copy
 Dist     OPT:40
```

B. Designate the optional pattern data (40H to 7FH) of the copy destination, and press the SET key. (When copying the data into another memory card, change over to the memory card serving as the copy destination, and press the SET key.)
The pattern data is now written into the copy destination.。

Fig. 3-34

```
OPT Data Copy
 Source     OPT:41
```

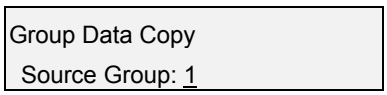
C. Copying is completed when the display shown in Fig. 3-33 is restored.
Other optional pattern data can now be copied.

Note:	Image data can be copied only from one memory card to another memory card.

(11) When group copy is selected

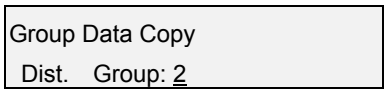
A. Input the group number of the copy source, and press the SET key.

Fig. 3-35



B. Designate the group number of the copy destination, and press the SET key.
(When copying group data into another memory card/panel ROM, change over to the memory card/panel ROM serving as the copy destination, and press the SET key.)
The group data is now written into the copy destination.

Fig. 3-36



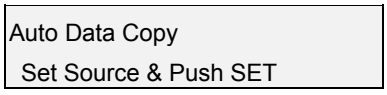
C. Copying is completed when the display shown in Fig. 3-35 is restored.
Other group data can now be copied.

Note:	Data can be copied from a memory card to panel ROM or vice versa. Before pressing the SET key, press the ROM key to select memory card or panel ROM.

(12) When auto copy is selected

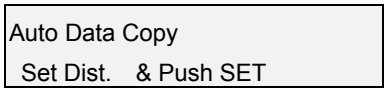
A. Install the memory card (or panel ROM) serving as the copy source, and press the SET key.

Fig. 3-37



B. Install the memory card (or panel ROM) serving as the copy destination, and press the SET key. (When copying data into another memory card/panel ROM, change over to the memory card/panel ROM serving as the copy destination, and press the SET key.)
The data is now written into the copy destination.

Fig. 3-38



C. Copying is completed when the display shown in Fig. 3-37 is restored.

Note:	Data can be copied from a memory card to panel ROM or vice versa. Before pressing the SET key, press the ROM key to select memory card or panel ROM.

(13) When card/ROM erase is selected

A. Install the memory card (or panel ROM) whose data is to be erased, and press the [SET] key.

Fig. 3-39

```
Card Erase
 Set Source & Push SET
```

B. The "Writing" display appears, and erasure is commenced. (It takes several minutes to erase all the data.)

C. Erasing is completed when the display shown in Fig. 3-39 is restored.

Note 1:	Select memory card/ROM erase by pressing the [ROM] key before the [SET] key is pressed.
Note 2:	The memory card erase procedure also includes the formatting of the card. Before using a new card for the first time, format it by the above procedure.

3-3-6 Config edit function (Func-5)

(1) Function selection display

Fig. 3-40

```
Select Function:5 (0-9)
Config Edit
```

<<Key operations>> [FUNC] [5] [SET]

(2) Initial display

Fig. 3-41

```
Cfg:Group No: 0 (00-40)
     Beep      :ON   (0/1)
```

(3) Set the group number.

Input using [0] to [9] keys	Setting range
Group No.	0 to 40 (factory setting: 0)

When "0" is selected, direct display is executed by Func-0.
When a number other than "0" is selected, the group No. concerned is executed in the group display mode by Func-0.

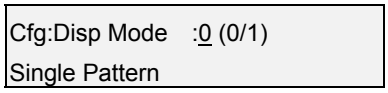
(4) Select ON or OFF for the warning beep.

0	OFF	The beep is not sounded.
1	ON	The beep is sounded. (Factory setting)

(5) Select the Disp Mode (pattern display mode).

Move to the screen below using the ▼▲ key. Select the pattern display mode.

Fig. 3-42

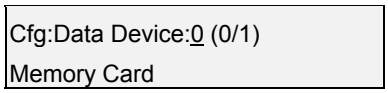


0	Single Pattern	Only one pattern can be selected when the pattern keys on the VG-852's front panel are used to select a pattern. (When CROSS is selected while CHARA is already selected, the CHARA selection is released.)
1	Multi Pattern	Multiple patterns can be selected when the pattern keys on the VG-852's front panel are used to select patterns. (The factory setting.) (When CROSS is selected while CHARA is already selected, both patterns are superimposed and displayed.)

(6) Select Data Device (default data device).

Move to the screen below using the ▼▲ key. Select the default data device.

Fig. 3-43



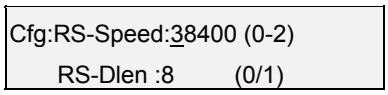
0	**Memory Card**	The memory card is the device which is selected when the VG-852's power is turned on. (Factory setting)
1	**Panel-ROM**	The panel ROM is the device which is selected when the VG-852's power is turned on.

Note :	The data device can be changed using the ROM key after the power has been turned on..

(7) Select RS-Speed (RS-232C baud rate)

Move to the screen below using the ▼ key. Select the RS-232C baud rate.

Fig. 3-44



0	9600	The RS-232C baud rate is set to 9600 bps.
1	19200	The RS-232C baud rate is set to 19200 bps.
2	38400	The RS-232C baud rate is set to 38400 bps. (Factory setting)

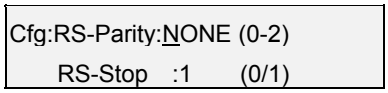
(8) Select the RS-Dlen (RS-232C data length)

0	7	The RS-232C data length is set to 7 bits.
1	8	The RS-232C data length is set to 8 bits. (Factory setting)

(9) Select the RS-Parity (RS-232C parity)

Move to the screen below using the ▼ key. Select the RS-232C parity.

Fig. 3-45



0	NONE	The RS-232C parity is set to none. (Factory setting)
1	EVEN	The RS-232C parity is set to even.
2	ODD	The RS-232C parity is set to odd.

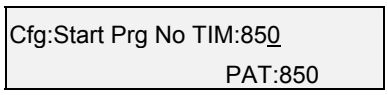
(10) Select the RS-Stop (RS-232C stop bit length).

0	1	The RS-232C stop bit length is set to 1 bit. (Factory setting)
1	2	The RS-232C stop bit length is set to 2 bits.

(11) Set Start PrgNo. (number of the program to be executed when the power is turned on).

Move to the screen below using the ▼ key. Set the number of the program which is to be executed when the power is turned on.

Fig. 3-46



The program whose number is set above is executed if direct display is executed when the power is turned on.

Set the numbers of the timing program and pattern program in separate items.

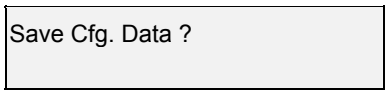
Set "0" for both items if no program is to be executed when the power is turned on.

(Factory setting: 0,0)

(12) Saving the config data

When the SAVE key is pressed on the screens appearing during config data editing, the SAVE-LED flashes, and the following LCD display appears.

Fig. 3-47



When the SAVE key is pressed again, the config data is saved, and the SAVE-LED goes off.

If the ESC key is pressed instead, the data is not saved, and the original screen is restored.

3-3-7 Group data edit function (Func-6)

(1) Concerning group data

With the direct display function, programs are executed in numerical sequence such as 01 → 02 → 03, etc. or 01 → 40 → 39, etc. using the ▲ (increment) key or ▼ (decrement) key. In contrast, with the group display function, the programs are executed in the numerical sequence in which the programs (group data) were entered using the group data edit function.

The group data consists of the timing program numbers and pattern program numbers.

Example

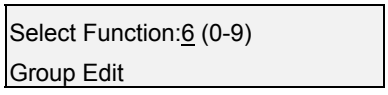
Group data No.	Timing program No.	Pattern program No.
1	850	900
2	851	901
:	:	:

In the example given above, when group data #1 is executed, the pattern in program No.900 is executed at the program No.850 timing.

Note:	When the existing panel ROM is used, the group data consists of program numbers only (these are not divided into timing and pattern programs). When group data is entered in the panel ROM, the pattern program numbers are ignored, and only the timing programs numbers are entered.

(2) Function selection display

Fig. 3-48



<<Key operations>> The initial display of function 6 appears when FUNC, 6 and SET are pressed in this order.

(3) Initial display

Fig. 3-49

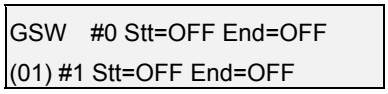
(4) Select the group number.

・Memory card	·····	32 groups can be entered.
・Standard (40-program type of) panel ROM	·····	2 groups can be entered.
・AH－3000	·····	8 groups can be entered.
HN58C256P	·····	40 groups can be entered.

Select the number of the group to be entered, and press the **SET** key.

(5) Set the group data SW (general-purpose) signal outputs.

Fig. 3-50



Select ON or OFF for GSW0 and GSW1 (general-purpose signals).

Item	Description
Stt	Status when (immediately before) group data execution is commenced
End	Status when (immediately after) group data execution is ended

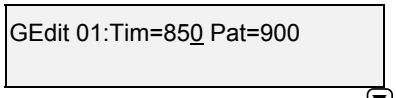
0	OFF
1	ON

Note:	These settings are valid when GSW0 or GSW1 has been selected at the SW0 ~ 3 output selection stage. They are valid only when the group data on the memory card is executed.

(6) Set the group data.

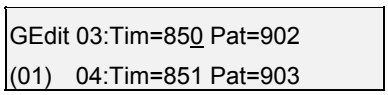
Move the cursor and set the program number.

Fig. 3-51



The display changes to the next page when the ▼▼ key is pressed.

Fig. 3-52



Up to 58 group data can be set but only the first 20 data will be entered in the panel ROM.

・Memory card	・・・・・	58 data can be entered.
・Standard (40-program type of) panel ROM	・・・・・	20 data can be entered.

Not all the data need be set: zeros can be entered instead.
When zeros are set for both the Tim and Pat items, the data will not be executed when the group display function is executed. (They will be skipped when the ▲ (increment) key or ▼ (decrement) key is pressed.)
When one zero is entered for either the Tim or Pat item, the data in other item will be executed when the group display function is executed. (When zero is set for the Tim item, only the pattern data is executed while the timing data remain in the previous status.)

(7) Selecting the group data setting mode

The setting mode is selected as shown below using either the PROG or TIMING / PAT keys.

PROG key	The PROG-LED lights. The mode for setting program numbers only is established. (See figure below) This mode is compatible with existing panel ROMs.
TIMING key PAT key	The TIMING-LED and PAT-LED light. The timing data and pattern data are set separately.

When the mode for setting program numbers only is established, the display shown below appears.

Fig. 3-53

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

(8) Saving group data

When the SAVE key is pressed on the screens appearing during group data editing, the SAVE-LED flashes, and the following LCD display appears.

Fig. 3-54

```
Save Group No.: 1
xxxxxxxxxxxxxxxx
```

A. Setting the group number

Use the number keys to set the number of the group to be saved. (For the range of numbers that can be set, refer to "selecting the group number" in (4).)

B. Setting the group name

Use the [▶] key to move the cursor to the bottom line, and input the group name in hexadecimal format.

(Up to 20 characters can be entered as the group name.)

* Characters can also be input from the display screen. For details, refer to Section 3-3-10.

Note:

When the [SAVE] key is pressed again, the group data is saved, and the SAVE-LED goes off.

If the [ESC] key is pressed instead, the data is not saved, and the original screen is restored.

3-3-8 Character edit function (Func-8)

(1) Function selection display

Fig. 3-55

```
Select Function:8 (0-9)
Character Edit
```

<<Key operations>> [FUNC] [8] [SET]

Note:	The character edit function displays character patterns on the display for editing. Before proceeding, connect a display to the VG-852, and display the patterns properly on the display.

(2) Initial display

Fig. 3-56

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

(3) Setting the character codes

Set the character code first. Input a 2-digit code from E0 to FF using the [0] to [F] keys. When the character code is input, the corresponding character pattern appears on the display.

Note 1:	The F0 to FF codes are internal VG-852 character codes. They can be read but not entered.
Note 2:	The E0 to EF codes have a capacity depending on the memory card/panel ROM used. (See 2-3)

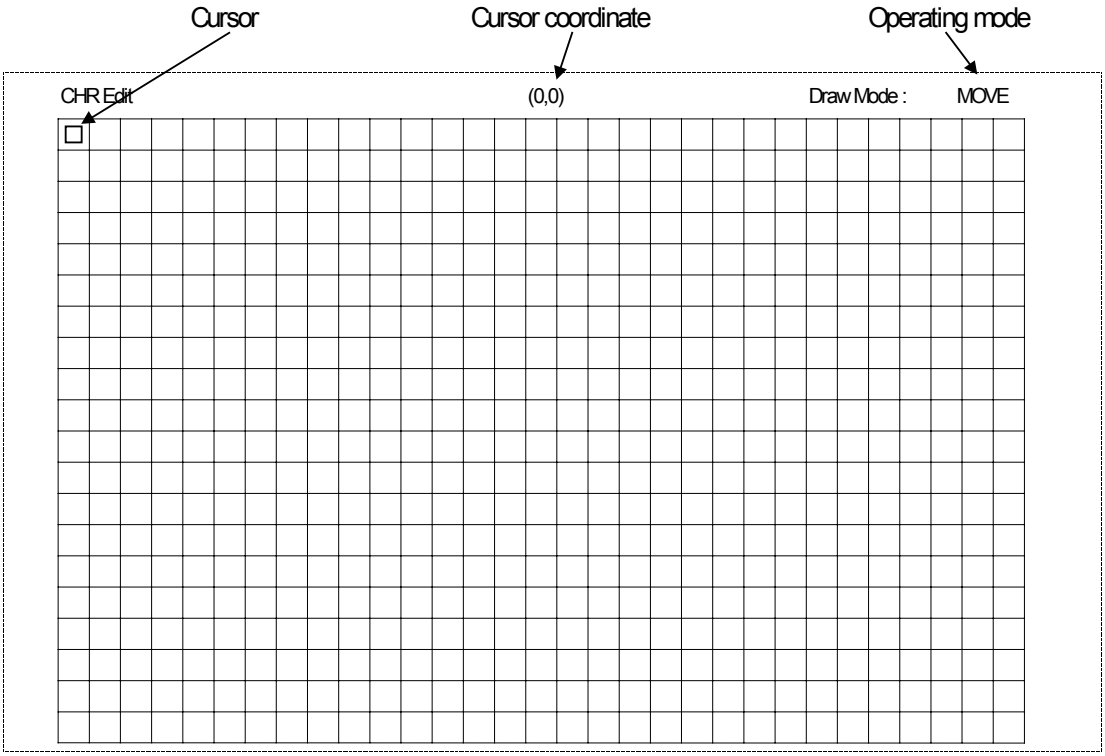
(4) Editing the data

When the **SET** key is pressed, the following appears on the LCD display.

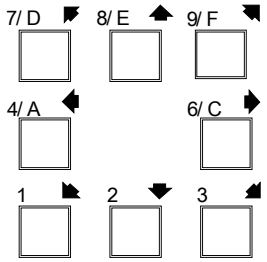
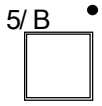
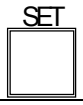
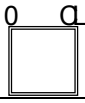
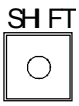
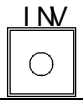
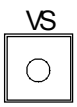
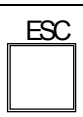
Fig. 3-57

```
CHR Edit :E0
    Editting on CRT
```

The following character data (64 × 64 dots) is displayed on the display.



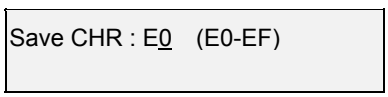
The key functions during data editing are described below.

Key operation	Function
	A For moving the cursor and drawing dots Depending on the drawing mode, the cursor is moved while dots are set or cleared. (Dots are not drawn in the movement mode.) B In the shift mode The character pattern is shifted in the designated direction.
	For switching the drawing mode. This changes the mode in sequence: dot set (SET) → dot clear (CLR) → move (MOVE). (The drawing mode display changes.)
	For setting or clearing the dot at the cursor position.
	For clearing all the dots in a cell.
	For turning the dot pattern shift mode on or off. (At "on," the draw mode display changes to SHIFT.)
	For inverting the dots in a cell.
	For returning the cursor position to the left or right home point (moves between the far left and far right by toggling).
	For returning the cursor position to the top or bottom home point (moves between the extreme top or extreme bottom by toggling).
	For aborting data editing and restoring the character code setting screen.

(5) Saving character data

Press the **SAVE** key on the screens appearing during character data editing, the SAVE-LED flashes, and the following LCD display appears.

Fig. 3-58



A. Setting the character code

Set the character code to be saved. Input the 2-digit code from E0 to EF using the [0] to [F] keys.

Note:

When the [SAVE] key is pressed again, the character data is saved, and the SAVE-LED goes off.

If the [ESC] key is pressed instead, the data is not saved, and the original screen is restored.

3-3-9 List display function (Func-9)

(1) Function selection display

Fig. 3-59

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

<<Key operations>> [FUNC] [9] [SET]

Note:	The list display function displays lists on the display. Before proceeding, connect a display to the VG-852, and display the patterns properly on the display.

(2) Initial display

Fig. 3-60

```
Select Type:0  (0-4)
Program Data List
```

(3) Selecting the data to be displayed

[0]	Program Data List	The program data--H-Timing, V-Timing and OUTPUT data--is displayed.
[1]	Program Name List	A list of the program names is displayed.
[2]	Group Name List	A list of the group names is displayed.
[3]	OPT Name List	A list of the optional pattern names is displayed.
[4]	IMG Name List	A list of the image data names is displayed.

(4) Program Data List

Select "Program Data List" as the data to be displayed, and press the [SET] key. The following LCD display appears.

Fig. 3-61

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

When the 3-digit number of the program to be displayed is input using the number keys, the data in that program is displayed.

Press the **ESC** key to return to (3).

The following display appears on the display.

```
PROG-NO.850  NAME=VESA400-84    H= 37.86KHz V= 83.40Hz  ENABLE
 MODE       : dot                              MODE        : H
 CLOCK      : 31.50MHz                         VTOTAL      : 11.991ms    454H
 HPERIOD    : 26.41us        832dot            VDISP       : 10.565ms    400H
 HDISP      : 20.32us        640dot            VSYNC       :  0.790ms    3.0H
 HSYNC      :  1.27us        40dot             VBACKP      :  1.004ms    38H
 HBACKP     :  4.06us        128dot            EQP FP      :  0.000ms    0.0H
 HDSTART    :  0.00us        0dot              EQP BP      :  0.000ms    0.0H
 HDWIDTH    :  0.00us        0dot              SERRATIO    : OFF
                                                N
                                                EQP         : OFF
                                                VDSTART     :  0.000ms    0.0H
 NRZ/RD     : NRZ      ANA/TTL   : ANALOG      VDLINE      :  0.000ms    0.0H
 HS         : NEGA                             SCAN        : NON INTER
 VS         : NEGA
 CS         : NEGA
 HD         : NEGA
 VD         : NEGA
 CLOCK      : NEGA

 SYNC ON    :
 RGB        : NEGA
 VIDEO      : 0.70 V
 SYNC       : 0.30 V
 SETUP      : 0.00 V
```

(5) Program Name List

Select "Program Name List" as the data to be displayed, and press the **SET** key. The following LCD display appears.

Fig. 3-62

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

When the 3-digit number of the first program to be displayed is input using the number keys, the data starting with the data in that program is displayed. Press the **ESC** key to return to (3).

The following display appears on the display.

```
Program Name List
Prg E/D DotClock   H-Freq      V-Freq     Name
850   E  31.50MHz   37.86KHz   83.40Hz   VESA400-84
851   E  31.50MHz   37.86KHz   72.82Hz   VESA400-72
                        :
                        :
```

(6) Group Name List

Select "Group Name List" as the data to be displayed, and press the **SET** key. The following LCD display appears.

Fig. 3-63

When the 2-digit number of the first group to be displayed is input using the number keys, the data starting with the data in that group is displayed. Press the **ESC** key to return to (3).

The following display appears on the display.

Note:	The memory card or panel ROM must be installed in order for the Group Name List data to be displayed.

(7) OPT Name List

Select "OPT-PTN Name List" as the data to be displayed, and press the **SET** key.

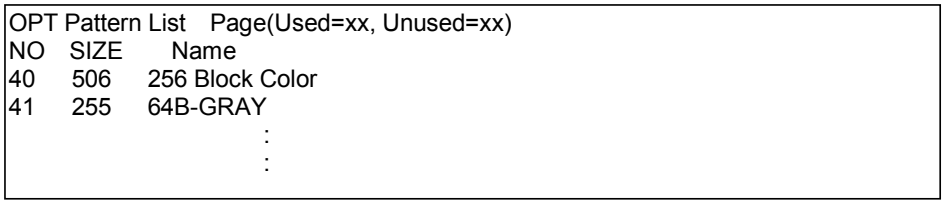
The following LCD display appears.

Fig. 3-64

When the 2-digit number of the first optional pattern to be displayed is input using the **0** to **F** keys, the data starting with the data in that pattern is displayed.

Press the **ESC** key to return to (3).

The following display appears on the display



Note:	The memory card must be installed in order for the OPT-PTN Name List data to be displayed.
Note:	"SIZE" denotes the number of optional pattern data bytes.
Note:	"Used/Unused" denotes the already used pages/unused pages in the memory card (in 1KB units).

(8) IMG Name List

Select "IMG Name List" as the data to be displayed, and press the **SET** key. The following LCD display appears.

Fig. 3-65

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

When the 2-digit number of the first optional pattern to be displayed is input using the **0** to **F** keys, the data starting with the data in that pattern is displayed.

Press the **ESC** key to return to (3).

The following display appears on the display.

```
IMG data List   Sector(Used=xx, Unused=xx)
NO    OPT-NO        SIZE              Name
 1        80      ( 1024,   768)    1024x768   Image #1
 2        81      (  640,   480)     640x480   Image #1
                      :
                      :
```

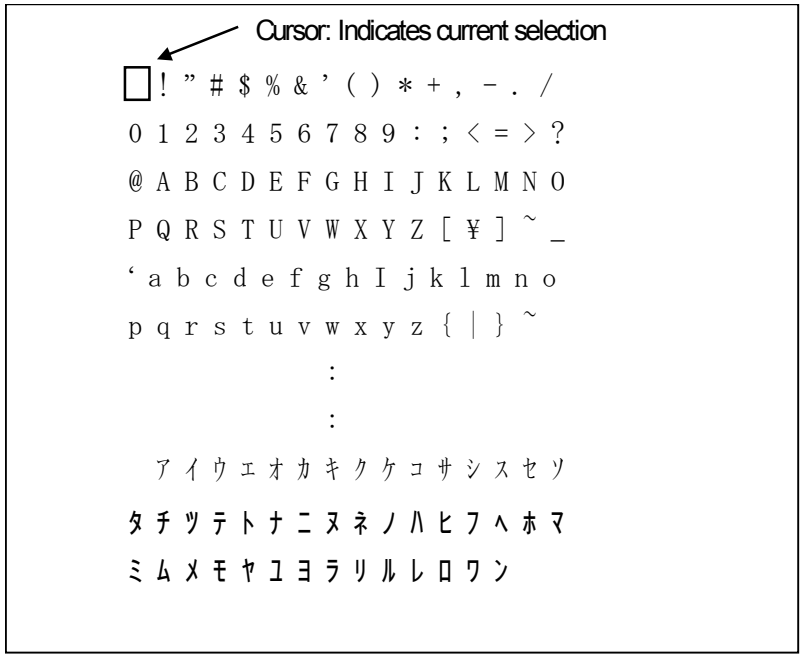
Note:	The memory card must be installed in order for the IMG-data Name List data to be displayed.
Note:	"SIZE" denotes the image data (number of horizontal dots and number of vertical lines).
Note:	"Used/Unused" denotes the already used sector/unused sector in the memory card (in 128KB units).
Note:	"OPT-NO" is the number of the optional pattern whose image data is to be displayed.

3-3-10 How to input character codes from the display

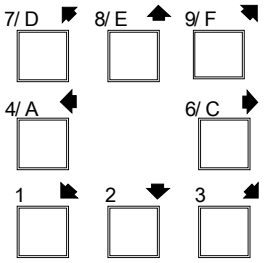
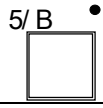
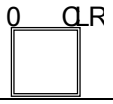
When the character codes of CHARA patterns, program names and group names are to be input, the character codes can be selected from the display screen by conducting the operations described below. However, the VG-852's timing data must be set in such a way that they appear properly on the display.

(1) Move the cursor on the LCD to the character code input position, and press the **LEVEL** key.

The **LEVEL** LED lights, and the following display appears on the display.



(2) Use the number keys to perform the following operations.

Key operation	Function
	For moving the cursor. The cursor on the display moves in the direction of the arrow.
	For entering one input character. The entered characters are displayed on the LCD.
	For moving the cursor on the display to the top left.

(3) When the **LEVEL** key is pressed again, the **LEVEL** LED goes off, and the hexadecimal input status is restored.

2-6 Differences in program data between memory card and panel ROM

The program data on the memory card is an expanded version of the panel ROM data, as is shown below.

Pattern data	Memory card (same as internal data)	Panel ROM
Character pattern	Code: 20 ~ FF Cell size: 1~ 255	Code: 20 ~ FF Cell size: 1~ 64
Crosshatch	Mode, format and line width added	----
Dot	Mode, format, size and shape added	----
Circle	Monitor aspect ratio added	----

OPT1/OPT2	00 ~ 7F designated, 7F no OPT1 and OPT2 groups	designated, separate groups for OPT1 and OPT2
Color bars	Number of repetitions added	----
Gray scale	Mode and interval separated from color bar; number of repetitions added	Mode and interval in common with color bar
Cursor	New addition	----
Program name	Display position and font size added; max. number of characters: 20	Display position and font size not available; max. number of characters: 8

Note:	When the memory card (or internal) program data is copied into the panel ROM, the expanded data is discarded (or an error results when the data, such as OPT1/2, is executed). When data is copied from the panel ROM to the memory card, the expanded parts are set to the default values.

CHAPTER 4 TIMING DATA EDITING

4-1 Timing data configuration

The timing data is configured by the items shown in Table 4-1.

Table 4-1

Horizontal timing data	Input Mode(0,1) Dot Clock	0 : μs 1 : dot □□□.□□ MHz
	H period H disp	□□.□□ μsec □□□□ dot □□.□□ μsec □□□□ dot
	H sync H backp	□□.□□ μsec □□□□ dot □□.□□ μsec □□□□ dot
	HD start HD width	□□.□□ μsec □□□□ dot □□.□□ μsec □□□□ dot
Vertical timing data	Scan Mode (0～2)	0 : NON INTERLACE 1 : INTERLASE & SYNC 2 : INTERLASE & VIDEO
	V total V disp	□□.□□□msec □□□□ H □□.□□□msec □□□□ H
	V sync V backp	□□.□□□msec □□. □ H □□.□□□msec □□□□ H
	EQP fp EQP bp	□□.□□□msec □□. □ H □□.□□□msec □□. □ H
	Serration (0～3) EQP (0,1)	0 : OFF 1 : 0.5H 2 : 1H 3 : XOR 0 : OFF 1 : ON
	VD start VD line	□□.□□□msec □□□□.□ H □□.□□□msec □□□□.□ H
Output condition data	NRZ/RZ (0,1)	0 : NRZ 1 : RZ
	HS VS CS HD VD DISP 1CH RGB 2CH RGB Clock OSW0 OSW1 Clock Out Clock Delay Clock Mode	0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : Nega 1 : Posi 0 : OFF 1 : ON 0 : OFF 1 : ON 0 : Disp 1 : All 0 : OFF 1 : ON 0 : 1/1 1 : 1/2
	Out Bit (0～8) Delay Time (0～31)	□ bit □□ nsec
	1CH Out OE 1CH Clock OE 2CH Out OE 2CH Clock OE	0 : ON 1 : Hi-Z 0 : ON 1 : Hi-Z 0 : ON 1 : Hi-Z 0 : ON 1 : Hi-Z
	SW0 Select SW1 Select SW2 Select SW3 Select	0:CS 1:VEQP･HSER 2:HEQP 3:OSW0 4:OSW1 5:GSW0 6:GSW1 0:CS 1:HEQP 2:HD1 3:OSW0 4:OSW1 5:GSW0 6:GSW1 0:CS 1:VD･HD2 2:VD 3:OSW0 4:OSW1 5:GSW0 6:GSW1 0:CS 1:HD1 2:HD2 3:OSW0 4:OSW1 5:GSW0 6:GSW1

(1) Selecting the timing data

When the **TIMING** key is pressed, while the display in Fig. 3-16 in Section 3-3-4 appears or while editing is underway, the TIMING-LED flashes, and the following display appears.

Fig. 4-1

```
Timing Edit:    0   (0-2)
H-Timing Data Edit
```

Select the data to be edited in accordance with the table below, and press the **SET** key to display one of the editing screens.
(The TIMING-LED stops flashing and remains lighted.)

Table 4-2

Display	Key	Data	Setting item
H-Timing Data Edit	0	Horizontal timing data	See Table 4-1
V-Timing Data Edit	1	Vertical timing data	See Table 4-1
Output Condition Edit	2	Output condition data	See Table 4-1

(2) Timing data setting ranges

A. Frequencies

Dot clock frequency	5.00to130.00 MHz	1/1 mode	10 kHz increments
	10.00to260.00 MHz	1/2 mode	
Horizontal sync frequency	10KHz ~		
Vertical sync frequency	15.625Hz ~		

B. Horizontal timing data

H PERIOD(Note 1)	0.00 to 99.99 μsec	0to8192 dot	1/1 mode	1-dot increments
		0,2,4,6 to 8192 dot	1/2 mode	2-dot increments
H DISP	0.00 to 99.99 μsec	0 to 4096 dot	1/1 mode	1-dot increments
		0,2,4,6 to 4096 dot	1/2 mode	2-dot increments
H SYNC	0.00 to 99.99 μsec	0 to 4096 dot	1/1 mode	1-dot increments
		0,2,4,6 to 4096 dot	1/2 mode	2-dot increments
H BACK P H FRONT P	0.00 to 99.99 μsec	0 to 4096 dot	1/1 mode	1-dot increments
		0,2,4,6 to 4096 dot	1/2 mode	2-dot increments
HD START HD WIDTH (Note 2)	0.00 to 99.99 μsec	0 to 4096 dot	1/1 mode	1-dot increments
			1/2 mode	2-dot increments
H BLANKING	Automatically calculated	0 to 4096 dot		1-dot increments

Note 1:	1/1 mode = When H BLANKING is under 4 and HSYNC, H BACK P and H FRONT P are each under 2, H PERIOD is set in 2-dot increments. 1/2 mode = When H BLANKING is under 8 and HSYNC, H BACK P and H FRONT P are each under 4, H PERIOD is set in 4-dot increments.

Note 2:	The sum of HD-start and HD-width cannot be set in excess of H-period. Set it within the following range: (HD-start + HD-width) <= H-period

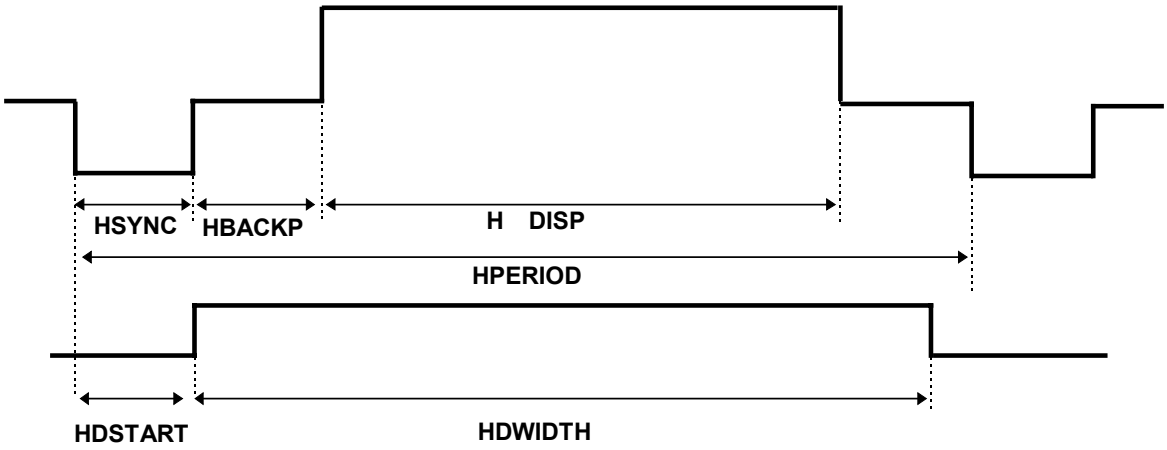
C. Vertical timing data

V TOTAL	0.000 to 99.999ms	4to8192H	Non-interlace	1H increments
		4to4096H	Interlace & video, interlace & sync	
V DISP	0.000 to 99.999ms	1to4093H		
V BACK P V front P	0.000 to 99.999ms	0to4000H		
V SYNC	0.000 to 99.999ms	1.0to99.0H		0.5H increments
EQP FP EQP BP	0.000 to 99.999ms	0.0to99.0H		
VD START VD Line Note 1:	0.000 to 99.999ms	0.0to4095.0H		
V BLANKING		More than 3H		

Note 1:	The sum of VD-start and VD-line cannot be set in excess of V-total. Set it within the following range: (VD-start + VD-Line) <= V-total

4-2 Horizontal timing data editing

Fig. 4-2



(1) How to establish the horizontal timing data editing mode

When "H-Timing Data Edit" is selected in Section 4-1, the following display appears.

Fig. 4-3

```
H-Input Mode:dot     (0/1)
  Dot Clock : 74.97MHz
```

(2) Inputting the input mode and dot clock frequency

A Select the data input mode.

0	µS	For inputting the data in microseconds. When this mode is selected, dots can no longer be input for H-sync, H-back-porch, HD-start and HD-width.
1	dot	For inputting the data in dots. When this mode is selected, the microsecond data is displayed only.

B Input the dot clock frequency.

Input using 0 to 9 keys	Setting range	Fixed mode
Dot clock frequency	5.00 to 260.00 (MHz)	Dot setting is fixed using 'C' key. (See Note)

Note: When the fixed mode is set to ON, '*' appears, and the setting can be fixed.

(3) Inputting H-period and H-disp

Move to the screen below using the ▼▼ key.

Fig. 4-4

```
Hperiod:15.70uS 1177dot
Hdisp   :11.80uS  885dot
```

	Input using [0] to [9] keys		Setting range		Fixed mode
H PERIOD (NOTE 1)	0.00 to 99.999 µsec	0 to 8192 dot	1/1 mode	1-dot increments	The setting is fixed to µs using 'E' key. The setting is fixed to dots using 'F' key. (See Note)
		0, 2, 4, 6 to 8192 dot	1/2 mode	2-dot increments	
H DISP	0.00 to 99.99 µsec	0 to 4096 dot	1/1 mode	1-dot increments	The setting is fixed to µs using 'B' key. The setting is fixed to dots using 'C'
		0, 2, 4, 6 to 4096 dot	1/2 mode	2-dot increments	

*	Even when values are set in microseconds, the setting ranges for the number of dots given above must not be exceeded.
Note:	When the fixed mode is set to ON, '*' appears, and the setting can be fixed.

(4) Inputting H-sync and H-back-porch

Move to the screen below using the [▼▲] key.

Fig. 4-5

```
Hsync  : 1.60uS   120dot
Hbackp : 2.00uS   150dot
```

	Input using [0] to [9] keys		Setting range	
H SYNC	0.00 to 99.99 µsec	0 to 4096 dot	1/1 mode	1-dot increments
		0, 2, 4, 6 to 4096 dot	1/2 mode	2-dot increments
H BACK P H FRONT P	0.00 to 99.99 µsec	0 to 4096 dot	1/1 mode	1-dot increments
		0, 2, 4, 6 to 4096 dot	1/2 mode	2-dot increments

*	Even when values are set in microseconds, the setting ranges for the number of dots given above must not be exceeded.
Note:	H-front-porch is automatically calculated on the basis of H-period, H-disp, H-sync and H-back-porch. It must be within the same range as the above H-back-porch.

(5) Inputting HD-start and HD-width

Move to the screen below using the [▼▲] key.

Fig. 4-6

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

	Input using [0] to [9] keys	Setting range

HD START HD WIDTH (Note 2)	0 to 99.99 μsec	0 to 4096 dot	1/1 mode	1-dot increments
			1/2 mode	2-dot increments
H BALANCE	Automatically calculated	0 to 4096 dot		1-dot increments

Note: The sum of HD-start and HD-width cannot be set in excess of H-period. Set it within the following range:

(HD-start + HD-width) <= H-period

[Supplementary Note] Concerning differences in operation by the input mode

(1) When the dot input mode has been selected:

The microsecond settings are re-calculated without changing the dot item of each data.

Dot clock frequency input	The microsecond setting items are re calculated without changing the dot item of each data.
Input of other items	The microsecond setting items are re-calculated on the basis of the dot items of the input data.

(2) When the microsecond mode has been selected:

Basically, the dot items are calculated in such a way that the microsecond item of each data remains unchanged. The microsecond settings are then re-calculated from the number of dots and dot clock frequency obtained.

Dot clock frequency input	The number of dots for each item is calculated in such a way that the microsecond settings of each item remains unchanged. The microsecond setting for each item is then re-calculated from the number of dots obtained. (The dot clock frequency is compensated for in such a way that the Hperiod microsecond setting remains unchanged.)
Input of other items	The corresponding dot items are calculated on the basis of the microsecond items of the input data. The microsecond items are then re-calculated on the basis of the dot items obtained. (The dot clock frequency is compensated for in such a way that Hperiod and Hdisp are set optimally for the input microsecond settings.)

[Supplementary note] Concerning fixed modes

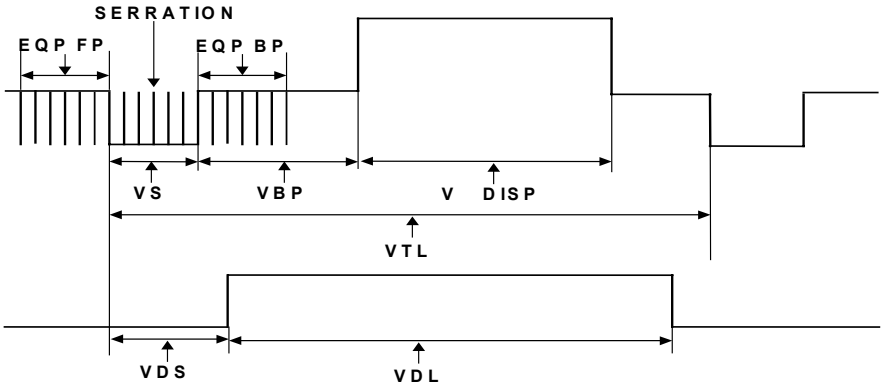
In (1) and (2) above, the timing data is re-calculated but the DotClock, Hperiod and Hdisp settings can be fixed.

When the fixed mode is set to ON, the settings concerned are fixed and this takes priority over (1) and (2) above.

4-3 Vertical timing data editing

* With non-interlacing

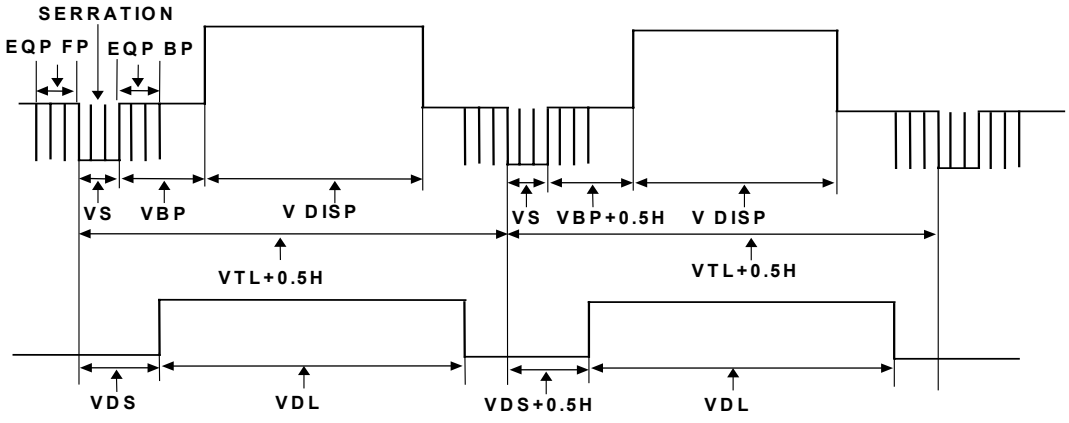
Fig. 4-7



VTL	V TOTAL
VS	V SYNC
VBP	V BACKP
EQP FP	EQP FP
EQP BP	EQP BP
VDISP	V DISP
VDS	VD START
VDL	VD LINE

* With interlacing

Fig. 4-8



· Even-numbered field · Odd-numbered field

VTL	V TOTAL
VS	V SYNC
VBP	V BACKP
EQP FP	EQP FP
EQP BP	EQP BP

VDISP	V DISP
VDS	VD START
VDL	VD LINE

(1) How to establish the vertical timing data editing mode

When "V-Timing Data Edit" is selected in Section 4-1, the following display appears.

Fig. 4-9

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

(2) Inputting the input mode and scanning mode

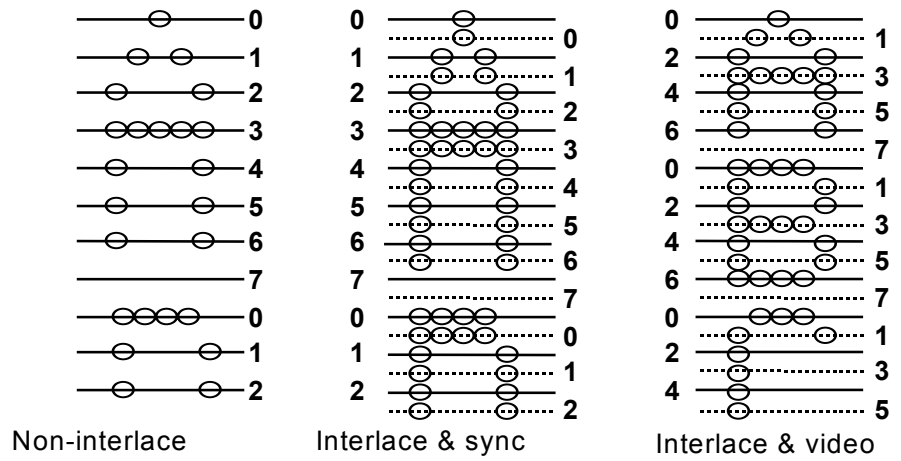
A. Select the data input mode.

0	H	For inputting the data in H increments. When this mode is selected, the microsecond data is displayed only.
1	mS	For inputting the data in microseconds. When this mode is selected, the H data is displayed only.

B. Input the scanning mode.

0	Non Interlace	Non-interlace
1	Inter&Sync	Interlace & sync
2	Inter&Video	Interlace & video

Fig. 4-10



(3) Inputting V-total-line and V-disp-line

Move to the screen below using the ▼▲ key.

Fig. 4-11

```
Vtotal:16.657mS   1061H
Vdisp :16.076mS   1024H
```

	Input using 0 to 9 keys		H Setting range		Fixed mode
V TOTAL	0.000 to 99.999ms	4 to 8192H	Non-interlace	1H increments	The setting is fixed to μs using 'E' key. The setting is fixed to H using 'F' key. (See note)
		4 to 4096H	Interlace & Video, interlace & sync		
V DISP	0.000 to 99.999ms	1 to 4093H			The setting is fixed to μs using 'B' key. The setting is fixed to H using 'C' key. (See note)

Note:	When the fixed mode is set to ON, '*' appears, and the setting can be fixed.
Note:	When INT&S (interlace & sync) or INT&V (interlace & video) has been selected for the SCAN item, set the number of scanning lines per field for each V timing data.

(4) Inputting V-sync and V-back-porch

Move to the screen below using the ▼▲ key.

Fig. 4-12

```
Vsync : 0.047mS    3.0H
Vbackp: 0.502mS     32H
```

	Input using 0 to 9 keys		H Setting range
V BACK P V front P	0.000 to 99.999ms	0 to 4000H	1H increments
V SYNC	0.000 to 99.999ms	1.0 to 99.0H	0.5 H increments

(5) Inputting the equalizing pulse, etc.

Move to the screen below using the ▼▲ key.

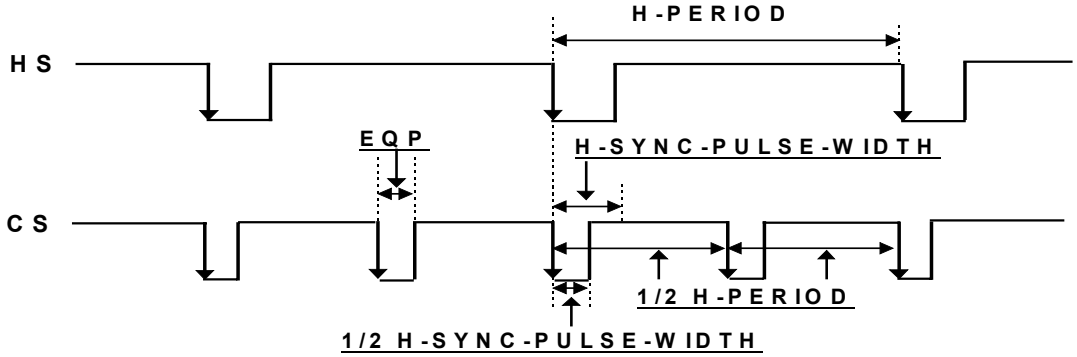
Fig. 4-13

```
EQPfp : 0.000mS    0.0H
EQPbp : 0.000mS    0.0H
```

	Input using 0 to 9 keys		H setting range
EQP FP EQP BP	0.000 to 99.999ms	0.0 to 99.0H	0.5H increments

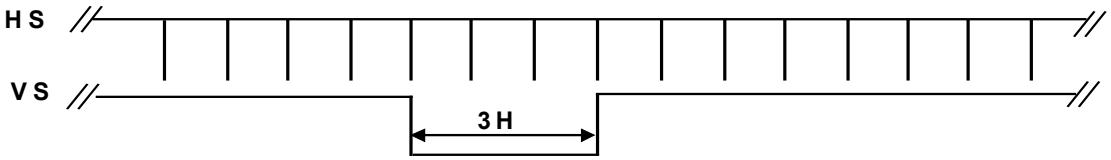
<<Example 1>> EQP phase relationship

Fig. 4-14



<<Example 2>> Examples of EQP settings

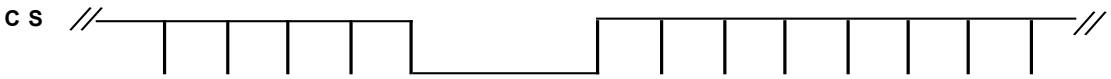
Fig. 4-15



<<Example 2-1>>

EQP-FP	→	0H
EQP-BP	→	0H
EQP	→	OFF
SERRATION	→	OFF

Fig. 4-16



<<Example 2-2>>

EQP-FP	→	0H
EQP-BP	→	0H
EQP	→	OFF
SERRATION	→	0.5H

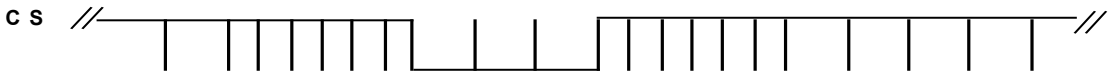
Fig. 4-17


CS

<<Example 2-3>>

EQP-FP	→	3H
EQP-BP	→	3H
EQP →	O N	
SERRATION	→	1H

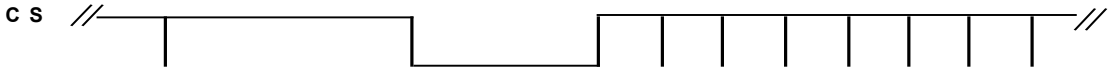
Fig. 4-18



<<Example 2-4>>

EQP-FP	→	3H
EQP-BP	→	0H
EQP	→	OFF
SERRATION	→	OFF

Fig. 4-19



(6) Selecting the equalizing and serrated pulses

Move to the screen below using the ▼▼ key.

Fig. 4-20

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

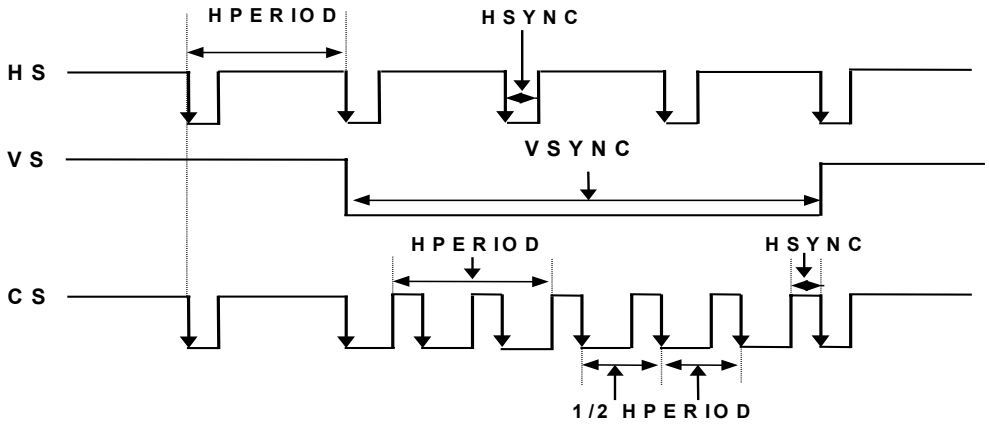
A. Select "Serration."

0	OFF	OFF
1	0.5H	See figure below.
2	1H	
3	EXOR	See figure below.

<<Example 1>> Serrated pulse phase relationship

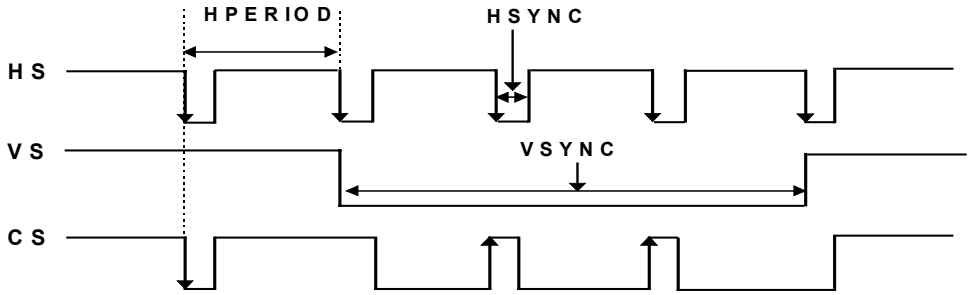
With the 0.5H setting

Fig. 4-21



With the XOR setting

Fig. 4-22



B. Select ON or OFF for EQP.

0	OFF	EQP off
1	ON	EQP on

(7) Inputting VD-Startline and VD-Line

Move to the screen below using the ▼▲ key.

Fig. 4-23

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

	Input using 0 to 9 keys		H Setting range
VD START VD Line Note 1	0.000 to 99.999ms	0.0 to 4095.0H	0.5H increments
V BLANKING		More than 3H	

Note: The sum of VD-start and VD-line cannot be set in excess of V-total. Set it within the following range:
(VD-start + VD-Line) <= V-total

Note: When interlace & sync or interlace & video has been selected, set the number of scanning lines per field. The same applies to V-sync through VD-Line.

[Supplementary Note] Concerning differences in operation by the input mode

(1) When the H input mode has been selected:

The microsecond settings are re-calculated without changing the H item of each data.

(2) When the microsecond input mode has been selected:

Basically, the H items are calculated in such a way that the microsecond item of each data remains unchanged. The microsecond settings are then re-calculated from the H number and horizontal period obtained.

[Supplementary note] Concerning fixed modes

In (1) and (2) above, the timing data is re-calculated but the Vtotal and Vdisp settings can be fixed.

Once the fixed mode is set to ON, the settings concerned are fixed when the Hperiod of the horizontal timing data has been changed, and the fixed settings are given precedence over (1) and (2) above.

4-4 Output condition data editing

(1) How to establish the output condition data editing mode

When "Output Condition Edit" is selected in Section 4-1, the following display appears.

Fig. 4-24

```
Output Mode:LCD
   NRZ/RZ  :NRZ      (0/1)
```

(2) Selecting the output mode and NRZ or RZ

Select NRZ or NZ

0	NRZ	NRZ (normal setting: non return to zero)
1	RZ	RZ (no dots : return to zero) This is ignored by the VG-852.

(3) Selecting the output polarities (1 of 2)

Move to the screen below using the ▼▼ key.

Fig. 4-25

```
HS:N    VS:N    CS:N (0/1)
HD:N    VD:N         (0/1)
```

Select the HS, VS, CS, HD and VD polarities.

0	N	Negative
1	P	Positive

(4) Selecting the output polarities (2 of 2)

Move to the screen below using the ▼▼ key.

Fig. 4-26

```
1CH:N  2CH:N  CLK:P(0/1)
DISP:P CLKOUT:ALL  (0/1)
```

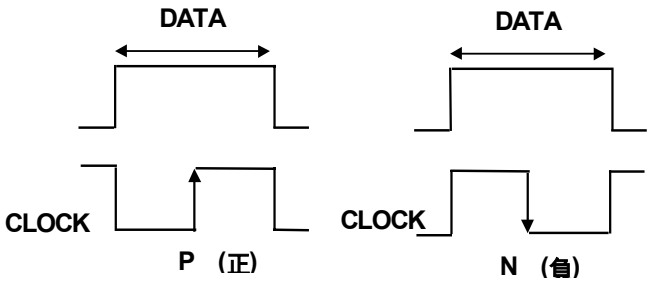
A. Select the polarity of the RGB (video) signals for CH1 and CH2.

0	N	Negative
1	P	Positive

B. Select the CLK (clock) polarity.

0	N	Negative
1	P	Positive

Fig. 4-27



C. Select the DISP polarity.

0	N	Negative
1	P	Positive

D. Select the clock signal output range with CLKOUT.

0	DISP	The clock signal is output only in the display area.
1	ALL	The clock signal is output in the entire area.

(5) Selecting output enable (OE)

Move to the screen below using the ▼▼ key.

Fig. 4-28

```
1CH:OUT:HiZ CLK:HiZ(0/1)
2CH:OUT:HiZ CLK:HiZ(0/1)
```

Select output enable (OE) for the CH1 and CH2 output and clock.

0	HiZ	High impedance
1	ON	ON (normal setting)

(6) Setting the number of video signal bits and ON or OF for the SW (general-purpose) signal

Move to the screen below using the ▼▼ key.

Fig. 4-29

```
RGB:8 Bit              (1-8)
OSW0:ON   OSW1:OFF (0/1)
```

A. Select the number of (high-order) RGB (video) signal bits.

Key	No. of bits	RGB signal values
1	1	0,128
2	2	0,64,128,192
3	3	0,32,64,96,128,160,192,224
4	4	0,16,32,48,…192,208,224,240
5	5	0,8,16,24,32,…224,232,240,248
6	6	0,4,8,12,16,20,…240,244,248,252
7	7	0,2,4,6,8,10,12,…248,250,252,254
8	8	0,1,2,3,4,5,6,7,8,…252,253,254,255

B. Select ON for OSW0 and OSW1 (general-purpose signals).

0	OFF	
1	ON	

This setting becomes valid when OSW0 or OSW1 is selected at the SW0 to 3 output selection stage.

(7) Selecting the SW0 and SW1 outputs

Move to the screen below using the ▼▼ key.

Fig. 4-30

```
SW0SEL: OSW0        (0-6)
SW1SEL: OSW1        (0-6)
```

A. Select the SW0 output.

0	CS	For outputting CS.
1	VD3	For outputting VEQP and HSER.
2	HD3	For outputting HEQP.
3	OSW0	For outputting the fixed output of SW0 by means of the OSW0 setting. (Note 1)
4	OSW1	For outputting the fixed output of SW0 by means of the OSW1 setting. (Note 1)
5	GSW0	For outputting the fixed output of SW0 by means of the GSW0 setting. (Note 2)
6	GSW1	For outputting the fixed output of SW0 by means of the GSW1 setting. (Note 2)

Note 1:	Refer to the section entitled "SW (general-purpose) signal ON/OFF settings."
Note 2:	Refer to the "Group data edit function (Func-6)."

B. Select the SW1 output.

0	CS	For outputting CS.
1	HD3	For outputting HEQP.
2	HD1	For outputting HD1.
3	OSW0	Same as for SW0.
4	OSW1	Same as for SW0.
5	GSW0	Same as for SW0.
6	GSW1	Same as for SW0.

(8) Selecting the SW2 and SW3 outputs

Move to the screen below using the ⏬ key.

Fig. 4-31

```
SW0SEL: VD          (0-6)
SW1SEL: HD1         (0-6)
```

A. Select the SW2 output.

0	VS	For outputting VS.
1	VD1	For outputting VD and HD2.
2	VD2	For outputting VD.
3	OSW0	Same as for SW0.
4	OSW1	Same as for SW0.
5	GSW0	Same as for SW0.
6	GSW1	Same as for SW0.

B. Select the SW3 output.

0	HS	For outputting HS.
1	HD1	For outputting HD1.
2	HD2	For outputting HD2.
3	OSW0	Same as for SW0.
4	OSW1	Same as for SW0.
5	GSW0	Same as for SW0.
6	GSW1	Same as for SW0.

(9) Selecting the clock settings

⏬Move to the screen below using the [down] key.

Fig. 4-32

```
CLKMode:1/1 Delay:OFF
CLKDelay: 0 nsec    (0-31)
```

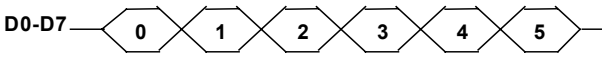
A. Select the clock output mode.

0	1/1	1/1 clock mode
1	1/2	1/2 clock mode

Fig. 4-33 When the 1/1 clock mode is selected

・CLOCK

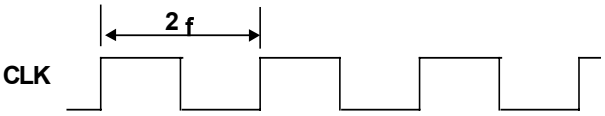
・ Channel 1 data



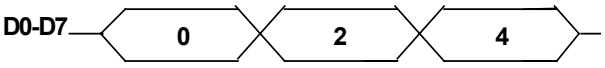
・ Channel 2 data

Fig. 4-34 When the 1/2 clock mode is selected

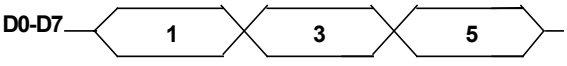
・ CLOCK



・ Channel 1 data



・ Channel 2 data



Note: In the 1/2 clock mode, the horizontal timing data is input in 2-dot increments for the setting.

B. Select ON or OFF for the clock signal delay.

0	OFF	Clock signal delay OFF
1	ONN	CLock signal delay ON

C. Input the clock signal delay time.

Input using 0 to 9 keys	Setting range
Clock Delay time	0nsec to 31nsec (in 1ns increments)

(10) Setting ON or OFF for the R (video) signal bits

Move to the screen below using the ▼▲ key.

Fig. 4-35

R7:ON R6:OF R5:ON R4:ON
R3:OF R2:ON R1:OF R0:ON

Select ON or OFF for each of the R bits.

0	OFF	The R bits are set to OFF.
1	ON	The R bits are set to ON.

(11) Setting ON or OFF for the G (video) signal bits

Set in the same way as for the R signal.

(12) Setting ON or OFF for the B (video) signal bits

Set in the same way as for the R signal.

CHAPTER 5 PATTERN DATA EDITING

5-1 Pattern data selection

When the [PAT] key is pressed while the display in Fig. 3-8 in Section 3-3-1 appears or while editing is underway, the PAT-LED flashes, and the display shown in Fig. 5-1 appears.

Fig. 5-1

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

Select the data to be edited in accordance with the table below, and press the [SET] key to display the editing screens. (The PAT-LED stops flashing and remains lighted.)

Table5-1

Display	Key	Data	Setting item
Pattern Select	0	Pattern select	Pattern select data
Graphic Color	1	Graphic color	Graphic color, background
CHARA Data Edit	2 CHARA	Character pattern	Display format, character code, font size, cell size
CROSS Data Edit	3 CROSS	Crosshatch pattern	Horizontal direction interval, vertical direction interval
DOTS Data Edit	4 DOTS	Dot pattern	Horizontal direction interval, vertical direction interval
CIRCLE Data Edit	5 CIRCLE	Circle pattern	Display format
COLOR Data Edit	6 COLOR	Color bar pattern	Horizontal direction and vertical direction intervals, layout direction, color layout
GRAY Data Edit	7 GRAY	Gray scale pattern	(Horizontal direction and vertical direction intervals common to color bar pattern) Layout direction, level
BURST Data Edit	8 BURST	Burst pattern	Display format, step, interval
WINDOW Data Edit	9 WINDOW	Window pattern	Horizontal direction, vertical size, display color, display format, flicker interval
OPT1 Data Edit	A OPT1	Optional pattern 1	Optional pattern No.
OPT2 Data Edit	B OPT2	Optional pattern 2	Optional pattern No.
CURSOR Data Edit	C CURSOR	Cursor pattern	
NAME Data Edit	D NAME	Program name	
ACTION Edit	E	Pattern action	Pattern action (scroll, flicker, etc.)

Note 1: In order to enter the data on the memory card, the [SAVE] key must be pressed to save the data after any changes have been made in the pattern setting data.

5-2 Pattern data editing

(1) Pattern select data editing

When "Pattern Select" is selected in Section 5-1, the following display appears.

Fig. 5-2

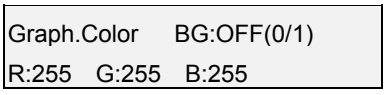
Select the pattern to be output by pressing the pattern keys (CHARA to NAME) and R/G/B/INV key. (The pattern shown by the lighted LED is the one selected.)

Note:	When the [SET] key is pressed, the selected pattern is displayed.

(2) Graphic color editing

When "Graphic Color" is selected in Section 5-1, the following display appears.

Fig. 5-3



A. Select the background.

When the background is set to ON, the dots of the character, crosshatch and dot patterns are displayed with the level and colors designated by the color bars and gray scale.
Select background OFF or ON using the [0] or [1] key.

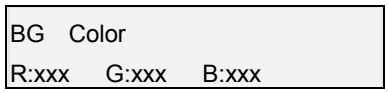
[0]	OFF
[1]	ON

Note:	If patterns are to be displayed with the level and colors designated by the color bars and gray scale while the background is ON, select "0" for all the "Graphic Color" settings.

Move to the screen below using the [▼▼] key.

Set the background color here. This color can be set for each program.

Fig. 5-4



Input the settings for R, G and B using the [0] to [9] number keys.

The setting range is as shown below.

Input using [0] to [9] keys	Setting range
R,G,B	0 to 255

Note:	The background color settings can be saved on the memory card only.

(3) Character pattern data editing

When "CHARA Data Edit" is selected in Section 5-1, the following display appears.

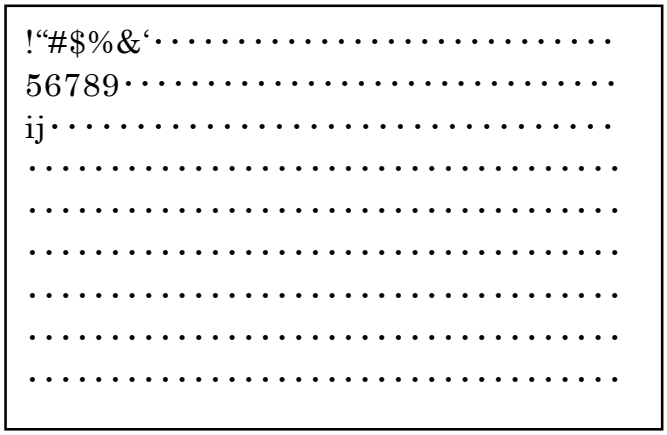
Fig. 5-5

Font:

A. Select the format number.
Input the number using 0, 1 or 2 key.

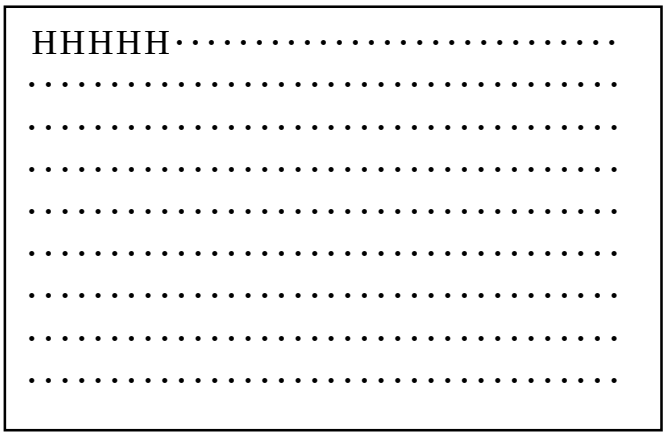
0 ····· Character list (Chara List)

Fig. 5-6



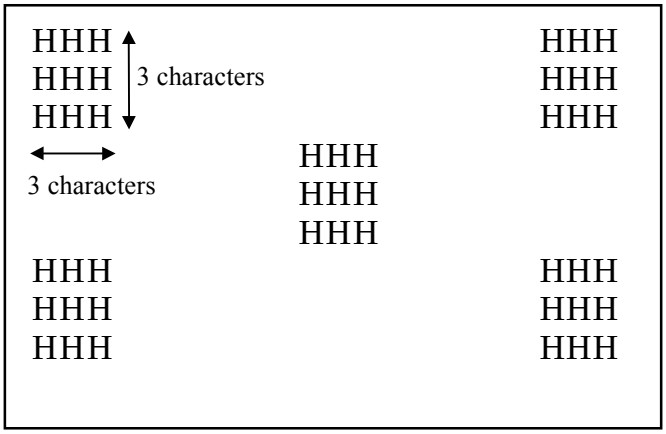
1 ····· All one character (All 1 Chara)

Fig. 5-7



[2] ····· Corners and center (Corner & Center)

Fig. 5-8



B. Select the font.

Move the cursor to the "Font" position, and input the number using [0], [1] or [2] key.

[0]	·····	**5×7**
[1]	·····	**7×9**
[2]	·····	**16×16**

C. Select the character code.

Fig. 5-9

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

Move to the screen above using the [▼▼] key.

A character code in the range shown below is set in hexadecimal notation.

Setting range	20to FF

* Characters can be input from the CRT screen. For further details, refer to Section 3-3-10.

D. Input the cell sizes (horizontal and vertical).

Input the size for R, G and B each using the [0] to [9] number keys.

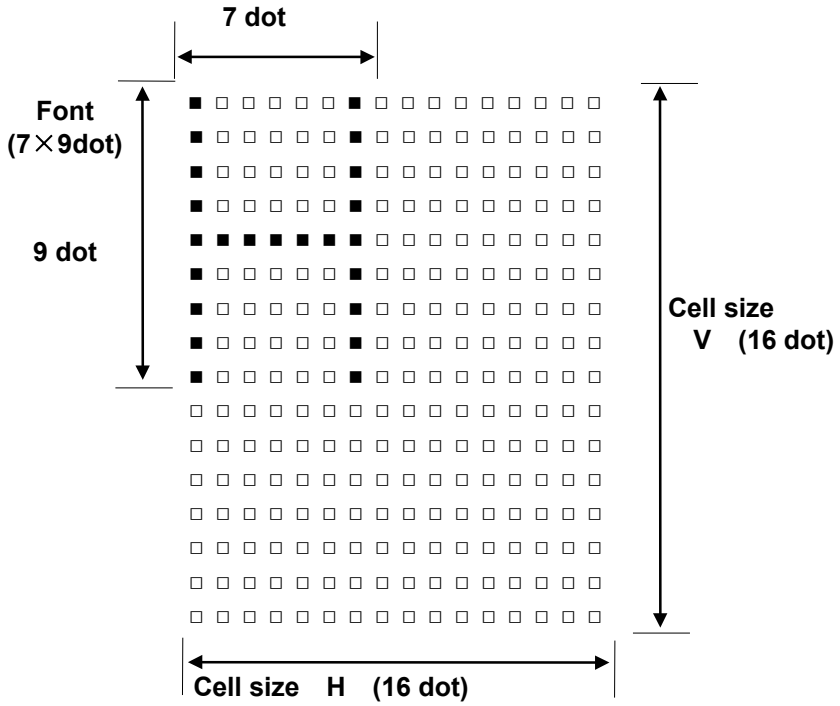
The setting ranges are as shown below.

Input using [0] to keys	Setting range
Cell size (horizontal)	1 to 255
Cell size (vertical)	1 to 255

* The correlation between the font and cell size is shown below.

<Example with 7x9 font and 16 × 16 cell size>

Fig. 5-10



(4) Crosshatch pattern data editing

When "CROSS Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-11

Mode:Line (0/1)
Format:from center (0/1)

A. Select the mode.

Input the mode using the **0** or **1** key.

0	Line	For designating the number of lines (in which case the interval is the number of crosshatch lines).
1	dot	For designating the number of dots (in which case the interval is the number of dots between the crosshatch patterns).

B. Select the format number.

Input the mode using the **0** or **1** key.

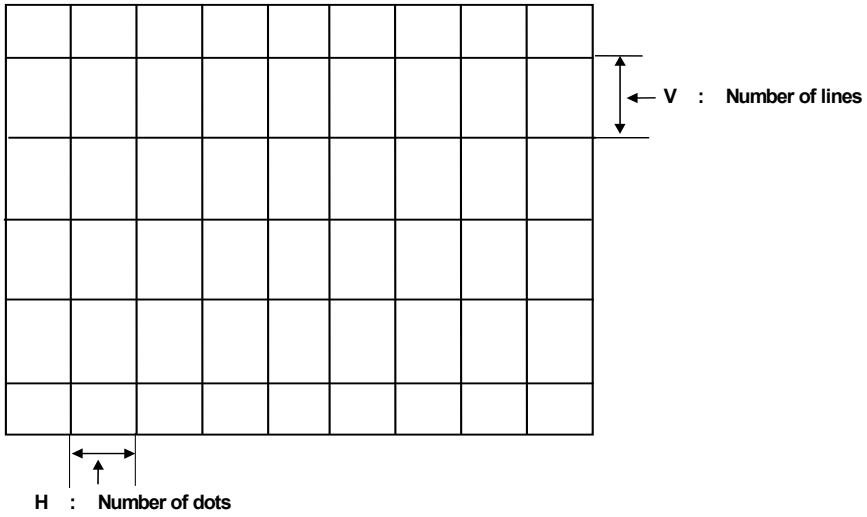
0	from center	For drawing with the screen center serving as the start point.
1	from LeftTop	For drawing with the top left of screen serving as the start point.

C. Set the interval.
Move to the screen below using the ▼▼ key. Input the H/V interval using the number keys.

Fig. 5-12

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

Fig. 5-13



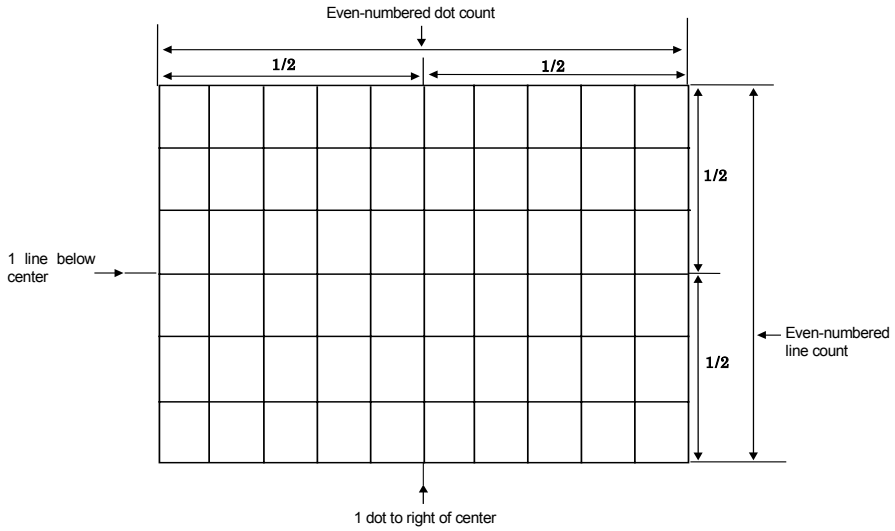
Input the H and V intervals.

Input using 0 to 9 keys	Setting range
H, V interval	0 to 9999 Line/dot

Note: The crosshatch in the H (or V) direction is not displayed if "0" is set for the H (or V) interval.

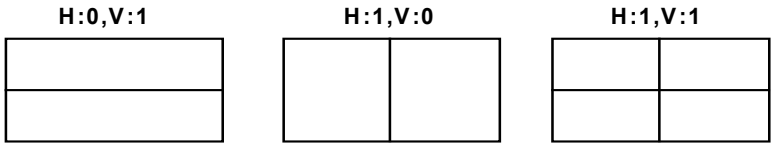
When "from center" is set for "Format," the crosshatch pattern is always displayed after the screen center is calculated. When both the number of dots and number of lines to be displayed are set to odd numbers, the screen center can be calculated, but when they are set to even numbers, the point which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

Fig. 5-14



* Examples when "0 and 1", "1 and 0" and "1 and 1" settings are used for H: and V: are shown below.

Fig. 5-15



D. Set the width.

Input the line width for H and V.

Input using [0] to [9] keys	Setting range
H, V line width	1 to 255 dot

(5) Dot pattern data input

When "DOTS Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-16

Mode:Line (0/1)
Format:from center (0/1)

A. Select the mode.

Input the mode using the [0] or [1] key.

[0]	Line	For designating the number of lines (in which case the interval is the number of dot pattern lines).
[1]	dot	For designating the number of dots (in which case the interval is the number of dots between the dots).

B. Select the format number.

Input the mode using the [0] or [1] key.

[0]	from center	For drawing with the screen center serving as the start point.
[1]	from LeftTop	For drawing with the top left of screen serving as the start point.

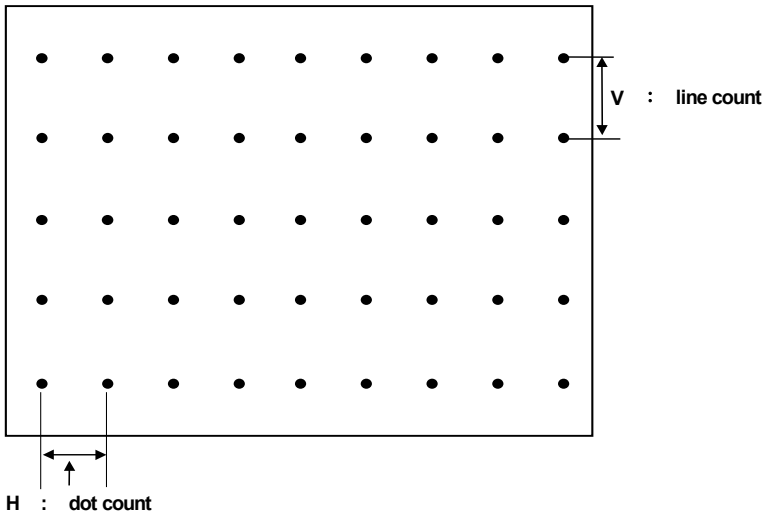
C. Set the interval.

Move to the screen below using the [▼▲] key. Input the H/V interval using the number keys.

Fig. 5-17

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

Fig. 5-18



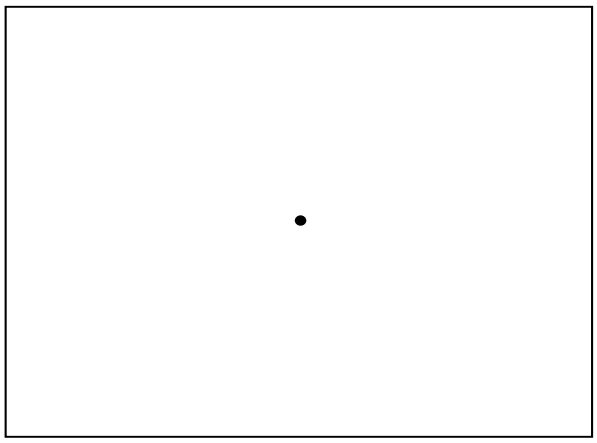
Input the H and V intervals.

Input using [0] to [9] keys	Setting range
H, V interval	0 to 9999 Line/dot

Note:	As with the crosshatch pattern, the dot pattern is displayed after the screen center is calculated.

* If "1" or "0" is set for both H: and V:, the display shown in the figure below will appear.

Fig. 5-19



D. Set the size.

Input the size of the dot pattern.

Input using 0 to 9 keys	Setting range
Size	1 to 15 dot

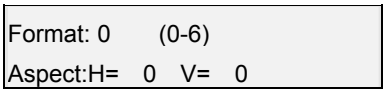
E. Input the type.
Input the type using the 0 or 1 key.

0	Crcl	For drawing dots in the shape of a circle whose diameter is the designated size.
1	Rect	For drawing dots in the shape of a square, one side of which is the designated size.

(6) Circle pattern data input

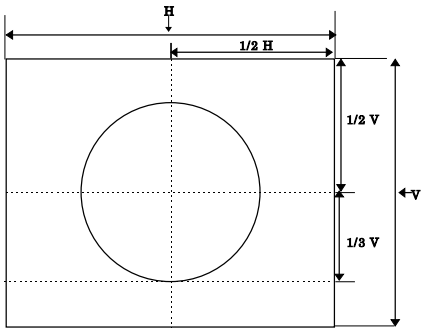
When "CIRCLE Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-20



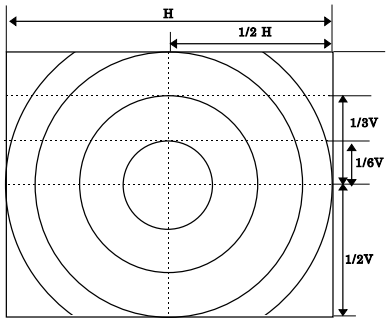
A. Select the format number.
Input the format number using one of [0] to [6] keys.

Fig. 5-21



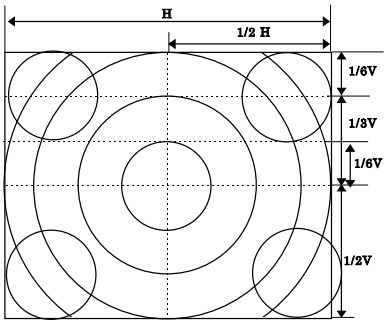
Format [0]

Single circle
Center: 1/2H, 1/2V
Radius: 1/3V



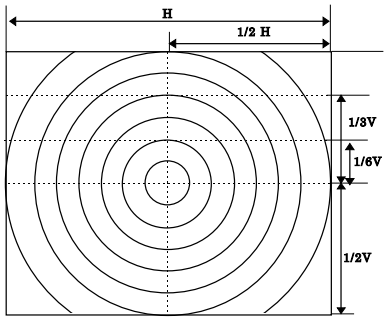
Format [1]

Concentric circles (1)
Center: 1/2H, 1/2V
Radius (from center): 1/6V, 1/3V, 1/2V, 1/2H



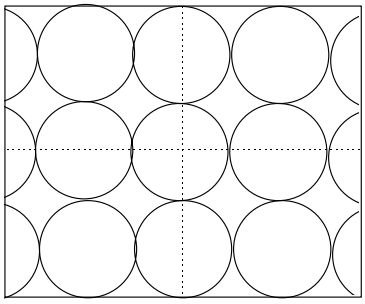
Format [2]

Format [1] + (4 circles with 1/6V radius)



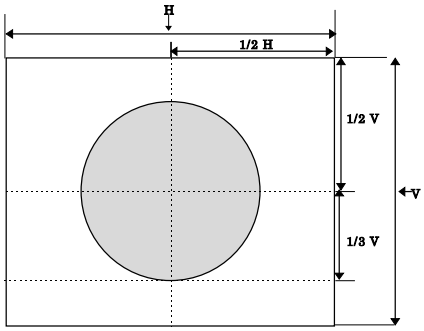
Format [3]

Concentric circles (2)
Center: 1/2H, 1/2V
Radius (from center): addition of other circles inside 1/6V, 1/3V, 1/2V circles; addition of 1/2 radius



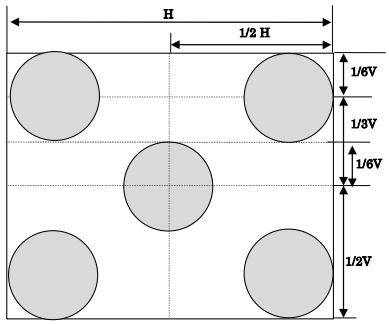
Format [4]

Consecutive circles with 1/6V radius
Circles are displayed symmetrically both horizontally and vertically with the center (1/2 H, V/2 V) serving as the reference.



Format 5

Single circle painted out
Center: 1/2H, 1/2V
Radius: 1/3V



Format 6

5 circles with 1/6V radius painted out

B. Set the aspect ratio (H:V).

Input using 0 to 9 keys	Setting range
H:V aspect ratio	0 to 255

Perfectly round circles are always displayed regardless of the display resolution by setting the aspect ratio of the monitor.

Example: Set H=4 and V=3 for an NTSC monitor.
Set H=16 and V=9 for an HDTV monitor.

Perfectly round circles will not be drawn if "0" is set for H or V. (This is compatible with Astro's existing VG generators.)

(7) Color bar pattern data input

When "Color Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-22

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

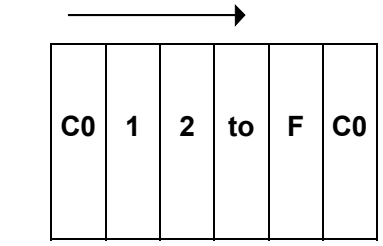
A. Select the mode.

0	%	For designating the interval as a percentage.
1	dot	For designating the interval as a number of dots.

B. Select the direction.
Input the layout direction using the [0], [1], [2] or [3] key.

Fig. 5-23

0 · · · · · · · · · · · · · · · Horizontal direction

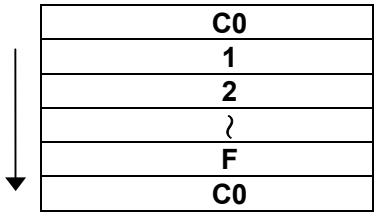


The colors from color "C0" to the color of the designated "repeat number" (color "CF" when 16 is designated) are repeated horizontally.

* The V interval is ignored.

---

1 · · · · · · · · · · · · · · · Vertical direction



The colors from color "C0" to the color of the designated "repeat number" (color "CF" when 16 is designated) are repeated vertically.

* The H interval is ignored.

---

2 · · · · · · · · · · · · · · · Horizontal direction

C0	1	2	to	F	C0
1	2	3	to	C0	1
2	3	4	to	1	2
3	4	5	to	2	3
4	5	6	to	3	4
5	6	7	to	4	5

The colors from color "C0" to the color of the designated "repeat number" (color "CF" when 16 is designated) are repeated horizontally, and when they reach the corner, they are continued onto the next line which is determined by the V interval.

---

3 · · · · · · · · · · · · · · · Vertical direction

C0	1	2	3	4	5
1	2	3	4	5	6
2	3	4	5	6	7
≀	≀	≀	≀	≀	≀
F	C0	1	2	3	4
C0	1	2	3	4	5

The colors from color "C0" to the color of the designated "repeat number" (color "CF" when 16 is designated) are repeated vertically, and when they reach the corner, they are continued onto the next row which is determined by the H interval.

C. Set the repeat number.
Move to the screen below using the ▼ key. Input the repeat number using the number keys.

Fig. 5-24

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

Input using 0 to 9 keys	Setting range
Repeat number	1 to 16

D. Input the H and V intervals.
The setting ranges are as shown below.

Input using 0 to 9 keys	Dot Setting range	% Setting range
H interval	1to 9999 dots	0.0 to 100.0%
V interval	1to 9999 dots	0.0 to 100.0%

E. Press the ▼ key to display the menu shown in the figure below, and input the color bar color layout.
There are 16 color layout settings ranging from C0 to CF.

Fig. 5-25

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

Fig. 5-26

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

Input one of the eight colors using the 0 to 7 number keys.

0	
1	R
2	G
3	R G
4	B
5	R B
6	G B
7	R G B

(8) Gray scale (half-tone) pattern data input

When "Gray Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-27

```
Mode:%          (0/1)
Direction:Hor   (0/1)
```

A. Select the mode.

0	%	For designating the interval as a percentage.
1	dot	For designating the interval as a number of dots.

B. Select the direction.

Input the direction using the 0 or 1 number key.

0	Hor	"LO" to the designated "repeat number" level is repeated in the horizontal direction.
1	Ver	"LO" to the designated "repeat number" level is repeated in the vertical direction.

C. Select the repeat number.

Move to the screen below using the ▼ key. Input the repeat number using the number keys.

Fig. 5-28

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

Input using 0 to 9 keys	Setting range
Repeat number	1 to 16

D. Input the H and V intervals.

The setting ranges are as shown below.

Input using 0 to 9 keys	Dot setting range	%の Setting range
H interval	1 to 9999dots	0.0 to 100.0%
V interval	1 to 9999dots	0.0 to 100.0%

E. Press the ▼ key to display the menu shown in the figure below, and input the gray scale level layout.

There are 16 level layout settings ranging from L0 to LF.

Fig. 5-29

```
L0:   0 1: 17 2: 34 3: 51
L4: 68 5: 85 6:102 7:119
```

Fig. 5-30

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

Input the gray scale level using the 0 to 9 number keys.

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Gray scale level	0 to 255

(9) Burst pattern data editing

When "BURST Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-31

```
Format:L->R           (0-3)
Interval: 1   Step: 2 dot
```

A. Select the 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.

B. Input the step and interval.

A step is a line thickness increase increment.

An interval is the number of lines with same thickness which are displayed.

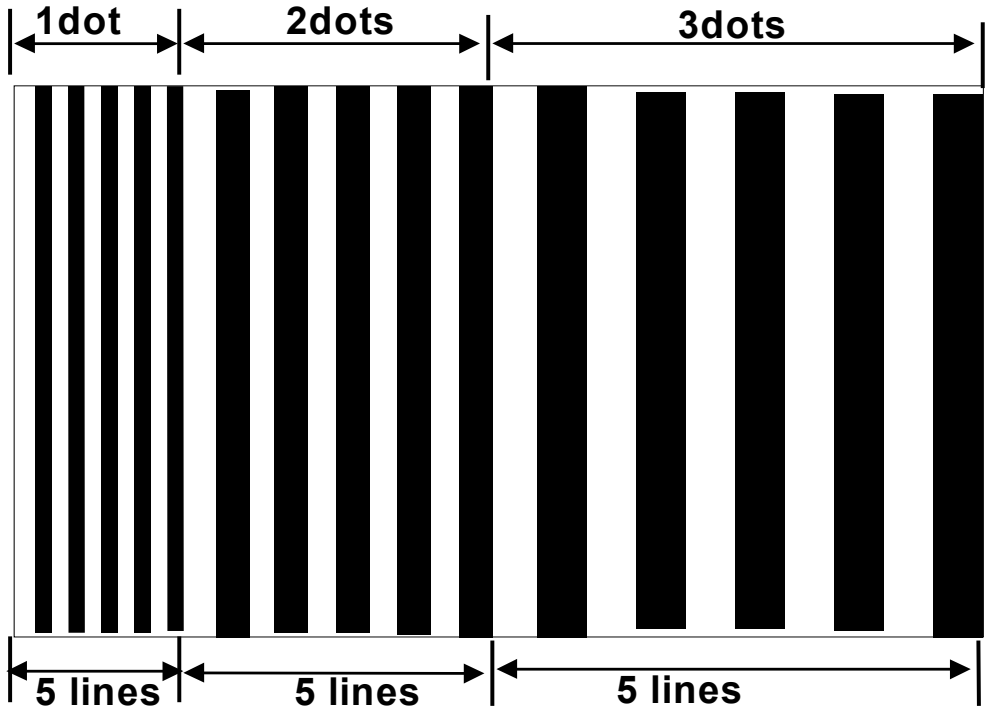
The setting range is as shown below.。

Input using 0 to 9 keys	Setting range
Step	1 to 99dot
Interval	1 to 99dot

[Example of settings]

Format 0, step 1, interval 5

Fig. 5-32



(10) Window pattern data editing

When "WINDOW Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-33

Mode:%	(0/1)
Format:1 WINDOW	(0-F)

A. Select the mode.

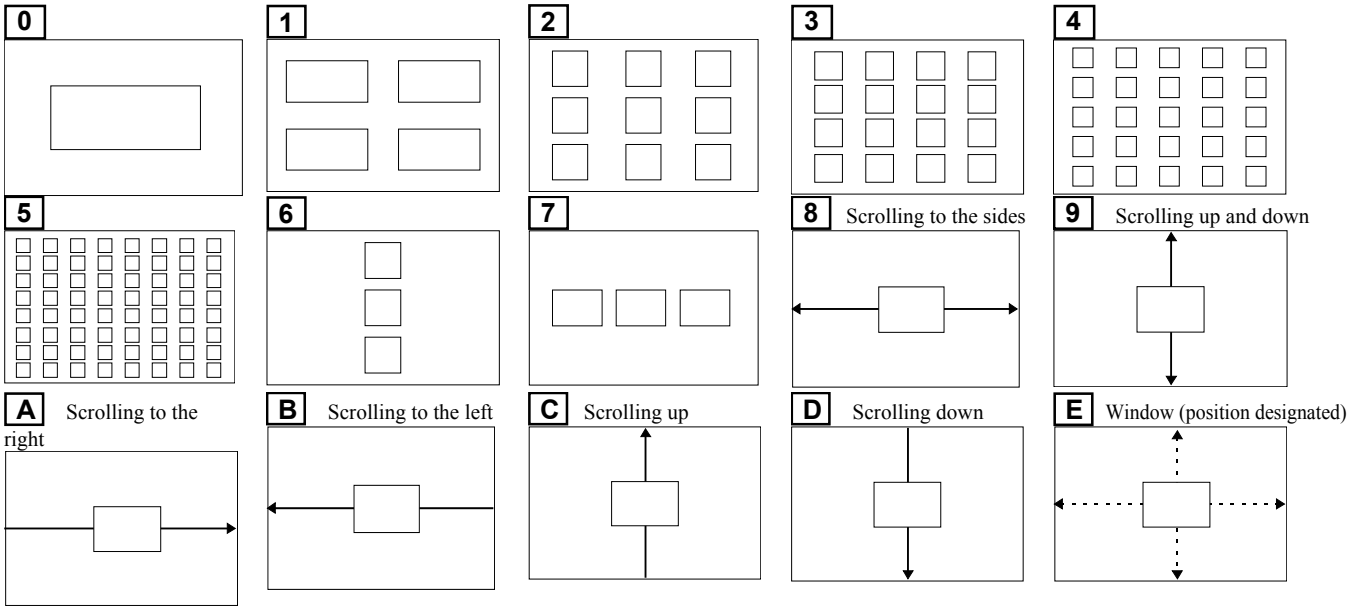
0	%	For setting the widths (horizontal and vertical) as a percentage.
1	dot	For setting the widths (horizontal and vertical) as a number of dots.

B. Select the format.

The setting range is as shown below.

Input using 0 to F keys	Setting range
Window format	0 to F

Fig. 5-34



Note: Format F
The window RGB level can be varied automatically in the direct display mode. The window display is the same as format 0.

C. Set the widths (horizontal and vertical).
Move to the screen below using the ▼▼ key. Input the horizontal and vertical widths using the number keys.

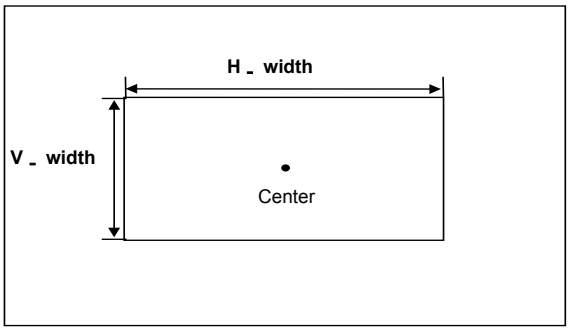
Fig. 5-35

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

The setting range is as shown below.

Input using 0 to 9 keys	Dot setting range	% setting range
H width	1 to 9999 dots	0.1 to 100.0%
V width	1 to 9999 dots	0.1 to 100.0%

Fig. 5-36



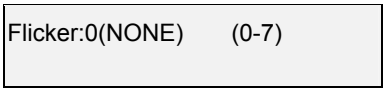
Note:	The window is displayed between the background (color bar, gray scale) and graphic pattern (characters, etc.).

D. Set R/G/B (window color).
Input one of 16.77 million colors using the 0 to 9 number keys.
The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Window color	0 to 255

E. Select the flicker (flicker interval) for a format from 0 to 7 or E.
Move to the screen below using the ▼▼ key. Select the flicker interval.

Fig. 5-37



0	0(NONE)	No flicker
1	1(1V)	Flicker occurs every V period.
2	2(2V)	Flicker occurs every 2 V periods.
3	3(4V)	Flicker occurs every 4 V periods.
4	4(8V)	Flicker occurs every 8 V periods.
5	5(16V)	Flicker occurs every 16 V periods.
6	6(32V)	Flicker occurs every 4 V periods.
7	7(64V)	Flicker occurs every 64 V periods.

Note: The flicker cannot be set for a window format from 8 to D.

F. Select the scroll speed for a window format 8 to D.

The window is scrolled for formats 8 to D. The scroll speed can be changed by setting one of the following numbers in "Flicker Interval."

0	1V:1dot	Window is scrolled by 1 dot every blanking period.	(Slow)
1	1V:2dots	Window is scrolled by 2 dots every blanking period.	
2	1V:3dots	Window is scrolled by 3 dots every blanking period.	
3	1V:4dots	Window is scrolled by 4 dots every blanking period.	↓
4	1V:4dots	Window is scrolled by 4 dots every blanking period.	↓
5	1V:4dots	Window is scrolled by 4 dots every blanking period.	
6	1V:4dots	Window is scrolled by 4 dots every blanking period.	(Fast)
7	1V:4dots	Window is scrolled by 4 dots every blanking period.	

G. Select the level variation speed for window format F.

The window RGB level is automatically varied for format F. The speed at which the window level is varied can be changed by setting one of the following numbers in "Flicker Interval."

0	1V:1Level	Window is changed by 1 level every blanking period.	(Slow)
1	2V:1Level	Window is changed by 1 level every 2 blanking periods.	
2	3V:1Level	Window is changed by 1 level every 3 blanking periods.	
3	4V:1Level	Window is changed by 1 level every 4 blanking periods.	↓
4	5V:1Level	Window is changed by 1 level every 5 blanking periods.	↓
5	6V:1Level	Window is changed by 1 level every 6 blanking periods.	
6	7V:1Level	Window is changed by 1 level every 7 blanking periods.	(Fast)
7	8V:1Level	Window is changed by 1 level every 8 blanking periods.	

H. Set the "Format-E" position (format E window position). (For format E only)
Move to the screen below using the ▼▼ key. Set the window center positions #1 and #2 (designated by a percentage).

Fig. 5-38

```
Format-E #1 ( 50.0,   50.0)
 Pos       #2 (  0.0,    0.0)
```

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Window center position #1 (h,v)	0.0% to 100.0%
Window center position #2 (h,v)	0.0% to 100.0%

Note:	The #2 window is not displayed when "0,0" is selected for window center position #2 setting.

(10-1) Level variation operation in direct display mode

The window level can be changed under the following conditions:

A. When window format F has been selected

B. When one of the window formats from 0 to 7 has been selected and the flicker interval has been set to "0" (the speed of the variation is fixed (1V: 1 level).

The following LCD display appears when a window pattern is selected in the direct display mode and the above conditions have been satisfied. (WIN: RGB level display)

Fig. 5-39

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

Proceed with the following operations using the [A] to [F] keys.

[A] Key	This increases the level automatically at the speed set for the flicker interval.
[B] Key	This decreases the level automatically at the speed set for the flicker interval.
[C] Key	This stops the automatic variation. It stops at the level applying when the key was pressed.
[E] Key	Each time this is pressed, the level is incremented by 1.
[F] Key	Each time this is decremented by 1.

(11) Optional pattern number setting

When "OPT1 Data Edit" or "OPT2 Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-40

```
OPT1-NO: 0          (00-BF)
```

or

Fig. 5-41

```
OPT2-NO: 0          (00-BF)
```

The setting range is as shown below.

Input using [0] to [F] keys	Setting range
Optional pattern number	00 to BF

Note 1:	When an optional pattern is selected, it cannot be superimposed onto any other pattern.
Note 2:	Optional patterns 00 to 3F are internal optional patterns. Patterns 40 to 7F are user-generated optional patterns, and patterns 80 to BF are image displays (#1 to #64). Patterns 40 to BF cannot be used when the panel ROM is used.

(12) Cursor pattern data editing

When "CURSOR DATA Edit" is selected in Section 5-1, the following display appears.

Fig. 5-42

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

A. Select the format.

[0]	5*5	For setting a cross-shaped cursor consisting of 5 horizontal dots and 5 vertical dots.
[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 (RGB).
[4]	Cross(RGB)	For setting a cross-shaped cursor which fills the entire screen (RGB).
[5]	V-Line(RGB)	For setting a vertical line as the cursor (RGB)

When [3], [4] or [5] has been selected, the cursor moves after the colors have changed from white to red, from red to green and from green to blue.

B. Select the position display mode.

[0]	OFF	The cursor position does not appear on the display screen.

1	Normal1	The cursor position is displayed on the display screen in the following format. (H-pos, V-pos, STEPxx) H-pos: Horizontal coordinate (1 or above) V-pos: Vertical coordinate (1 or above) STEP: Movement step (1/10/100) * "1,1" serves as the coordinates for the top left of the LCD screen.
2	Normal2	The cursor position is displayed on the LCD screen in the following format. (GATE=gate, STEPxx) (R=rrr, G=ggg, B=bbb) gate: Vertical coordinate (1 or above) rrr: R color horizontal coordinate (1 or above) ggg: G color horizontal coordinate (2 or above) bbb: B color horizontal coordinate (3 or above) STEP: Movement step (1/10/100) * "1,1" serves as the coordinates for the top left of the LCD screen. * As the horizontal coordinates, the coordinates on the LCD screen are trebled and the +1, +2 and +3 values are displayed for R, G and B, respectively.
3	Reverse1	What is shown is the same as for Normal1 except that the characters and coordinates are rotated through 180 degrees. When the LCD display is turned upside down, the display is the same as for Normal1. * "1,1" serves as the coordinates for the bottom right of the LCD screen.
4	Reverse2	What is shown is the same as for Normal2 except that the characters and coordinates are rotated through 180 degrees. When the LCD display is turned upside down, the display is the same as for Normal2. * "1,1" serves as the coordinates for the bottom right of the LCD screen.

C. Select the flicker (flicker interval).

Move to the screen below using the ▼ key. Select the flicker interval.

Fig. 5-43

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

0	0(NONE)	No flicker
1	1(1V)	Flicker occurs every V period.
2	2(2V)	Flicker occurs every 2 V periods.
3	3(4V)	Flicker occurs every 4 V periods.
4	4(8V)	Flicker occurs every 8 V periods.
5	5(16V)	Flicker occurs every 16 V periods.
6	6(32V)	Flicker occurs every 32 V periods.
7	7(64V)	Flicker occurs every 64 V periods.

D. Select the step (movement step).

0	1 dot	Movement is made in 1-dot increments.
1	10 dot	Movement is made in 10-dot increments.
2	100 dot	Movement is made in 100-dot increments.

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

Move to the screen below using the ▼ key. Select the cursor color and background color.

Fig. 5-44

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

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Cursor color	0 to 255
Background color	0 to 255

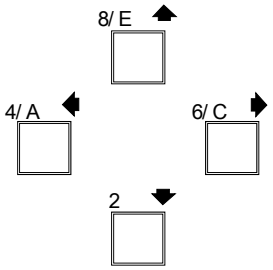
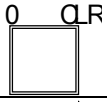
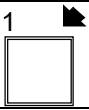
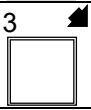
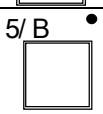
(12-1) Cursor pattern operations in direct display mode

In the direct display mode, the following LCD display appears when the cursor pattern is selected. (H/V: cursor coordinates displayed)

Fig. 5-45

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

Perform the operations shown below using the 0 to 9 number keys.

Key operation	Function
	For moving the cursor pattern on the LCD screen in the designated direction. For indicating the cursor coordinate position (H/V) on the LCD.
 Key	For changing the coordinate display. (No display → Type 1 → Type 2)
 Key	For changing the flashing speed. (No flashing → once in 1V → once in 64V)
 Key	For changing the cursor shape. (5*5 → Cross → V-line)
 Key	For changing the movement step. (100 dots → 10 dots → 1 dot)

Note: Program numbers cannot be input at this time using the number keys.

(13) Program name data editing

When "NAME Data Edit" is selected in Section 5-1, the following display appears.

Fig. 5-46

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

Astro xxx

A. Select the display position ("Pos").

0	Cntr	The program name is displayed in the center of the screen.
1	L-T	The program name is displayed at the top left of the screen.
2	L-B	The program name is displayed at the bottom left of the screen.
3	R-T	The program name is displayed at the top right of the screen.
4	R-B	The program name is displayed at the bottom right of the screen.

B. Select the font.

0	5*7	5×7 font
1	7*9	7×9 font
2	16*16	16×16 font

C. Input the program name.

Move the cursor to the bottom line and input the program name in hexadecimal notation. Up to 20 characters can be used for a program name.

* Characters can be input on the LCD screen. For further details, refer to Section "3-3-10. How to input character codes from the display."

(14) Pattern action editing

When "Action Edit" is selected in Section 5-1, the following display appears.

Fig. 5-47

Action Interval: 1V (1-999)

A. Set the action interval.

The setting range is as shown below.。

Input using 0 to 9 keys	Setting range
Action interval (V increments)	0 to 999

Press the ▼▼ key to move to the screen below.

Fig. 5-48

G-SCR:OFF C-SCR:OFF(0/1) G-Dir:L-B C-Dir:R-T(1-9)

B. Select ON or OFF for GRSR (8-bit plane scrolling)

0	OFF	For not executing 8-bit plane scrolling. (Default)
1	ON	For executing 8-bit plane scrolling.

C. Select ON or OFF for CRSR (1-bit plane scrolling).

0	OFF	For not executing 1-bit plane scrolling. (Default)
1	ON	For executing 1-bit plane scrolling.

D. Select GRDir (8-bit plane scrolling direction).

1	L-D	For scrolling toward the bottom left.
2	D	For scrolling toward the bottom.
3	R-D	For scrolling toward the bottom right.
4	L	For scrolling toward the left.
6	R	For scrolling toward the right.
7	L-U	For scrolling toward the top left.
8	U	For scrolling toward the top.
9	R-U	For scrolling toward the top right.

E. Select CRDir (1-bit plane scrolling direction).

Same as for GRDir.

Press the ▼▼ key to move to the screen below.

Fig. 5-49

```
G&C-Step:
H=    1 V=    1    (1-4095)
```

F. Set the step (1-bit and 8-bit scrolling step).

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Step (dots) in H direction	1 to 4095
Step (H) in V direction	1 to 4095

Press the ▼▼ key to move to the screen below.

Fig. 5-50

```
WDSR:OFF WDFL:OFF (0/1)
P-SCR:OFF C-FLK:OFF(0/1)
```

G. Select ON or OFF for WDSR (window scrolling).

0	OFF	For not executing window scrolling. (Default)
1	ON	For executing window scrolling.

H. Select ON or OFF for WDFL (window flicker).

0	OFF	For not executing window flicker. (Default)
1	ON	For executing window flicker.

I. Select ON or OFF for PLSR (palette scrolling).

0	OFF	For not executing palette scrolling. (Default)
1	ON	For executing palette scrolling.

J. Select ON or OFF for CRFL (1-bit plane flicker).

0	OFF	For not executing 1-bit plane flicker. (Default)
1	ON	For executing 1-bit plane flicker.

Press the ▼ key to move to the screen below.

Fig. 5-51

```
W-Dir :R-D          (1-9)
W-Step:100          (1-255)
```

K. Set the direction of the window scrolling.

Same as for GRDir.

L. Set the step for window scrolling.

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Step (common) in H and V directions	1 to 255

Press the ▼ key to move to the screen below.

Fig. 5-52

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

M. Set the step sign and value for palette scrolling.

0	-	A negative value is set.
1	+	A positive value is set.

The setting range is as shown below.

Input using 0 to 9 keys	Setting range
Step	1 to 128

N. Set the start and end positions for palette scrolling.

The setting range is as shown below.。

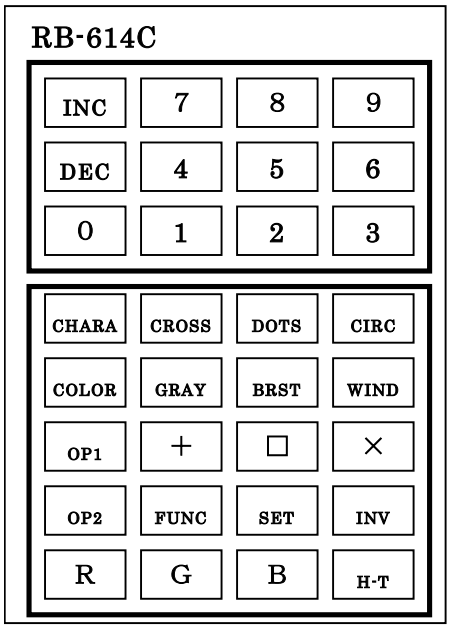
Input using 0 to 9 keys	Setting range
Start position, end position	0 to 255

CHAPTER 6 OPERATIONS USING RB-614C

6-1 Connections with VG-852

The RB-614C cable is connected to the REMOTE connector on the rear panel of the VG-852.

6-2 Overview



6-3 Operations

The keys of the RB-614C can be used in place of the corresponding keys on the VG-852 as shown in the table below.

RB-614C	VG-852
INC Key	▲▲ Key
DEC Key	▼▼ Key
0 to 9 Key	0 to 9 Key
CHARA to OP2 Key	CHARA to OPT2 Key
FUNC Key	FUNC Key
SET Key	SET Key
INV Key	INV Key
R to B Key	R to B Key
H-T Key	No operation possible

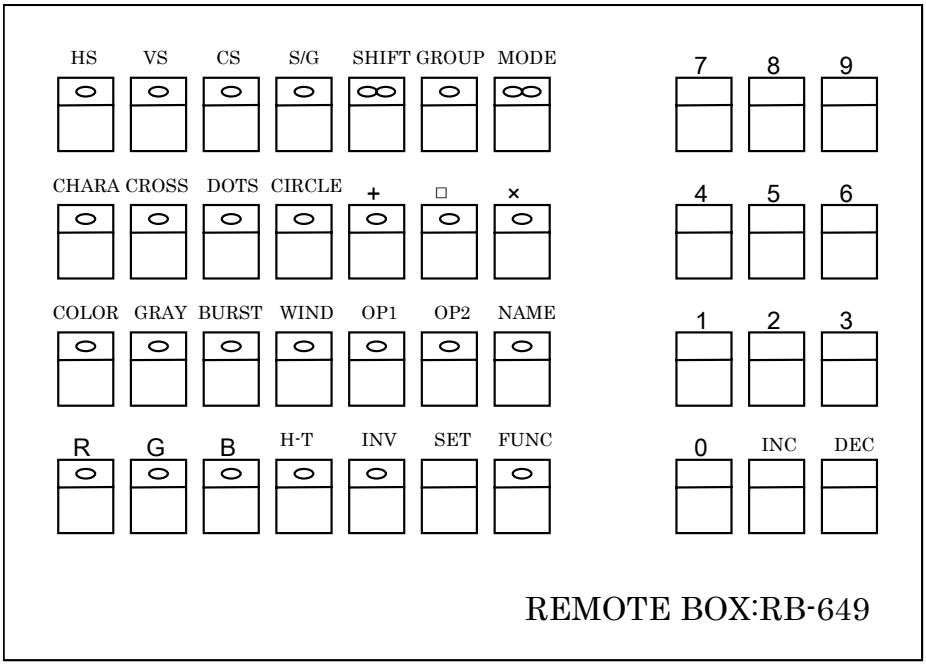
Note: Program data, etc. cannot be edited using the RB-614C.
(Only functions 0, 4 and 9 can be executed.)

CHAPTER 7 OPERATIONS USING RB-649

7-1 Connections with VG-852

Connect the RB-649 cable to the REMOTE connector on the rear panel of the VG-852.

7-2 Overview



7-3 Operations

The keys of the RB-649 can be used in place of the corresponding keys on the VG-852 as shown in the table below.

RB-649	VG-852
HS to S/G Key	HS to G/S Key
SHIFT Key	SHIFT Key
GROUP Key	Used to select the group execution number. It is equivalent to the ESC key.
MODE Key	The functions in Func-0 are as follows. Red line lighted: All program data is executed. Red dot lighted: Timing data only is executed. Green dot lighted: Pattern data only is executed.
CHARA to NAME Key	CHARA to NAME Key
R to B Key	R to B Key
H-T Key	CURSOR Key
INV Key	INV Key
SET Key	SET Key
FUNC Key	FUNC Key
0 to 9 Key	0 ~ 9 Key
INC Key	▲ Key
DEC Key	▼ Key

Note: Program data, etc. cannot be edited using the RB-649.
(Only functions 0, 4 and 9 can be executed.)

* Refer to (5) in Section 3-3-2.

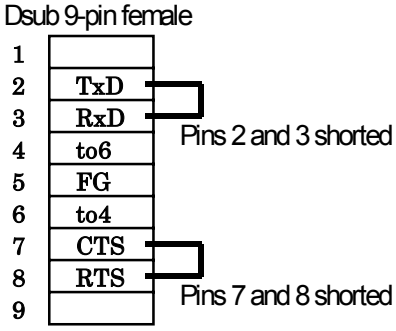
CHAPTER 8 SELF-DIAGNOSIS MODE

8-1 Introduction

The self-check functions of the VG-852 check the devices of the VG-852 hardware.

8-2 What is required for checking

A. Connector used for checking RS-232C



8-3 Operation method

8-3-1 Startup method

Switch on the power of the VG-852 while pressing the ▲▼ key.
The buzzer sounds, all the LEDs on the operation panel of the VG-852 generator light, and the following LCD display appears.

Fig. 8-1

VG-852 Self Check Mode

Five seconds later, the buzzer sounds again, and the check item selection screen appears on the LCD display.

Fig. 8-2

Select Item.: 0 (0-6)
Key Check

8-3-2 Selecting the check items

Using the [0] to [6] number keys, select the items to be checked on the check item selection screen described above.

[0]	Key Check	For checking the keys and LEDs on the VG-852's operation panel.
[1]	RAM Check	For checking H-Sync RAM, V-Sync RAM, H-Window RAM, V-Window RAM, CHARA-RAM (1-bit VRAM), GRAPH-RAM (8-bit VRAM) and LUT.
[2]	Mem-Card Check	For checking the memory card.
[3]	Panel-ROM Check	For checking the panel ROM.
[4]	RS232C(LoopBack)	For checking the RS-232C loopback.
[6]	Internal EEPROM Check	For checking the internal EEPROM.
[7]	Internal EEPROM Init.	For initializing the internal EEPROM.

8-3-3 Key check

(1) Selecting the check item

Fig. 8-3

```
Select Item.: 0 (0-6)
Key Check
```

<<Key operations>> [0], [SET]

(2) Initial display

Fig. 8-4

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

(3) Checking the keys

When each key from [CHARA] to [▼▼] is pressed, the pressed key is displayed on the bottom line of the LCD. When [ESC] is pressed, the key check is completed, and the check item selection screen is restored.

8-3-4 RAM check

(1) Selecting the check item

Fig. 8-5

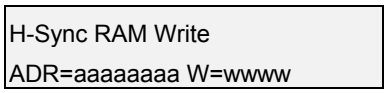
```
Select Item.: 1 (0-6)
RAM Check
```

<<Key operations>> [1] [SET]

(2) Checking the RAMs
When the [SET] key is pressed in (1), the RAM check is commenced in the following sequence.

A. H-Sync RAM write

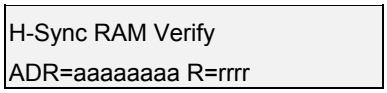
Fig. 8-6



aaaaaaaa = write address, wwww = write data (hexadecimal display)

B. H-Sync RAM Verify

Fig. 8-7



aaaaaaaa = read address, rrrr = read data (hexadecimal display)

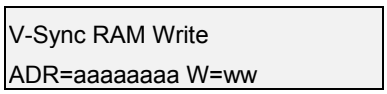
Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

Fig. 8-8

aaaaaaaa = read address, rrrr = read data,
wwww = write data (hexadecimal display)

C. V-Sync RAM write

Fig. 8-9



aaaaaaaa = write address, ww = write data (hexadecimal display)

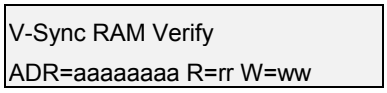
D. V-Sync RAM Verify

Fig. 8-10

aaaaaaaa = read address, rr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

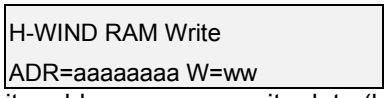
Fig. 8-11



aaaaaaaa = read address, rr = read data, ww = write data (hexadecimal display)

E. H-Window RAM write

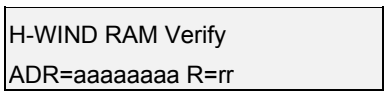
Fig. 8-12



aaaaaaaa = write address, ww = write data (hexadecimal display)

F. H-Window RAM Verify

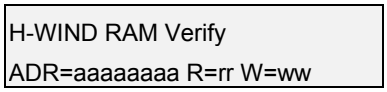
Fig. 8-13



aaaaaaaa = read address, rr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

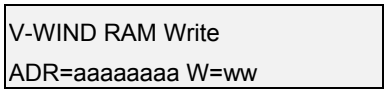
Fig. 8-14



aaaaaaaa = read address, rr = read data, ww = write data (hexadecimal display)

G. V-Window RAMwrite

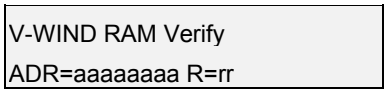
Fig. 8-15



aaaaaaaa = write address, ww = write data (hexadecimal display)

H. V-Window RAM Verify

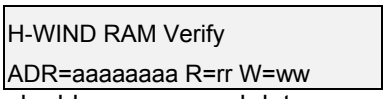
Fig. 8-16



aaaaaaaa = read address, rr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

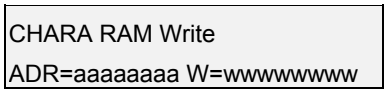
Fig. 8-17



aaaaaaaa = read address, rr = read data, ww = write data (hexadecimal display)

I. CHARA RAM (1bit VRAM) write

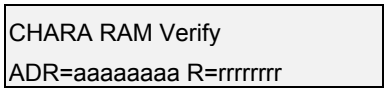
Fig. 8-18



aaaaaaaa = write address, wwwwwwww = write data (hexadecimal display)

J. CHARA RAM (1bit VRAM)Verify

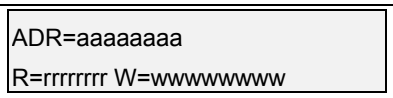
Fig. 8-19



aaaaaaaa = read address, rrrrrrrr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

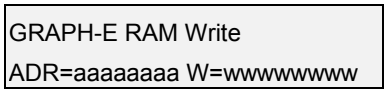
Fig. 8-20



aaaaaaaa = read address, rrrrrrrr = read data,
wwwwwwww = write data (hexadecimal display)

K. GRAPH-E RAM (8bit VRAM even) write

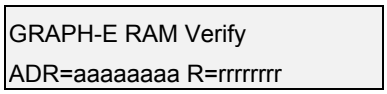
Fig. 8-21



aaaaaaaa = write address, wwwwwwww = write data (hexadecimal display)

L. GRAPH-E RAM (8bit VRAM even)Verify

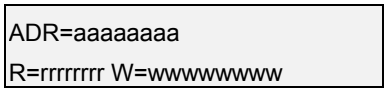
Fig. 8-22



aaaaaaaa = read address, rrrrrrrr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

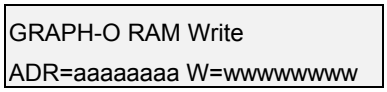
Fig. 8-23



aaaaaaaa = read address, rrrrrrrr = read data,
wwwwwwww = write data (hexadecimal display)

M. GRAPH-O RAM (8bit VRAM odd) write

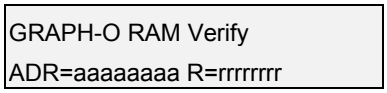
Fig. 8-24



aaaaaaaa = write address, wwwwwwww = write data (hexadecimal display)

N. GRAPH-O RAM (8bit VRAM odd)Verify

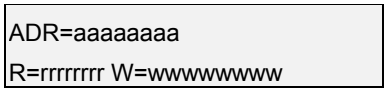
Fig. 8-25



aaaaaaaa = read address, rrrrrrrr = read data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

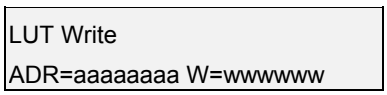
Fig. 8-26



aaaaaaaa = read address, rrrrrrrr = read data,
wwwwwwww = write data (hexadecimal display)

O. LUT write

Fig. 8-27

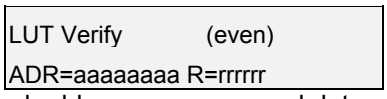


aaaaaaaa = write address, wwwwww = write data (hexadecimal display)

P. LUT verify

The LUT verify operation is performed twice (even and odd).

Fig. 8-28



aaaaaaaa = read address, rrrrrr = read data (hexadecimal display)

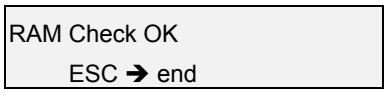
Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

Fig. 8-29

aaaaaaaa = read address, rrrrrr = read data,
wwwwww = write data (hexadecimal display)

Q. When no errors at all have been discovered, the following display appears upon completion of the checks, and the check item selection screen is restored three seconds later (or by pressing the **ESC** key).

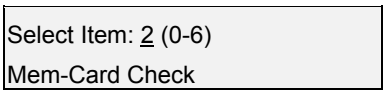
Fig. 8-30



8-3-5 Memory card check

(1) Selecting the check item

Fig. 8-31



<<Key operations>> **2** **SET**

Note :	This check requires a memory card. Install the card properly before proceeding. Bear in mind that all the data on the memory card will be erased when this check is conducted. Once a memory card has been used for this check, it will not be possible to use it to enter the VG-852 data without first formatting it. Use function 4 (Card/ROM Erase) to format the card before re-using it.

(2) Initial display

Fig. 8-32

```
Mem-Card Check
Erasing All Data OK?
```

→ **Fig. 8-33**

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

The screen shown in Fig. 8-33 appears when the **SET** key is pressed.
When the **SET** key is pressed again, the check is commenced.
When the **ESC** key is pressed, the check is aborted, and the check item selection screen is restored.

(3) Checking the memory card

When the **SET** key is pressed in (2), the memory card check is commenced in the following sequence.

A. Memory card write

Fig. 8-34

```
Mem-Card Check : Write
Sector : ss
```

ss = Write sector number

B. Memory card verify

Fig. 8-36

```
Mem-Card Check : Verify
Sector : ss OK
```

ss = Read sector number

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

Fig. 8-36

```
Mem-Card Check : Verify
adr=ss:aaa R=rr W=ww
```

ss = Read sector number
aaa = address in sector, rr = read data, ww = write data (hexadecimal display)

C. When no errors at all have been discovered, the following display appears upon completion of the checks, and the check item selection screen is restored three seconds later (or by pressing the ESC key).

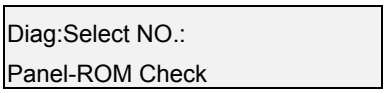
Fig. 8-37

```
MemCard Check OK
      ESC ➔ end
```

8-3-6 Panel ROM check

(1) Selecting the check item

Fig. 8-38

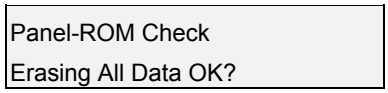


<<Key operations>> 3 SET

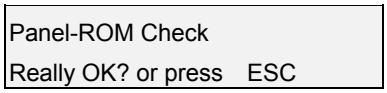
Note :	This check requires a panel ROM. Install the panel ROM properly before proceeding. Bear in mind that all the data on the panel ROM will be erased when this check is conducted.

(2) Initial display

Fig. 5-39



→ **Fig. 4-40**

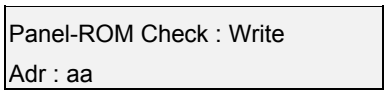


The screen shown in Fig. 8-40 appears when the SET key is pressed. When the SET key is pressed again, the check is commenced. When the ESC key is pressed, the check is aborted, and the check item selection screen is restored.

(3) Checking the panel ROM
When the SET key is pressed in (2), the panel ROM check is commenced in the following sequence.

A. Panel ROM write

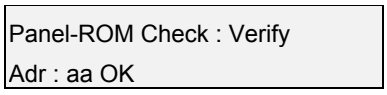
Fig. 8-41



aa = write address

B. Panel ROM verify

Fig. 8-42



aa = read address

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

Fig. 8-43

aaa = read address, rr = read data, ww = write data (hexadecimal display)

C. When no errors at all have been discovered, the following display appears upon completion of the checks, and the check item selection screen is restored three seconds later (or by pressing the ESC key).

Fig. 8-44

```
Panel-ROM Check OK
      ESC ➔ end
```

Note :	The address display appears as shown below when the AH-3000 is used for the panel ROM.

Adr = b:aa
b = bank no.
aa = read address

8-3-7 RS-232C check

(1) Selecting the check item

Fig. 8-45

```
Diag:Select NO.: 4 (0-6)
RS-232C (LoopBack)
```

<<Key operations>> [4] [SET]

Note :	The connector defined in paragraph 8.2 is required for this check. Install the connector properly before proceeding.

(2) Starting the check
When the [SET] key is pressed in (1), the RS-232C check is commenced as follows.

Fig. 8-46

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

rr = read data, ww = write data (hexadecimal display)

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped.

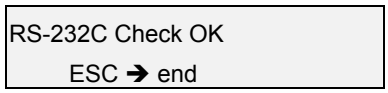
Fig. 8-47

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

* Codes 20H to 7FH are checked.

When no errors at all have been discovered, the following display appears upon completion of the checks, and the check item selection screen is restored three seconds later (or by pressing the ESC key).

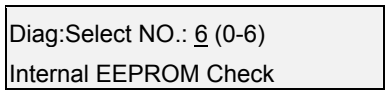
Fig. 8-48



8-3-8 Internal EEPROM check

(1) Selecting the check item

Fig. 8-49

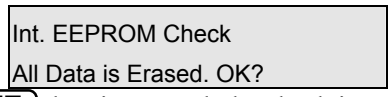


<<Key operations>> 6 SET

Note :	The data on the internal EEPROM will be initialized to the factory settings when this check is conducted.

(2) Initial display

Fig. 8-50

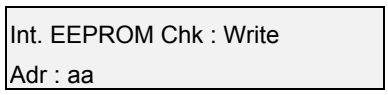


When the SET key is pressed, the check is commenced.
When the ESC key is pressed, the check is canceled, and the check item selection screen is restored.

(3) Checking the internal EEPROM
When the SET key is pressed in (2), the internal EEPROM check is commenced in the following sequence.

A. Internal EEPROM write

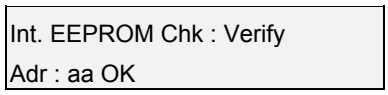
Fig. 8-51



aa = write address

B. Internal EEPROM verify

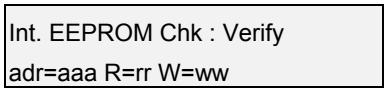
Fig. 8-52



aa = read address

Note :	When an error is detected, the error buzzer sounds, the following display appears, and the check is stopped..

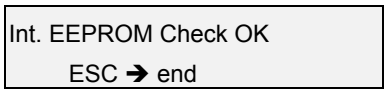
Fig. 8-53



aaa = read address, rr = read data, ww = write data (hexadecimal display)

C. When no errors at all have been discovered, the following display appears upon completion of the checks, and the check item selection screen is restored three seconds later (or by pressing the ESC key).

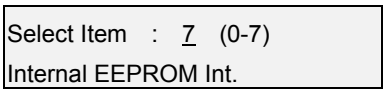
Fig. 8-54



8-3-9 Internal EEPROM initialization

(1) Selecting the check item

Fig. 8-55

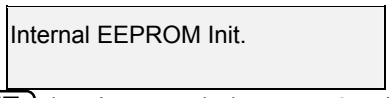


<<Key operations>> 7 SET

Note :	The data on the internal EEPROM will be initialized to the factory settings when this operation is conducted.

(2) Initial display

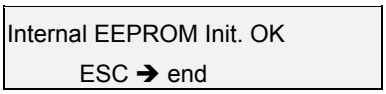
Fig. 8-56



When the SET key is pressed, the EEPROM initialization is commenced.
When the ESC key is pressed, the initialization is aborted, and the check item selection screen is restored.

(3) Initializing the internal EEPROM
When the SET key is pressed in (2), the internal EEPROM initialization is commenced.
When no errors at all have been discovered, the following display appears upon completion of the initialization, and the check item selection screen is restored three seconds later (or by pressing the ESC key).

Fig. 8-57



CHAPTER 9 MAIN SPECIFICATIONS

9-1 Error messages

Error message	Code (H)	Description
Panel ROM Unsetted	00	The EEPROM has not been installed in the panel ROM socket or the memory card has not been installed.
Prog No Disabled	01	The number of the program was set to "Disable" when direct display or a program was executed.
DotClk over	02	The Dot clock frequency in the horizontal timing data is outside the specified range.
Hfp over	03	The front porch in the horizontal timing data is outside the specified range. (Hperiod >= Hsync + Hpackp + Hdisp)
HD over	05	HDstart + HDwidth in the horizontal timing data is outside the specified range. (Hperiod >= HDstart + HDwidth)
Hperiod over	07	HPeriod in the horizontal timing data is outside the specified range.
Hdisp over	08	Hdisp in the horizontal timing data is outside the specified range.
Hsync over	09	Hsync in the horizontal timing data is outside the specified range.
Hbp over	0A	Hbackp in the horizontal timing data is outside the specified range.
Hblank over	0B	The blanking period in the horizontal timing data is outside the specified range.
Hfreq over	0C	The horizontal frequency in the horizontal timing data is outside the specified range.
H-TIM data NG	0D	Error other than those described above in the horizontal timing data.
OUTPUT data error	10	Error in the output condition data.
CHR data error	11	Error in the CHARA pattern data.
CROSS data error	12	Error in the CROSS pattern data.
DOTS data error	13	Error in the DOTS pattern data.
CRCL data error	14	Error in the circle pattern data.
BRST data error	15	Error in the burst pattern data.
WIND data error	16	Error in the window pattern data.
COLBAR data error	17	Error in the color bar pattern data.
PARAMETER error	18	Error in a parameter in the terminal mode.
DATA error	19	Error in the data in the terminal mode.
SYNC data error	1A	The sync signal has not been set.
COMM. Timeout	1E	Time-out has occurred during communication in the terminal mode.
Undef Command	1F	An undefined command was received in the terminal mode.
V-Sync Timeout	20	Time-out has occurred during V sync interrupt wait.
Prog-NO error	21	Error in the program number.
Group-NO error	22	Error in the group number.
User-CHR code error	23	Error in a user character code.
EEPROM write error	24	An EEPROM write error has occurred.
M-Card Type error	25	The memory card is not the correct type.
M-Card Write error	26	A memory card write error has occurred.
M-Card W-Protected	27	The memory card has been set to the write protect status.
M-Card Not Set	28	The memory card has not been installed.
M-Card UnFormated	29	The memory card has not been formatted.
M-Card Full	2A	There is no free space on the memory card.
OPT PTN No error	2B	Error in the optional pattern number.
OPT PTN FAT error	2C	Error in user-generated optional pattern FAT.
OPT PTN Not Registed	2D	No user-generated optional patterns have been entered.
BMP data No error	2E	Error in the image data number.
BMP data FAT error	2F	Error in image data FAT.

Error message	Code (H)	Description
BMP data Not Registed	30	No image data has been entered.
Cur-DEV Incorrect	31	Illegal current data device (memory card or EEPROM).
Key Not Available	32	The function cannot be used because the key lock function is activated.
GRAY data error	38	Error in gray scale pattern data.
OPT-PTN data error	39	Error in optional pattern data.
HALFTONE data error	3A	Error in half-tone pattern data.
CURSOR data error	3B	Error in cursor pattern data.
PrgName data error	3C	Error in program name data.
GCOLOR data error	3D	Error in graphic color data.
Vtotal over	40	Vtotal in the vertical timing data is outside the specified range.
Vdisp over	41	Vdisp in the vertical timing data is outside the specified range.
Vsync over	42	Vsync in the vertical timing data is outside the specified range.
Vbp over	43	Vbackp in the vertical timing data is outside the specified range.
Vfp over	44	The front porch in the vertical timing data is outside the specified range. (Vtotal >= Vsync + Vbackp + Vdisp)
Vblank over	45	The blanking period in the vertical timing data is outside the specified range.
Vfreq over	46	The vertical frequency in the vertical timing data is outside the specified range.
VD over	47	VDstart + VDline in the vertical timing data is outside the specified range. (Vtotal >= VDstart + VDline)
EQPfp over	48	EQPfp in the vertical timing data is outside the specified range.
EQPbp over	49	EQPbp in the vertical timing data is outside the specified range.
V-TIM data NG	4A	Error other than those described above in the vertical timing data.

The following errors may occur when a user-generated optional pattern is executed.

Error message	Code (H)	Description
OPT-Prog. not Exist	81	No user-generated optional patterns exist.
Variables Stack Err	82	Variable stack error.
Register Stack Err	83	Register stack error.
Call Stack Error	84	Function stack error.
Illegal Instruction	85	Illegal instruction code.
Divide by Zero	86	An attempt was made to divide by zero.
Math Error	87	An error has occurred in a floating decimal point calculation.

9-2 Ratings and specifications

9-2-1 Specifications

Dot clock frequency frequency	Parallel output (TTL, LVTTL) 1/1 5.0 to 100 MHz Parallel output (TTL, LVTTL) 1/2 10.0 to 200 MHz Serial output (Panel Link) 1/1 20.0 to 112 MHz *1 (Frequencies up to 162 MHz can be supported) Serial output (Panel Link) 1/2 40.0 to 224 MHz *1 (Frequencies up to 162 MHz x 2 can be supported) Serial output (LVDS) 1/1 20.0 to 70 MHz *1 (Frequencies up to 130 MHz can be supported) Serial output (LVDS) 1/2 40.0 to 140 MHz *1 (Frequencies up to 130 MHz x 2 can be supported)
Horizontal frequency	10 to 300 kHz, max. 8192 dots
Number of vertical scanning lines	Max. 4096 lines
Video memory	8192 dots × 4096 dots (character plane) 4096 dots × 2048 dots (bitmap)
Equalizing pulse	ON/OFF selectable
Serrated pulse	OFF/0.5 H/1 H/XOR selectable
Composite video sync signal	R/G/B ON/OFF selectable for each
Scanning Non	interlace, interlace & sync, interlace & video
Parallel digital output (CH1, CH2) (Half-pitch 68 pins ×2)	8 bits each for RGB; HS, VS, DISP, CLK, SW0, SW1, SW2, SW3 VCC (5/3.3V selectable for output level, VCC)
Serial digital output (CH1, CH2) (MDR 26 pins × 2)	8 bits each for RGB; HS, VS, DISP, CLK SW0, SW1
Output control	Video data: Polarity inversion, OE function *2 Clock: Polarity inversion, OE function *2 Delay 0--31ns (in 1ns increments)
External interface	Remote connector (25-pin)
	RS-232C (9-pin)
	USB (complying with USB standard)

*1: Either panel link or LVDS is selected as the serial output factory setting.
*2: A voltage exceeding VCC cannot be applied to the output even when the output is disabled by OE.

9-2-2 Ratings

Supply voltage	AC100 to 120V, AC200 to 240V
Power line frequency	50Hz / 60Hz
Power consumption	Max. 200 VA
Dimensions	430(W) × 88(H) × 430(D) mm (excluding protrusions)
Weight	Approx. 8 kg
Ambient operating temperature	+5 to +40 degrees Celsius
Ambient storage temperature	-10 to +60 degrees Celsius
Humidity	30 to 85% RH (no condensation)

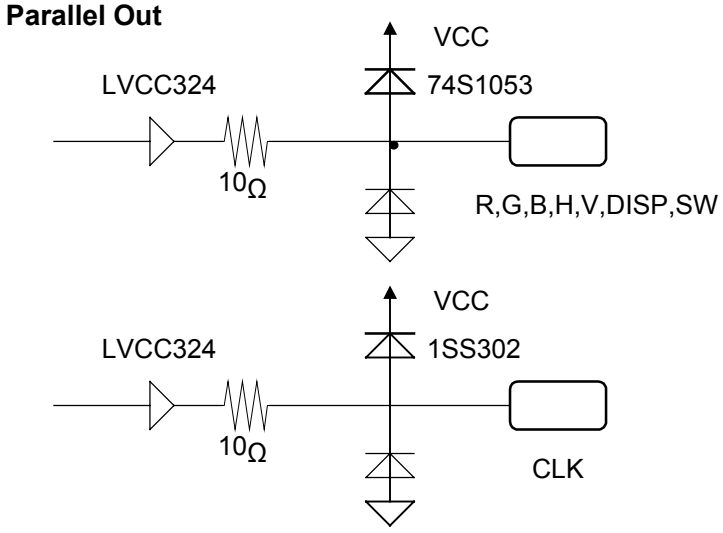
9-3 Accessories

Instruction manual	1
Memory card (4MB)	1
SP-8024 (Windows version editing software program)	1 set
SP-8024 software program installation manual	1
Power cable	1
FG cable (1.5 meters)	1
AC 2P-3P conversion adapter	1
Fuse (slow-blow type, 6.3A, 250V)	2

Note :	The above connecting cables are for the exclusive use of the VG-852 only. Use of any other accessories will cause trouble: use only the designated accessories.

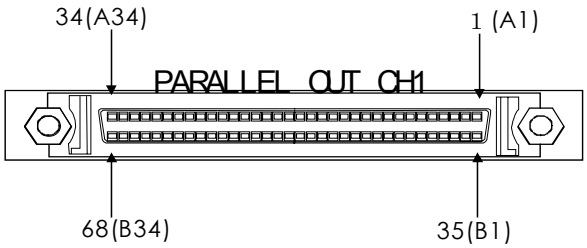
9-4 Output circuit diagrams

Parallel Out



9-5 Connector pin layouts

(1) Digital parallel output (half-pitch 68 pins)

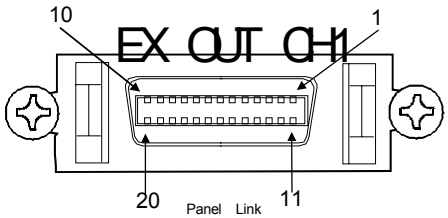


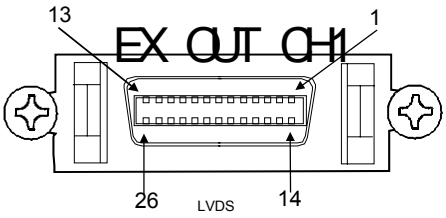
1CH				2CH			
Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	(GND)	35	RA0	1	(GND)	35	RB0
2	(GND)	36	RA1	2	(GND)	36	RB1
3	(GND)	37	RA2	3	(GND)	37	RB2
4	(GND)	38	RA3	4	(GND)	38	RB3
5	(GND)	39	RA4	5	(GND)	39	RB4
6	(GND)	40	RA5	6	(GND)	40	RB5
7	(GND)	41	RA6	7	(GND)	41	RB6
8	(GND)	42	RA7	8	(GND)	42	RB7
9	(GND)	43	GA0	9	(GND)	43	GB0
10	(GND)	44	GA1	10	(GND)	44	GB1
11	(GND)	45	GA2	11	(GND)	45	GB2
12	(GND)	46	GA3	12	(GND)	46	GB3
13	(GND)	47	GA4	13	(GND)	47	GB4
14	(GND)	48	GA5	14	(GND)	48	GB5
15	(GND)	49	GA6	15	(GND)	49	GB6
16	(GND)	50	GA7	16	(GND)	50	GB7
17	VCC	51	VCC	17	VCC	51	VCC
18	VCC	52	VCC	18	VCC	52	VCC
19	GND	53	GND	19	GND	53	GND
20	GND	54	GND	20	GND	54	GND
21	(GND)	55	HS	21	(GND)	55	(SW3)
22	(GND)	56	VS	22	(GND)	56	(SW2)
23	(GND)	57	DISP	23	(GND)	57	DISP
24	(GND)	58	SW0	24	(GND)	58	SW1
25	(GND)	59	BA0	25	(GND)	59	BB0
26	(GND)	60	BA1	26	(GND)	60	BB1
27	(GND)	61	BA2	27	(GND)	61	BB2
28	(GND)	62	BA3	28	(GND)	62	BB3
29	(GND)	63	BA4	29	(GND)	63	BB4
30	(GND)	64	BA5	30	(GND)	64	BB5
31	(GND)	65	BA6	31	(GND)	65	BB6
32	(GND)	66	BA7	32	(GND)	66	BB7
33	GND	67	GND	33	GND	67	GND
34	(GND)	68	CLK	34	(GND)	68	CLK

Note 1:	"0" is the LSB for each of the bits.
Note 2:	The pin layout of these connectors is not compatible with that of the 57 connectors available to date. (A 1:1 layout with GND is provided in order to do full justice to the characteristics.)

(2) Digital serial output (MDR 26 pins and 20 pins, made by 3M)

Output: Panel Link or LVDS FPDLINK™, FLAT LINK ™ compatible





Connector pin No.	Panel Link transmitter output		Connector pin No.	LVDS 8-bit transmitter output	
	CH1(A)	CH2(B)		CH1(A)	CH2(B)
1	TX1+	TX1+	1	GND	GND
2	TX1-	TX1-	14	TxOUT/RxIN0 -	TxOUT/RxIN0-
3	TX1G	TX1G	2	TxOUT/RxIN0G	TxOUT/RxIN0 G
4	TXCG	TXCG	15	TxOUT/RxIN0 +	TxOUT/RxIN0 +
5	TXC+	TXC+	3	NC	NC
6	TXC-	TXC-	16	GND	GND
7	GND	GND	4	TxOUT/RxIN1-	TxOUT/RxIN1-
8	+5V	+5V	17	TxOUT/RxIN1G	TxOUT/RxIN1G
9	NC	NC	5	TxOUT/RxIN1 +	TxOUT/RxIN1 +
10	NC	NC	18	DDCSDA	NC
11	TX2+	TX2+	6	TxOUT/RxIN2 -	TxOUT/RxIN2 -
12	TX2-	TX2-	19	TxOUT/RxIN2G	TxOUT/RxIN2G
13	TX2G	TX2G	7	TxOUT/RxIN2 +	TxOUT/RxIN2+
14	TX0G	TX0G	20	NC	NC
15	TX0+	TX0+	8	NC	NC
16	TX0-	TX0-	21	NC	NC
17	NC	NC	9	DDCSCL	NC
18	SENSE	NC	22	TxCLKOUT/RxCLKIN -	TxCLKOUT/RxCN -
19	DDCSDA	NC	10	TxCLKOUT/RxCLKING	TxCLKOUT/RxCLKI
20	DDCSCL	NC	23	TxCLKOUT/RxCLKIN +	TxCLKOUT/RxCN +
			11	+ 5V	+ 5V
			24	+ 5V	+ 5V
			12	TxOUT/RxIN3-	TxOUT/RxIN3-
			25	TxOUT/RxIN3G	TxOUT/RxIN3G
			13	TxOUT/RxIN3+	TxOUT/RxIN3+
			26	GND	GND

Note 1:	It is not possible to set the clock delay with the LVDS or Panel Link output.
Note 2:	When signals are to be supplied to a 6-bit LVDS device, operation is enabled by connecting the TXA0, TXA1, TXA2 and TXACK differential pair lines in the case of CH1. The same applies for CH2.
Note 3:	Maximum current from each.+5V output pin is 0.5A. Total 1A can be supplied for serial output.

A. Panel Link device input pin correspondence table

Panel Link device: Sil
Transmitter: Sil150 (compatible with 112 MHz)

Input pin SiI	Panel Link 8 bits	
	1CH	2CH In 1/2 clock mode

D0	BA0(LSB)	BB0(LSB)
D1	BA1	BB1
D2	BA2	BB2
D3	BA3	BB3
D4	BA4	BB4
D5	BA5	BB5
D6	BA6	BB6
D7	BA7(MSB)	BB7(MSB)
D8	GA0(LSB)	GB0(LSB)
D9	GA1	GB1
D10	GA2	GB2
D11	GA3	GB3
D12	GA4	GB4
D13	GA5	GB5
D14	GA6	GB6
D15	GA7(MSB)	GB7(MSB)
D16	RA0(LSB)	RB0(LSB)
D17	RA1	RB1
D18	RA2	RB2
D19	RA3	RB3
D20	RA4	RB4
D21	RA5	RB5
D22	RA6	RB6
D23	RA7(MSB)	RB7(MSB)
DE	DISP	DISP
HSYNC	HS	HS
VSYNC	VS	VS
CTL1	SW0	SW3
CTL2	RSV0	SW2
CTL3	RSV1	SW1

Note 1:	In this pin configuration, the CTL signal connections have been changed from the existing VG-826A and VG-827 configurations. The parts concerning the RGB signals remain unchanged.
Note 2:	Bear in mind that the LSB and MSB designations for RGB will differ depending on the manufacturer of the device concerned.
Note 3:	RSV(0, 1) means “Reverse”.

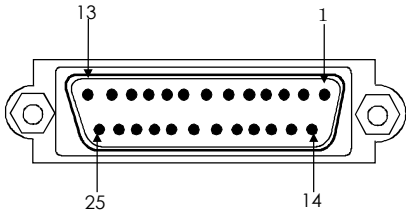
B. LVDS device pin correspondence table

LVDS device: NS THINE
Transmitter: DS90C384 THC63LVDM83A

Input pin		LVDS 8 bits	
THINE	NS	1CH	2CH In 1/2 clock mode
T(R)A0	TxIN/RxOUT0	RA2	RB2
TA1	TxIN/RxOUT 1	RA3	RB3
TA2	TxIN/RxOUT 2	RA4	RB4
TA3	TxIN/RxOUT 3	RA5	RB5
TA4	TxIN/RxOUT 4	RA6	RB6
TA5	TxIN/RxOUT 6	RA7(MSB)	RB7(MSB)
TA6	TxIN/RxOUT 7	GA2	GB2
TB0	TxIN/RxOUT 8	GA3	GB3
TB1	TxIN/RxOUT 9	GA4	GB4
TB2	TxIN/RxOUT 12	GA5	GB5
TB3	TxIN/RxOUT 13	GA6	GB6
TB4	TxIN/RxOUT 14	GA7(MSB)	GB7(MSB)
TB5	TxIN/RxOUT 15	BA2	BB2
TB6	TxIN/RxOUT 18	BA3	BB3
TC0	TxIN/RxOUT 19	BA4	BB4
TC1	TxIN/RxOUT 20	BA5	BB5
TC2	TxIN/RxOUT 21	BA6	BB6
TC3	TxIN/RxOUT 22	BA7(MSB)	BB7(MSB)
TC4	TxIN/RxOUT 24	HS	SW3
TC5	TxIN/RxOUT 25	VS	SW2
TC6	TxIN/RxOUT 26	DISP	DISP
TD0	TxIN/RxOUT 27	RA0(LSB)	RB0(LSB)
TD1	TxIN/RxOUT 5	RA1	RB1
TD2	TxIN/RxOUT 10	GA0(LSB)	GB0(LSB)
TD3	TxIN/RxOUT 11	GA1	GB1
TD4	TxIN/RxOUT 16	BA0(LSB)	BB0(LSB)
TD5	TxIN/RxOUT 17	BA1	BB1
TD6	TxIN/RxOUT 23	SW0	SW1

Note 1:	This pin configuration has nothing in common with the LV-1600 8-bit and 6-bit configurations of the existing VG-826A and VG-827.
Note 2:	Bear in mind that the LSB and MSB designations for RGB will differ depending on the manufacturer of the device concerned.
Note 3:	The pin layout is compatible with the devices made by THINE, NS and TI.

(3) Remote connector (Dsub 25-pin, female)



Pin No.	I/O	Signal	Pin No.	I/O	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	-	GND
9	O	*RMT_RST	22	O	*RMT_CLK
10	O	*RMT_LAT	23	O	+5V
11	-	GND	24	-	GND
12	O	*RMT_DIN	25	O	+5V
13	O	*RMT_EN			

* The pins marked with an asterisk must NOT be connected by the user since they are already used by Astrodesign for the control signals.

Note :	"I" or "O" is the designation as seen from the VG generator end.

As shown in the figures below, the signals and remote control box (RB-649 or RB-614C: option) key contacts are arranged in the form of a matrix.

Fig. 9-1 RB-649 key matrix

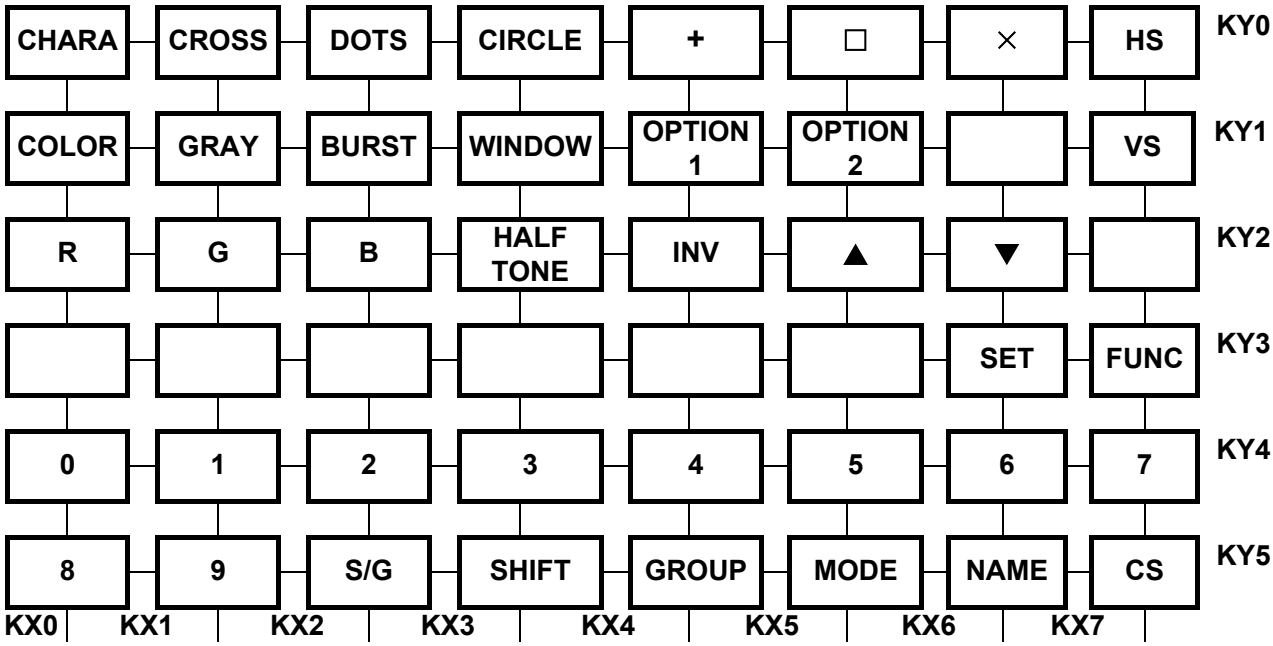
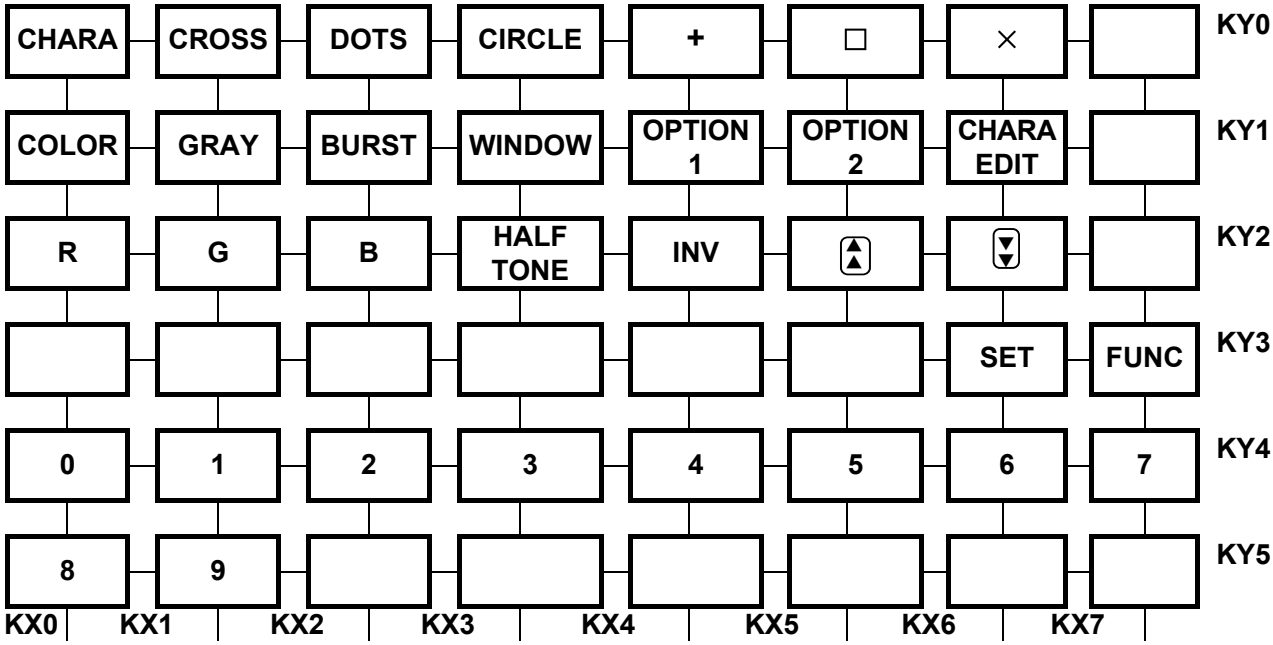
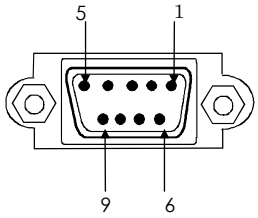


Fig. 9-2 RB-614C key matrix

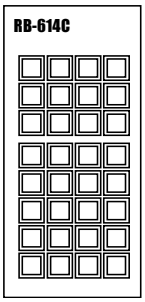
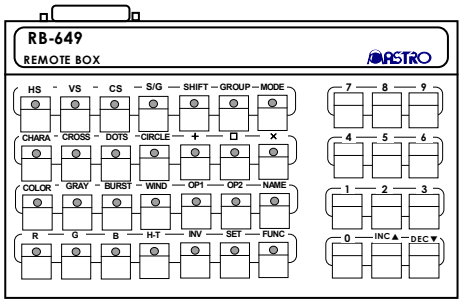


(4) RS-232C connector (Dsub 9-pin, female)



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

9-6 Optional accessories

A RB-614C remote control box 	This is one of the remote control boxes used for the VG generator. Connecting this box to the VG-852 enables a program to be called directly by its number and the character, dot, crosshatch and other patterns as well as the RGB signals to be set ON or OFF. The box can also be used with the VG-812, 813, 814, 815, 819, 822, 823, 827, 833, 829, 851, 854, 856, 825 and 826A models.
B AH-3000 expansion panel ROM 	Main unit, operating instructions This has 8 times the capacity of a conventional EEPROM, and it can accommodate the data in up to 320 programs.
C RB-649 remote control box 	This is another remote control box designed for use with the VG generator. It can also be used with the VG-822, 823, 827, 826A, 851, 854 and 856 models.

CHAPTER 10 INTERNAL DATA

10-1 Internal program data

(1/4)

Program No.	Horizontal frequency (KHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (H×V)	Timing name	Pattern data	Pattern name
850	37.86	85.08	31.50	640 × 400	VESA400-85	Character list 7 × 9	Character List
851	37.86	72.81	31.50	640 × 480	VESA480-72	OPT27 (song of youth)	Words
852	37.50	75.00	31.50	640 × 480	VESA480-75	Character 1 (H 5 × 7 / 10 × 14)	H Character 1
853	35.16	56.25	36.00	800 × 600	VESA600-56	Character 1 (H 7 × 9 / 14 × 18)	H Character 2
854	37.88	60.32	40.00	800 × 600	VESA600-60	Character 1 (H 16 × 16 / 32 × 32)	H Character 3
855	48.08	72.19	50.00	800 × 600	VESA600-72	Character 2 (H 5 × 7 / 10 × 14)	H Character 4
856	48.36	60.00	65.00	1024 × 768	VESA768-60	Character 2 (H 7 × 9 / 14 × 18)	H Character 5
857	56.48	70.07	75.00	1024 × 768	VESA768-70	Character 2 (H 16 × 16 / 32 × 32)	H Character 6
858	60.02	75.03	78.75	1024 × 768	VESA768-75	Character 1 (@ 7 × 9 / 14 × 18)	@ Character
859	79.98	75.02	135.00	1280 × 1024	VESA1024-75	Character 1 (Chinese character "KU" 7 × 9 / 14 × 18)	Chinese Chara 1
860	91.15	85.02	157.50	1280 × 1024	VESA1024-85	Character 1 (Chinese character "BI" 64 × 64 / 64 × 64)	Chinese Chara 2
861	75.00	60.00	162.00	1600 × 1200	VESA1200-60	Character 1 (Chinese character "AI" 64 × 64 / 64 × 64)	Chinese Chara 3
862	81.25	65.00	175.50	1600 × 1200	VESA1200-65	Character 1 (chessboard 16 × 16/16 × 16)	1 dot ON/OFF
863	87.50	70.00	189.00	1600 × 1200	VESA1200-70	Character me (#1 18 × 18)	me Character 1
864	93.75	75.00	202.50	1600 × 1200	VESA1200-75	Character me (VESA specifications 18 × 18)	me Character 2
865	100.00	80.00	216.00	1600 × 1200	VESA1200-80	OPT0B (character edge H)	H Character Line
866	106.25	85.00	229.50	1600 × 1200	VESA1200-85	OPT0C (character edge O)	O Character Line
867	98.21	70.05	236.50	1800 × 1350	VESA1350-70		
868	18.44	49.83	16.26	750 × 350	MDA	1-dot width crosshatch (H=5, V=5)	1line Cross 5 × 5
869	15.75	60.10	14.36	640 × 200	CGA	2-dot width crosshatch (H=5, V=5) 2 lines	2lines Cross 5 × 5
870	21.85	59.71	16.26	640 × 350	EGA	OPT23 (8-block crosshatch)	1line Cross 8 × 8
871	30.48	60.00	24.87	640 × 400	PGA	2-dot width crosshatch (H=8,V=8)	2lines Cross 8 × 8
872	31.47	50.03	28.32	720 × 350	VGA-TEXT350-50	1-dot width crosshatch (H=10,V=8)	1line Cross 10 × 8
873	31.47	59.94	28.32	720 × 350	VGA-TEXT350-60	2-dot width crosshatch (H=8,V=8)	2lines Cross 10 × 8
874	31.47	70.08	28.32	720 × 350	VGA-TEXT350-70	1-dot width crosshatch (H=16,V=12)	1line Cross 16 × 12
875	31.47	50.03	28.32	720 × 400	VGA-TEXT400-50	2-dot width crosshatch (H=8,V=8)	2lines Cross 16 × 12
876	31.47	59.94	28.32	720 × 400	VGA-TEXT400-60		
877	31.47	70.08	28.32	720 × 400	VGA-TEXT400-70	Burst (Format 0)	Burst 1
878	31.46	50.02	25.17	640 × 350	VGA350-50	Burst (Format 1)	Burst 2
879	31.46	59.93	25.17	640 × 350	VGA350-60	Burst (Format 2)	Burst 3
880	31.46	70.07	25.17	640 × 350	VGA350-70	Burst (Format 3)	Burst 4
881	31.46	50.02	25.17	640 × 400	VGA400-50		
882	31.46	59.93	25.17	640 × 400	VGA400-60	OPT10 (sine wave scroll)	Sign Wave Scroll
883	31.46	70.07	25.17	640 × 400	VGA400-70	OPT11 (multi burst)	Multi Burst
884	31.46	50.02	25.17	640 × 480	VGA480-50	OPT12 (10 steps &1/10MHz)	1/10MHz x 10step
885	31.46	59.93	25.17	640 × 480	VGA480-60	Circle (Format 0)	Circle 1
886	35.16	57.16	36.00	800 × 600	S-VGA-56	Circle (Format 1)	Circle 2
887	48.08	72.19	50.00	800 × 600	S-VGA-72	Circle (Format 2)	Circle 3
888	46.88	75.00	49.50	800 × 600	S-VGA-75	Circle (Format 3)	Circle 4
889	48.08	59.80	65.00	1024 × 768	XGA-60	Circle (Format 4)	Circle 5

Internal program data

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Program No.	Horizontal frequency (KHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (H × V)	Timing name	Pattern data	Pattern name
890	53.95	66.11	71.64	1024 × 768	XGA-66	Circle (Format 5)	Circle 6
891	56.48	70.07	75.00	1024 × 768	XGA-70	Circle (Format 6)	Circle 7
892	60.68	57.03	100.00	1280 × 1024	SXGA-57		
893	63.50	59.68	106.93	1280 × 1024	SXGA-60A	Window (Format 0, Flicker 0)	Window 1
894	63.75	59.75	110.16	1280 × 1024	SXGA-60B	Window (Format 1, Flicker 0)	Window 2
895	63.72	60.00	109.47	1280 × 1024	SXGA-60C	Window (Format 2, Flicker 0)	Window 3
896	78.91	74.16	132.88	1280 × 1024	SXGA-70	Window (Format 3, Flicker 0)	Window 4
897	74.63	59.94	160.00	1600 × 1200	UXGA1200-60	Window (Format 4, Flicker 0)	Window 5
898	107.42	85.05	220.00	1600 × 1200	UXGA1200-85A	Window (Format 5, Flicker 0)	Window 6
899	106.48	85.05	230.00	1600 × 1200	UXGA1200-85B	Window (Format 8, Flicker 7)	Moving Window 1
900	107.42	80.05	220.00	1600 × 1280	UXGA1280-80A	Window (Format 9, Flicker 7)	Moving Window 2
901	106.48	80.06	230.00	1600 × 1280	UXGA1280-80B	Window (Format E, Flicker 7)	Moving Window 3
902	106.40	80.00	238.34	1600 × 1280	UXGA1280-80C	Window (Format F, Flicker 0)	Window Level
903	109.82	80.40	246.00	1600 × 1280	UXGA1280-82	Window (Format 0, Flicker 1)	Flicker Window 1
904	35.52	43.48	44.90	1024 × 768	IBM 8514A	Window (Format 0, Flicker 3)	Flicker Window 2
905	63.36	60.00	89.12	1024 × 1024	IBM 5080	Window (Format 0, Flicker 5)	Flicker Window 3
906	29.58	36.57	24.02	640 × 754	IBM 5550	Window (Format 0, Flicker 7)	Flicker Window 4
907	63.36	60.00	111.52	1280 × 1024	IBM 6000		
908	15.71	59.98	6.38	323 × 246	NAVIGATION	Color bar (horizontal, 8 colors × 1)	Color Bar 1
909	35.00	66.67	30.24	640 × 480	Mac 480-66A	Color bar (horizontal, 8 colors × 2)	Color Bar 2
910	34.97	66.60	31.33	640 × 480	Mac 480-66B	Color bar (vertical, 8 colors × 1)	Color Bar 3
911	48.83	66.89	50.00	800 × 600	Mac 600-66	Color bar (vertical, 8 colors × 2)	Color Bar 4
912	49.72	74.55	57.28	832 × 624	Mac 624-57	Color bar (horizontal, H=0.1%)	Color Bar 5
913	48.78	59.56	64.00	1024 × 768	Mac 768-60	Color bar (vertical, V=0.1%)	Color Bar 6
914	60.24	74.93	80.00	1024 × 768	Mac 768-75	OPT06 (color temperature)	Color Temp.
915	68.68	75.06	100.00	1152 × 870	Mac 870-75	OPT2D (random 256 colors)	Random 256 Color
916	24.82	56.42	21.05	640 × 400	NEC PC9801	OPT2A (256-color character)	256 Color Chara
917	32.86	39.92	47.84	1120 × 750	NEC PC9801XL	OPT00 (256-block color)	256 Block Color
918	50.02	60.05	78.43	1120 × 750	NEC 768-60A	OPT03 (8 colors & 16 gray)	8Color & 16Gray
919	56.48	70.07	75.00	1024 × 768	NEC 768-70	Gray scale (4 step)	Gray 4 step
920	64.60	59.93	107.50	1280 × 1024	NEC 1024-60	Gray scale (horizontal 8 gradations)	Gray 8 step(H)
921	74.88	69.85	127.00	1280 × 1024	NEC 1024-70	Gray scale (horizontal 16 gradations)	Gray 16 step(H)
922	78.86	74.11	135.00	1280 × 1024	NEC 1024-75	OPT1B (horizontal gradations of gray)	Gray 32 step(H)
923	48.36	60.08	65.00	1024 × 768	NEC 768-60B	OPT1C (horizontal gradations of gray)	Gray 64 step(H)
924	61.80	65.95	92.94	1152 × 900	SUN 900-66	OPT2B (horizontal linear gradation ramp)	Gray256step(H)
925	71.73	76.07	105.59	1152 × 900	SUN 900-76	Gray scale (vertical 8 gradations)	Gray 8 step(V)
926	70.84	84.03	92.94	1024 × 800	SUN 800-84	Gray scale (vertical16 gradations)	Gray 16 step(V)
927	81.13	76.11	135.00	1280 × 1024	SUN 1024-76	OPT36 (vertical 32 gradations of gray)	Gray 32 step(V)
928	63.38	60.02	107.50	1280 × 1024	SONY NEWS	OPT37 (vertical 64 gradations of gray)	Gra 64 step(V)
929	78.86	74.11	135.00	1280 × 1024	SONY 1024-74	OPT2C (vertical linear gradation ramp)	Gray256step(V)

Internal program data

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Program No.	Horizontal frequency (KHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (H × V)	Timing name	Pattern data	Pattern name
930	78.86	74.11	135.00	1280 × 1024	SONY 1024-74	OPT01 (64-gradation block gray)	Gray 64 Block 1
931	48.48	59.64	64.00	1024 × 768	SGI Indigo768-60	OPT02 (64-gradation block gray)	Gray 64 Block 2
932	77.01	72.38	130.00	1280 × 1024	SGI Indigo1024-72	OPT31 (36 gradations of gray)	Gray H:36
933	63.90	60.00	107.35	1280 × 1024	SGI IRIS4D	OPT0D (crosstalk width 90%)	Cross Talk 90%
934	63.33	59.97	108.17	1280 × 1024	HP 9000t1	OPT21 (crosstalk width 60%)	Cross Talk 60%
935	78.13	72.00	135.00	1280 × 1024	HP 9000t2	Black solid	Black
936	54.00	60.00	69.12	1024 × 864	VAX 768-60	White solid	RGB
937	70.66	66.47	119.84	1280 × 1024	VAX 1024-66	Red solid	R
938	60.05	75.06	78.78	1024 × 768	Fujitsu FMV 1024-75	Green solid	G
939	80.66	100.83	108.41	1280 × 1024	Fujitsu FMV 1024-100	Blue solid	B
940	79.70	74.83	134.37	1280 × 1024	Fujitsu FMV5166	Magenta solid	R-B
941	80.38	75.12	135.04	1280 × 1024	Fujitsu FMV5133	Yellow solid	R-G
942	63.74	60.02	108.10	1280 × 1024	Fujitsu SIGMA	Cyan solid	G-B
943	78.16	71.64	135.06	1280 × 1024	HITACHI SXGA	Dot (H=20, V=20)	Dot H20 / V20
944	26.35	59.90	22.77	640 × 400	Panasonic M550	Dot (H=60, V=60)	Dot H60 / V60
945							
946	15.73	29.97	12.65	664 × 484	NTSC	OPT26 (SMPTE Color version)	SMPTE RP133 COL
947	31.47	59.95	28.64	746 × 471	ASTRO SC-2025	OPT26 (SMPTE Color version)	SMPTE RP133 COL
948	62.95	59.95	57.28	746 × 942	NTSC*4	OPT26 (SMPTE Color version)	SMPTE RP133 COL
949	15.63	25.00	14.50	756 × 574	PAL	OPT26 (SMPTE Color version)	SMPTE RP133 COL
950	31.25	50.00	29.00	756 × 557	PAL*2	OPT26 (SMPTE Color version)	SMPTE RP133 COL
951	33.75	30.00	74.25	1920 × 1034	HDTV	OPT26 (SMPTE Color version)	SMPTE RP133 COL
952	67.50	60.00	148.50	1920 × 1035	HDTV*2	OPT26 (SMPTE Color version)	SMPTE RP133 COL
953	31.54	60.08	27.00	720 × 480	480p	OPT34 (Circle & crosshatch)	4:3 Test
954	45.00	60.00	74.25	1280 × 720	720p	OPT34 (Circle & crosshatch)	16:9 Test
955	33.75	30.00	74.25	1920 × 1080	1080i	OPT34 (Circle & crosshatch)	16:9 Test
956	31.22	24.99	46.20	1170 × 1168	MEDICAL-1I	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
957	31.22	50.03	46.20	1170 × 584	MEDICAL-1N	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
958	30.69	30.00	36.83	947 × 946	MEDICAL-2I	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
959	30.69	60.07	36.83	947 × 473	MEDICAL-2N	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
960							
961	112.50	90.00	243.00	1600 × 1200	1200-90	OPT1A (ITC H Character)	ITC H Character
962	67.50	60.00	148.50	1920 × 1080	1080p	OPT18 (ITC 9 Window)	ITC 9 Window
963	63.98	60.02	108.00	1280 × 1024	VESA1024-60	OPT19 (ITC ITC cross & marker)	ITC Cross & Marker
964						OPT04 (gray & crosshatch)	Gray & Cross
965	31.47	59.94	34.24	864 × 480	W-VGA	OPT05 (color bar & crosshatch)	Color & Cross
966	37.88	60.32	53.94	1072x600	W-SVGA	OPT07 (pairing)	Pairing
967	48.36	60.00	87.44	1376 × 768	W-XGA	OPT08 (crosshatch & circle & gray)	Cross & Circle
968						OPT09 (crosshatch + circle + character)	Total Test
969						OPT0A (circle & line)	Circle & Line

Internal program data

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Program No.	Horizontal frequency (KHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (H×V)	Timing name	Pattern data	Pattern name
970	67.50	60.00	148.50	1920 × 1080	1080P	OPT13 (gamma correction ramp wr2.5)	Gamma Ramp 1
971	67.50	59.94	148.35	1920 × 1080	1080P	OPT14 (gamma correction ramp r2.0)	Gamma Ramp 2
972	33.75	30.00	74.25	1920 × 1080	1080i	OPT15 (gamma correction ramp r0.5)	Gamma Ramp 3
973	33.75	29.97	74.18	1920 × 1080	1080i	OPT17 (SMPTE RP27.1)	SMPTE PR27.1
974	33.75	30.00	74.25	1920 × 1035	1035i	OPT25 (SMPTE RP-133)	SMPTE RP133 MONO
975	33.75	29.97	74.18	1920 × 1035	1035i	OPT26 (SMPTE Color version)	SMPTE RP133 COL
976	45.00	60.00	74.25	1280 × 720	720P	OPT1D (64 gray + RGBW color)	64 Gray & Color
977	45.00	59.94	74.18	1280 × 720	720P	OPT1E (gray scale + circle)	Gray & Circle
978	31.50	59.94	27.00	720 × 483	483P	OPT29(crosshatch & marker)	Cross & Marker
979						OPT30	Edge & Window
980						OPT35 (chessboard & window)	1dot ON/OFF
981						OPT22 (high-voltage power supply)	High Voltage
982						OPT33 (19 × 15 crosshatch & marker)	D.Y.Test
983						OPT32 (3 gradation window)	TTL test
984						OPT16 (cross cursor pattern)	Cross Cursor
985						OPT32 (timing chart)	Timing Chart
986							
987						Center + edge	Center & Edge
988						Edge + diagonal line	Diagonal & Edge 1
989						Edge + diagonal line + center	Diagonal & Edge 2
990						OPT24 (display position adjustment)	Display Position
991						OPT20 (corner & center)	Corner & Center
992							
993							
994							
995							
996	31.46	59.93	25.17	640 × 480	VGA480-60	OPT80 (image data #1 display)	IMG Disp #1
997	48.08	72.19	50.00	800 × 600	VESA600-72	OPT81 (image data #2 display)	IMG Disp #2
998	56.48	70.07	75.00	1024 × 768	VESA768-70	OPT82 (image data #3 display)	IMG Disp #3
999	79.98	75.02	135.00	1280 × 1024	VESA1024-75	OPT83 (image data #4 display)	IMG Disp #4

* Default timing data (VGA) applies where the timing data is blank.

10-2 Internal optional patterns

Code	Pattern	Code	Pattern	Code	Pattern	Code	Pattern
00	256-color block color	10	Sine wave scroll	20	Corner & center point marker	30	Center, corner window & edge marker
01	64-gradation block gray (white→ black)	11	Multi burst	21	Crosstalk (width 60%)	31	
02	64-gradation block gray (black → white)	12	10 steps × 1/10 MHz	22	High-voltage power supply	32	3-gradation window
03	8 color bars & 16 gray scale	13	Gamma correction ramp wr=25	23	8-block crosshatch	33	19×15 crosshatch & marker
04	Gray scale & crosshatch	14	Gamma correction ramp r=20	24	Display position adjustor	34	Crosshatch & circle
05	Color bar & crosshatch	15	Gamma correction ramp r=0.5	25	SMPTE RP-133	35	Chessboard & window
06	Color temperature	16		26	SMPTE Color version	36	32-gradation gray scale (V)
07	Pairing	17	SMPTE PR27.1	27	Song of youth	37	64-gradation gray scale (V)
08	Crosshatch & circle & gray	18	ITC pattern 9 windows	28	Timing chart	38	Ramp scroll (H)
09	Crosshatch & circle & character	19	ITC pattern crosshatch & marker	29	Crosshatch & marker	39	Ramp scroll (V)
0A	Circle & line	1A	ITC pattern H character	2A	256-color block color "Color" letters	3A	Ramp scroll (diagonal)
0B	Character edge (H)	1B	32-gradation gray scale (H)	2B	Linear gradation ramp H direction	3B	ANSI pattern (setup)
0C	Character edge (0)	1C	64-gradation gray scale (H)	2C	Linear gradation ramp V direction	3C	ANSI pattern (contrast)
0D	Crosstalk (width 90%)	1D	64-gray + RGBW color bar superimposed	2D	Random 256-color color bar	3D	ANSI pattern (9 point)
0E	DDC pattern	1E	Gray scale + circle	2E		3E	ANSI pattern (horizontal resolution)
0F		1F		2F		3F	ANSI pattern (vertical resolution)

* 80H through BFH are image data (#1 to #64) displays.

10-3 Internal user character data

Code	Description	Cell size
F0	"me" letters #1	18 × 18
F1	"me" letters #2 (VESA specifications)	18 × 18
F2	Chinese character "AI"	64 × 64
F3	Chinese character "BI"	64 × 64
F4	Chinese character "TAKA"	32 × 32
F5	Chinese character "KIRI"	32 × 32
F6	Chinese character "KEN"	32 × 32
F7	Burst	64 × 64
F8		
F9		
FA		
FB		
FC		
FD		
FE		
FF		