VG-845

INSTRUCTION MANUAL

Ver 1.0
April 1, 2002

ASTRODESIGN, Inc.

FOREWORD

Thank you for purchasing the model VG-845 video signal generator.
This manual provides details on how to operate the VG-845 and the precautions to be heeded when doing so.
Since improper handling may lead to accidents, we recommend that you take the time to read through this manual without fail before attempting to operate the VG-845: the information provided will ensure that you will operate the VG-845 properly.
After reading through the manual, keep it in a safe place for future reference.

SAFETY PRECAUTIONS

⚠ WARNING

◆ 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.

⚠ CAUTION

◆ 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-845 to the display
- Connect the frame grounds on both the VG-845 and display before connecting the two units using the signal cables. (Use the accessory FG cable.) * See figure below.

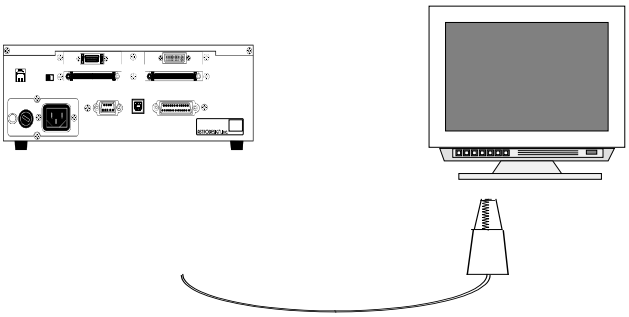

Fig. 0-1

Connect to the frame ground on the VG-845.

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

Connection between the frame grounds makes the output DAC and other extremely costly parts of the VG-845 less susceptible to damage. Taking this precaution is particularly important when the display is a newly developed model.

◆ When disconnecting the VG-845 from the display
- First disconnect the connecting cable, and disconnect the frame ground last of all.

◆ Handling the memory cards
- The POWER switch on the front panel must always be used to turn on the power of the VG-845 when a memory card has already been installed. Turning on and off the power by plugging in and unplugging the AC power cord with the power switch kept on may damage the memory card.

◆ When accuracy is a particularly important issue
- When accuracy is a particularly important issue, leave the VG-845 standing for 10 to 15 minutes after having turned on the power in order to allow the VG-845 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.

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CHAPTER 1
CONCERNING THE VG-845

1-1 Introduction

The VG-845 is a top-of-the-line portable type of programmable video signal generator exclusively designed for the digital output signals. It is compatible with a wide variety of displays from the low-resolution displays used in cell phones and PDAs to the high-resolution displays meeting the UXGA standard and above.

Frequencies up to 100 MHz (or 0.5 to 25 MHz with the low-band specifications) in the parallel output 1/1 clock mode and up to 200 MHz in the 1/2 clock mode are supported.

A low-voltage digital serial output function (panel link or LVDS) is provided, and panel link outputs up to 330 MHz are supported in the dual link mode (see Note).

The generator's top-notch basic performance paves the way for an extremely broad spectrum of applications in departments responsible for the development of technologies for LCDs and PDPs, on production lines and in maintenance areas, to name a few.

1-2 Features

(1) Ultra-wide-band dot clock frequency

Since the generator is equipped with a digital 1/2 clock mode (parallel output of even and odd 2-dot data using one clock), it can support dot clock frequencies from 10 to 100 MHz (in the 1/1 clock mode) and 20 to 200 MHz (in the 1/2 clock mode).

Furthermore, it also comes with the 0.5 to 10 MHz low-band mode.

(2) Low voltage digital serial output facility

A low voltage digital serial output facility for reducing the EMI during signal transmission is provided. It enables frequencies up to 330 MHz to be supported in the panel link output or dual link mode.

(3) Function for creating special patterns: a powerful new weapon

In addition to its basic patterns (11 types including character, crosshatch, color bar and gray scale) and its special patterns (up to 64 types contained in the unit) provided in the past, the generator now supports a new function that enables users to create their own special patterns. This function proves to be invaluable for creating the special patterns that can be effectively used for automatic machines and for developing and assessing the next-generation displays.

(4) Memory cards used to enter program data

The generator uses memory cards as a standard feature. Up to 850 sets of program data can be entered on a memory card, and personal computer screens and natural images can also be entered.

(5) Internal sample data

As sample data, 150 types of timing data and 150 types of pattern data have been entered inside the generator. The sample data can be edited in any combinations and the resulting signals can be output. This function comes in handy when a memory card is not available. The sample data can also be used when the program data is being edited.

(6) Editing and entry software program (SP-8024), that can be run in Windows 95 or 98, provided as a standard specification

This enables program data to be edited and entered and output signals to be executed in Windows 95 or 98.

(7) Compact size

This generator has been designed to be more compact and lightweight (compared with the VG-852) out of consideration to its use on production lines.

(8) Diverse operation-related functions

- The optional RB-614C or RB-649 can be used as the remote control box with this generator.
- Group display and auto display functions are provided.
- The RS-232C and USB interface facilities enable control from an external personal computer and data transfer to and from the PC.

(9) Compatibility with conventional models assured

The data on the memory cards edited by the VG-852 or 828 can be used with the generator. A conventional model (VG-825 or subsequent model) using panel ROMs can be connected to the RS-232C connector on the VG-845, and the digital output VG data stored on the ROMs can be transferred to the VG-845 for use by the VG-845.

1-3 Panel parts and their functions

1-3-1 Top panel

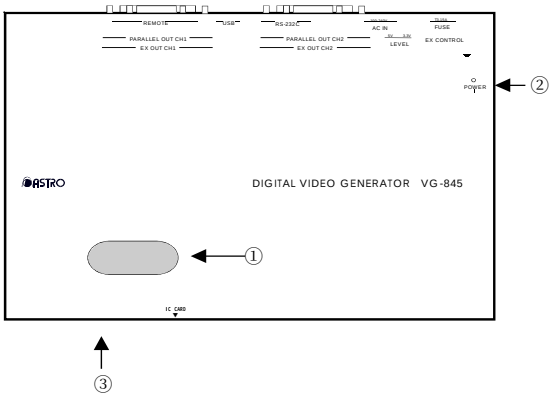


Fig. 1-1

(1) Top panel of generator

<1>	8888 LED (4-digit) display	For displaying the program numbers, function numbers, etc.

(2) Right side panel of generator

<2>	POWER switch		* The POWER switch on the right side panel must always be used to turn on the generator's power. Turning on and off the power by plugging in and unplugging the AC power cord with the power switch kept on may damage the memory card.

(3) Front panel of generator

<3>	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.

1-3-2 Rear panel

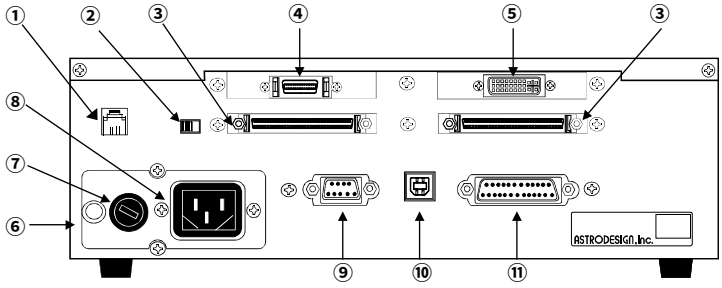
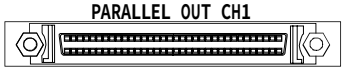
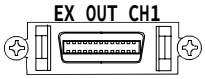
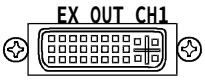
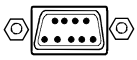


Fig. 1-2

<1>		External control output Used for adding functions available in the future. Refrain from use.
<2>		LEVEL (Digital output level selector switch) This is used to switch the digital output level to 5V or 3.3V.
<3>		Digital parallel output connectors CH1, 2 (68 pin) Refer to the section on the pin layout of the connectors for details on this connector's pin layout.
<4>		DFP digital serial output connector CH2 (26 pin) Refer to the section on the pin layout of the connectors for details on this connector's pin layout.
<5>		DVI digital serial output connector CH1 Refer to the section on the pin layout of the connectors for details on this connector's pin layout.
<6>		Frame ground (FG) Connect this frame ground to the frame ground of the unit which is connected to the VG-845.
<7>		Fuse A slow-blow 3.15A 250V fuse is used.
<8>		AC input socket This supports a voltage from 100V to 120V or 200V to 240V.
<9>		RS-232C connector (9-pin female) This is used to control the VG-845 from an external computer (personal computer, etc.). Refer to the section on the pin layout of the connectors for details on this connector's pin layout.
<10>		USB connector This is used to control the VG-845 from the external computer (personal computer, etc.). (This is supported by Windows 98 only.)
<11>		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 the section on the pin layout of the connectors for details on this connector's pin layout.

1-4 Description of abbreviations

(1) Abbreviations related to 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 lock
EQP(EQ－PULSE)	Equalizing pulse
SERR	Serrated pulse
CV	Composite video sync signal
HD	Horizontal direct drive pulse
VD	Vertical direct drive pulse

(2) Abbreviations related to operation

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

1-5 Main differences from existing models

Item	Description	
Internal optional pattern	Existing models	The OPT1 and OPT2 optional patterns are in separate groups. Patterns 00 to 1F are selected in each group.
	VG-845	The OPT1 and OPT2 optional patterns are in the same group. Patterns 00 to 3F are selected. (Refer to Section 8-2 on internal optional patterns.)
Internal user characters	Existing models	None
	VG-845	Patterns F0 to FF are selected. (Refer to Section 8-3 on internal user characters.)
Remote control box	Existing models	Data can be edited using the RB-649 with some models only.
	VG-845	Data can be edited using the RB-649.
NRZ/RZ	This is not supported by the VG-845. The program data can be set because it is compatible with an existing model but it will be ignored when it is executed by the VG-845. (Refer to Section 4-4.)	
External control (Note)	Existing models	Possible with RS-232C only. (9600 bps, data length = 7 bits, stop bit = 1, parity = none)
	VG-845	Both the RS-232C and USB interfaces can be used. The RS-232C baud rate and other parameters can be set by Func-5. (Refer to Section 3-5-6 on the config edit function.)
CPC function	This is not supported by the VG-845. It must be created as an optional pattern by the user.	

Note:	The terminal commands of existing models can be used but the functions expanded for use by the VG-845 cannot be used. All terminal commands can be called from the C program by using the library in the software program provided.

CHAPTER 2
MEMORY CARDS

2-1 VG-845 internal data

The following data is contained in the E-PROM inside the main unit of the VG-845.

Table 2-1

	Internal E-PROM of VG-845
Number of program data	150 (850 to 999)
Number of user characters	16 (F0H～FFH)
Number of optional patterns	64 (00H～3FH)

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

2-2 Workings of the memory card

Program data, group data, user characters and auto display data can be entered or edited on the memory card. Furthermore, user-created optional patterns and image data can be entered on the memory card.

Program data (150 sets from #850 to #999) has been entered in the E-PROM inside the main unit of the VG-845, but this data cannot be edited and saved.

Customized timing and pattern data can be prepared by editing and entering data on the memory card.

2-3 Memory card types and main specifications

(1) Types of memory cards

The following 6 types of memory cards can be used with the VG-845.

Flash memory cards made by Fujitsu	MB98A81063-15(1MB)、MB98A81183-15(2MB)、MB98A81273-15(4MB)、MB98A81373-15(8MB)、MB98A81473-15(16MB)、MB98A81573-15(32MB)

(2) Main specifications of memory cards

Table 2-2

	Programs	User characters	Groups	User-created optional patterns	Image data
Number which can be entered	849 (1 - 849)	16 (E0H - EFH)	32 (1 - 32)	64 (40H - 7FH)	Depends on card capacity (*1).

*1)	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 + 131,071)/131,072 (decimal places rounded off)
*2)	The image data is displayed by executing OPT-80 to BF (which support image data #1 to #64).

2-4 Configuration of program data

The data of one program is divided into the blocks listed in Table 2-3.

Table 2-3

Valid/invalid	Denotes whether the 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	Graphic 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

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 initiated 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 automatically in accordance with the delay time settings and in the sequence for the programs involved as entered on the memory card. 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 departments.
3	Memory card edit	The program data is edited and entered. This function is used when preparing memory card data.
4	Memory card copy	Data on the memory card is copied. Copying data of one memory card onto another card is also possible. This function is used when preparing memory card data.
5	Config edit	This function is used to set the execution mode, etc. of the VG-845.
6	Group data edit	Group numbers and program numbers are entered on the memory card. This function is used when entering group display data.
7	Group display	The group display execution mode is established by selecting the number of group whose data is to be executed. This function is used for adjustments and inspections conducted on production lines, etc.
8	Character edit	User character data is edited and entered. This function is used for testing and evaluation by personnel in development or engineering departments.
9	List display/other edit	The various data which has been entered is displayed on a display. The coefficient tables during YPbPr output are edited. This function is used for testing and evaluation by personnel in development or engineering departments.

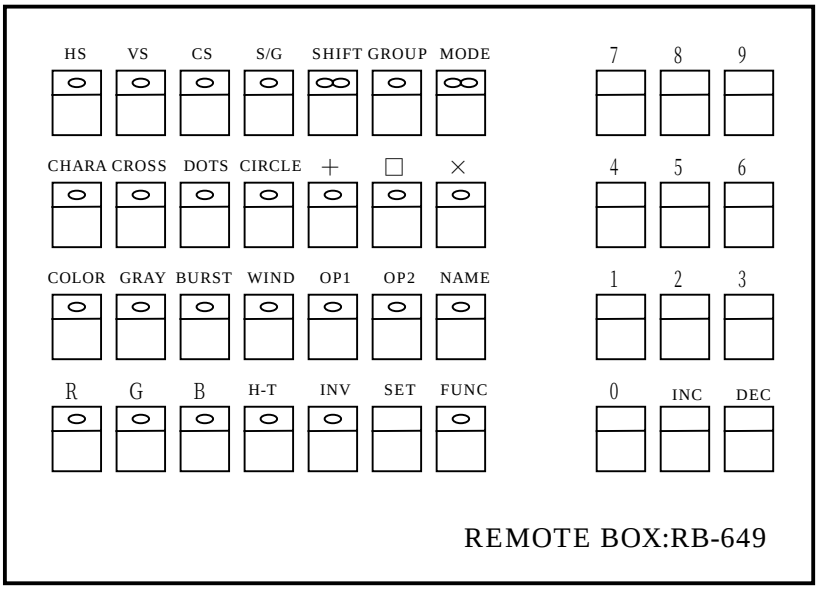
(*1) The group display execution mode is established when the group number is set using config edit (Func-5).

3-2 Operations using RB-649

3-2-1 Connections with VG-845

The RB-649's cable is connected to the REMOTE connector on the rear panel of the VG-845.

3-2-2 Overview



3-2-3 Operation

All the functions can be selected and executed.

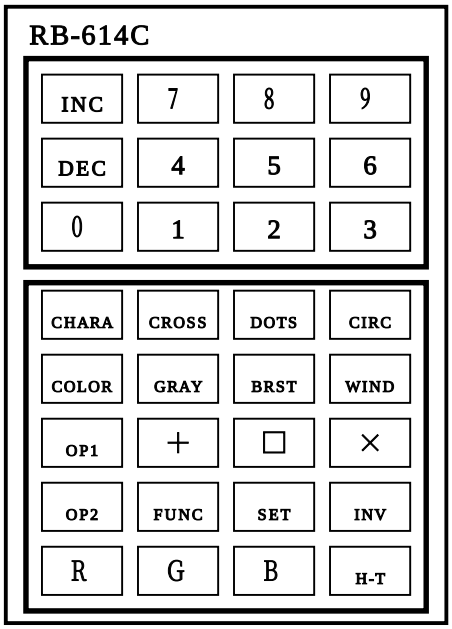
For details on the operations, refer to the description of the individual function.

3-3 Operation using RB-614C

3-3-1 Connections with VG-845

The RB-614C's cable is connected to the REMOTE connector on the rear panel of the VG-845.

3-3-2 Overview



3-3-3 Operations

The program data, etc. cannot be edited using the RB-614C. The operations that can be performed are limited to the following.

For details on the operations, refer to the description of the individual function.

FUNC No.	Name of function
0	Direct display
4	Memory card copy
5	Config edit
7	Group display
9	List display/other edit

3-4 Operating modes when the power is switched on

3-4-1 Operating modes established by key operation

The operating mode established differs in accordance with the operations performed to turn on the VG-845 unit's power as described below.

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 memory card and executed.
Power is turned on while the INC▲ key is pressed.	The unit is started up in the self-diagnosis mode
Power is turned on while the 0 key is pressed.	Terminal mode is started with RS-232C. This setting is stored even the power is turned off.
Power is turned on while the 1 key is pressed.	Terminal mode is started with USB. This setting is stored even the power is turned off.

3-5 Operation of functions

3-5-1 Direct display function (Func-0)

The program data inside the VG-845 or the program data entered on the memory card is executed simply by inputting the number of the program containing the data.

(1) To initiate this function

To initiate the direct display function, do not press any of the keys but use the POWER switch on the side panel to turn on the generator's power.

* Turning on and off the power by plugging in and unplugging the AC power cord with the power switch kept on may damage the hardware.

(2) Initial LED display

When the power is turned on, what is shown in Fig. 3-1 appears on the LED display.

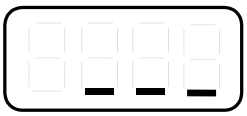


Fig. 3-1

(3) Once this function has been initiated, the designated program data is executed simply by inputting the program number (3 digits) using the number keys.

The program number can also be selected using the INC key or DEC key.

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

«Key operations».....Example: 850 (or INC key)
<Display after program execution>

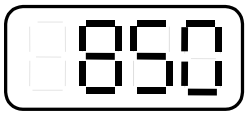


Fig. 3-2

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

The LED lighting changes and the execution mode is switched as shown below each time the MODE key is pressed.

MODE	Red on Green on	All the program data (timing + pattern data) is executed. Multiple patterns can be superimposed.
MODE	Red on Green off	Only the timing data is executed. Multiple patterns can be superimposed.
MODE	Red off Green on	Only the pattern data is executed. Multiple patterns can be superimposed.
MODE	Red off Green off	All the program data (timing + pattern data) is executed. Multiple patterns cannot be superimposed. The timing chart is displayed using the NAME key. Each time 'OP1/2' key is pressed, option patterns are switched by the option numbers accordingly.

(5) Selecting patterns using the pattern keys

Using the pattern keys from **CHARA** through **NAME**, it is possible to select only the display patterns while keeping the timing data unchanged.

The pattern which is output 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
X key	Diagonal line
H-T key	Cursor
COLOR key	Color bar
GRAY key	Gray scale
BURST key	Burst
WIND key	Window

OP1 key	Optional pattern 1
OP2 key	Optional pattern 2
NAME key	Program name

(6) R/G/B output on/off, inversion

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 is on).
INV key	R/G/B signal output inversion (output inverted when LED is on).

(7) HS/VS/CS/GS output on/off, nega/posi switching

The output can be selected using the keys shown below.

The operation mode changes depending on the SHIFT key status (each time it is pressed, the LED display changes).

<1> SHIFT (red off, green off) status: Output on/off inversion

HS VS key	HS/VS sync signal output on/off (output 'on' when LED is on). * HS/VS is output from the HS/VS output connector at the 'on' setting.
CS key	CS sync signal output on/off (output 'on' when LED is on). * CS is output from the CS output connector at the 'on' setting.

<2> SHIFT (red on, green off) status: Output Nega/Posi (negative/positive) inversion.

HS VS key	Negative/positive polarity of HS/VS sync signals is inverted (negative when LED is on).
CS key	Negative/positive polarity of the CS sync signal is inverted (negative when LED is on).

3-5-2 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 on the memory card.

Note:	Use function 6 to enter the data settings.

(1) Concerning group data

In the direct display mode, the INC and DEC keys are used to execute the programs in numerical order such as 001 → 002 → 003 → and so on or, conversely, 003 → 002 → 001 and so on.

In the group display mode, however, programs are executed in the order with which the programs (group data) were entered using their numbers by the group data edit function.

This means that the order of the numbers of the programs to be used can be specified using the group data without changing the order of the numbers of the programs entered on the memory card.

Group data can be entered using the remote control box (RB-649).

(2) To initiate the group display function

There are two methods when the RB-649 remote control box is used.

<1> Install the memory card on which the group data is entered.

When the FUNC key of the RB-649 is pressed, the LED display appears as shown in Fig. 3-3 below. When the 7 key is next pressed, the display changes to what is shown in Fig. 3-4, and the function is initiated when the SET key is pressed.

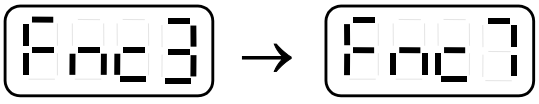


Fig. 3-3 Fig. 3-4

<2> Install the memory card on which the group data is entered.

When the GROUP key of the RB-649 is pressed, the LED display appears as shown in Fig. 3-5, and the function is initiated.

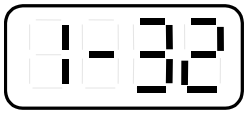


Fig. 3-5

(3) Select the group number.

When the number (01 to 32) of the group to be executed is selected and the SET key is pressed, the LED display appears as shown below, and group display is executed.

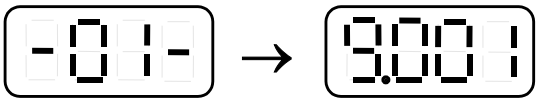


Fig. 3-6 Fig. 3-7

Note: If the group data has not been entered on the memory card, an error will result when the group number is selected.

(4) Select the number of the data in the group.

The program data is executed by selecting the number (01 to 58) of the data in the group to be executed.

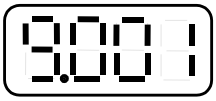


Fig. 3-8

Note: While group display execution is underway, the number '9' is displayed at the far left as shown in the figure above and the period flashes.

Note: The number of the program executed is displayed in the bottom 3 digits of the LED display.

Subsequent operations are performed using the INC or DEC key.

INC key ... For incrementing the number of the program currently displayed.

DEC key ... For decrementing the number of the program currently displayed.

FUNC key ... For aborting execution and returning to the direct display mode.

(5) Changing the group numbers

When the GROUP key is pressed while direct display or group display execution is underway, the display in (2) <2> will appear. Input again the number of the group whose data is to be executed to change the group number.

If '0' is selected for the group number, the direct display mode is established.

3-5-3 Auto display function (Func-1)

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 1 key is then pressed, the LED display changes to what is shown in Fig. 3-10.

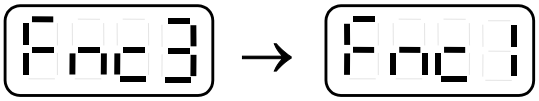


Fig. 3-9 Fig. 3-10

The auto display function is now initiated by pressing the SET key, and the following menu appears.

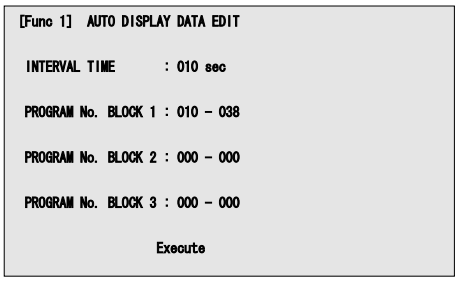


Fig. 3-11

(2) Editing the auto display data

Use the INC▲ or DEC▼ key to move the highlighting to the data to be changed, and input the data using the 0 to 9 number keys.

When the FUNC key is pressed, auto display data editing is suspended, and direct display is restored.

(3) Entering the auto display data

When the SET key is pressed, the following display appears.

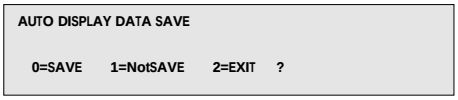


Fig. 3-12

The auto display data now displayed is entered on the memory card by pressing the 0 key.

(4) Executing the auto display data

Use the INC▲ or DEC▼ key to move the highlighting to "Execute." Now press the SET key to execute the auto display data which is displayed. To stop the execution, press the FUNC key.

(5) Description of the auto display data

Programs with up to three pairs of start and end program numbers can be entered as the auto display data.

During auto display execution, the data is executed in sequence at the specified interval from the start program numbers to the end program numbers of blocks 1 through 3.

Item	Setting	Description
INTERVAL TIME	0 - 999	The program data is executed at the specified interval (which is set in seconds).
PROGRAM NO. BLOCK 1〜3	0 - 999	Programs with up to three pairs of start and end program numbers can be entered. When "0" is selected as the program number, the block with the program concerned will not be executed.

3-5-4 Memory card edit function (Func-3)

(Perform the same operations as for the program edit function (Func-2).)

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears.

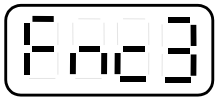


Fig. 3-13

The memory card edit function is now initiated by pressing the SET key, and the menu shown in Fig. 3-15 appears.

* To initiate the program edit function, press the FUNC, 2 and SET keys in this order.

(2) Editing the program data

Use the INC▲ or DEC▼ key to move the highlighting to the data to be changed, and input the data using the 0 to 9 number keys.

By pressing the MODE key, the LED lighting is changed, and the editing menus are switched as shown below.

MODE	Red off Green off	Timing editing menu H/V timing data, output conditions
MODE	Red on Green off	Pattern data 1 editing menu (CHARA, CROSS, DOTS, CIRCLE, BURST, WIND, OP1, OP2, CURSOR)
MODE	Red off Green on	Pattern data 2 editing menu (COLORBAR, GRAYSCALE)
MODE	Red on Green on	Pattern select data editing menu (Pattern select, program name, enable/disable)

* Pop-up screens as shown below are displayed for some of the data such as CHARACTER CODE.

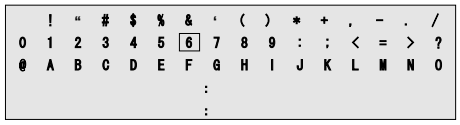
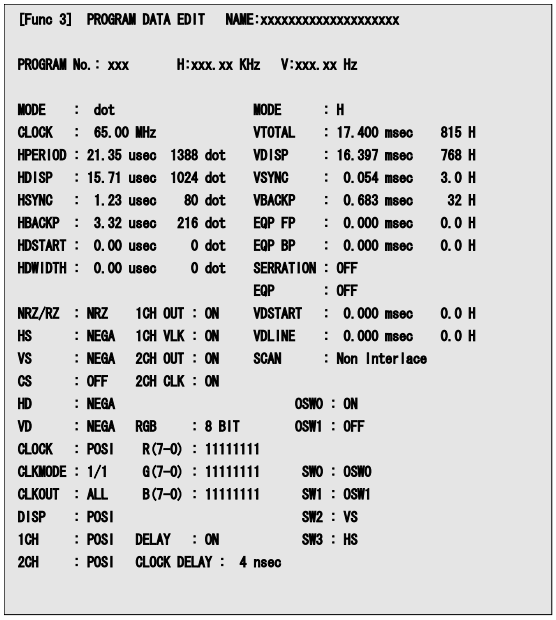


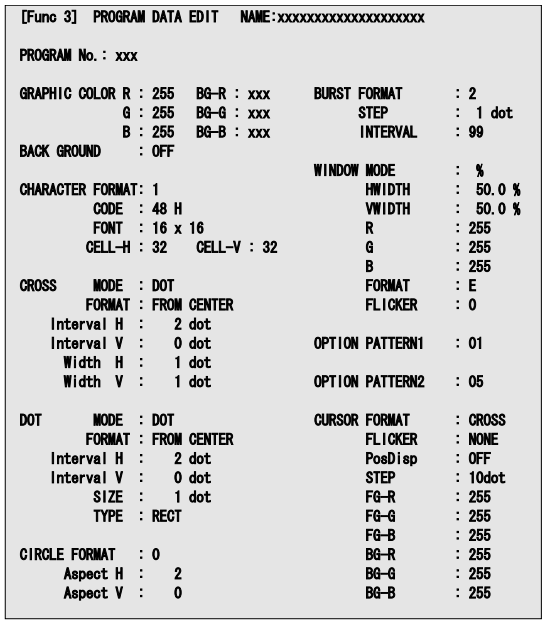
Fig. 3-14

Use the 4 (left), 6 (right), 8 (up) or 2 (down) keys to move the highlighting to the data to be selected, and enter the data using the 5 key.

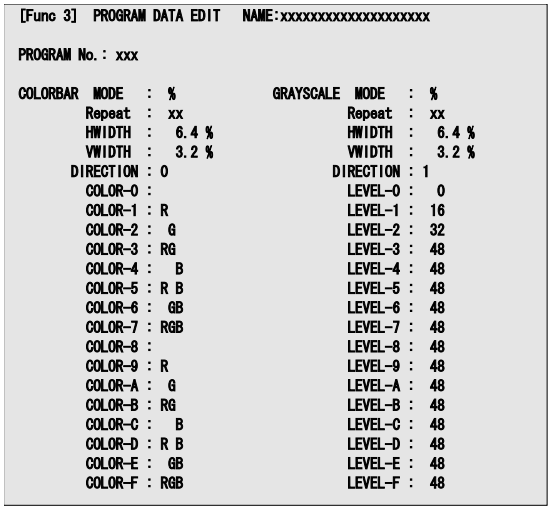
Timing data editing menu



Pattern data 1 editing menu



Pattern data 2 editing menu



Pattern select data editing menu

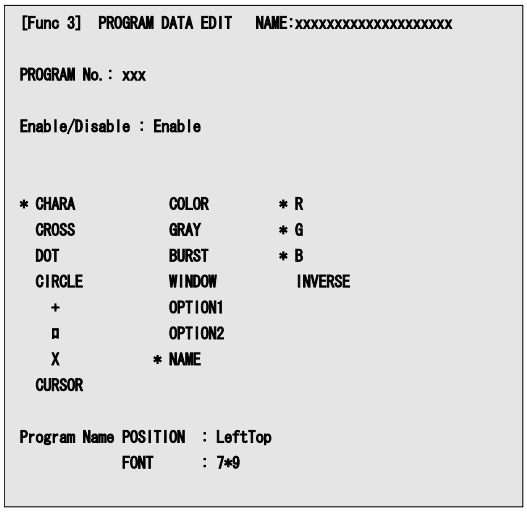


Fig. 3-15

(3) Calling the program data

Use the INC▲ or DEC▼ key to move the highlighting to "PROGRAM No.," and input the number (000 to 999) of the program to be edited using the 0 to 9 number keys. When the 3-digit program number has been input, the data in the corresponding program is loaded, and the on-screen display is updated.

(4) Entering the program data

When the SET key is pressed, the following display appears.

```
PROGRAM DATA SAVE

 PROG No. : 001

  SET:SAVE   FUNC:EXIT
```

Fig. 3-16

The program data displayed is entered on the memory card by pressing the SET key.

(Only when Func-3 has been initiated)

If the FUNC key is pressed instead, the program data is not entered, and only the current data is updated.

Furthermore, by inputting the number (000 to 849) of the program in which the data is to be entered using the 0 to 9 number keys, the data can be entered into a program with a different number from the one of the program which was called.

* Program data cannot be entered when the program edit function (Func-2) has been initiated.

(5) Changing the program name

When the NAME key is pressed, the following menu appears on-screen.

```
Program Name :  VGA800-60
                                        Mode:INS

   !  "  #  $  %  &  '  (  )  *  +  ,  -  .  /
 0  1  2  3  4  5  6  7  8  9  :  ;  <  =  >  ?
 @  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O
 P  Q  R  S  T  U  V  W  X  Y  Z  [  ¥  ]  ^  _
    a  b  c  d  e  f  g  h  i  j  k  l  m  n  o
 p  q  r  s  t  u  v  w  x  y  z  {  |  }  ~
                  :
                  :

 '5'=SELECT,  '2','4','6','8'=MOVE
 'INC','DEC'=Move current position
 'MODE'=INS/REP mode, 'X'=Delete current
 'SET'=END,  'NAME'=QUIT
```

Fig. 3-17

Use the 4 (left), 6 (right), 8 (up) or 2 (down) keys to move the highlighting to the data to be selected, and enter the data using the 5 key.

Use the INC or DEC key to move the current position of the program name.

Use the MODE key to switch between the overwriting (REP) mode and insertion (INS) mode.

Use the X key the delete the character at the current position of the program name.

Use the SET key to change to the name just input or use the NAME key to cancel the input.

(6) Exiting the memory card edit function

When the FUNC key is pressed, the program data editing is suspended, and direct display is restored.

If the FUNC key is pressed during editing using the menus, the memory card edit function is suspended, and the direct display function is restored. In this case, the program data being edited is not entered on the memory card. To enter the data on the memory card, press the SET key before exiting this function.

3-5-5 Memory card copy function (Func-4)

* This function can also be executed without using the on-screen menus.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 4 key is then pressed, the LED display changes to what is shown in Fig. 3-19.

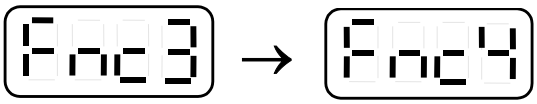
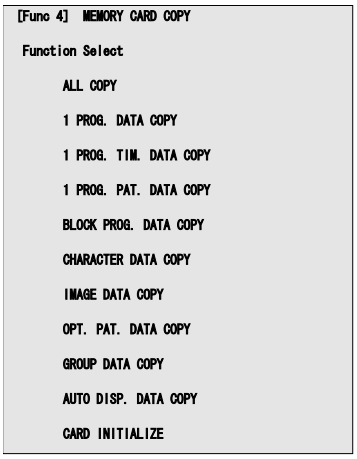


Fig. 3-18 Fig. 3-19

The memory card copy function is now initiated by pressing the SET key.

(2) Select the type of copying.

The following on-screen menu appears.



For copying all the data on the memory card.
For copying program data in 1-program increments.
For copying timing data in 1-program increments.
For copying pattern data in 1-program increments.
For copying program data in increments of multiple blocks.
For copying user character data in 1-character units.
For copying image data in 1-data increments.
For copying user optional pattern data in 1-data increments.
For copying group data in 1-group increments.
For copying auto display data.
For initializing the memory card

Fig. 3-20

Use the INC▲ or DEC▼ key to select the type of the copying to be performed, and press the SET key. One of the following displays will now appear on the LED.

ALL COPY	ALL	IMAGE DATA COPY	IMG
1 PROG. DATA COPY	Pr01	OPT. PAT. DATA COPY	OPt
1 PROG. TIM. DATA COPY	Pr0t	GROUP DATA COPY	GrP
1 PROG. PAT. DATA COPY	Pr0P	AUTO DATA COPY	AUto
BLOCK PROG. DATA COPY	Pr0b	CARD INITIALIZE	CIni
CHARACTER DATA COPY	CHAr		

Note:	Memory cards are formatted using CARD INITIALIZE above. Perform this operation before using a new memory card.

(3) When ALL copy has been selected

* No on-screen displays appear since the VG-845's video memory is used for copying all the memory card data.

<1> The following display appears on the LED.

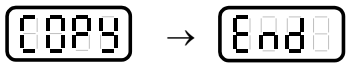
LOAd

<2> Insert the memory card serving as the copy source, and press the SET key. The memory card data is loaded, and the LED display changes.

LOAd → End

<3> When the INC key is next pressed, the LED display changes as follows.

<4> Insert the memory card serving as the copy destination, and press the SET key. The data is saved onto this memory card, and the LED display changes.



(Although it depends on the capacity of the memory card, it takes several minutes for the copying to be completed.)

<5> When the DEC key is now pressed, the step <1> status is restored.

<6> If the FUNC key is pressed instead, the status in (2) is restored.

(4) When program data copy has been selected (the procedure is the same for copying the timing data and pattern data)

The following on-screen menu appears.

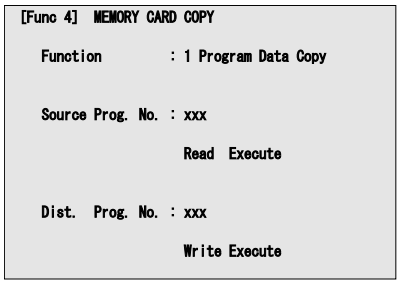
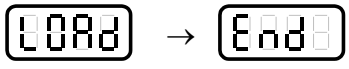


Fig. 3-21

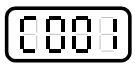
<1> Input the number of the program that is to serve as the copy source. The following display now appears on the LED.

<2> Press the DEC▼ key, and highlight "Read Execute." The following display now appears on the LED.

<3> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.

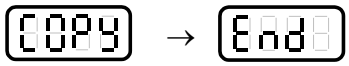


<4> Press the DEC▼ key, and input the number of the program to be serve as the copy destination. The following display now appears on the LED.



<5> Press the DEC▼ key, and highlight "Write Execute." The following display now appears on the LED.

<6> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



<7> When the DEC key is now pressed, the step <1> status is restored.

<8> If the FUNC key is pressed instead, the status in (2) is restored.

(5) When block program data copying has been selected.

* No on-screen displays appear since the VG-845's video memory is used for copying blocks.

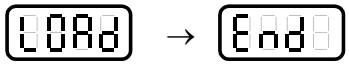
<1> Input the number of the first program that is to serve as the copy source. The following display now appears on the LED.

<2> Press the DEC▼ key, and input the number of the program that is to serve as the last copy source. The following display now appears on the LED.

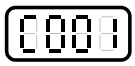
* A dot appears at 'L' on the far left.

<3> Press the DEC▼ key, and the following display now appears on the LED.

<4> Insert the memory card serving as the copy source, and press the SET key. The data is saved onto this memory card, and the LED display changes.



<5> Press the DEC▼ key, and input the number of the first program to serve as the copy destination. The following display now appears on the LED.

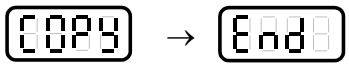


<6> Press the DEC▼ key, and input the number of the last program to serve as the copy destination. The following display now appears on the LED.

* A dot appears at 'C' on the far left.

<7> Press the DEC▼ key. The LED display changes as follows.

<8> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.

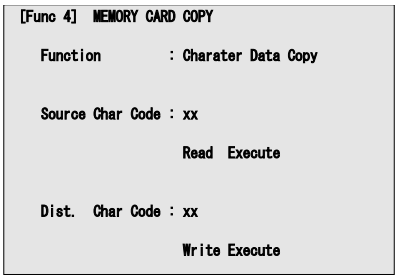


<9> When the DEC key is now pressed, the step <1> status is restored.

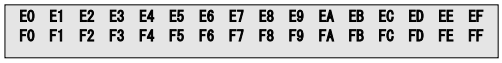
<10> If the FUNC key is pressed instead, the status in (2) is restored.

(6) When CHARACTER copying has been selected

The following on-screen menu appears.



When the Code field is highlighted, the following pop-up display appears.



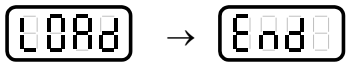
Use the 4, 6, 8 and 2 keys to move the highlighting position, and make the selection using the 5 key.

Fig. 3-22

<1> Select the CHAR code of the copy source. The following display now appears on the LED.

<2> Press the DEC▼ key, and highlight "Read Execute." The following display now appears on the LED.

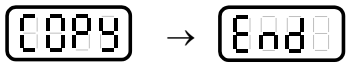
<3> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.



<4> Press the DEC▼ key, and select the CHAR code of the character to serve as the copy destination. The following display now appears on the LED.

<5> Press the DEC▼ key, and highlight "Write Execute." The following display now appears on the LED.

<6> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



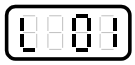
<7> When the DEC key is now pressed, the step <1> status is restored.

<8> If the FUNC key is pressed instead, the status in (2) is restored.

(7) When Image Data copying has been selected

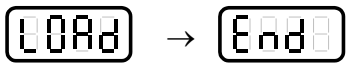
* No on-screen displays appear since the VG-845's video memory is used for copying the image data.

<1> Select the image number (01 to 64) of the copy source. The following display now appears on the LED.



<2> Press the DEC▼ key. The following display now appears on the LED.

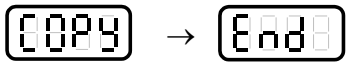
<3> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.



<4> Press the DEC▼ key, and input the number (01 to 64) of the image to serve as the copy destination. The following display now appears on the LED.

<5> Press the DEC▼ key. The following display now appears on the LED.

<6> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



<7> When the DEC key is now pressed, the step <1> status is restored.

<8> If the FUNC key is pressed instead, the status in (2) is restored.

(8) When Option Pattern data copying has been selected

The following on-screen menu appears.

```
[Func 4]  MEMORY CARD COPY

  Function        : Opt.Pat. Data Copy

  Source OptPat No.: xx

                    Read  Execute

  Dist.  OptPat No.: xx

                    Write Execute
```

When the PatNo field is highlighted, the following pop-up display appears.

40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F

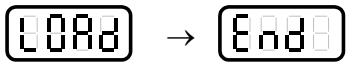
Use the 2, 4, 6 and 8 keys to move the highlighting position, and make the selection using the 5 key.

Fig. 3-23

<1> Select the Option Pattern No. of the copy source. The following display now appears on the LED.

<2> Press the DEC▼ key, and highlight "Read Execute.” The following display now appears on the LED.

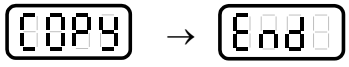
<3> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.



<4> Press the DEC▼ key, and select the number of the Option Pattern to serve as the copy destination. The following display now appears on the LED.

<5> Press the DEC▼ key, and highlight "Write Execute.” The following display now appears on the LED.

<6> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



<7> When the DEC key is now pressed, the step <1> status is restored.

<8> If the FUNC key is pressed instead, the status in (2) is restored.

(9) When Group data copying has been selected

The following on-screen menu appears.

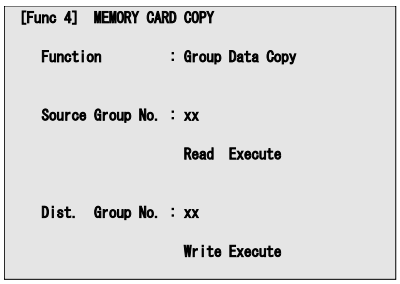
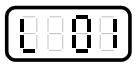


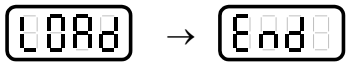
Fig. 3-24

<1> Select the group No. (01 to 32) of the copy source. The following display now appears on the LED.



<2> Press the DEC▼ key, and highlight "Read Execute." The following display now appears on the LED.

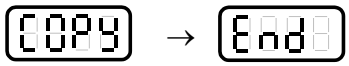
<3> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.



<4> Press the DEC▼ key, and select the No. (01 to 32) of the group to serve as the copy destination. The following display now appears on the LED.

<5> Press the DEC▼ key, and highlight "Write Execute." The following display now appears on the LED.

<6> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



<7> When the DEC key is now pressed, the step <1>status is restored.

<8> If the FUNC key is pressed instead, the status in (2) is restored.

(10) When AutoDisplay data copying has been selected

The following on-screen menu appears.

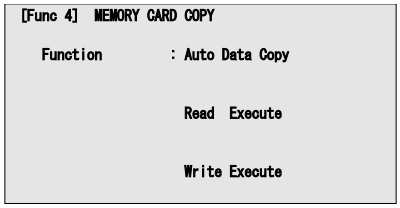
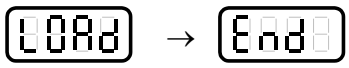


Fig. 3-25

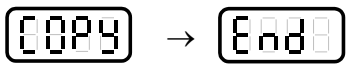
<1> The following display now appears on the LED.

<2> Insert the memory card serving as the copy source, and press the SET key. The data is loaded from the memory card, and the LED display changes.



<3> Press the DEC▼ key, and highlight "Write Execute." The following display now appears on the LED.

<4> Insert the memory card serving as the copy destination, and press the SET key. The data is saved on this memory card, and the LED display changes.



<5> When the DEC key is now pressed, the step <1>status is restored.

<6> If the FUNC key is pressed instead, the status in (2) is restored.

(11) When Card Initialize has been selected

The following on-screen menu appears.

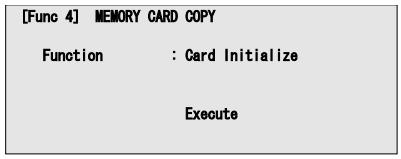
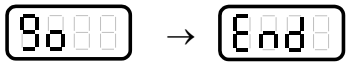


Fig. 3-26

<1> The following display now appears on the LED.

<2> Insert the memory card, and press the SET key. The memory card is initialized, and the LED display changes.



<3> When the DEC key is now pressed, the step <1>status is restored.

<4> If the FUNC key is pressed instead, the status in (2) is restored.

Note:	The memory card is formatted when it is initialized. Before a new card is used for the very first time, follow the steps above to initialize it.

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

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 5 key is pressed, the display changes to what is shown in Fig. 3-28.

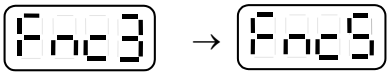


Fig. 3-26 Fig. 3-26

The config edit function is now initiated by pressing the SET key, and the following menu appears.

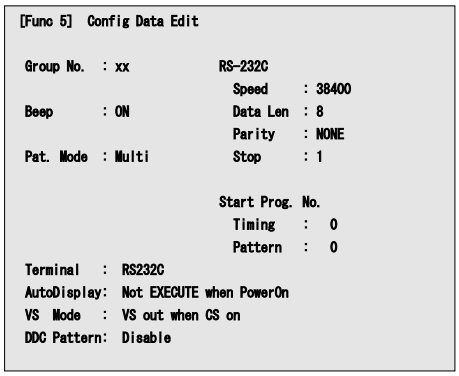


Fig. 3-29

(2) Editing the config data

Use the INC▲ or DEC▼ key to move the highlighting to the data to be changed, and input the data using the 0 to 9 number keys.

If the FUNC key is pressed instead, config data editing is suspended, and direct display is restored.

(3) Entering the config data

When the SET key is pressed, the following display appears.

Fig. 3-30

The config data displayed is entered in the VG-845 by pressing the 0 key.

(4) Description of config data

Item	Setting	Description
GROUP No	0	For executing direct display by Func-0. (Factory setting)
	1 - 32	For executing in the group display mode the group No. selected by Func-0.
Beep	0 (OFF)	The beep is not sounded.
	1 (ON)	The beep is sounded. (Factory setting)
Pat. Mode	0 (Single)	Only one pattern can be selected when the pattern keys on the VG-845's front panel are used to select a pattern. (If CROSS is selected while CHARA is already selected, the CHARA selection is released.)
	1 (Multi)	Multiple patterns can be selected when the pattern keys on the VG-845's front panel are used to select patterns. (Factory setting.) (If CROSS is selected while CHARA is already selected, both patterns are superimposed and displayed.)
RS-232C Speed	0 (9600) - 2 (38400)	For setting the RS-232C baud rate. The baud rate is set to 9600 to 38400 bps. (Factory setting = 38400 bps)
RS-232C Data Len	0 (7bit) 1 (8bit)	For selecting the RS-232C data length. The RS-232C data length is set to 7 or 8 bits. (Factory setting = 8 bits)
RS-232C Parity	0 (NONE) 1 (EVEN) 2 (ODD)	For selecting the RS-232C parity. NONE = none, EVEN = even parity, ODD = odd parity (Factory setting = none)
RS-232C Stop	0 (1bit) 1 (2bit)	For selecting the RS-232C stop bit length. The stop bit length is set to 1 or 2 bits. (Factory setting = 1 bit)
Start Prog.No Timing Pattern	0 - 999	For setting the number of the program to be executed when the power is turned on. Set "0" for both items if no program is to be executed when the power is turned on. (Factory setting: 0,0)
Terminal	0 (RS232C)	For executing the terminal mode using the RS-232 connector. (Factory setting)
	1 (USB)	For executing the terminal mode using the USB connector.
Auto Display	0 or 1	0 = Do not execute when the power is turned on. Auto display is not executed when the power is turned on. (Factory setting) 1 = Execute when the power is turned on. Auto display is executed when the power is turned on.
DDC Pattern	0 or 1	For enabling or disabling the DDC optional patterns. 0 = Disable (Factory setting = off) 1 = Enable * When a DDC optional pattern is executed, the DDC data is captured from the monitor or other unit connected, and displayed. If the data fails to be captured, capture is retried, and no other operations will be acknowledged for about 30 seconds. When this item is set to "Disable," the DDC data is not captured, and the pattern is not displayed. If the connected unit does not support DDC, set this item to "Disable."

3-5-7 Group data edit function (Func-6)

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

* Concerning group data

With the direct display function, programs are executed in numerical sequence such as 001 → 002 → 003 and so on or 003 → 002 → 001 and so on using the INC▲ or DEC▼ 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.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 6 key is pressed, the display changes to what is shown in Fig. 3-32.

Fig. 3-31

→

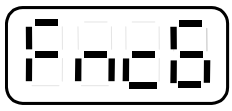
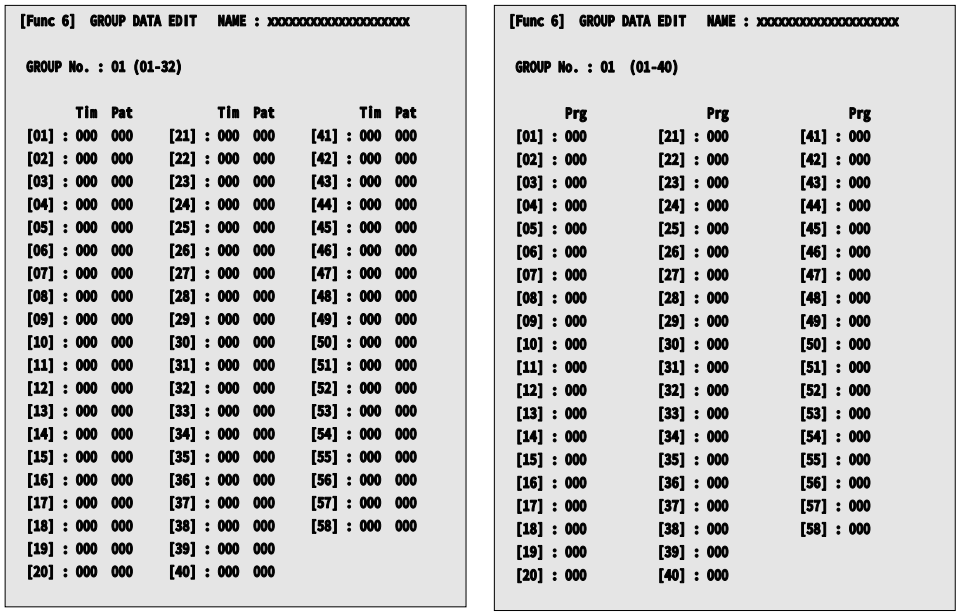


Fig. 3-32

The group data edit function is now initiated by pressing the SET key, and the following menu appears.



```
[Func 6]  GROUP DATA EDIT   NAME : xxxxxxxxxxxxxxxxxxxx

GROUP No. : 01 (01-32)

      Tim  Pat          Tim  Pat          Tim  Pat
[01] : 000  000    [21] : 000  000    [41] : 000  000
[02] : 000  000    [22] : 000  000    [42] : 000  000
[03] : 000  000    [23] : 000  000    [43] : 000  000
[04] : 000  000    [24] : 000  000    [44] : 000  000
[05] : 000  000    [25] : 000  000    [45] : 000  000
[06] : 000  000    [26] : 000  000    [46] : 000  000
[07] : 000  000    [27] : 000  000    [47] : 000  000
[08] : 000  000    [28] : 000  000    [48] : 000  000
[09] : 000  000    [29] : 000  000    [49] : 000  000
[10] : 000  000    [30] : 000  000    [50] : 000  000
[11] : 000  000    [31] : 000  000    [51] : 000  000
[12] : 000  000    [32] : 000  000    [52] : 000  000
[13] : 000  000    [33] : 000  000    [53] : 000  000
[14] : 000  000    [34] : 000  000    [54] : 000  000
[15] : 000  000    [35] : 000  000    [55] : 000  000
[16] : 000  000    [36] : 000  000    [56] : 000  000
[17] : 000  000    [37] : 000  000    [57] : 000  000
[18] : 000  000    [38] : 000  000    [58] : 000  000
[19] : 000  000    [39] : 000  000
[20] : 000  000    [40] : 000  000
```

```
[Func 6]  GROUP DATA EDIT   NAME : xxxxxxxxxxxxxxxxxxxx

GROUP No. : 01  (01-40)

      Prg          Prg          Prg
[01] : 000   [21] : 000   [41] : 000
[02] : 000   [22] : 000   [42] : 000
[03] : 000   [23] : 000   [43] : 000
[04] : 000   [24] : 000   [44] : 000
[05] : 000   [25] : 000   [45] : 000
[06] : 000   [26] : 000   [46] : 000
[07] : 000   [27] : 000   [47] : 000
[08] : 000   [28] : 000   [48] : 000
[09] : 000   [29] : 000   [49] : 000
[10] : 000   [30] : 000   [50] : 000
[11] : 000   [31] : 000   [51] : 000
[12] : 000   [32] : 000   [52] : 000
[13] : 000   [33] : 000   [53] : 000
[14] : 000   [34] : 000   [54] : 000
[15] : 000   [35] : 000   [55] : 000
[16] : 000   [36] : 000   [56] : 000
[17] : 000   [37] : 000   [57] : 000
[18] : 000   [38] : 000   [58] : 000
[19] : 000   [39] : 000
[20] : 000   [40] : 000
```

* Mode in which timing data and pattern data are specified separately

* Mode in which only the program numbers are specified

Fig. 3-33

(2) Calling the group data

Use the INC▲ or DEC▼ key to move the highlighting to "GROUP No.," and input the group number (01 to 32) to be edited using the 0 to 9 number keys. When a 2-digit group number is input, the data in that group is read, and the on-screen display is updated.

(3) Editing the group data

Use the INC▲ or DEC▼ key to move the highlighting to the data to be changed, and input the data using the 0 to 9 number keys.

If the FUNC key is pressed instead, group data editing is suspended, and direct display is restored.

(4) Switching the group data setting mode

By pressing the MODE key, the LED lighting is changed, and the editing menus are switched as shown below.

MODE	Red off Green off	The mode for setting only the program numbers is set.
MODE	Red on Green off	The mode for setting the timing data and pattern data separately is set.

(5) Changing the group name

When the NAME key is pressed, the group name input menu appears on-screen. For details on operation, refer to changing the program names in Section 3-5-4 on the memory card edit function.

(6) Entering the group data

When the SET key is pressed, the following display appears.

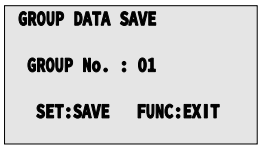


Fig. 3-34

By pressing the SET key, the group data displayed is entered on the memory card.

If the FUNC key is pressed instead, the group data is not entered.

Furthermore, by using the 0 to 9 number keys to input the number (01 to 32) of the group whose data is to be entered, the data can be entered into a group with a different number from the one of the group which was called.

3-5-8 Character edit function (Func-8)

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 8 key is then pressed, the LED display changes to what is shown in Fig. 3-36.

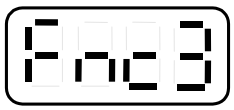


Fig. 3-35

→

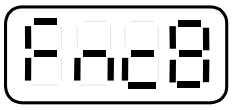


Fig. 3-36

The character edit function is now initiated by pressing the SET key, and the following menu appears.

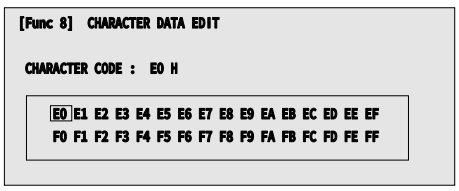


Fig. 3-37

(2) Calling the character data

Use the 2, 4, 6 and 8 keys to move the highlighting to the targeted character code, and select the character code using the 5 key.

When the SET is pressed, the character data is read, and the following editing screen appears.

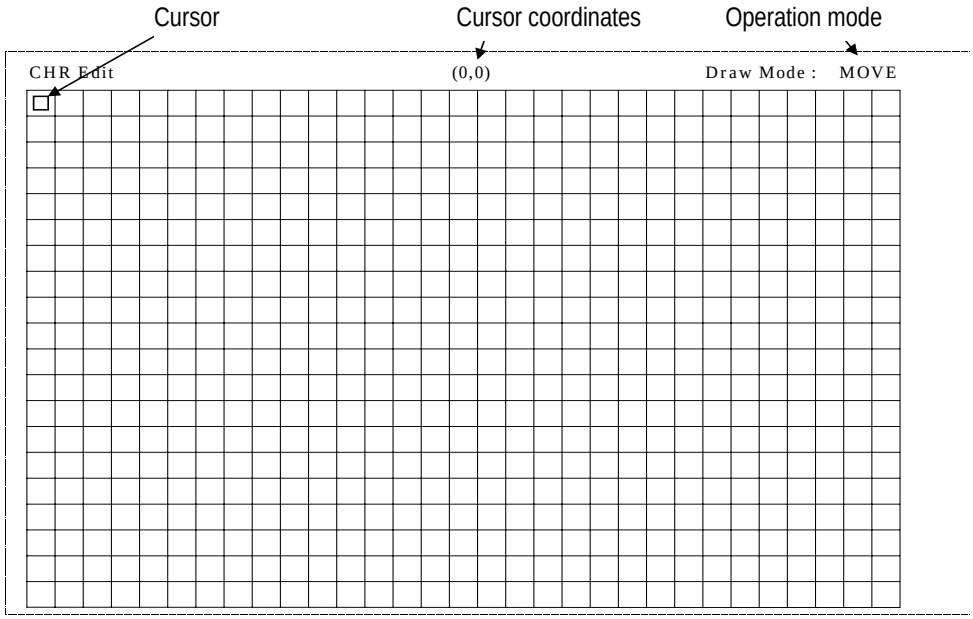


Fig. 3-38

If the FUNC key is pressed, character data editing is suspended, and direct display is restored.

(3) Editing the character data

The key functions during data editing are described below.

Key operation	Function
7 8 9 4 6 1 2 3	<1> For moving the cursor and drawing dots. The cursor is moved while dots are set or cleared according to the drawing mode established. (Dots are not drawn in the movement mode.) <2> In the shift mode For shifting the character pattern in the designated direction.
5	For setting or clearing the dot at the cursor position.
0	For clearing all the dots in a cell.
MODE	For switching the drawing mode in sequence. Move (MOVE) → dot set (SET) → dot clear (CLR) → shift (SHIFT)
INV	For inverting the dots in a cell.
HS	For returning the cursor position to the left or right home point (moves between the far left and far right by toggling).
VS	For returning the cursor position to the top or bottom home point (moves between the extreme top or extreme bottom by toggling).
FUNC	For aborting data editing and restoring the character code setting screen.
SET	For entering the character code data.

(4) Entering the character data

When the SET key is pressed, the following menu appears on-screen.

```
CHARACTER DATA SAVE

  CHARACTER CODE : E0 H

E0 E1 E2 E3 E4 E5 E6 E7 E8 E9 EA EB EC ED EE EF

 '5'=SELECT,  '4','6'=MOVE
 'SET'=END,  'FUNC'=QUIT
```

Fig. 3-39

By pressing the SET key, the character data displayed is entered on the memory card.

Furthermore, by selecting another character code into which the character data is to be entered using the 4, 6 and 5 number keys, the data can be entered into a different character code from the one which was called.

3-5-9 List display/other edit function (Func-9)

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

(1) To initiate this function

When the FUNC key on the RB-649 is pressed, the LED display shown below appears, and when the 9 key is then pressed, the LED display changes to what is shown in

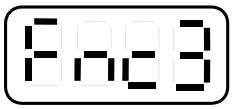


Fig. 3-40

→

Fig. 3-41

The list display/other edit function is now initiated by pressing the SET key, and the following menu appears.

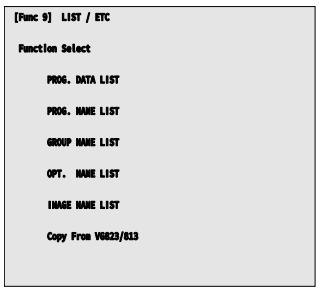


Fig. 3-42

(2) Selecting the functions

Use the INC▲ or DEC▼ DEC key to move the highlighting to the function to be selected, and execute the function by pressing the SET key.

PROG. DATA LIST	For displaying the H-Timing, V-Timing and OUTPUT data of the program data.
PROG. NAME LIST	For displaying a list of the program names.
GROUP NAME LIST	For displaying a list of the group names.
OPT. NAME LIST	For displaying a list of the optional pattern names.
IMAGE NAME LSIT	For displaying a list of the image data names.
Copy From VG826A/827	For copying the data in the panel ROM of the VG-826A/827.

If the FUNC key is pressed, the function is suspended, and direct display is restored.

(3) Program Data List

Select "Program Data List" as the function in (2), and press the SET key. The following display appears.

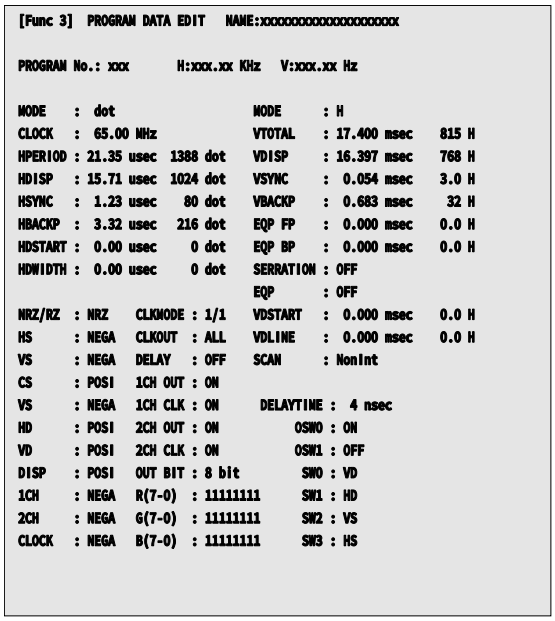


Fig. 3-43

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

The number of the program to be displayed can also be updated using the INC▲ or DEC▼ key.

Press the FUNC key to return to (2).

(4) Program Name List

Select "Program Name List" as the function in (2), and press the SET key. The following display appears.

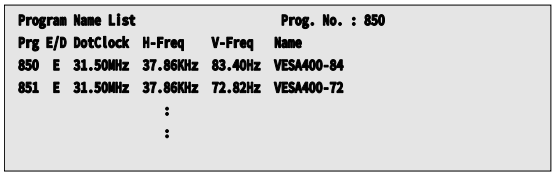


Fig. 3-44

When the 3-digit number of the first program to be displayed is input using the number keys, the program names starting with the name for that program are displayed.

The number of the first program to be displayed can also be updated using the INC▲ or DEC▼ key.

Press the FUNC key to return to (2).

(5) Group Name List

Select "Group Name List" as the function in (2), and press the SET key. The following display appears.

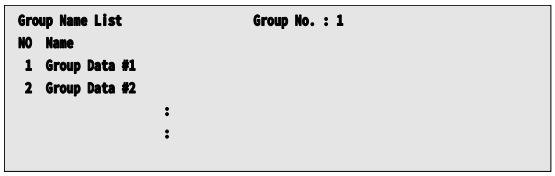


Fig. 3-45

When the 2-digit number of the first group to be displayed is input using the number keys, the group names starting with the name for that group number are displayed.

The number of the first group to be displayed can also be updated using the INC▲ or DEC▼ key.

Press the FUNC key to return to (2).

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

(6) OPT Name List

Select "OPT.NAME LIST" as the function in (2), and press the SET key. The following display appears.

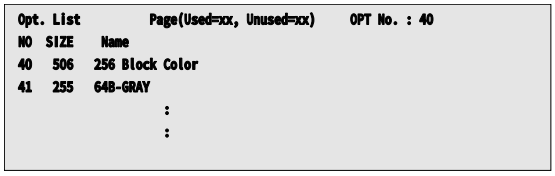


Fig. 3-46

The optional pattern data to be displayed can also be updated using the INC▲ or DEC▼ key.

Press the FUNC key to return to (2).

Note:	The memory card must be installed in order for the OPT.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).

(7) IMAGE Name List

Select "IMAGE NAME LIST" as the function in (2), and press the SET key. The following display appears.

```
Image List     Sector(Used=xx, Unused=xx)    Img No. :  1
NO   OPT-NO      SIZE       COL  Name
 1       80   ( 1024,  768)    8  1024x768  Image #1
 2       81   (  640,  480)   24  640x480   Image #1
                    :
                    :
```

Fig. 3-47

The image data to be displayed can also be updated using the INC▲ or DEC▼ key.

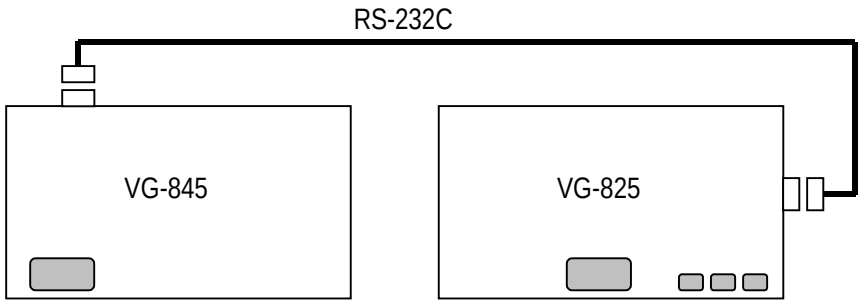
Press the FUNC key to return to (2).

Note:	The memory card must be installed in order for the IMAGE 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 sectors/unused sectors in the memory card (in 128KB units).
Note:	"OPT-NO" is the number of the optional pattern whose image data is to be displayed.

3-5-10 VG-826A/827 panel ROM copy function

* The on-screen menus are used for this function. Execute the number of the program supporting the monitor which has been connected, and check that it is displayed correctly.

This function copies the data on the panel ROMs of the VG-826A or VG-827 onto the memory card in the VG-845. In order for it to be used, the VG-845 and VG-826A or VG-827 must be connected using an RS-232C cable as shown below, and a panel ROM must be installed in the VG-826A or VG-827.



* Use the dedicated reversible cable as the RS-232C cable.

(1) To initiate this function

The following menus are displayed by selecting "Copy From VG823/813" in (2) of Section 3-5-9 on the list display/other edit function.

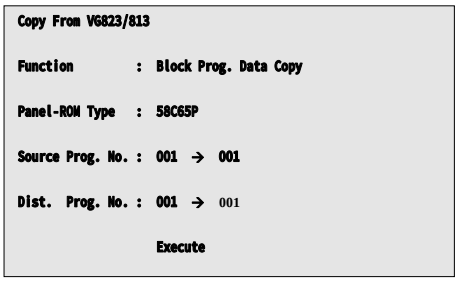


Fig. 3-50

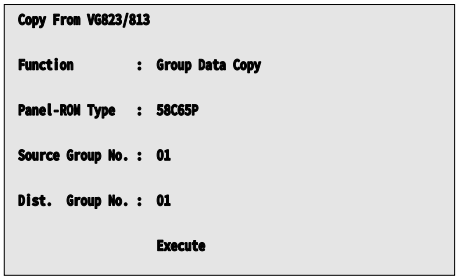


Fig. 3-51

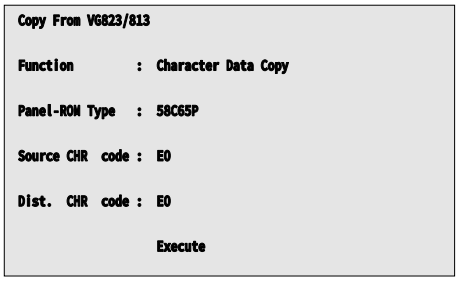


Fig. 3-52

Note: This function reads the panel ROM data from the VG-823 or VG-813 by RS-232C communication. Since the RS-232C port may be used for other applications, turn on the power of the VG-823 or VG-813 after performing step (1).

(2) Selecting the function

Use the INC▲ or DEC▼ key to move the highlighting to "Function," and select the function to be edited using the 0 to 2 number keys. The display menu is changed as shown in Figs. 3-50, 3-51 and 3-52.

Block Prog. Data Copy	For copying the panel ROM program data onto the memory card.
Group Data Copy	For copying the panel ROM group data onto the memory card.
Character Data Copy	For copying the panel ROM character data onto the memory card.

(3) Selecting the panel ROM

Use the INC▲ or DEC▼ key to move the highlighting to "Panel-ROM Type," and select the type of panel ROM using the 0 to 2 number keys.

'0'	58C65P
'1'	58C256P
'2'	AH-3000

(4) Setting the copy source and copy destination

Use the INC▲ or DEC▼ key to move the highlighting to "Source" and "Dest.," and input the numbers of the programs or groups serving as the copy source and copy destination or the character code using the 0 to 9 number keys. The program data is copied in blocks. Input the first and last numbers to define a block.

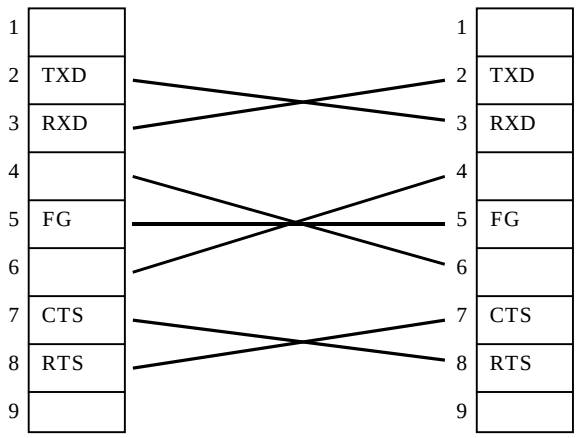
(5) Executing copying

Use the INC▲ or DEC▼ key to move the highlighting to "Execute," and execute the coping by pressing the 0 number key.

(6) Exiting the copying

When the FUNC key is pressed, VG-823 or VG-813 panel ROM copying is suspended, and (2) in Section 3-5-9 is restored.

Note: Use a reversible cable with the specifications shown below as the RS-232C cable used by this function.



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	MODE 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 (Note)	□□.□□ μsec □□□□ dot □□.□□ μsec □□□□ dot
Vertical timing data	MODE	0 : H 1: ms
	SCAN	0 : NON INTERLACE 1 : INTERLACE & SYNC 2 : INTERLACE & 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 EQP	0 : OFF 1 : 0.5H 2 : 1H 3 : EXOR 0 : OFF 1 : ON
	VD START VD LINE (Note)	□□.□□□msec □□□□.□ H □□.□□□msec □□□□.□ H

Output condition data	NRZ/RZ (Note)	0 : NRZ 1 : RZ
	HS	0 : NEGA 1 : POSI 2 : OFF
	VS	0 : NEGA 1 : POSI 2 : OFF
	CS	0 : NEGA 1 : POSI 2 : OFF 3 : HS 4 : VS
	HD (Note)	0 : NEGA 1 : POSI
	VD (Note)	0 : NEGA 1 : POSI
	CLOCK	0 : NEGA 1 : POSI
	DISP	0 : NEGA 1 : POSI
	1CH	0 : NEGA 1 : POSI
	2CH	0 : NEGA 1 : POSI
	CLOCK MODE	0 : 1/1 1 : 1/2
	CLOCK OUT(AREA)	0 : DISP 1 : ALL
	(Note)	0 : OFF 1 : ON
	DELAY	□nsec (0 - 31)
	DELAY TIME	
	RGB	□bit
	R (0-7)	0 : OFF 1 : ON
	G (0-7)	0 : OFF 1 : ON
	B (0-7)	0 : OFF 1 : ON
	1CH OUT	0 : ON 1 : Hi-Z
	1CH CLK	0 : ON 1 : Hi-Z
	2CH OUT	0 : ON 1 : Hi-Z
	2CH CLK	0 : ON 1 : Hi-Z
	OSW0	0 : OFF 1 : ON
	OSW1	0 : OFF 1 : ON
	SW0	0:CS 1:VD 2:HD 3:OSW0 4:OSW1 5:GSW0 6:GSW1
	SW1	0:CS 1:VD 2:HD 3:OSW0 4:OSW1 5:GSW0 6:GSW1
	SW2	0:VS 1:VD 2:HD 3:OSW0 4:OSW1 5:GSW0 6:GSW1
	SW3	0:HS 1:VD 2:HD 3:OSW0 4:OSW1 5:GSW0 6:GSW1

Note: The data can be edited by the VG-845 but it will not be supported by the hardware.

(1) How to edit the timing data

The data is edited by means of the on-screen menus using the memory card edit function described in Section 3-5-4.

The editing of the following types of data will be described below:

Horizontal timing data

Vertical timing data

Output condition data

(2) Timing data setting ranges

<1> Frequencies

Table 4-2

Dot clock frequency	10.00 - 100.00 MHz 0.50 – 9.99 MHz (in the low-band mode)	1/1 mode	10 kHz increments
	20.00 - 200.00 MHz	1/2 mode	
Horizontal sync frequency	00.00 KHz – 300 KHz (when low band width mode, no limit)		
Vertical sync frequency	0.00Hz – (when low band width mode, no limit)		

4-2 Horizontal timing data editing

The horizontal timing data will be described below.

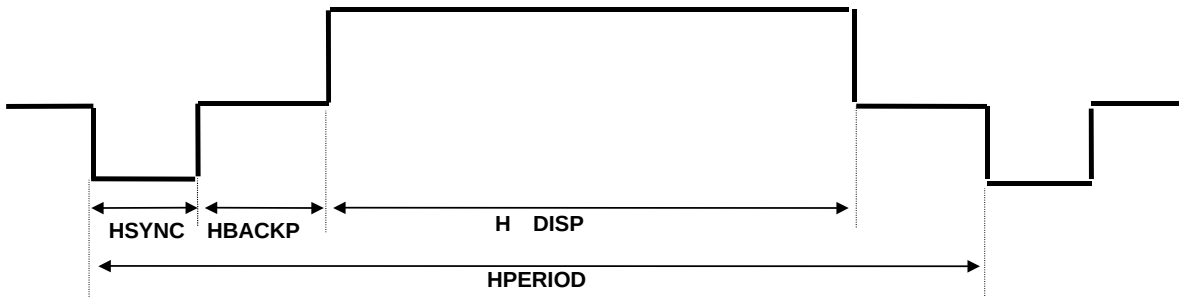


Fig. 4-1

Fig.4-3 Horizontal Timing Data Setting Item

Item	Setting Value			Details
MODE	0 - 1			Select Horizontal Timing Data Input mode. 0 = data input in microseconds, 1 = in dots
DOT CLOCK	When equipped with SB-1628			Input Dot Clock * When 1/1 Clock mode and set 0.50-9.99MHz, it becomes low band width mode.
	1/1	0.50 - 9.99 (MHz) 10.00 - 165.00 (MHz)		
	1/2	20.00 - 330.00 (MHz)		
	When equipped with SB-1617or SB-1619 Or without option boards			
	1/1	0.50 - 9.99 (MHz) 10.00 - 100.00 (MHz)		
	1/2	20.00 - 200.00 (MHz)		
HPERIOD	1/1	Low band	21 - 1024 (dot)	Input horizontal period in dots or microseconds.
		High band	84 - 4096 (dot)	
	1/2	168 - 8192 (dot)		
	0.00 - 655.35 (μ sec)			
HDISP	1/1	Low band	2 - 511 (dot)	Input horizontal display period in dots or microseconds.
		High band	8 - 2048 (dot)	
	1/2	16 ～ 4096 (dot)		
	0.00～655.35 (μ sec)			
HSYNC	1/1	Low band	1 ～ 512 (dot)	Input the horizontal sync in dots or microseconds.
		High band	4 ～ 2048 (dot)	
	1/2	8 ～ 4096 (dot)		
	0.00～655.35 (μ sec)			

HBACKP (Note 1)	1/1	Low band	0 - 512 (dot)	Input horitozntal backporch in dots or microseconds.
		High band	0,2,4,6 - 2048 (dot)	
	1/2	0,4,8,12 - 4096 (dot)		
	0.00〜655.35 (μ sec)			
HDSTART	1/1	0 - 2048 (dot)		Input in dots or microseconds * This item is not supported by VG-845. (it is ignored)
	1/2	0 - 4096 (dot)		
	0.00〜655.35 (μ sec)			
HDWIDTH	1/1	0 - 2048 (dot)		Input in dots or microseconds * This item is not supported by VG-845. (it is ignored)
	1/2	0 - 4096 (dot)		
	0.00-655.35 (μ sec)			

(Note1)	When H BACK P(1/1 clock, high-band) is under 6 dots, the setting value is rounded down as below: 1→ 0, 3→ 2, 5→ 4 When H BACK P(1/2 clock) is under 12 dots, the setting value is rounded down as below. 1-3 → 0, 5-7 → 4, 9-11 → 8

Table. 4-4 Horizontal Timing Data Automatic Calculation

Item	Capacity			Details
HFRONTP	1/1	Low band	0 - 512 (dot)	* HFRONTP is calculated in the following equation: HPERIOD - (HDISP + HSYNC + HBACKP)
		High band	0 - 2048 (dot)	
	1/2	0 - 4096 (dot)		
HBLANKING	1/1	Low band	5 - 512 (dot)	* HBLANKING is calculated in the following equation: HPERIOD - HDISP
		High band	20 - 2048 (dot)	
	1/2	40 〜 4096 (dot)		

4-3 Vertical timing data editing

Table 4-5

Item	Setting	H unit	Description
MODE	0 - 1		For selecting the vertical timing data input mode. 0 = data input in H; 1 = data input in milliseconds.
VTOTAL	100 - 4096 (H) 0.000-99.999 (msec)	1H	For inputting the vertical period as a number of H or milliseconds.
VDISP	16 - 2048 (H) 0.000 - 99.999 (msec)	1H	For inputting the vertical display period as a number of H or milliseconds.
VSYNC	1.0 - 99.0 (H) 0.000 - 99.999 (msec)	1H	For inputting the vertical sync width as a number of H or milliseconds.
VBACKP	0 - 2048 (H) 0.000 - 99.999 (msec)	1H	For inputting the vertical backporch as a number of H or milliseconds.
EQP FP EQP BP	0 - 99.0 (H) 0.000 - 99.999 (msec)	0.5H	For inputting the equalizing pulse front porch and back porch as a number of H or milliseconds.
SERRATION	0 - 1		For selecting the serration type. 0 = OFF 1 = 0.5 H 2 = 1 H 3 = EXOR
EQP	0 - 1		For selecting on or off for the equalizing pulse. 0 = off、 1 = on
VDSTART (Note 1)	0 – 2047.0 (dot) 0.000 - 99.999 (msec)	0.5H	For inputting as a number of H or milliseconds. * This item is not supported by the VG-845 (it is ignored).
VDLINE (Note 1)	0 – 2047 (dot) 0.000 - 99.999 (msec)	0.5H	For inputting in H or milliseconds. * This item is not supported by the VG-845 (it is ignored).
SCAN	0 - 2		For selecting the scanning mode. 0 = non-interlace, 1 = interlace & sync, 2 = interlace & video

(Note1) **The sum of VD-start and VD-Line can not be set in excess of V-total.**
Set it within the following range.
(VD-start + VD-Line) <= V-total

Table 4-6 Vertical Timing Data Automatic Calculation

Item	Capacity	H unit	Details
VFRONTP	0 - 2048 (H)	0.5H	* VFRONTP is calculated in the following equation: VTOTAL – (VDISP + VSYNC + VBACKP)
VBLANKING	30(microseconds) or more (Note 2)		* VBLANKING is calculated in the following equation: VTOTAL - VDISP

(Note2) **If the V Blanking setting is too low, trouble may occur in some of the functions such as Window scrolloing. A setting of at least 60 microseconds is recommended.**

* Scanning modes

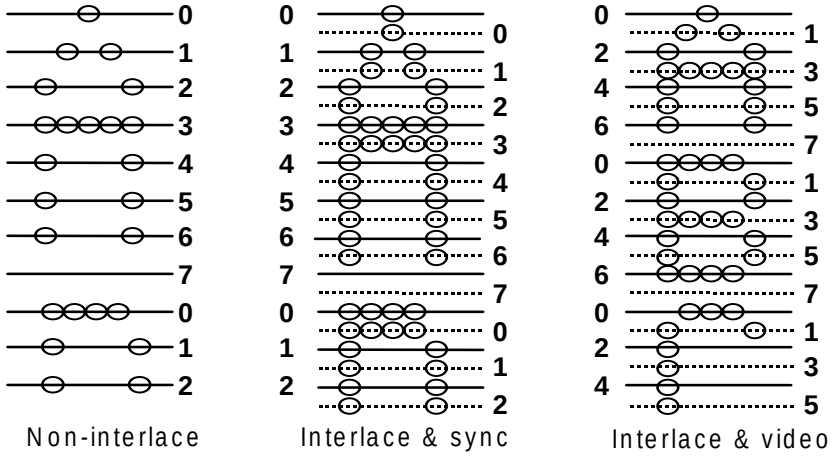
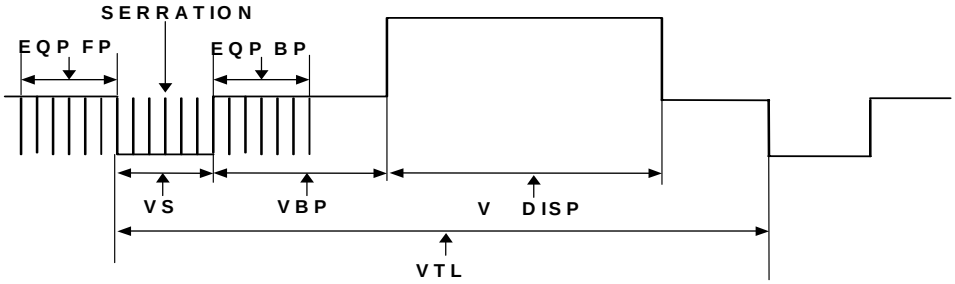


Fig. 4-2

* With non-interlacing



* With interlacing

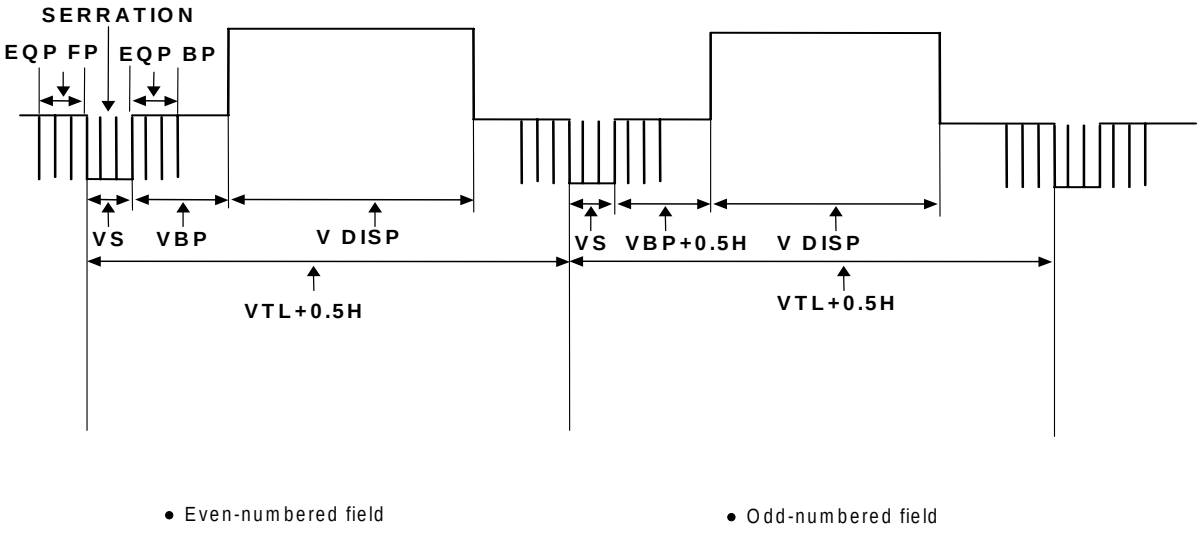


Fig. 4-3

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

Fig. 4-4

* EQP phase relationship

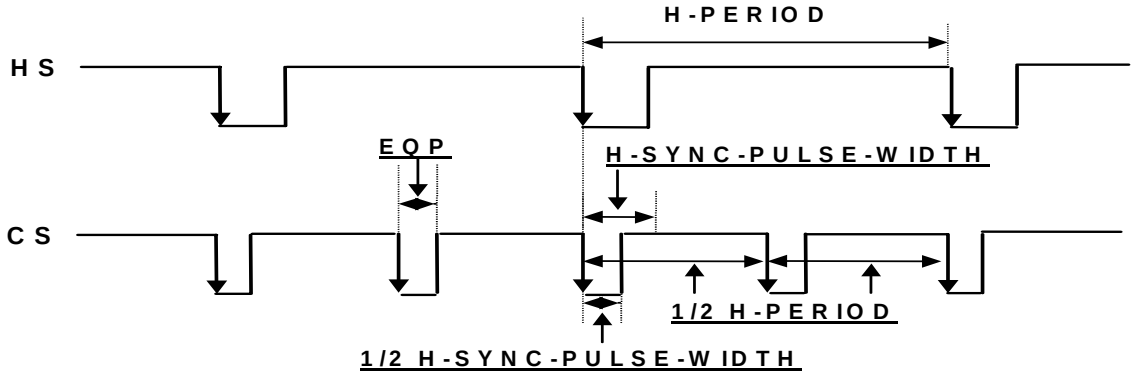


Fig. 4-5

* EQP setting examples

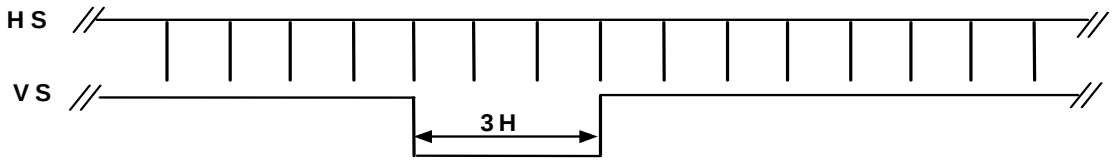


Fig. 4-6

<Example 2-1>

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

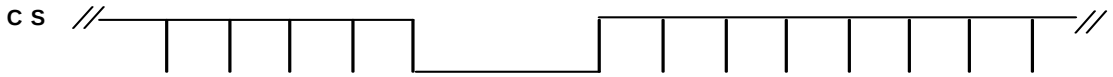


Fig. 4-7

<Example 2-2>

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

Fig. 4-8

<Example 2-3>

EQP - FP	→ 3H
EQP - BP	→ 3H
EQP	→ ON
SERRATION	→ 1H

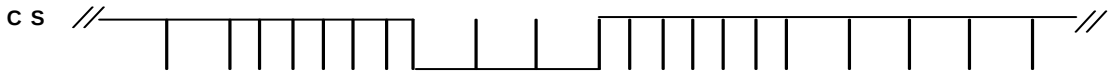


Fig. 4-9

<Example 2-4>

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

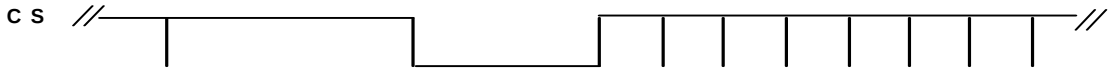


Fig. 4-10

* Serrated pulse phase relationship

With the 0.5H setting

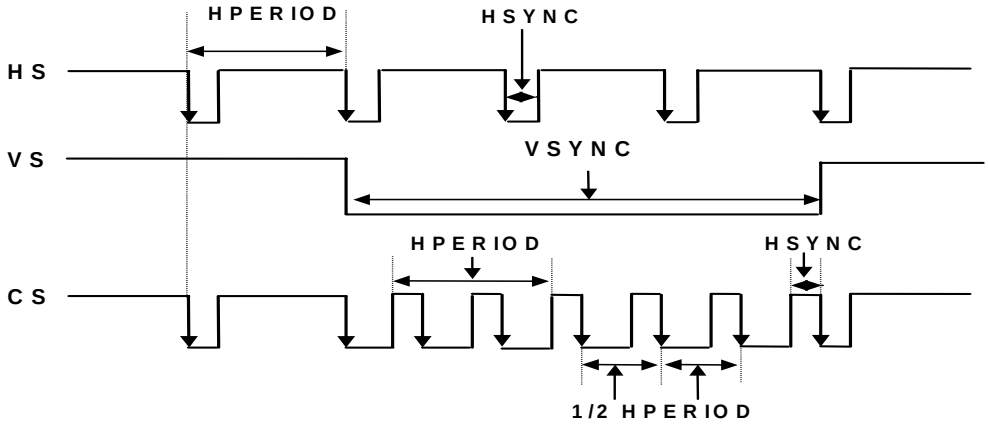


Fig. 4-11

With the EXOR setting

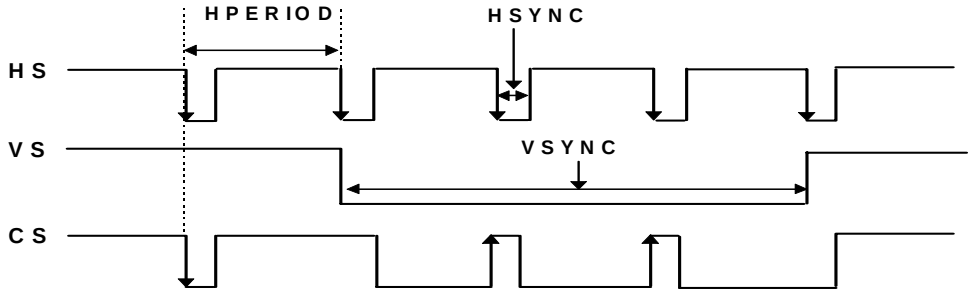
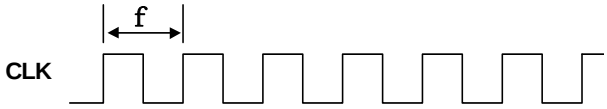
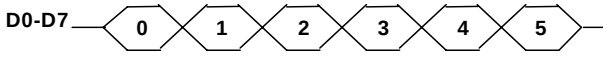
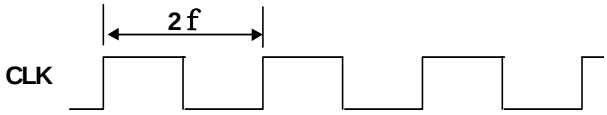
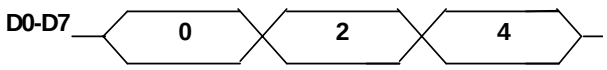
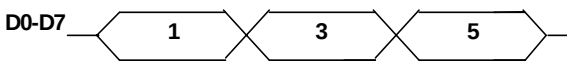


Fig. 4-12

4-4 Output condition data editing

The output condition data is described below.

Table 4-7

Item	Setting	Description
NRZ/RZ	0 - 1	For selecting the NRZ or RZ mode. 0 = NRZ, 1 = RZ * This item is not supported by the VG-845 (it is ignored).
HS VS	0 - 2	For selecting the HS/VS polarity. 0 = NEGA, 1 = POSI
CS	0 - 4	For selecting the CS polarity and type. 0 = NEGA, 1 = POSI * This item is not supported by the VG-845 (it is ignored).
HD VD	0 - 1	For selecting the HD/VD polarity and type. 0 = NEGA, 1 = POSI * This item is available only when HD/VD is selected in SW0-3. * This item is not supported by the VG-845 (it is ignored).
CLOCK 1CH 2CH DISP	0 - 1	For selecting the CLOCK/1CH/2CH/DISP polarity. 0 = NEGA、 1 = POSI
CLKMODE	0 - 1	For selecting the clock output mode. 0 = 1/1 clock mode, 1 = 1/2 clock mode Fig. 4-3 In the 1/1 clock mode ・CLOCK  ・1-channel data  ・2-channel data Invalid Fig. 4-2 In the 1/2 clock mode ・CLOCK  ・1-channel data  ・2-channel data  Note: In the 1/2 clock mode, the horizontal timing input is set in 2-dot increments.
CLK OUT (Clock Area)	0 - 1	For selecting clock output range. 0=DISP Clock output only in display range 1=ALL Clock output in all range * This item is not supported by VG-845. (it is ignored.)
DELAY	0 - 1	For selecting ON or OFF for the clock signal delay. 0 = OFF (clock delay OFF) 1 = ON (clock delay ON)

CLOCK DELAY	0 - 31	For inputting the clock signal delay time (in 1-nanosecond increments)
RGB	1 - 8	For selecting the number of video signal bits (high-order).
R0～R7 G0～G7 B0～B7	0 - 1	For setting the video signal bits ON or OFF. 0 = bit OFF, 1 = bit ON
1CH OUT 1CH CLK 2CH OUT 2CH CLK	0 - 1	For selecting OE (output enable) for the channel 1 and channel 2 output and clock 0 = Hiz High impedance 1 = ON ON (usual setting)
OSW0 OSW1	0 - 1	For setting the OSW0 and OSW1 general-purpose signals ON or OFF. 0 = OFF This setting is enabled when either OSW0 or OSW1 has been selected 1 = ON for the SW0 to 3 output selections.
SW0 SW1	0 - 4	For selecting the SW0 and SW1 general-purpose signal output. 0 = CS CS is output. 1 = VD HD is output. 2 = HD VD is output. 3 = OSW0 A fixed output depending on the OSW0 setting is output. (Note 1) 4 = OSW1 A fixed output depending on the OSW1 setting is output. (Note 1)
SW2	0 - 4	For selecting the SW2 general-purpose signal output. 0 = VS VS is output. 1 = VD HD is output. 2 = HD VD is output. 3 = OSW0 A fixed output depending on the OSW0 setting is output. (Note 1) 4 = OSW1 A fixed output depending on the OSW1 setting is output. (Note 1)
SW3	0 - 4	For selecting the SW3 general-purpose signal output. 0 = HS HS is output. 1 = VD HD is output. 2 = HD VD is output. 3 = OSW0 A fixed output depending on the OSW0 setting is output. (Note 1) 4 = OSW1 A fixed output depending on the OSW1 setting is output. (Note 1)

Note 1: Refer to the ON/OFF selection for general-purpose signals OSW0 and OSW1.

CHAPTER 5
PATTERN DATA EDITING

5-1 Pattern data configuration

The pattern data is configured by the items listed in Table 5-1.

Table 5-1

Display	Name of data	Setting item	Mode
GRAPHIC COLOR	Graphic color	Graphic color, background color, background	MODE Red on, green off
CHARACTER	Character pattern	Display format, character code, font size, cell size	
CROSS	Crosshatch pattern	Horizontal direction interval, vertical direction interval	
DOT	Dot pattern	Horizontal direction interval, vertical direction interval	
CIRCLE	Circle pattern	Display format	
BURST	Burst pattern	Display format, step, interval	
WINDOW	Window pattern	Horizontal direction, vertical size, display colors, display format, flicker interval	
OPTION PATTRERN 1	Optional pattern 1	Optional pattern No.	
OPTION PATTRERN 2	Optional pattern 2	Optional pattern No.	
CURSOR	Cursor pattern	Display format, position display mode, flicker interval, movement step, cursor color, background color	
COLORBAR	Color bar pattern	Horizontal direction, vertical direction interval, layout direction, color layout	MODE Red off, green on
GRAYSCALE	Gray scale pattern	(Common to horizontal direction, vertical direction interval color bar) Layout direction, level	
Enable/Disable	Enable/disable	Enable or disable	MODE Red on, green off
Pattern Select	Pattern select	Pattern select data	
Program Name	Program name	Display position, font size	
ACTION	Pattern action	Pattern operation (scroll, flicker, etc.)	

(1) How to edit the timing data

The data is edited by means of the on-screen menus using the memory card edit function described in Section 3-5-4.

By pressing the MODE key, the LED lighting changes, and the editing menus are switched as shown above.

5-2 Graphic color

These data items set the graphic and background colors.

Item	Setting	Description
GRAPHIC COLOR R, G, B	0 - 255	For setting the graphic colors of the CHARA, CROSS, DOTS, CIRCLE, +, □, X and BURST patterns.
BG-R, BG-G, BG-B	0 - 255	For setting the background color of the CHARA, CROSS, DOTS, CIRCLE, +, □, X and BURST patterns.
BACK GROUND	0 - 1	For setting the background mode. 0 = OFF, 1 = ON

5-3 Character pattern data

These data items set the character pattern data.

Item	Setting	Description
FORMAT	0 - 2	0 = Character list (Chara List) 1 = All one character (All 1 Chara) 2 = Corners and center (Corner & Center) (Note 1)
CODE	20H - FFH	Move using the 2, 4, 6 and 8 keys, and select the character code using the 5 key.
FONT	0 - 2	0 = 5×7, 1 = 7×9, 2 = 16×16
CELL-H, CELL-V	1 - 255	Horizontal/vertical cell sizes (Note 2)

Note 1: Character pattern formats

<1> Character list (Chara List)

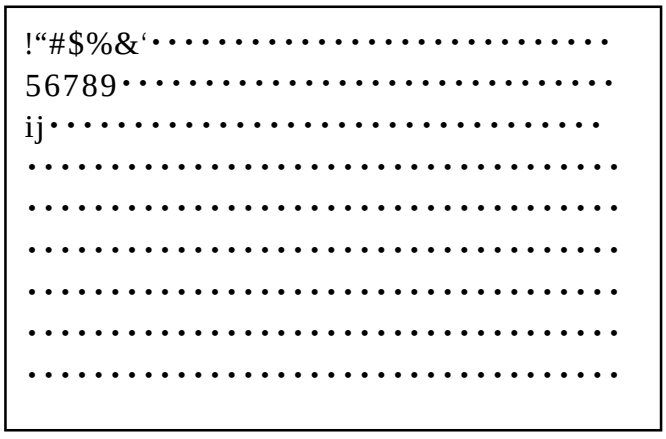


Fig. 5-1

<2> All one character (All 1 Chara)

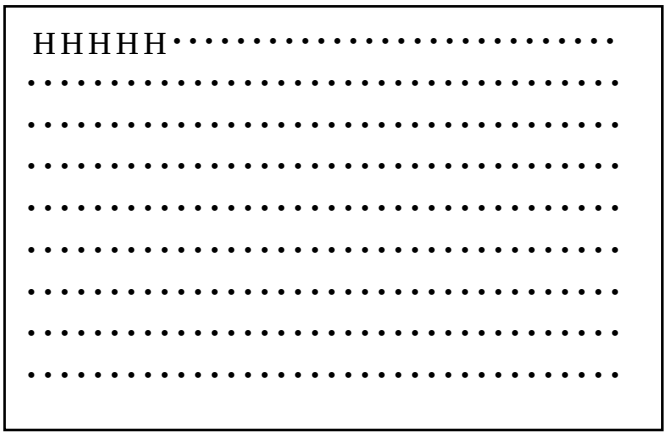


Fig. 5-2

<3> Corners and center (Corner & Center)

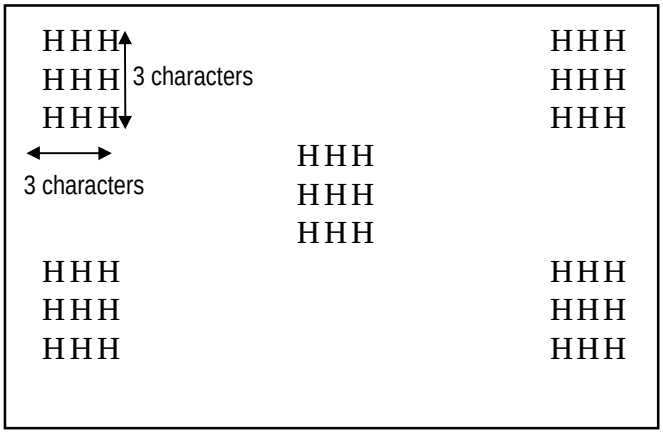
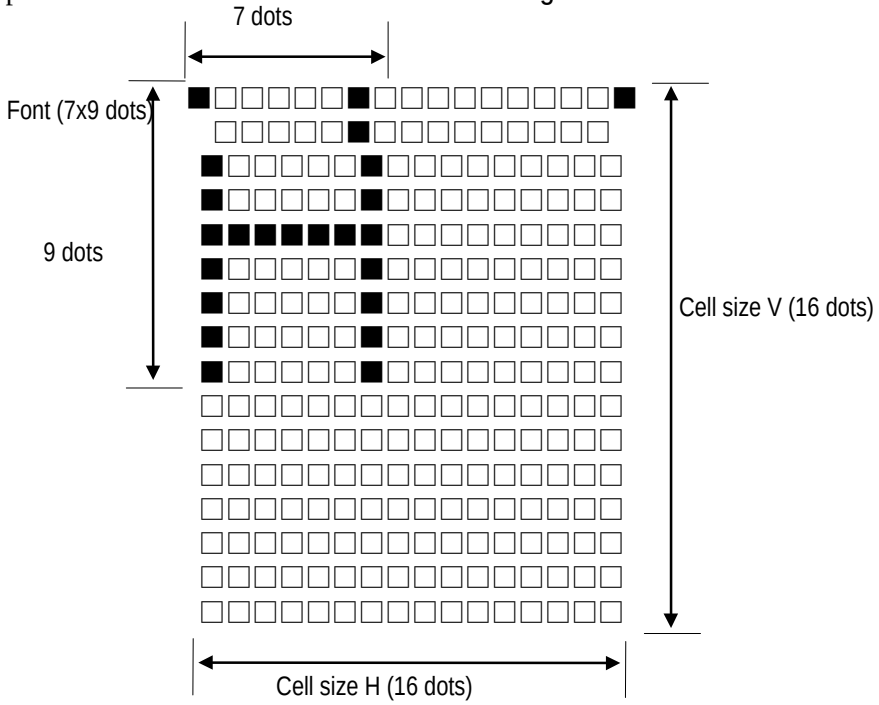


Fig. 5-3

Note 2: Relationship between font and cell size

<Example with 7 × 9 font and 16 × 16 cell size> Fig 5-4

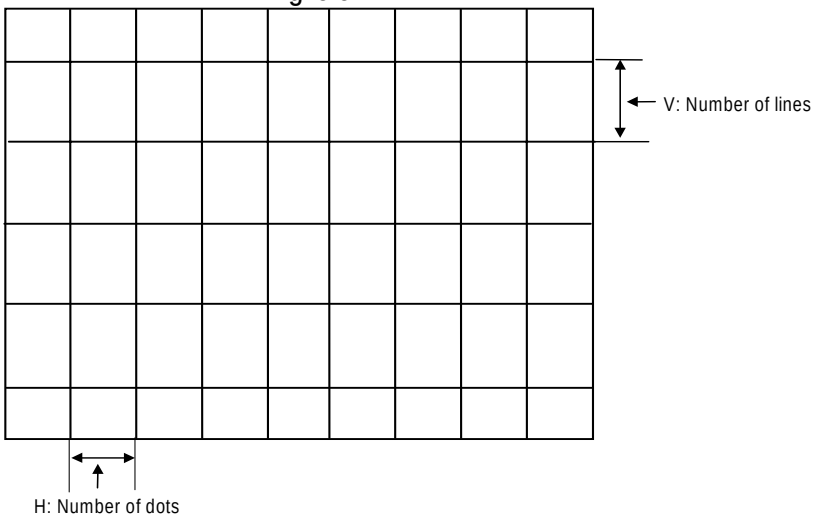


5-4 Crosshatch pattern data

These data items set the crosshatch pattern data.

Item	Setting	Description
MODE	0 - 1	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)
FORMAT	0 - 1	0 = From center → For drawing with the screen center serving as the start point. 1 = From left top → For drawing with the top left of screen serving as the start point.
INTERVAL H/V	0 - 9999 (Line/dot)	H/V interval
WIDTH H/V	1 - 255 (dot)	H/V line width

Fig. 5-5



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.

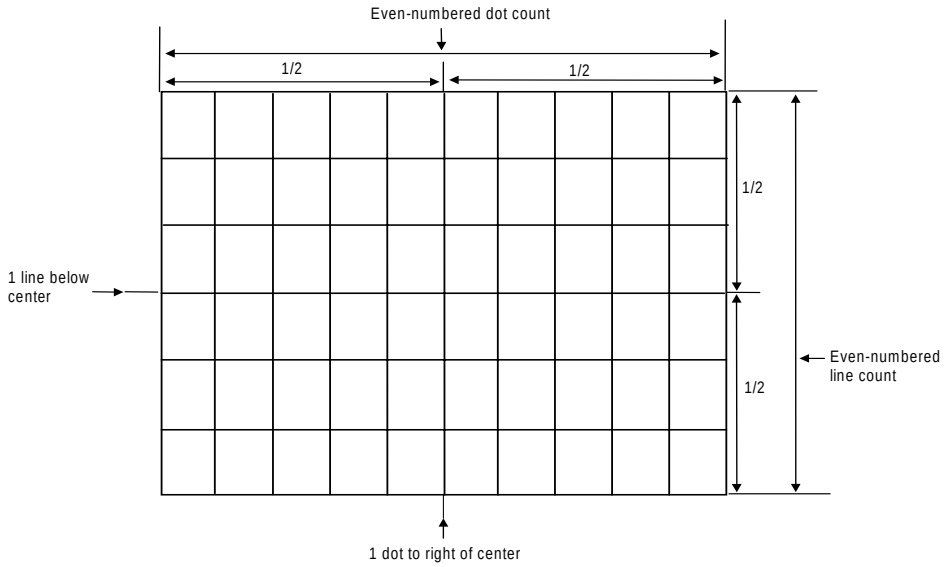


Fig. 5-6

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

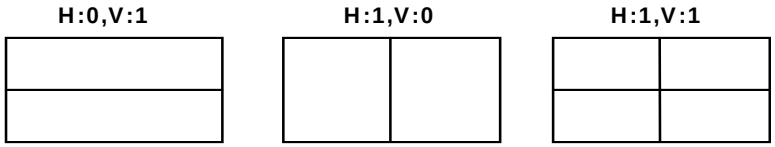


Fig. 5-7

5-5 Dot pattern data

These data items set the dot pattern data.

Item	Setting	Description
MODE	0 - 1	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).
FORMAT	0 - 1	0 = From center → For drawing with the screen center serving as the start point. 1 = From left top → For drawing with the top left of screen serving as the start point.
INTERVAL H/V	0 - 9999 (Line/dot)	H/V interval
SIZE	1 - 15 (dot)	Dot pattern size
TYPE	0 - 1	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.

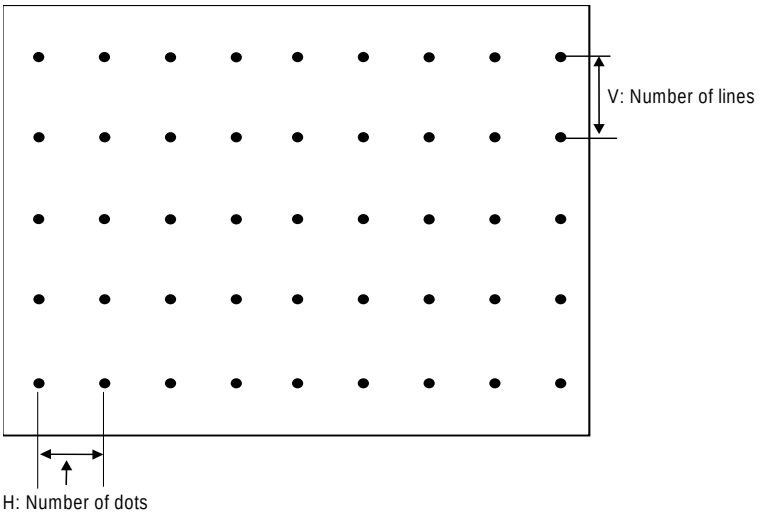


Fig. 5-8

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

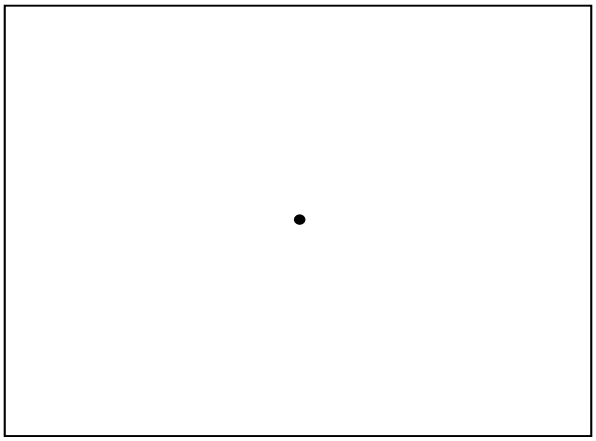
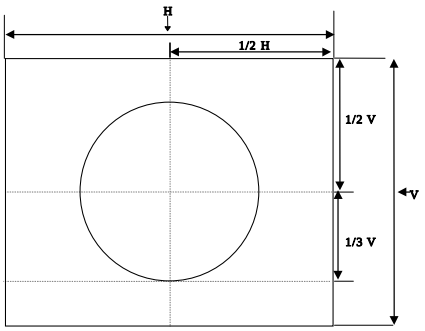


Fig 5-9

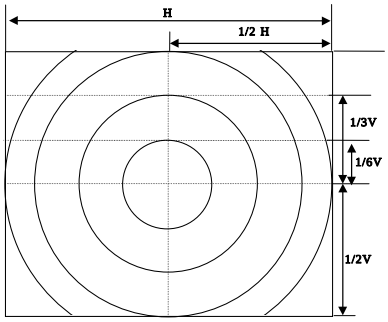
5-6 Circle pattern data

These data item set the circle pattern data.

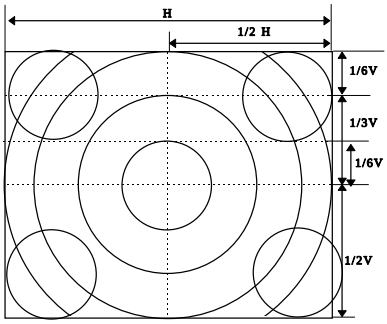
Item	Setting	Description
FORMAT	0 ～ 6	Format number (see Fig. 5-10)
Aspect H/V	0 ～ 255	H, V aspect ratio Perfectly round circles are always displayed regardless of the display resolution by setting the aspect ratio of the monitor. For example: Set H=4 and V=3 for an NTSC monitor. Set H=16 and V=9 for 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.)



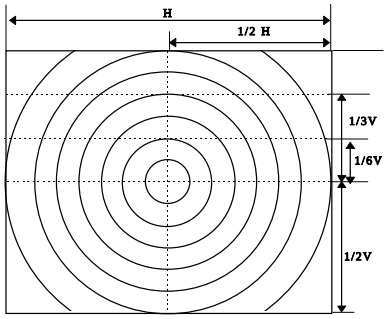
Format [0] Single circle
Center: 1/2H, 1/2V
Radius: 1/3V



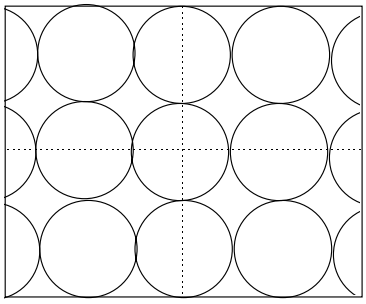
Format [1] Concentric circles (1)
Center: 1/2H, 1/2V
Radius (from center): 1/6V, 1/3V, 1/2V, 1/2H



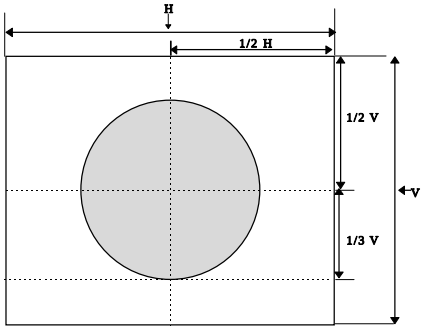
Format [2]
Format [1] + (4 circles with 1/6V radius)



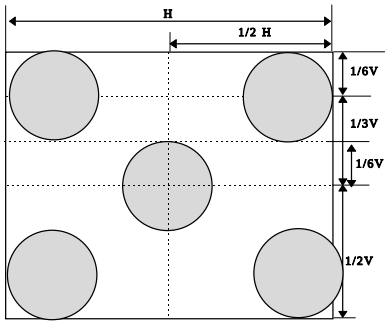
Format [3] Concentric circles (2)
Center: 1/2H, 1/2V
Radius (from center): addition of other circles inside 1/6V, 1/3V, 1/2V circles; addition of 1/2 radius



Format [4] Consecutive circles with 1/6V radius
Circles are displayed symmetrically both horizontally and vertically with the center (1/2H, 1/2V) 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

Fig. 5-10

5-7 Burst pattern data

These data items set the burst pattern data.

Item	Setting	Description
FORMAT	0 - 3	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.
STEP	1 – 99 (dot)	Line thickness increase increment
INTERVAL	1 – 99 (dot)	Number of lines with same thickness which are displayed

[Example of settings]

Format 0, step 1, interval 5

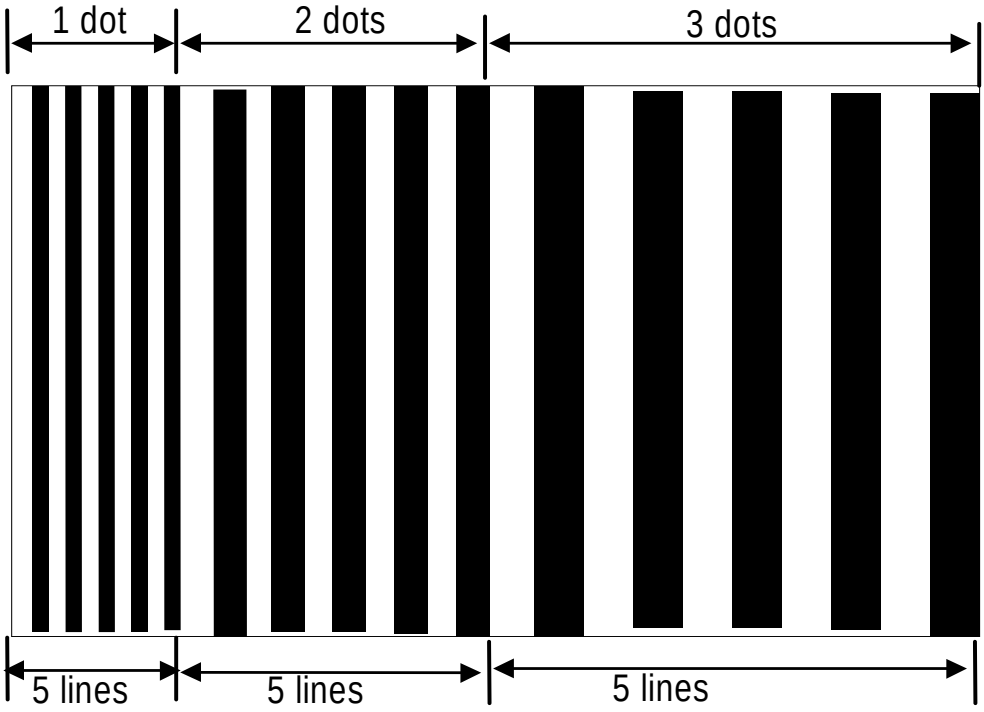


Fig. 5-11

5-8 Window pattern data

These data items set the window pattern data.

Item	Setting	Description
MODE	0 - 1	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.
HWIDTH, VWIDTH (Note 2)	1 - 9999	Horizontal/vertical window width dimensions When set in dots → 1 to 9999 dots When set as a percentage → 0.1 to 100.0%
R, G, B	0 - 255	For setting the window colors.
FORMAT (Note 1)	0 - F	Window format Move using the 2, 4, 6 and 8 keys, and select the window format using the 5 key.
FLICKER (Note 3) (Note 4)	0 - 7	For selecting the flicker interval or scroll speed.

Note 1: Window dimensions

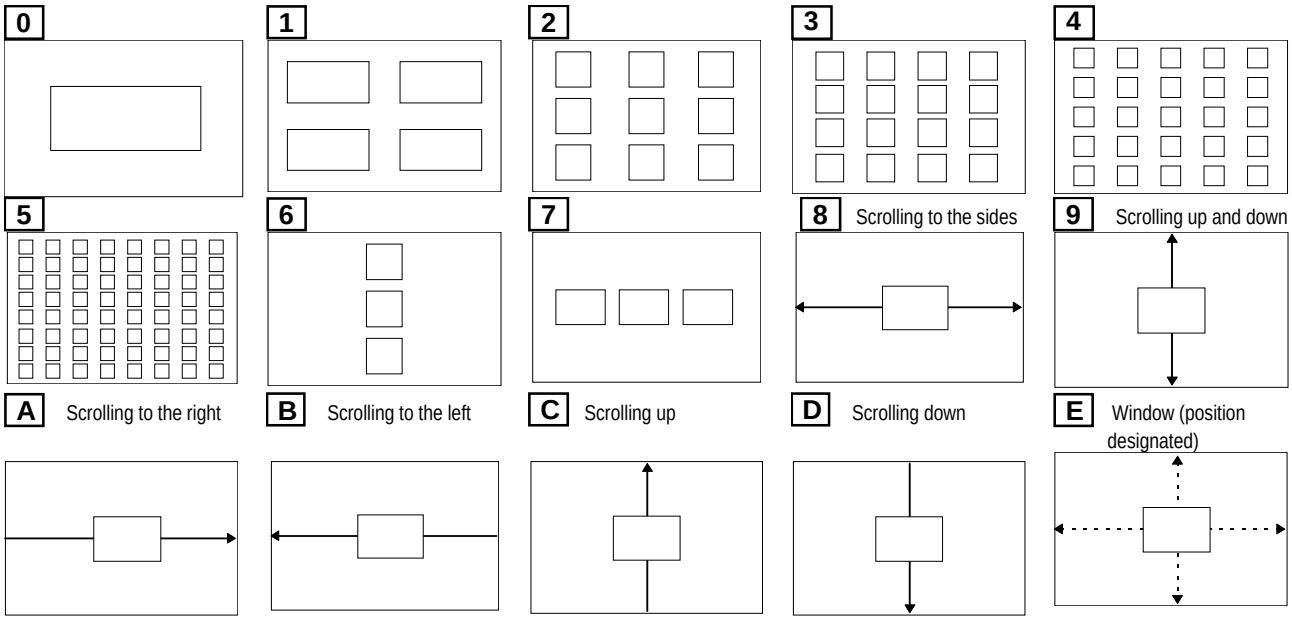


Fig. 5-12

(Note) Format F

With the VG-845, format F is the same as format 0.

Note 2: Window width

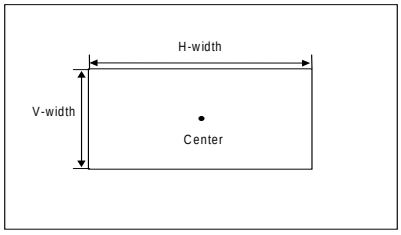


Fig. 5-13

Note 3: Flicker interval (format from 0 to 7)

The window flickers with formats 0 to 7.

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.

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

5-9 Optional pattern data

These data items set the optional pattern data.

Item	Setting	Description
MODE	00 ～ BF	Optional pattern no. of optional pattern 1 or 2 Move using the 2, 4, 6 and 8 keys, and select the optional pattern using the 5 key.

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).

5-10 Cursor pattern data

These data items set the cursor pattern data.

Item	Setting	Description
FORMAT	0 - 2	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.
FLICKER (Note 1)	0 - 7	Flicker interval
PosDisp	0 (OFF)	The cursor position does not appear on the CRT.
	1 (Type1)	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 CRT screen.
	2 (Type2)	The cursor position is displayed on the CRT 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 CRT screen. As the horizontal coordinates, the coordinate on the CRT screen is trebled and the values with 1, 2 and 3 added to the number are displayed for R, G and B, respectively.
Step	1 - 2	0 = 1 dot → For moving in 1-dot increments. 1 = 10 dot → For moving in 10-dot increments. 2 = 100 dot → For moving in 100-dot increments.
FG-R, FG-G, FG-B	0 - 255	For setting the cursor color.
BG-R, BG-G, BG-B	0 - 255	For setting the background color.

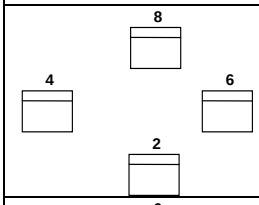
Note 1: Flicker interval

0	0 (NONE)	No flicker
1	1 (1V)	Flicker occurs once 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.

Note 2: Cursor pattern operations in direct display mode

In the direct display mode, the following operations are performed when the cursor pattern has been selected.

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

Key operation	Function
	For moving the cursor pattern on the CRT screen in the designated direction.
0 key	For changing the coordinate display. (No display → Type 1 → Type 2)
1 key	For changing the flashing speed. (No flashing → once in 1V → once in 64V)
3 key	For changing the cursor shape. (5*5 → Cross → V-line)
5 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.

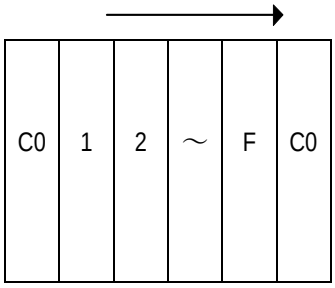
5-11 Color bar pattern data

These data items set the color bar pattern data.

Item	Setting	Description
MODE	0 - 1	0 = % → For designating the interval as a percentage. 1 = dot → For designating the interval as a number of dots.
Repeat	1 - 16	Repeat number
HWIDTH, VWIDTH	0 - 9999	H/V interval When set as a percentage →0.1 to 100.0% When set in dots →1 to 9999 dots
DIRECTION (Note 1)	0 - 3	Direction
COLOR-0 - F	0 - 7	Color (0=black, 1=red, 2=green, 3=yellow, 4=blue, 5=purple, 6=cyan, 7=white)

Note 1: Set the color bar pattern data.

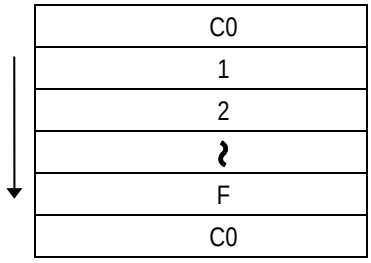
0 .....Horizontal direction (Hor)



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 (Ver)



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 (Hor & V)

C0	1	2	～	F	C0
1	2	3	～	C0	1
2	3	4	～	1	2
3	4	5	～	2	3
4	5	6	～	3	4
5	6	7	～	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 (Ver & H)

	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.

5-12 Gray scale pattern data

These data items set the gray scale pattern data.

Item	Setting	Description
MODE	0 - 1	0 = % → For designating the interval as a percentage. 1 = dot → For designating the interval as a number of dots.
Repeat	1 - 16	Repeat count
HWIDTH, VWIDTH	0 - 9999	H/V interval When set as a percentage →0.1 to 100.0% When set in dots → 1 to 9999 dots
DIRECTION	0 - 1	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.
LEVEL-0 - F	0 - 255	Gray scale level

5-13 Program data enable/disable

This data item sets whether to enable or disable the program data.

Item	Setting	Description
ENABLE / DISABLE	0 - 1	0 = DISABLE → This program data is disabled. 1 = ENABLE → This program data is enabled.

Note: "Disable" is set to prohibit the use of a specific program number on the memory card. Normally, the "Enable" setting is used.

5-14 Pattern select data

These data items set the signals and patterns to be displayed during direct display, group display and auto display execution.

Item	Setting	Description
CHARA, CROSS DOT, CIRCLE ＋, □, X CURSOR, COLOR GRAY, BURST WINDOW, OPTION1, OPTION2 NAME	0 - 1	For selecting the patterns. 0 = Patterns are not selected. 1 = Patterns are selected. ('*' appears on the right.)
R, G, B INVERSE	0 - 1	For selecting the output signals. 0 = Signals are not selected. 1 = Signals are selected. ('*' appears on the right.)

5-15 Program name pattern data

These data items set the program name pattern data.

Item	Setting	Description
POSITION	0 - 4	Display position 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.
FONT	0 - 2	0 = 5×7, 1 = 7×9, 2 = 16×16
NAME	Max. 20 characters	Program name

5-16 Pattern action data

These data items set the pattern action data.

Item	Setting	Description
Action Interval	1 - 999	For setting the action interval (in V increments).
G-SCR	0 - 1	For setting the 8-bit plane scrolling ON or OFF. 0 = OFF, 1 =ON
G-Dir	0 - 9	For setting the 8-bit plane scrolling direction. Note: For simple moving images, refer to the simple moving image function in Section 5-17. 0 = Mov → The display start coordinates are moved, and simple moving images are executed. 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. 5 = R → For scrolling toward the right. 6 = L-U → For scrolling toward the top left. 7 = U → For scrolling toward the top. 8 = R-U → For scrolling toward the top right.
G-Step H G-Step V	1 - 4095	For setting the 8-bit plane scrolling step. Step in the horizontal direction (dots) Step in the horizontal direction (H)
G-Rept H G-Rept V	1 - 15	For setting the number of simple moving image repetitions. Note: This item is valid when "Mov" has been selected as the G-Dir setting. Number of repetitions in the horizontal direction Number of repetitions in the vertical direction
W-SCR	0 - 1	For setting the window scrolling ON or OFF. 0 = OFF, 1 =ON
W-FLK	0 - 1	For setting the window flicker ON or OFF. 0 = OFF, 1 =ON
P-SCR	0 - 1	For setting the palette scrolling ON or OFF. 0 = OFF, 1 =ON
W-Step	1 - 255	For setting the window scrolling step value. Steps (common) in horizontal and vertical directions
W-Dir	0 - 9	For setting the window scrolling direction. 0 = MOV → The display start coordinates are moved, and simple moving images are executed. 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. 5 = R → For scrolling toward the right. 6 = L-U → For scrolling toward the top left. 7 = U → For scrolling toward the top. 8 = R-U → For scrolling toward the top right.
P-Step Sigh	0 - 1	For setting the sign for the palette scrolling step value. 0 = - (negative value) 1 = + (positive value)
Value	1 - 128	For setting the palette scrolling step value.
P-Start P-End	0 - 255	For setting the palette scrolling start and end positions.

5-16-1 Simple moving image function

Simple moving images can be achieved by drawing several images in the drawing area and moving the display start coordinates.

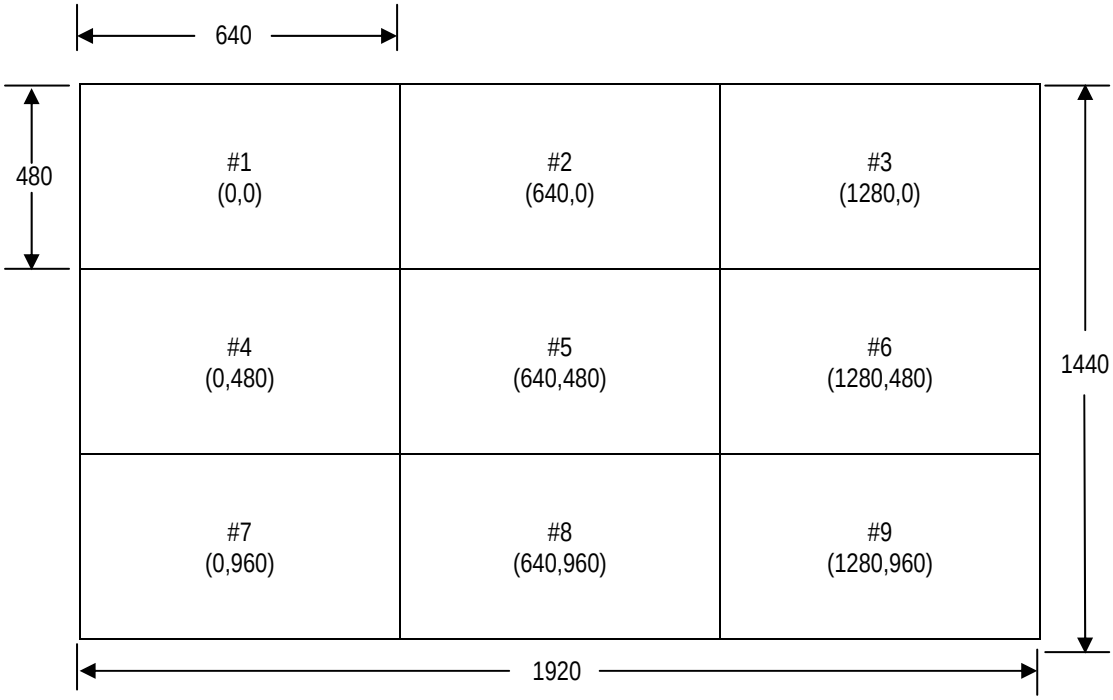
As an example, the method of executing simple moving images in 9 frames using three 640 x 480 images placed vertically and three 1920 x 1440 images placed horizontally will be described.

<1> Set the 8-bit plane scroll G-SCR to "ON" (1) and the scrolling direction G-Dir to "Mov" (0).

<2> Set G-Step H to 640 and G-Step V to 480 (8-bit plane scrolling step).

<3> Set G-Rept H to 3 and G-Rept V to 3 (number of moving image repetitions).

When these steps are implemented, the display start coordinates move in sequence from #1 to #9 in the figure below.



* The figures in parentheses are the display start coordinates.

Note:	The user must create this 1920 x 1440 image by processing and editing it.

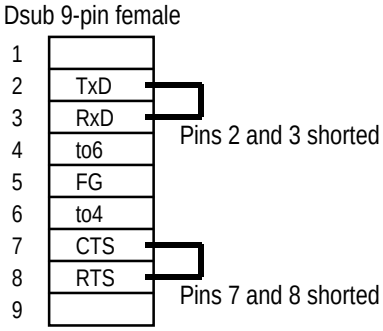
CHAPTER 6
SELF-DIAGNOSIS MODE

6-1 Introduction

The self-check functions of the VG-845 check each device of the VG-845 hardware.

6-2 What is required for checking

<1> Connector used for the RS-232C check



6-3 Operation method

(1) Turn on the power of the VG-845 generator while holding down the INC key.

(2) The CPU-ROM version is displayed on the LED.

(3) All the LED digits light up.

The self-diagnosis is now performed in the following sequence.

LED display	Item checked	Operation
CH01	CPU WORK RAM	
CH02	Video RAM1	
CH03	Video RAM2	
rb--	Remote Box	Press the keys on the remote control box, and check the LED. Exit this check using the INC key and proceed to the next check.
CArd	Memory card check start	Insert the memory card, and press the SET key to start the check. (Note)
CH04	Memory Card	
rS--	RS-232C check start	Install the connector for the RS-232C check, and press the SET key to start the check. (Note)
CH05	RS-232C	
CH06	Internal flash ROM	

(Note) This check is skipped by pressing the INC key.

When a self-check error has occurred, an error code is displayed on the 7-segment LED. After checking the code, press the SET key to continue the self-check.

The self-check is completed when appears on the 7-segment LED.

Turn off the generator's power and then turn it back on to proceed with operation.

CHAPTER 7
MAIN SPECIFICATIONS

7-1 Error messages

Code (H)	Description of error
00	The memory card has not been installed.
01	The number of the program which was input has been set to "Disable" when direct display or a program was executed.
02	The dot clock in the horizontal timing data is outside the specified range.
03	The front porch in the horizontal timing data is outside the specified range. (Hperiod ≥ Hsync + Hbackp + Hdisp)
05	HDstart + HDwidth in the horizontal timing data is outside the specified range. (Hperiod ≥ Hdstart + HDwidth)
07	HPeriod in the horizontal timing data is outside the specified range.
08	Hdisp in the horizontal timing data is outside the specified range.
09	Hsync in the horizontal timing data is outside the specified range.
0A	Hbackp in the horizontal timing data is outside the specified range.
0B	The blanking period in the horizontal timing data is outside the specified range.
0C	The horizontal frequency in the horizontal timing data is outside the specified range.
0D	Error other than those described above in the horizontal timing data.
10	Error in the output condition data.
11	Error in the CHARA pattern data.
12	Error in the CROSS pattern data.
13	Error in the DOTS pattern data.
14	Error in the circle pattern data.
15	Error in the burst pattern data.
16	Error in the window pattern data.
17	Error in the color bar pattern data.
18	Error in a parameter in the terminal mode.
19	Error in the data in the terminal mode.
1A	The sync signal has not been set.
1E	Time-out has occurred during communication in the terminal mode.
1F	An undefined command was received in the terminal mode.
20	Time-out has occurred during V sync interrupt wait.
21	Error in the program number.
22	Error in the group number.
23	Error in a user character code.
24	An EEPROM write error has occurred.
25	The memory card is not the correct type.
26	A memory card write error has occurred.
27	The memory card has been set to the write protect status.
28	The memory card has not been installed.
29	The memory card has not been formatted.
2A	There is no free space on the memory card.
2B	Error in the optional pattern number.
2C	Error in user-generated optional pattern FAT.
2D	No user-generated optional patterns have been entered.
2E	Error in the image data number.
2F	Error in image data FAT.

Code (H)	Description of error
30	No image data has been entered.
31	Illegal current data device (memory card or EEPROM).
32	The function cannot be used because the key lock function is activated.
33	The cursor is not displayed when the cursor command is received.
34	DDC Option pattern invalid
35	A flash ROM write error has occurred.
38	Error in gray scale pattern data.
39	Error in optional pattern data.
3A	Error in half-tone pattern data.
3B	Error in cursor pattern data.
3C	Error in program name data.
3D	Error in graphic color data.
40	Vtotal in the vertical timing data is outside the specified range.
41	Vdisp in the vertical timing data is outside the specified range.
42	Vsync in the vertical timing data is outside the specified range.
43	Vbackp in the vertical timing data is outside the specified range.
44	The front porch in the vertical timing data is outside the specified range. (Vtotal ≥ Vsync + Vbackp + Vdisp)
45	The blanking period in the vertical timing data is outside the specified range.
46	The vertical frequency in the vertical timing data is outside the specified range.
47	VDstart + VDline in the vertical timing data is outside the specified range. (Vtotal ≥ Vdstart + VDline)
48	EQPfp in the vertical timing data is outside the specified range.
49	EQPbp in the vertical timing data is outside the specified range.
4A	Error other than those described above in the vertical timing data.
4B	DDC1 timeout
4C	DDC1 ACK error
4E	DDC2B error
4F	Memory card copy error (original data is not read.)

The following errors may occur when user-generated optional patterns are executed.

Code (H)	Description of error
81	No user-generated optional patterns exist.
82	Variable stack error.
83	Register stack error.
84	Function stack error.
85	Illegal instruction code.
86	An attempt was made to divide a number by zero.
87	An error has occurred in a floating decimal point calculation.

7-2 Ratings and specifications

7-2-1 Specifications

Dot clock frequency	1/1 clock mode: 10.00 to 100.00 MHz (0.50 to 25.00 MHz in low-band mode) 1/2 clock mode: 20.00 to 200.00 MHz
	Serial output 165 MHz x 1 (when SB-1617 is installed) 165 MHz x 2 (after device chip has been supported)
Horizontal frequency	10 to 300 kHz (2.5 kHz and up in low-band mode), max. 8192 dots (Video 4096 dots, 2048 dots in 1/1 mode)
Number of vertical scanning lines	Max. 4096 lines
Video memory	4096 dots x 2048 dots, 24 bits, window, one of 16.77 million colors
Equalizing pulse	ON/OFF selectable
Serration pulse	OFF/0.5H/1H/EXOR selectable
Scanning	Non-interlaced, interlaced & sync, interlaced & video
Parallel output 1CH, 2CH (half-pitch, 68 pins)	8 bits each for R, G and B; HS, VS, DISP, CLK (no masking between DISPs), SW0, SW1, SW2, SW3
Serial output (DFP 20 pins, DVI connector)	8 bits each for R, G and B; HS, VS, DISP, CLK (no masking between DISPs), SW0, SW1, SW2, SW3
Sync signal output level (parallel)	More than 2V (when terminated with 75-ohm resistance)
Output control	R, G, B ON/OFF and inversion HS/CS, VS ON/OFF and negative/positive
External interfaces	Remote control box connector: D-Sub, 25 pins
	RS-232C: D-Sub 9 pins (max. 38.4 kbps)
	USB: type B (full speed, 12 Mbps)

7-2-2 Ratings

Supply voltage	AC 100 - 240V (50/60 Hz)
Power consumption	Max. 80W
Dimensions	295 (W) x 95 (H) x 210 (D) mm (excluding protrusions)
Weight	Approx. 3.5 kg
Ambient operating temperature	+5 to +40 degrees Celsius
Ambient storage temperature	-10 to +60 degrees Celsius
Humidity	30 - 85% RH (no condensation)

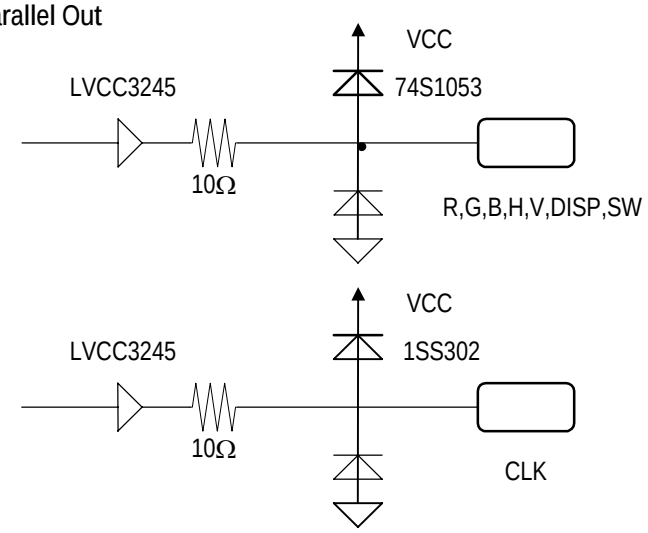
7-3 Accessories

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, 3.15A, 250V)	2

Note:	The above connecting cables are for the exclusive use of the VG-845. Since use of any other accessories will cause trouble, be absolutely sure to use only the designated accessories.

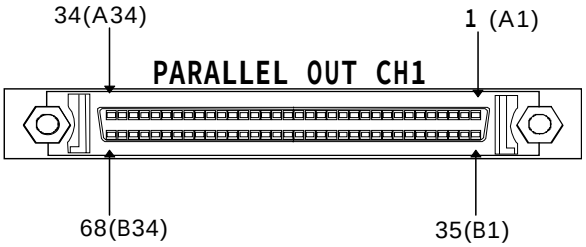
7-4 Output circuit diagrams

Parallel Out



7-5 Connector pin layouts

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

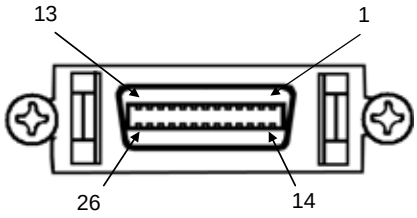


1 CH				2 CH			
Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	(GND)	35	RA0	1	(GND)	35	RB0
2	(GND)	36	RA1	2	(GND)	36	RB1
3	(GND)	37	RA2	3	(GND)	37	RB2
4	(GND)	38	RA3	4	(GND)	38	RB3
5	(GND)	39	RA4	5	(GND)	39	RB4
6	(GND)	40	RA5	6	(GND)	40	RB5
7	(GND)	41	RA6	7	(GND)	41	RB6
8	(GND)	42	RA7	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 all the bits.
Note 2:	This pin layout is not compatible with the pin layout of the 57-pin connector used to date. (1:1 for GND is used to give priority to the characteristics.)

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

Output: Compatible with panel link, LVDS FPDLINK(TM) or FLAT LINK (TM)



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

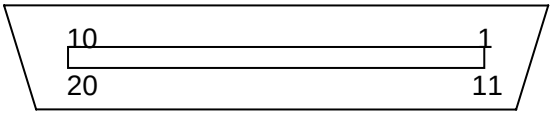
Note 1:	The clock delay for the LVDS output cannot be set.
Note 2:	When signals are input to a 6-bit LVDS device, operation can be performed by connecting the differential pair lines of TXA0, TXA1, TXA2 and TXACK in the case of CH1. The same applies for 2CH.

(3) DFP digital serial output

<1> Connector: made by HRS, 20 pins
<2> Output: Panel link
Pin layout

Connector pin no.	I/O signal
1	TX1+
2	TX1-
3	TX1G
4	TXCG
5	TXC+
6	TXC-
7	GND
8	+5V
9	NC
10	NC
11	TX2+
12	TX2-
13	TX2G
14	TX0G
15	TX0+
16	TX0-
17	NC
18	SENSE
19	DDC DATA
20	DDC CLK

Pin layout as seen from panel



Note: The clock delay for the LVDS output cannot be set. Only the EVEN data is output with 1:2.

(4) DVI digital serial output

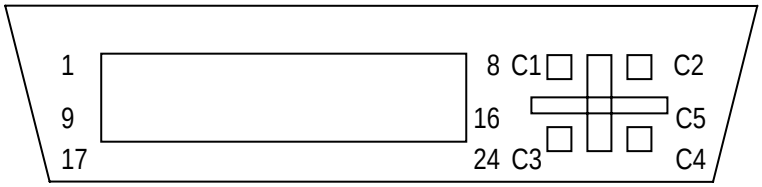
<1> Connector: made by Morex, DVI-I (74320.1000), 24 pins + 5 terminals (analog) or DVI-D (74320.4000), 24 pins

<2> Output: Panel link

Pin layout

Connector pin no.	I/O signal
1	TMDS DATA2-
2	TMDS DATA2+
3	TMDS DATA2/4 G
4	TMDS DATA4-
5	TMDS DATA4+
6	DDC CLK
7	DDC DATA
8	NC
9	TMDS DATA1-
10	TMDS DATA1+
11	TMDS DATA1/3 G
12	TMDS DATA3-
13	TMDS DATA3+
14	+5V
15	GND
16	SENSE
17	TMDS DATA0-
18	TMDS DATA0+
19	TMDS DATA0/5 G
20	TMDS DATA5-
21	TMDS DATA5+
22	TMDS CLK G
23	TMDS CLK+
24	TMDS CLK-

Pin layout as seen from panel



Note: The clock delay for the panel link output cannot be set.

The 1:1 panel link signals are output from connector 1. Only the EVEN data is output with 1:2.
When DVI-I (74320.1000) is used, analog signals are not output, and analog terminal C5 is connected to ground.
Terminals C1 through C5 shown in the figure above are not provided for the DVI-D (74320.4000).
The maximum current rating for +5V (pin 14) is 0.5A.

<1> Panel link device input pin correspondence table
Panel link devices: Made by SiI
Transmitter: SiI150 (supporting 112 MHz)
SiI160 (supporting 165 MHz)

Input pin SiI	Panel link 8 bits	
	1 CH	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 bitmap, the CTL signal connections have been changed from the bitmap for the conventional VG-826A and VG-827. The areas related to the R, G and B signals have been left unchanged.
Note 2:	It should be borne in mind that the R, G and B LSB and MSB names differ from one device manufacturer to another.

<2> LVDS device pin correspondence table

LVDS device	NS	Thine
Transmitter	DS90C384	THC63LVDM83A

Input pin		LVDS 8 bits	
ZAIN	NS	1 CH	2 CH 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 layout is not the same as the 8-bit or 6-bit pin layout of the conventional VG-826A, VG-827 and LV-1600.
Note 2:	It should be borne in mind that the R, G and B LSB and MSB names differ from one device manufacturer to another.
Note 3:	This pin layout is compatible with the devices made by THine, NS and TI.

(3) Remote connector (D-sub 25-pin, female)

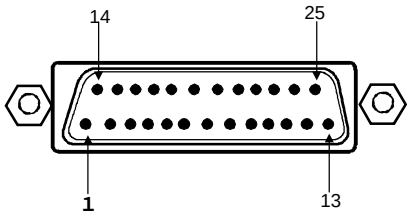


Fig. 7-4

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.

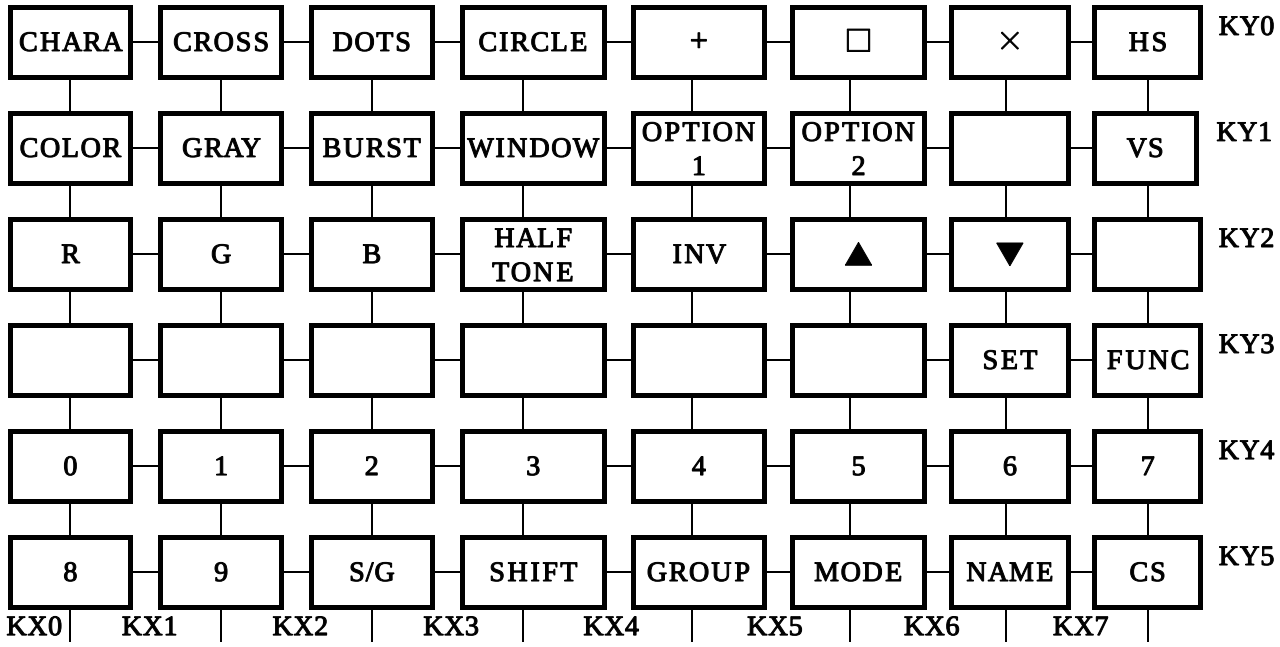


Fig. 7-5 RB-649 key matrix

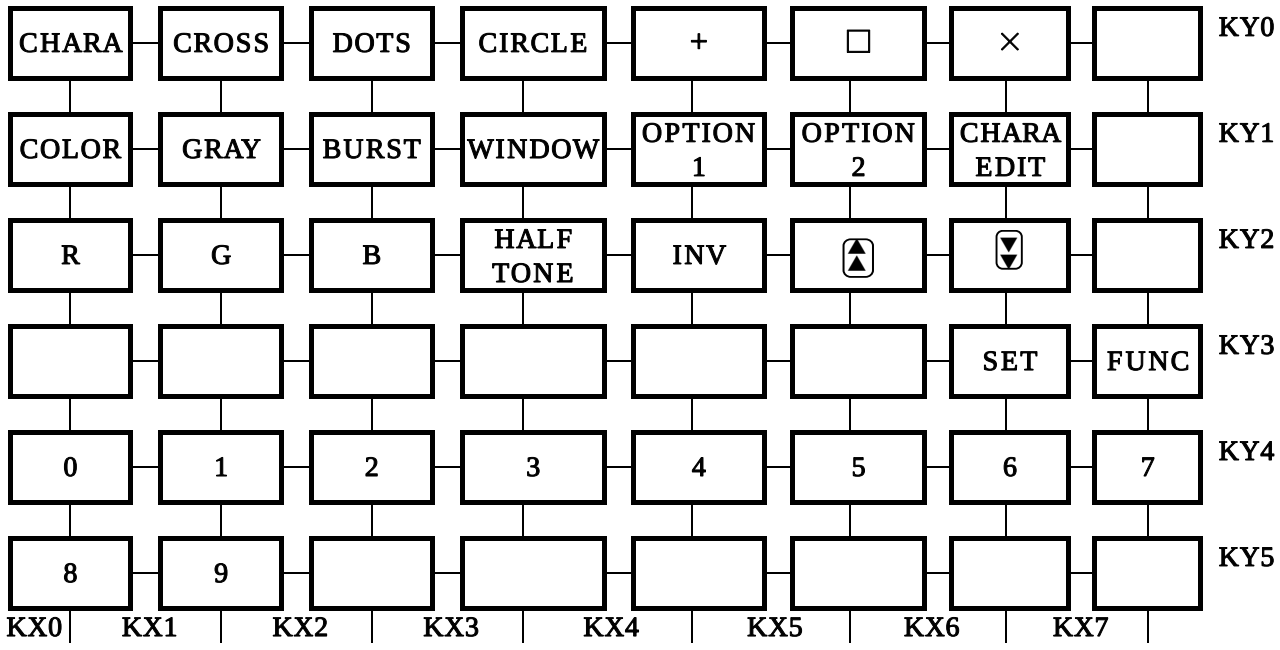


Fig. 7-6 RB-614C key matrix

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

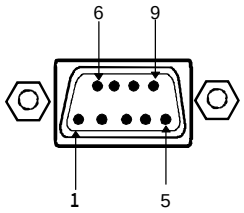
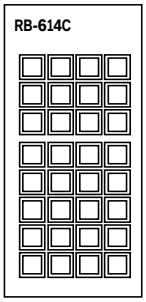


Fig. 7-7

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

7-6 Optional accessories

(1) RB-614C remote control box

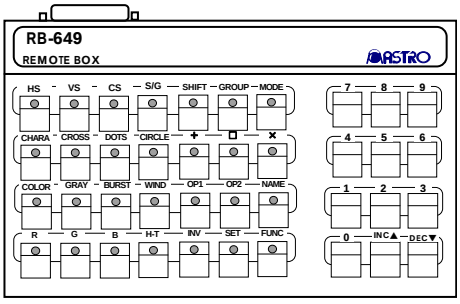


This is one of the remote control boxes used for the VG generators.

Connecting this box to the VG-845 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, 856, 825, 826A and 852 models.

(2) RB-649 remote control box



This is another remote control box designed for use with the VG generators.

In addition to the VG-845, it can also be used with the VG-822, 823, 827, 826A, 851, 852 and 856 models.

CHAPTER 8
INTERNAL DATA

8-1 Internal program data

Program No.	Horizontal frequency (kHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (HxV)	Timing name	Pattern data	Pattern name
850	37.86	85.08	31.50	640x400	VESA400-85	Character list 7x9	Character List
851	37.86	72.81	31.50	640x480	VESA480-72	OPT27 (song of youth)	Words
852	37.50	75.00	31.50	640x480	VESA480-75	Character 1 (H 5x7/10x14)	H Character 1
853	35.16	56.25	36.00	800x600	VESA600-56	Character 1 (H 7x9/14x18)	H Character 2
854	37.88	60.32	40.00	800x600	VESA600-60	Character 1 (H 16x16/32x32)	H Character 3
855	48.08	72.19	50.00	800x600	VESA600-72	Character 2 (H 5x7/10x14)	H Character 4
856	48.36	60.00	65.00	1024x768	VESA768-60	Character 2 (H 7x9/14x18)	H Character 5
857	56.48	70.07	75.00	1024x768	VESA768-70	Character 2 (H 16x16/32x32)	H Character 6
858	60.02	75.03	78.75	1024x768	VESA768-75	Character 1 (@ 7x9/14x18)	@ Character
859	79.98	75.02	135.00	1280x1024	VESA1024-75	Character 1 (Chinese character "KU" 7x9/14x18)	Chinese Chara 1
860	91.15	85.02	157.50	1280x1024	VESA1024-85	Character 1 (Chinese character "BI" 64x64/64x64)	Chinese Chara 2
861	75.00	60.00	162.00	1600x1200	VESA1200-60	Character 1 (Chinese character "AI" 64x64/64x64)	Chinese Chara 3
862	81.25	65.00	175.50	1600x1200	VESA1200-65	Character 1 (chessboard 16x16/16x16)	1 dot ON/OFF
863	87.50	70.00	189.00	1600x1200	VESA1200-70	Character me (#1 18x18)	me Character 1
864	93.75	75.00	202.50	1600x1200	VESA1200-75	Character me (VESA specifications 18x18)	me Character 2
865	100.00	80.00	216.00	1600x1200	VESA1200-80	OPT0B (character edge H)	H Character Line
866	106.25	85.00	229.50	1600x1200	VESA1200-85	OPT0C (character edge O)	O Character Line
867	98.21	70.05	236.50	1800x1350	VESA1350-70		
868	18.44	49.83	16.26	750x350	MDA	1-dot width crosshatch (H=5, V=5)	1line Cross 5x5
869	15.75	60.10	14.36	640x200	CGA	2-dot width crosshatch (H=5, V=5)	2line Cross 5x5
870	21.85	59.71	16.26	640x350	EGA	OPT23 (8-block crosshatch)	1line Cross 8x8
871	30.48	60.00	24.87	640x400	PGA	2-dot width crosshatch (H=8, V=8)	2line Cross 8x8
872	31.47	50.03	28.32	720x350	VGA-TEXT350-50	1-dot width crosshatch (H=10, V=8)	1line Cross 10x8
873	31.47	59.94	28.32	720x350	VGA-TEXT350-60	2-dot width crosshatch (H=10,V=8)	2line Cross 10x8
874	31.47	70.08	28.32	720x350	VGA-TEXT350-70	1-dot width crosshatch (H=16,V=12)	1line Cross 16x12
875	31.47	50.03	28.32	720x400	VGA-TEXT400-50	2-dot width crosshatch (H=16,V=12)	2line Cross 16x12
876	31.47	59.94	28.32	720x400	VGA-TEXT400-60		
877	31.47	70.08	28.32	720x400	VGA-TEXT400-70	Burst (Format 0)	Burst 1
878	31.46	50.02	25.17	640x350	VGA350-50	Burst (Format 1)	Burst 2
879	31.46	59.93	25.17	640x350	VGA350-60	Burst (Format 2)	Burst 3
880	31.46	70.07	25.17	640x350	VGA350-70	Burst (Format 3)	Burst 4
881	31.46	50.02	25.17	640x400	VGA400-50		
882	31.46	59.93	25.17	640x400	VGA400-60	OPT10 (sine wave scroll)	Sign Wave Scroll
883	31.46	70.07	25.17	640x400	VGA400-70	OPT11 (multi burst)	Multi Burst
884	31.46	50.02	25.17	640x480	VGA480-50	OPT12 (10 steps & 1/10 MHz)	1/10MHz x 10step
885	31.46	59.93	25.17	640x480	VGA480-60	Circle (Format 0)	Circle 1
886	35.16	57.16	36.00	800x600	S-VGA-56	Circle (Format 1)	Circle 2
887	48.08	72.19	50.00	800x600	S-VGA-72	Circle (Format 2)	Circle 3
888	46.88	75.00	49.50	800x600	S-VGA-75	Circle (Format 3)	Circle 4
889	48.08	59.80	65.00	1024x768	XGA-60	Circle (Format 4)	Circle 5

Internal program data

Program No.	Horizontal frequency (kHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (HxV)	Timing name	Pattern data	Pattern name
890	53.95	66.11	71.64	1024x768	XGA-66	Circle (Format 5)	Circle 6
891	56.48	70.07	75.00	1024x768	XGA-70	Circle (Format 6)	Circle 7
892	60.68	57.03	100.00	1280x1024	SXGA-57		
893	63.50	59.68	106.93	1280x1024	SXGA-60A	Window (Format 0, Flicker 0)	Window 1
894	63.75	59.75	110.16	1280x1024	SXGA-60B	Window (Format 1, Flicker 0)	Window 2
895	63.72	60.00	109.47	1280x1024	SXGA-60C	Window (Format 2, Flicker 0)	Window 3
896	78.91	74.16	132.88	1280x1024	SXGA-70	Window (Format 3, Flicker 0)	Window 4
897	74.63	59.94	160.00	1600x1200	UXGA1200-60	Window (Format 4, Flicker 0)	Window 5
898	107.42	85.05	220.00	1600x1200	UXGA1200-85A	Window (Format 5, Flicker 0)	Window 6
899	106.48	85.05	230.00	1600x1200	UXGA1200-85B	Window (Format 8, Flicker 7)	Moving Window 1
900	107.42	80.05	220.00	1600x1280	UXGA1280-80A	Window (Format 9, Flicker 7)	Moving Window 2
901	106.48	80.06	230.00	1600x1280	UXGA1280-80B	Window (Format E, Flicker 7)	Moving Window 3
902	106.40	80.00	238.34	1600x1280	UXGA1280-80C	Window (Format F, Flicker 0)	Window Level
903	109.82	80.40	246.00	1600x1280	UXGA1280-82	Window (Format 0, Flicker 1)	Flicker Window 1
904	35.52	43.48	44.90	1024x768	IBM 8514A	Window (Format 0, Flicker 3)	Flicker Window 2
905	63.36	60.00	89.12	1024x1024	IBM 5080	Window (Format 0, Flicker 5)	Flicker Window 3
906	29.58	36.57	24.02	640x754	IBM 5550	Window (Format 0, Flicker 7)	Flicker Window 4
907	63.36	60.00	111.52	1280x1024	IBM 6000		
908	15.71	59.98	6.38	323x246	NAVIGATION	Color bar (horizontal, 8 colors x 1)	Color Bar 1
909	35.00	66.67	30.24	640x480	Mac 480-66A	Color bar (horizontal, 8 colors x 2)	Color Bar 2
910	34.97	66.60	31.33	640x480	Mac 480-66B	Color bar (vertical, 8 colors x 1)	Color Bar 3
911	48.83	66.89	50.00	800x600	Mac 600-66	Color bar (vertical, 8 colors x 2)	Color Bar 4
912	49.72	74.55	57.28	832x624	Mac 624-57	Color bar (horizontal, H=0.1%)	Color Bar 5
913	48.78	59.56	64.00	1024x768	Mac 768-60	Color bar (vertical, V=0.1%)	Color Bar 6
914	60.24	74.93	80.00	1024x768	Mac 768-75	OPT06 (color temperature)	Color Temp.
915	68.68	75.06	100.00	1152x870	Mac 870-75	OPT2D (random 256 colors)	Random 256 Color
916	24.82	56.42	21.05	640x400	NEC PC9801	OPT2A (256-color character)	256 Color Chara
917	32.86	39.92	47.84	1120x750	NEC PC9801XL	OPT00 (256-block color)	256 Block Color
918	50.02	60.05	78.43	1120x750	NEC 768-60A	OPT03 (8 colors & 16 grays)	8Color & 16Gray
919	56.48	70.07	75.00	1024x768	NEC 768-70	Gray scale (4 steps)	Gray 4 step
920	64.60	59.93	107.50	1280x1024	NEC 1024-60	Gray scale (horizontal 8 gradations)	Gray 8 step(H)
921	74.88	69.85	127.00	1280x1024	NEC 1024-70	Gray scale (horizontal 16 gradations)	Gray 16 step(H)
922	78.86	74.11	135.00	1280x1024	NEC 1024-75	OPT1B (horizontal 32 gradations of gray)	Gray 32 step(H)
923	48.36	60.08	65.00	1024x768	NEC 768-60B	OPT1C (horizontal 64 gradations of gray)	Gray 64 step(H)
924	61.80	65.95	92.94	1152x900	SUN 900-66	OPT2B (horizontal linear gradation ramp)	Gray256step(H)
925	71.73	76.07	105.59	1152x900	SUN 900-76	Gray scale (vertical 8 gradations)	Gray 8 step(V)
926	70.84	84.03	92.94	1024x800	SUN 800-84	Gray scale (vertical 16 gradations)	Gray 16 step(V)
927	81.13	76.11	135.00	1280x1024	SUN 1024-76	OPT36 (vertical 32 gradations of gray)	Gray 32 step(V)
928	63.38	60.02	107.50	1280x1024	SONY NEWS	OPT37 (vertical 64 gradations of gray)	Gra 64 step(V)
929	78.86	74.11	135.00	1280x1024	SONY 1024-74	OPT2C (vertical linear gradation ramp)	Gray256step(V)

Internal program data

Program No.	Horizontal frequency (kHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (HxV)	Timing name	Pattern data	Pattern name
930	126.84	60.00	357.18	2048x2048	SONY DDM2802	OPT01 (64-gradation block gray)	Gray 64 Block 1
931	48.48	59.64	64.00	1024x768	SGI Indigo768-60	OPT02 (64-gradation block gray)	Gray 64 Block 2
932	77.01	72.38	130.00	1280x1024	SGI Indigo1024-70	OPT34 (circle & crosshatch)	Circle & Cross
933	63.90	60.00	107.35	1280x1024	SGI IRIS4D	OPT0D (crosstalk width 90%)	Cross Talk 90%
934	63.33	59.97	108.17	1280x1024	HP 9000t1	OPT0E (crosstalk width 60%)	Cross Talk 60%
935	78.13	72.00	135.00	1280x1024	HP 9000t2	Black solid	Black
936	54.00	60.00	69.12	1024x864	VAX 768-60	White solid	RGB
937	70.66	66.47	119.84	1280x1024	VAX 1024-66	Red solid	R
938	60.05	75.06	78.78	1024x768	Fujitsu FMV 1024-75	Green solid	G
939	80.66	100.83	108.41	1280x1024	Fujitsu FMV 1024-100	Blue solid	B
940	79.70	74.83	134.37	1280x1024	Fujitsu FMV5166	Magenta solid	R-B
941	80.38	75.12	135.04	1280x1024	Fujitsu FMV5133	Yellow solid	R-G
942	63.74	60.02	108.10	1280x1024	Fujitsu SIGMA	Cyan solid	G-B
943	78.16	71.64	135.06	1280x1024	HITACHI SXGA	Dot (H=20, V=20)	Dot H20 / V20
944	26.35	59.90	22.77	640x400	Panasonic M550	Dot (H=60, V=60)	Dot H60 / V60
945	46.88	75.00	49.50	800x600	VESA600-75	OPT00 (256-block color)	256 Block Color
946	15.73	29.97	12.65	646x484	NTSC	OPT26 (SMPTE color version)	SMPTE RP133 COL
947	31.47	59.95	28.64	746x471	ASTRO SC-2025	OPT26 (SMPTE color version)	SMPTE RP133 COL
948	62.95	59.95	57.28	746x942	NTSC*4	OPT26 (SMPTE color version)	SMPTE RP133 COL
949	15.63	25.00	14.50	756x574	PAL	OPT26 (SMPTE color version)	SMPTE RP133 COL
950	31.25	50.00	29.00	756x557	PAL*2	OPT26 (SMPTE color version)	SMPTE RP133 COL
951	33.75	30.00	74.25	1920x1034	HDTV	OPT26 (SMPTE color version)	SMPTE RP133 COL
952	67.50	60.00	148.50	1920x1035	HDTV*2	OPT26 (SMPTE color version)	SMPTE RP133 COL
953	31.54	60.08	27.00	720x480	480p	OPT34 (circle & crosshatch)	4:3 Test
954	45.00	60.00	74.25	1280x720	720p	OPT34 (circle & crosshatch)	16:9 Test
955	33.75	30.00	74.25	1920x1080	1080i	OPT34 (circle & crosshatch)	16:9 Test
956	31.22	24.99	46.20	1170x1168	MEDICAL-1I	OPT25(SMPTE RP-133)	SMPTE RP133 MONO
957	31.22	50.03	46.20	1170x584	MEDICAL-1N	OPT25(SMPTE RP-133)	SMPTE RP133 MONO
958	30.69	30.00	36.83	947x946	MEDICAL-2I	OPT25(SMPTE RP-133)	SMPTE RP133 MONO
959	30.69	60.07	36.83	947x473	MEDICAL-2N	OPT25(SMPTE RP-133)	SMPTE RP133 MONO
960	37.93	85.04	35.50	720x400	VESA400-88	OPT00 (256-block color)	256 Block Color
961	112.50	90.00	243.00	1600x1200	1200-90	OPT1A (ITC H character)	ITC H Character
962	67.50	60.00	148.50	1920x1080	1080p	OPT18 (ITC 9 window)	ITC 9 Window
963	63.98	60.02	108.00	1280x1024	VESA1024-60	OPT19 (ITC cross & marker)	ITC Cross & Marker
964						OPT04 (gray & crosshatch)	Gray & Cross
965	31.47	59.94	34.24	864x480	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	1376x768	W-XGA	OPT08 (crosshatch & circle & gray)	Cross & Circle
968						OPT09 (crosshatch + circle + character)	Total Test
969						OPT0A (circle & line)	Circle & Line

Internal program data

Program No.	Horizontal frequency (kHz)	Vertical frequency (Hz)	Dot clock frequency (MHz)	No. of display dots (HxV)	Timing name	Pattern data	Pattern name
970	67.50	60.00	148.50	1920x1080	1080P	OPT13 (gamma correction ramp wr2.5)	Gamma Ramp 1
971	67.50	59.94	148.35	1920x1080	1080P	OPT14 (gamma correction ramp r2.0)	Gamma Ramp 2
972	33.75	30.00	74.25	1920x1080	1080I	OPT15 (gamma correction ramp r0.5)	Gamma Ramp 3
973	33.75	29.97	74.18	1920x1080	1080I	OPT17(SMPTE RP27.1)	SMPTE PR27.1
974	33.75	30.00	74.25	1920x1035	1035I	OPT25(SMPTE RP-133)	SMPTE RP133 MONO
975	33.75	29.97	74.18	1920x1035	1035I	OPT26 (SMPTE color version)	SMPTE RP133 COL
976	45.00	60.00	74.25	1280x720	720P	OPT1D (64 gray + RGBW color)	64 Gray & Color
977	45.00	59.94	74.18	1280x720	720P	OPT1E (gray scale + circle)	Gray & Circle
978	31.50	59.94	27.00	720x483	483P	OPT29 (crosshatch & marker)	Cross & Marker
979						OPT30	Edge & Window
980	83.64	60.00	204.75	1792x1344	VESA1344-60	OPT35 (chessboard & window)	1dot ON/OFF
981	106.27	75.00	261.00	1792x1344	VESA1344-75	OPT22 (high-voltage power supply)	High Voltage
982	86.33	60.00	218.25	1856x1392	VESA1392-60	OPT33 (19x15 crosshatch & marker)	D.Y.Test
983	112.50	75.00	288.00	1856x1392	VESA1392-75	OPT32 (3 gradation window)	TTL test
984	90.00	60.00	234.00	1920x1440	VESA1440-60	OPT16 (SMPTE color bar)	SMPTE Color Bar
985	112.50	75.00	297.00	1920x1440	VESA1440-75	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	640x480	VGA480-60	OPT80 (image data #1 display)	IMG Disp #1
997	48.08	72.19	50.00	800x600	VESA600-72	OPT81 (image data #2 display)	IMG Disp #2
998	56.48	70.07	75.00	1024x768	VESA768-70	OPT82 (image data #3 display)	IMG Disp #3
999	79.98	75.02	135.00	1280x1024	VESA1024-75	OPT83 (image data #4 display)	IMG Disp #4

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

8-2 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	32-gradation gray scale in horizontal direction
02	64-gradation block gray (black →white)	12	10 steps x 1/10 MHz	22	High-voltage power supply	32	3-gradation window
03	8 color bars & 16 gray scale	13	Gamma correction ramp wr=2.5	23	8-block crosshatch	33	19x15 crosshatch & marker
04	Gray scale & crosshatch	14	Gamma correction ramp r=2.0	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	SMPTE color bar	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 data	1E	Gray scale + circle	2E		3E	ANSI pattern (horizontal resolution)
0F		1F		2F	Full color RGBW color bar superimposed	3F	ANSI pattern (vertical resolution)

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

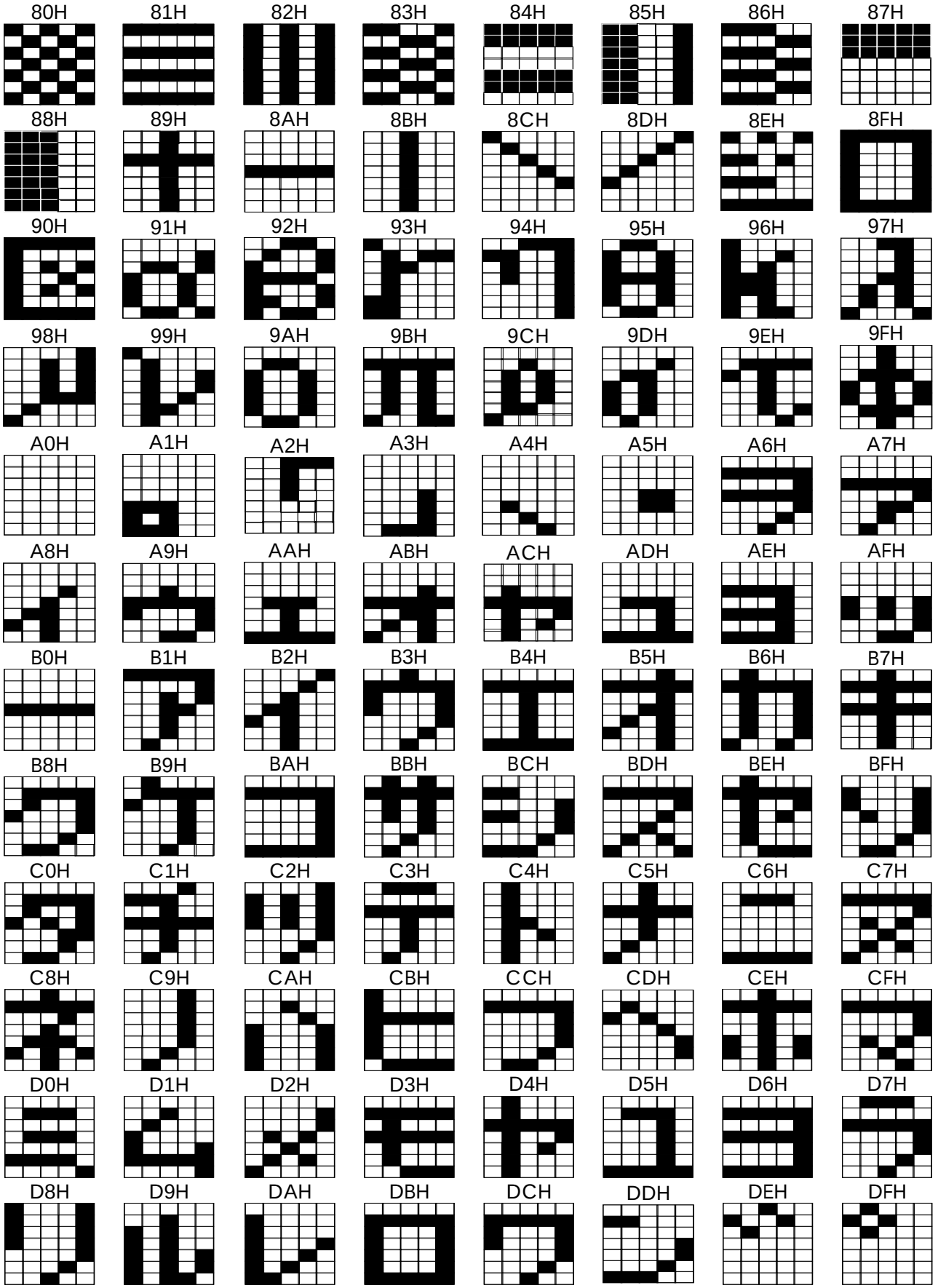
8-3 Internal user character data

Code	Description	Cell size
F0	"me" letters #1	18x18
F1	"me" letters #2 (VESA specifications)	18x18
F2	Chinese character "AI"	64x64
F3	Chinese character "BI"	64x64
F4	Chinese character "TAKA"	32x32
F5	Chinese character "KIRI"	32x32
F6	Chinese character "KEN"	32x32
F7	Burst	64x64
F8		
F9		
FA		
FB		
FC		
FD		
FE		
FF		

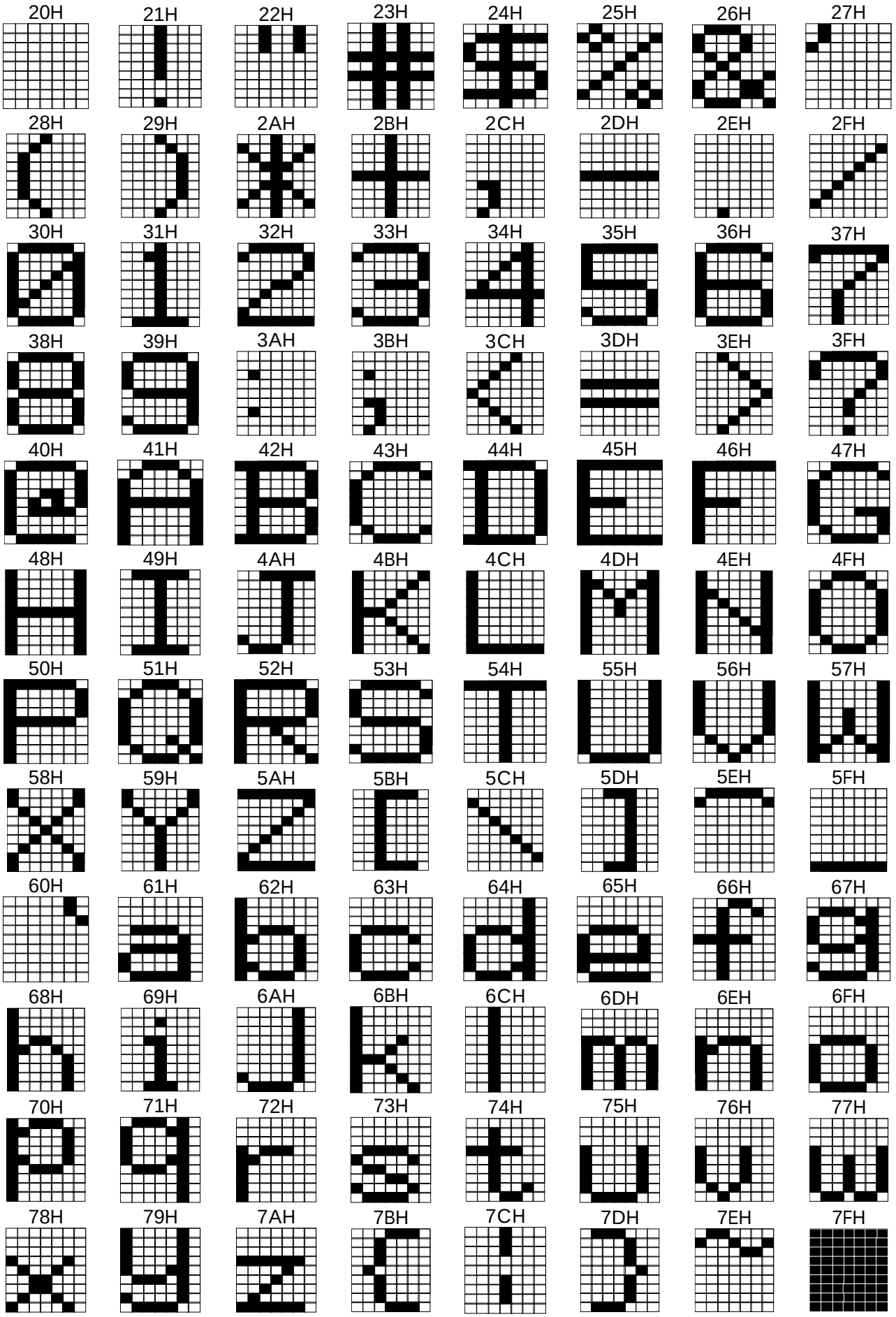
CHAPTER 9 CHARACTER CODES

(5x7) Character pattern table 1

(5x7) Character pattern table 2

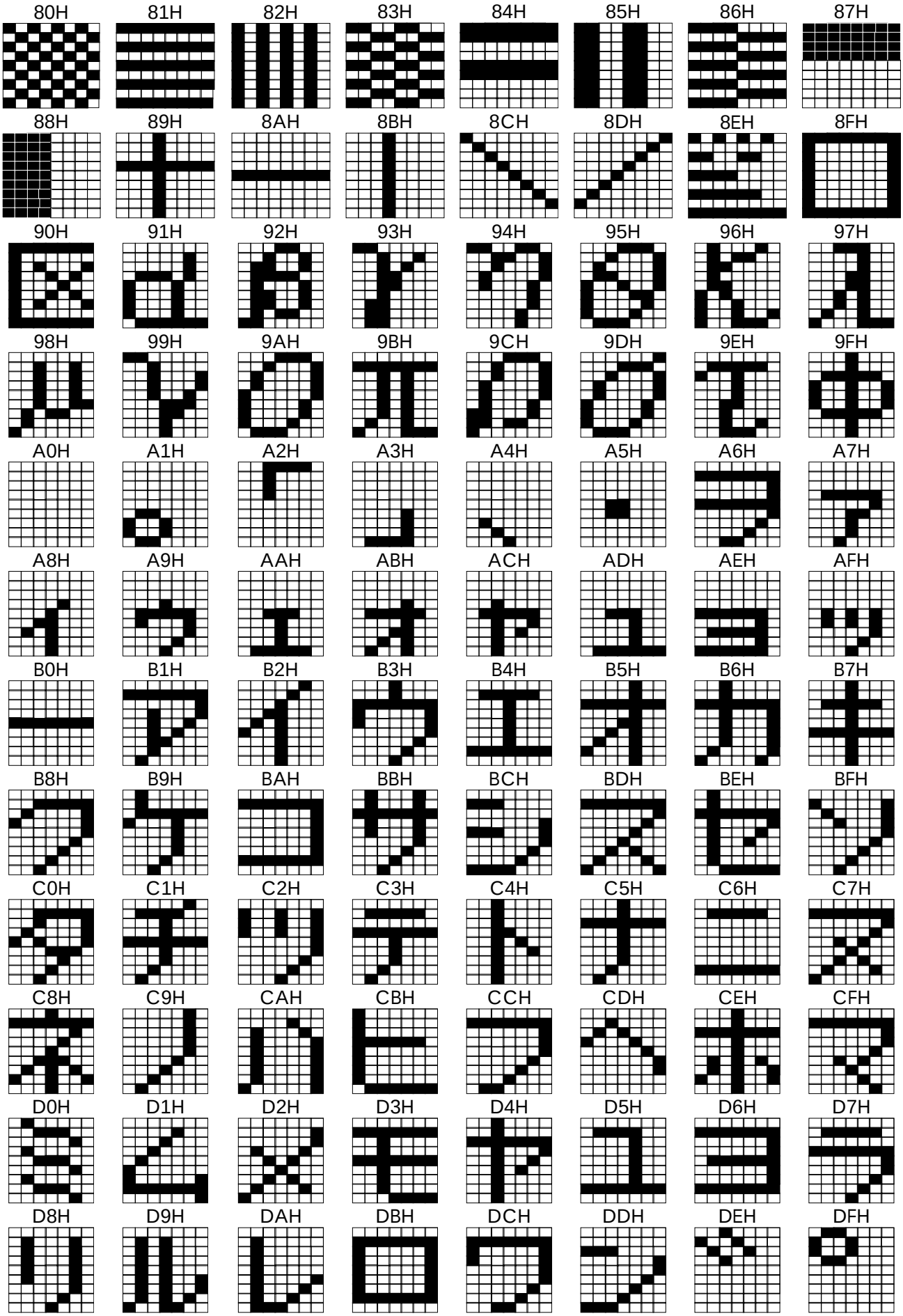


(7x9) Character pattern table 1

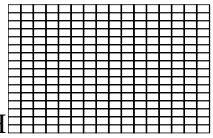


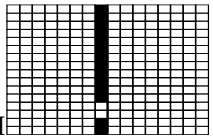
(7x9) Character pattern table 2

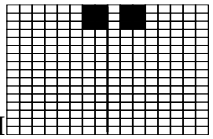
* Character codes 80H to 8FH are displayed with 8x9 dots.

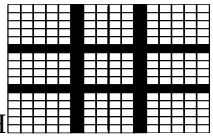


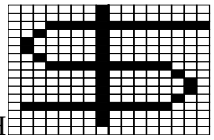
(16x16) Character pattern table 1

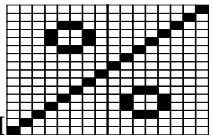
20H 

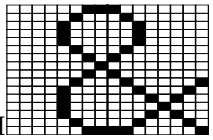
21H 

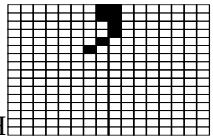
22H 

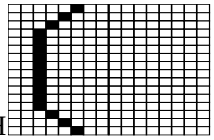
23H 

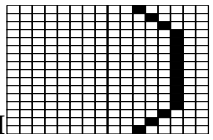
24H 

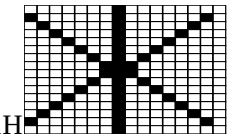
25H 

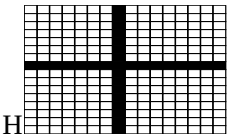
26H 

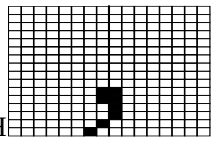
27H 

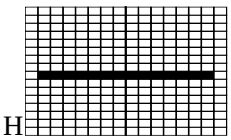
28H 

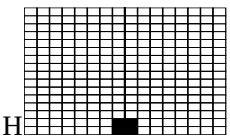
29H 

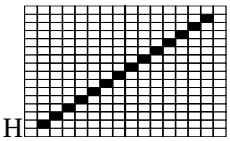
2AH 

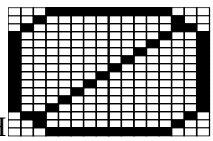
2BH 

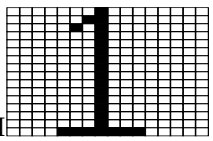
2CH 

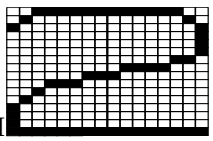
2DH 

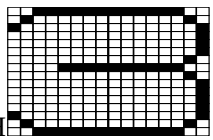
2EH 

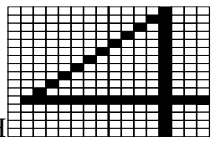
2FH 

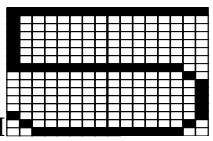
30H 

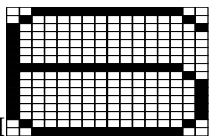
31H 

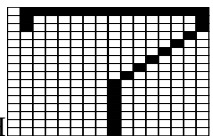
32H 

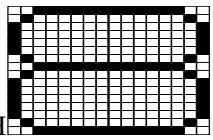
33H 

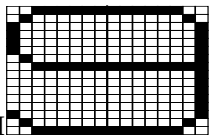
34H 

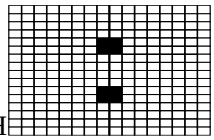
35H 

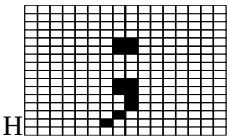
36H 

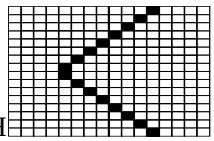
37H 

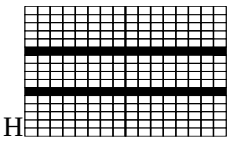
38H 

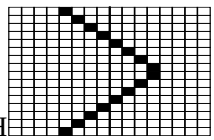
39H 

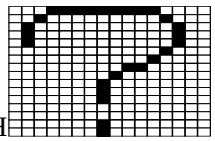
3AH 

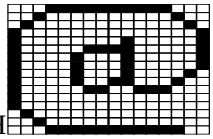
3BH 

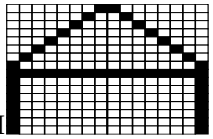
3CH 

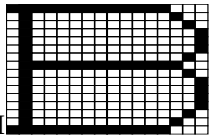
3DH 

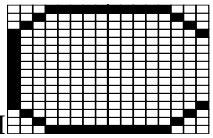
3EH 

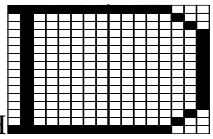
3FH 

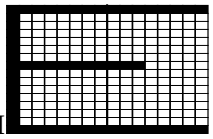
40H 

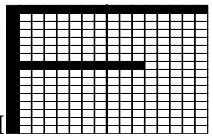
41H 

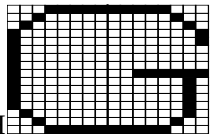
42H 

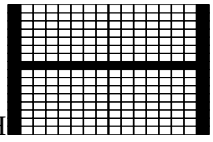
43H 

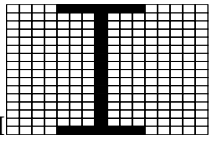
44H 

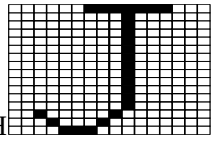
45H 

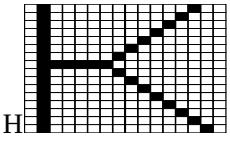
46H 

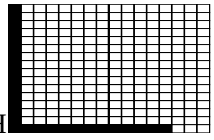
47H 

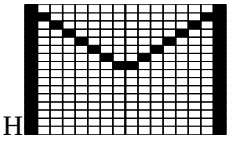
48H 

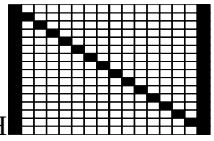
49H 

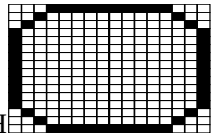
4AH 

4BH 

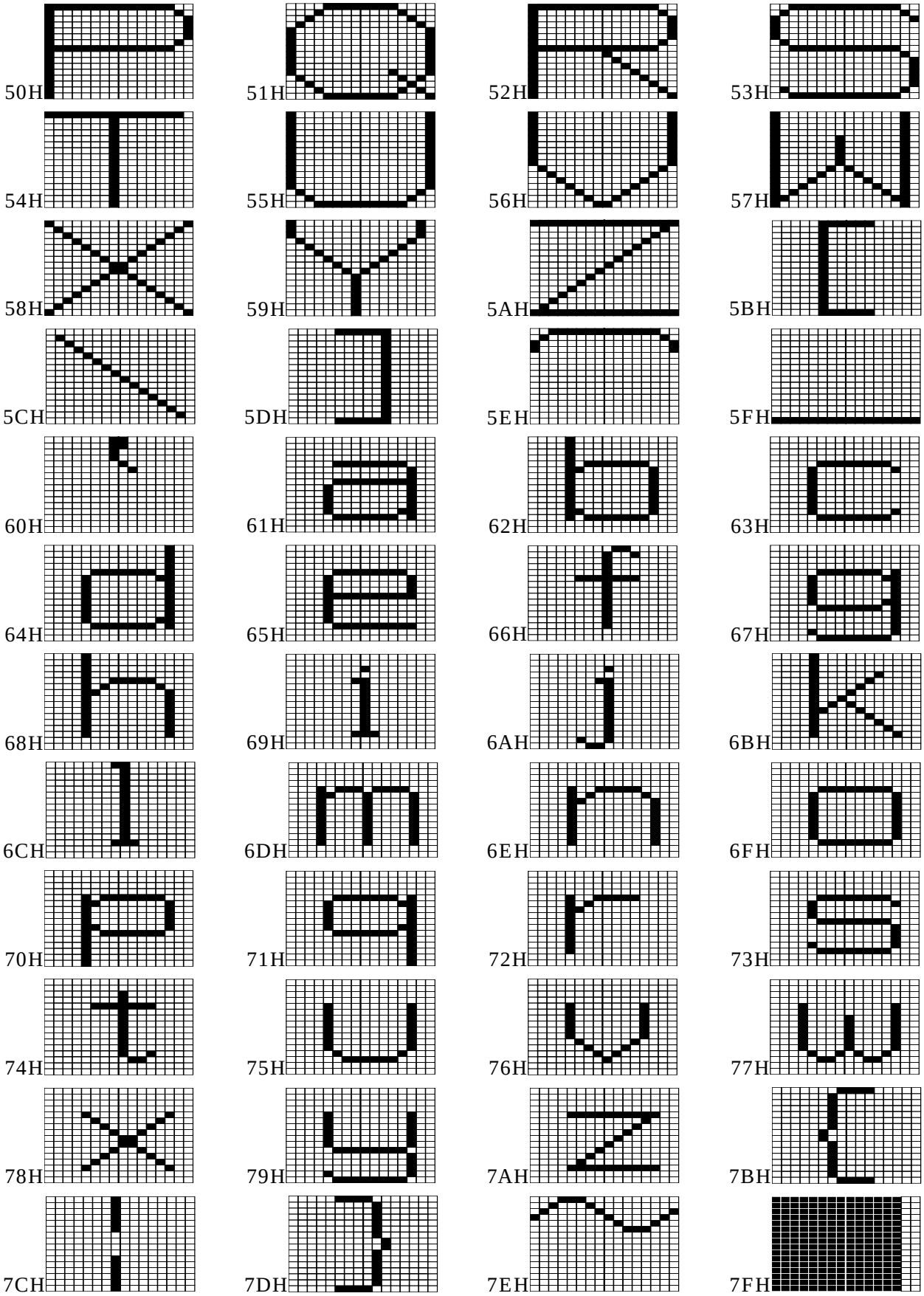
4CH 

4DH 

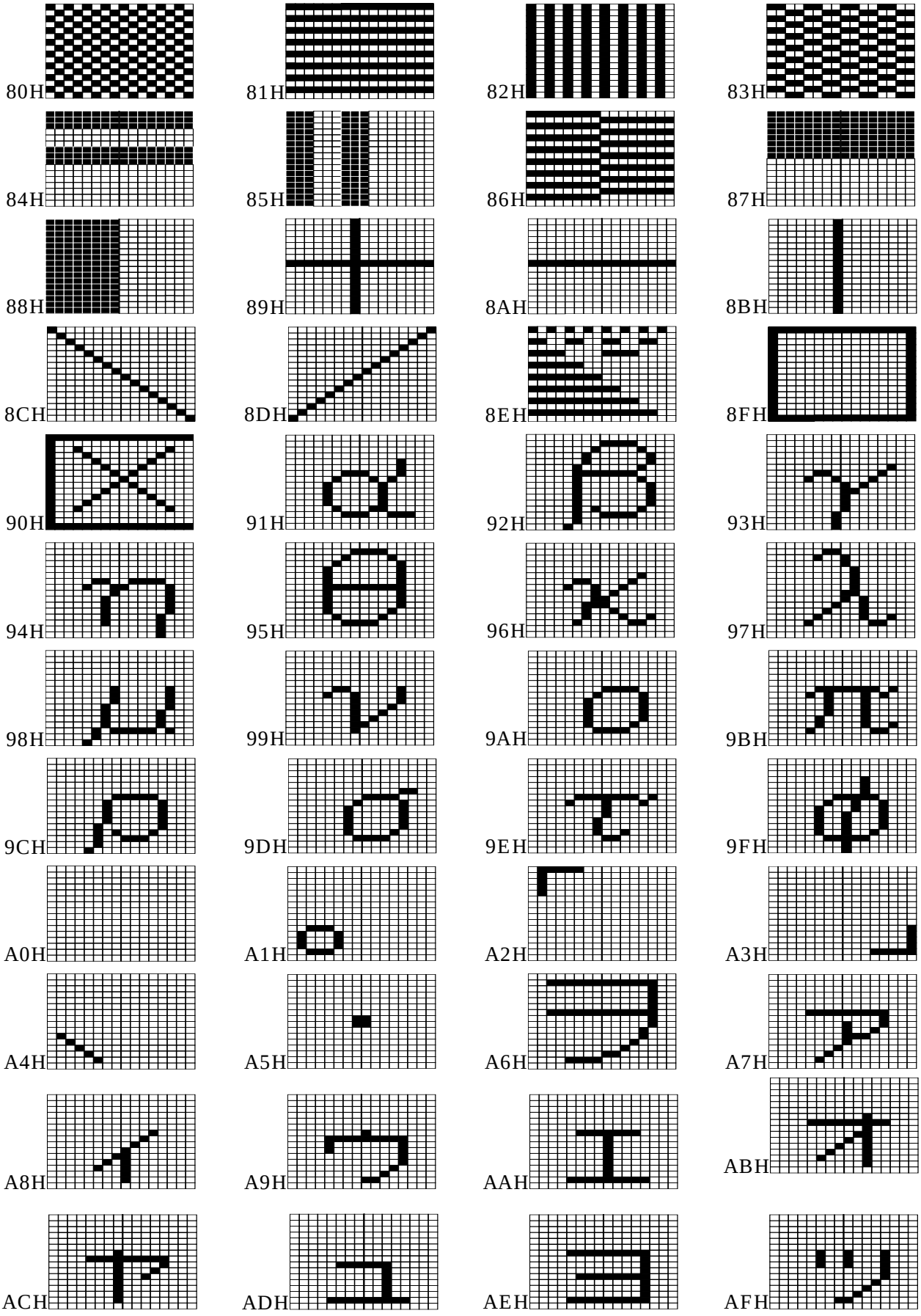
4EH 

4FH 

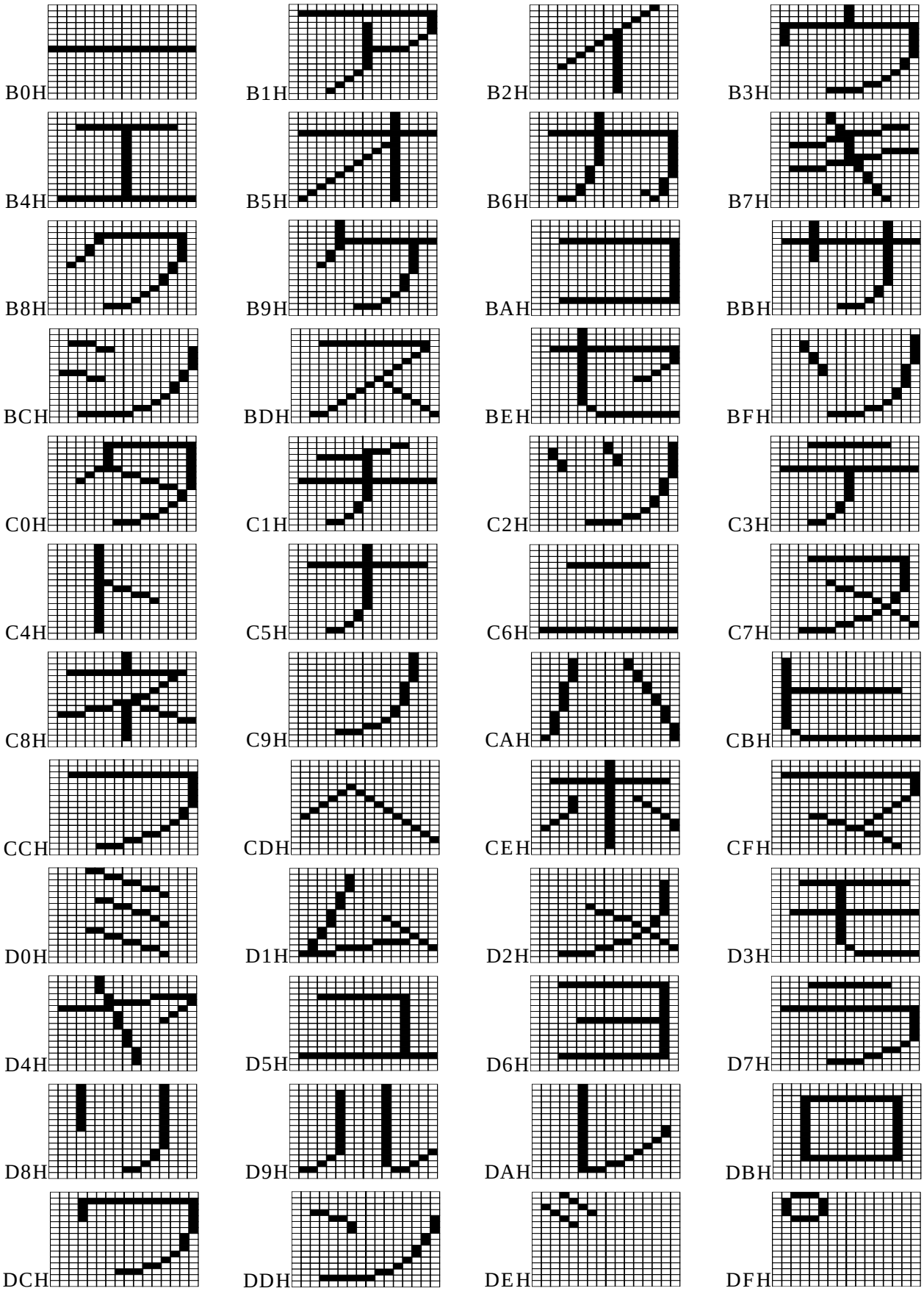
(16x16) Character pattern table 2



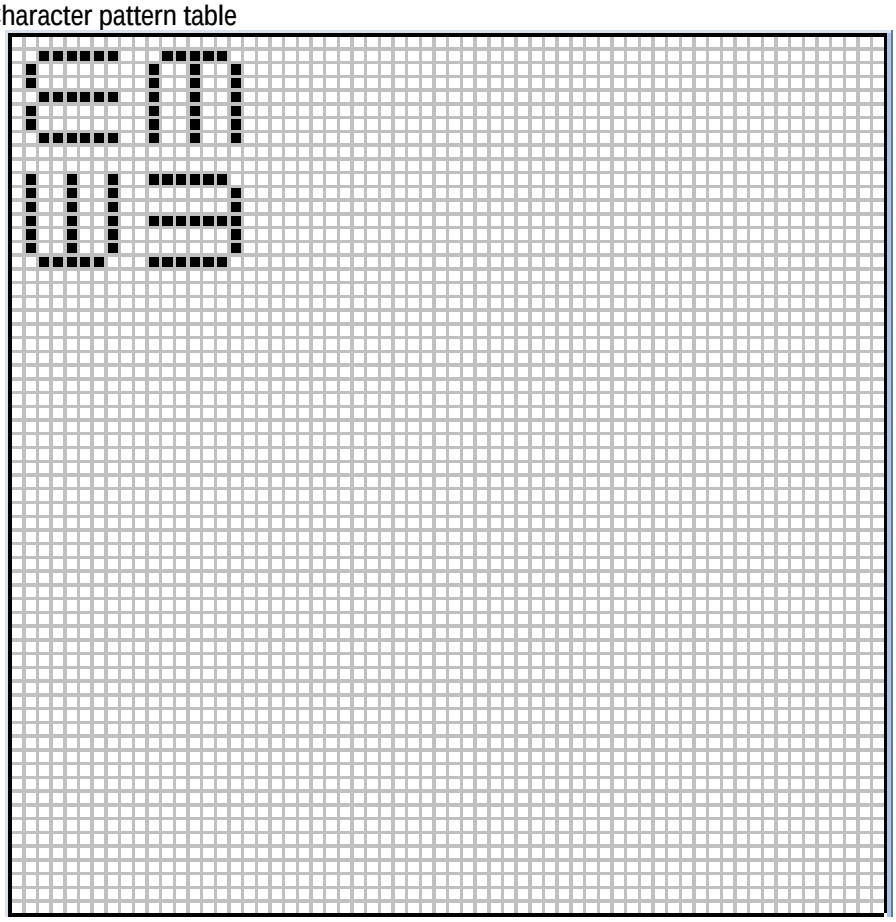
(16x16) Character pattern table 3



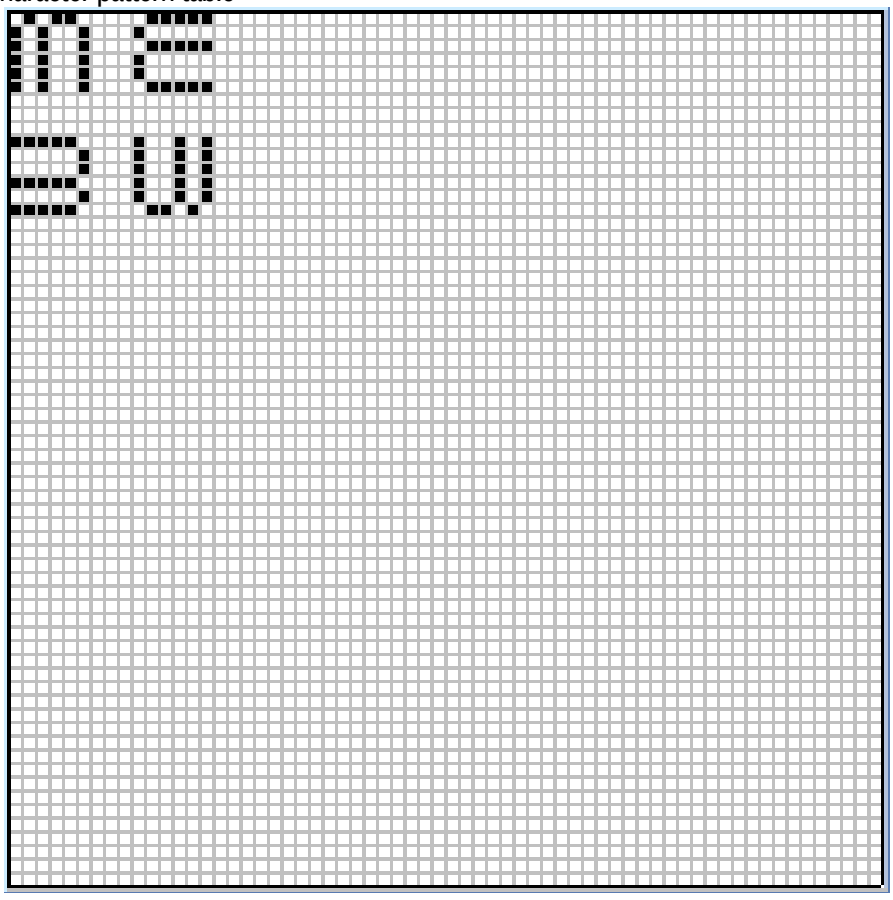
(16x16) Character pattern table 4



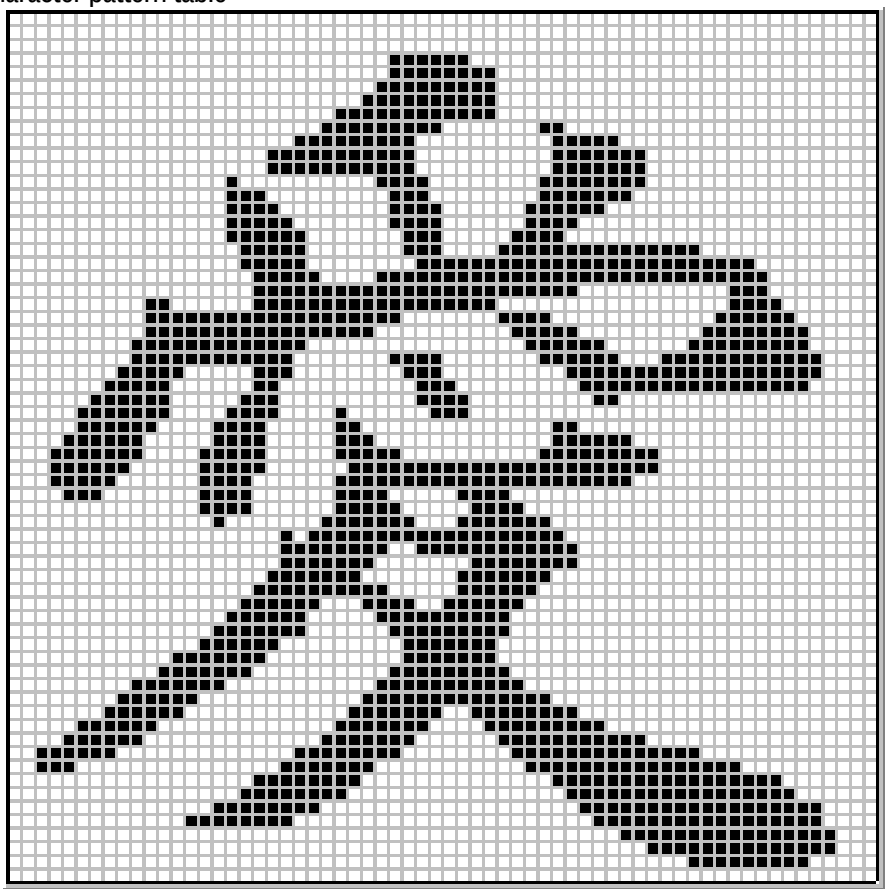
F0H (18x18) Character pattern table



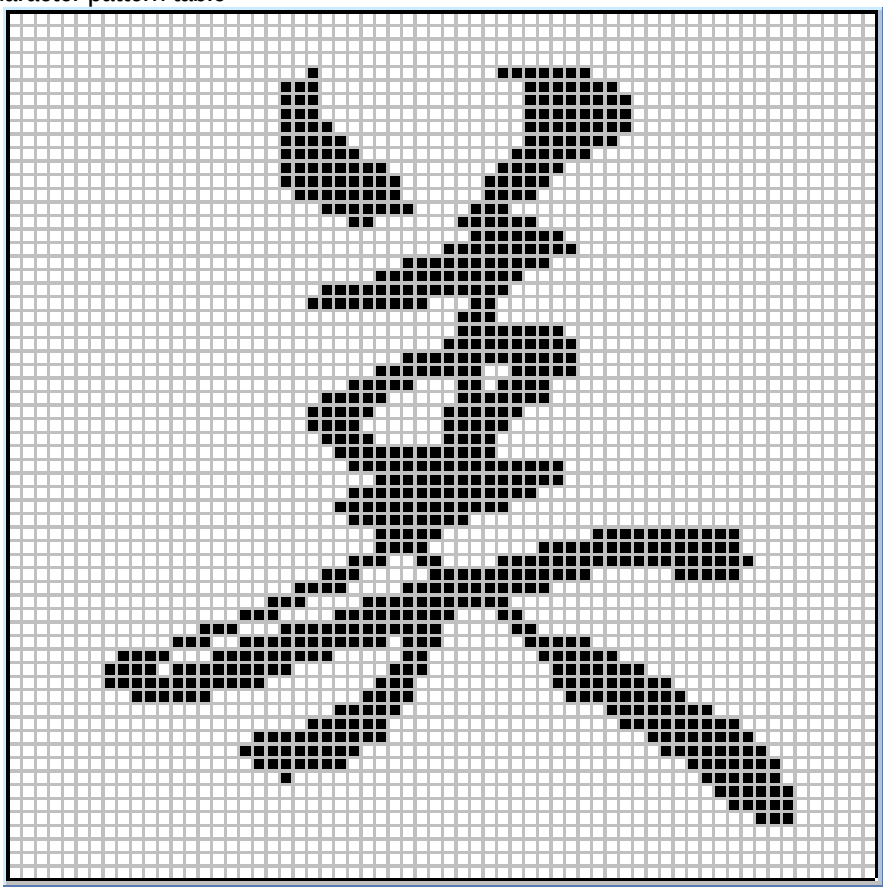
F1H (18x18) Character pattern table



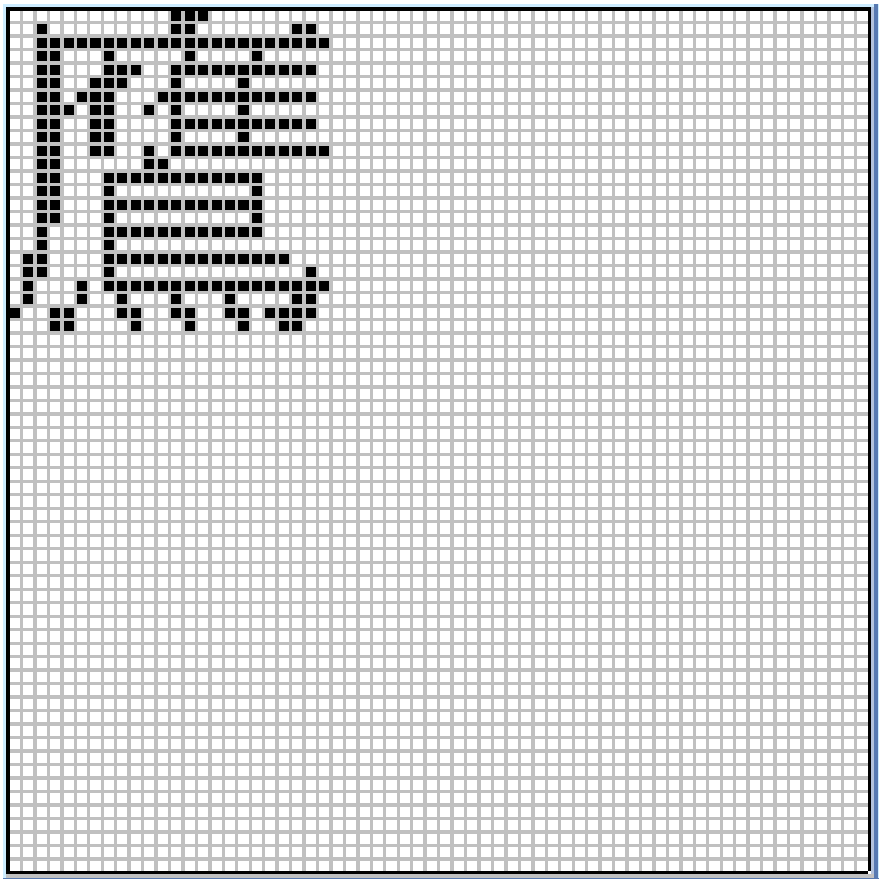
F2H (64x64) Character pattern table



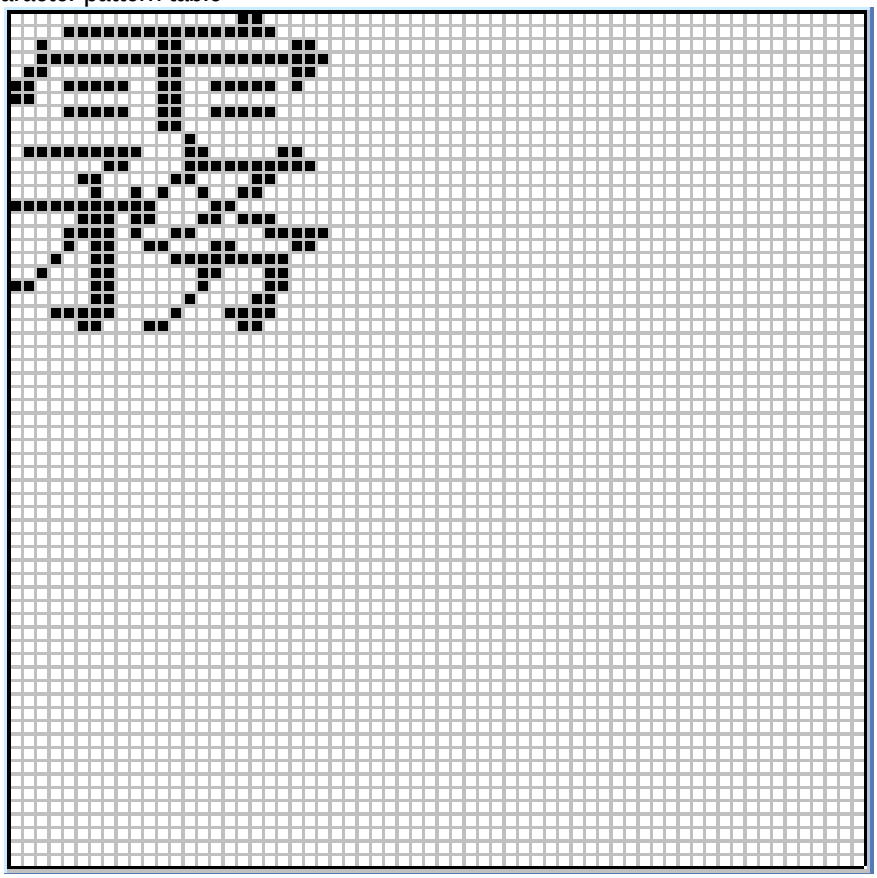
F3H (64x64) Character pattern table



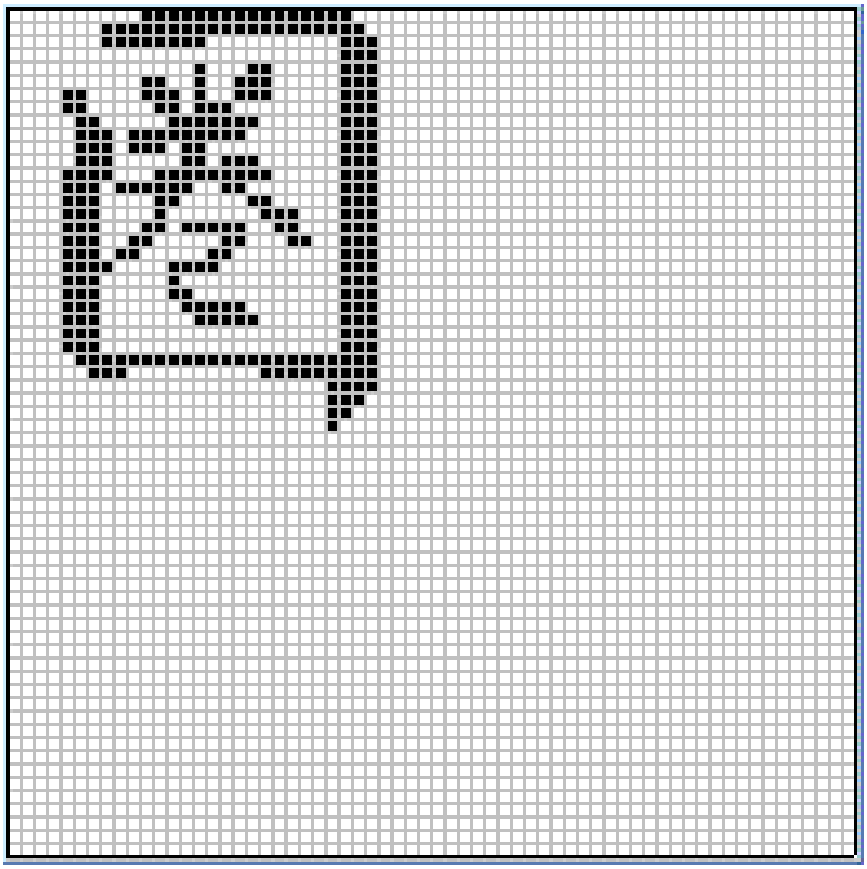
F4H (32x32) Character pattern table



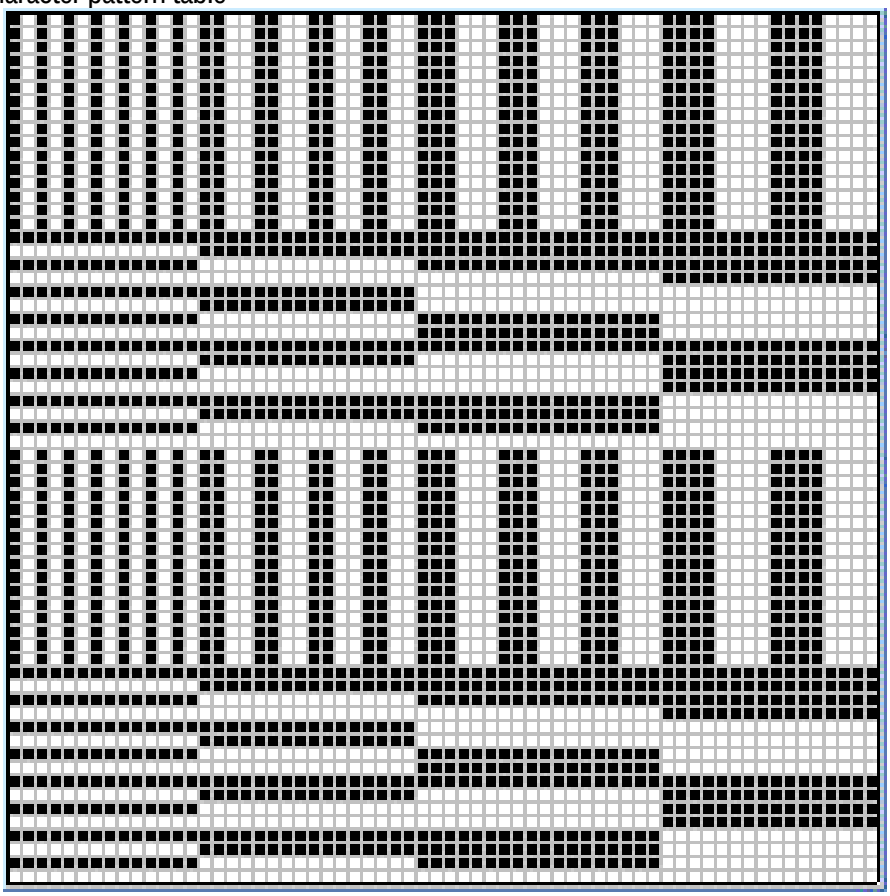
F5H (32x32) Character pattern table



F6H (32x32) Character pattern table



F7H (64x64) Character pattern table



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VG-845 Instruction Manual Apr. 1, 2002

ASTRODESIGN, INC.
http://www.astrodesign.co.jp

International Sales and Marketing Department
2-6-17, Haramachi, Meguro-ku, Tokyo 152-0011 Japan
Tel: +81-3-5720-5837 Fax: +81-3-5720-6353