VG series Terminal Commands

Instruction Manual

Ver.1.80

Supporting models ： VG-848/VG-849/VG-849A/VG-849B/VG-849C/

VG-849C-A/VG-835/VG-835-A/VG-835-B/VG-858/VG-859/VG-859A/

VG-859B/VG-859C/VG-830/VG-857

VG series
Terminal Commands

Instruction Manual

2008.3

Ver.1.80

Supporting models ：VG-848/VG-849/VG-849A/VG-849B/VG-849C/
VG-849C-A/VG-835/VG-835-A/VG-835-B/VG-858/VG-859/VG-859A/
VG-859B/VG-859C/VG-830/VG-857

ASTRODESIGN,Inc

CONTENTS

1 ABOUT TERMINAL COMMAND

1.1 Introduction

In the terminal mode, the VG can be controlled from an external computer (such as a PC). The commands and data are transmitted and received through the serial RS-232C input/output port or through a LAN.
By using the terminal mode, it is possible to register program data, run programs, turn patterns ON or OFF and perform other operations which are virtually identical to their corresponding manual operations. In addition, functions for writing straight lines, circles, dots, etc. are supported by means of graphic commands.
A number of new extended terminal commands have been introduced in order to support the new functions.
The commands and data are transmitted and received via the RS-232C serial input/output port or LAN just as has been done in the past. Apart from differences in the communication format, the communication specifications, connection configuration, error statuses and other aspects remain virtually unchanged from the conventional commands (which are hereafter referred to as the “interchangeable commands”).
This manual describes the terminal commands which support the VG-848, 849, 835, 858, 859, 830 and 857 generators.

1.2 Communication specifications

1.2.1 RS-232C specifications

■ **Communication parameters**

Communication system	Asynchronous system
Interface	RS-232C
Transfer rate	9600/19200/38400/57600/115200 bps
Data length	7/8
Stop bits	1/2
Parity	NONE/EVEN/ODD
Flow control	None

Fig. 1-2-1

■ **Connector**

Computer end

Pin no.	Signal
2	RXD (received data)
3	TXD (transmitted data)
5	GND (signal ground)
7	RTS (request to send)
8	CTS (clear to send)

VG-848 end

Pin no.	Signal
2	TXD (transmitted data)
3	RXD (received data)
5	GND (signal ground)
7	CTS (clear to send)
8	RTS (request to send)

Fig. 1-2-2

1.2.2 LAN

■ **Communication parameters**

10BaseT, 10BaseTX

■ **Connector**

RJ-45

1.3 Connection configuration

1.3.1 RS-232C connections

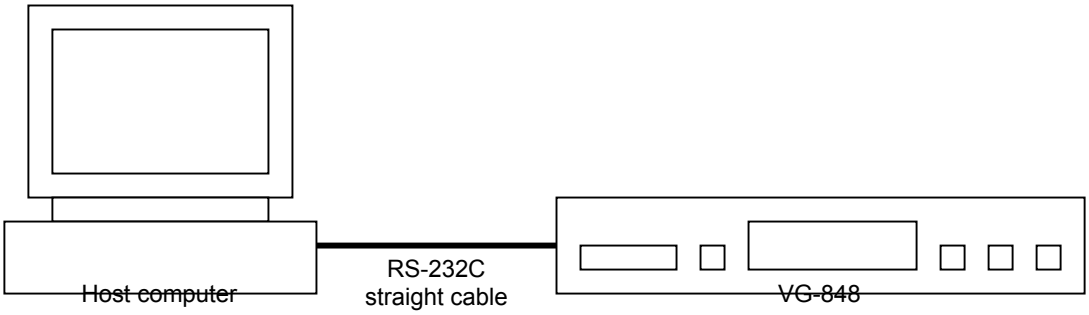


Fig. 1-3-1

1.3.2 LAN

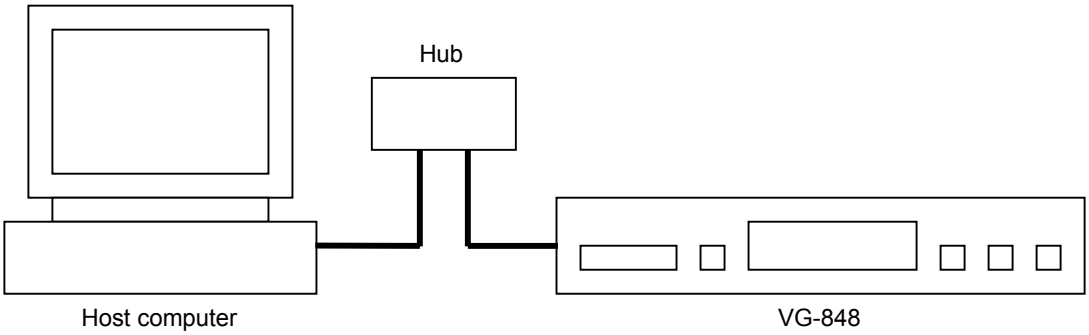


Fig. 1-3-2

1.4 Differences in commands from conventional VG series

The following commands used by the old VG models are not supported by the VG-848.

Command	Function	Remarks
PED [30H]	This enables or disables the panel ROM programs.	
DISPON [21H]	This turns the display on.	
DISPOFF [22H]	This turns the display off.	
PNAMES [5EH]	This sends the name of the program whose number has been designated. * It has the same function as the PNAMES3 command.	
PNAMER [5FH]	This receives the name of the program whose number has been designated. * It has the same function as the PNAMER3 command.	
PRGENTRY [2BH]	This enters program numbers 1 through 4, which are switched at a high speed, into the VG-828.	This function is not supported by the VG-848.
PRGEXE [2CH]	This executes the program whose number was entered using the PRGENTRY command.	
LPED [56H]	This enables or disables the program whose number has been designated.	
CHGMODE [50H]	This changes or checks the VG-828 panel ROM mode.	Panel ROMs are not installed in the VG-848.
LBM3 [B1H]	This receives the image data whose number has been designated.	These commands are used exclusively by the SP software program provided as a standard option. The following commands can be used by users as well. LBM3,SBM3,BMDEL3, BMNAMES3, BMNAMER3
SBM3 [B2H]	This sends the image data whose number has been designated.	
BMDEL3 [B0H]	This deletes the image data whose number has been designated.	
BMNAMES3 [B5H]	This sends the name of the image data whose number has been designated.	
BMNAMER3 [B6H]	This receives the name of the image data whose number has been designated.	
LUOPT3 [B3H]	This receives the data of the user optional pattern whose number has been designated.	
SUOPT3 [B4H]	This sends the data of the user optional pattern whose number has been designated.	
OPTDEL3 [B7H]	This deletes the data of the user optional pattern whose number has been designated.	
OPTNAMES3 [B8H]	This sends the name of the user optional pattern whose number has been designated.	
OPTNAMER3 [B9H]	This receives the name of the user optional pattern whose number has been designated.	
MCFOMT3 [BFH]	This formats the memory cards.	
SCDD3 [C0H]	This sets the current device to memory card or panel ROM.	
QCDD3 [C1H]	This queries the current data device and type.	
BMSIZER [BAH]	This receives the size of the image data whose number has been designated.	These commands are used exclusively by the SP software program provided as a standard option. They can be used by the users.
OPTSIZER [BBH]	This receives the size of the user optional pattern whose number has been designated.	
QUOPT3 [7CH]	This gets the information on the user optional pattern data.	
QBM3 [7DH]	This gets the information on the image data.	

1.5 Description of terms used

Term	Description
Auto display data	The length of the interval (in seconds) after the patterns have been output until the next program is run as well as the sequence in which the programs are to be run when /the VG is operated in the auto display mode are set as parameters. The sequence in which the programs are to be run can be set in a 3-block format. If, for instance, program numbers 01, 02 and 03 are to be output first followed by program numbers 07, 08 and 09 after which the programs are to be repeated from 01, then 01-03 is set in the first block, 07-09 is set in the second block, and 00-00 is set in the third block.
Pattern select data	This data is for selecting which pattern is to be output if programs are run when the VG is operated in the direct display or auto display mode. Bear in mind that “R,” “G” and “B” must always be entered in the data: otherwise, the data will be entered without colors.
Buffer RAM	The VG calls one of the programs entered in its memory card to its execution RAM first, and it then executes the contents of the RAM. This RAM is called the buffer RAM.
1-program data	The 1-program data includes the H timing data, V timing data, output condition data, pattern select data and various pattern data.
User character	This refers to the characters which can be created and registered by the user. The size of these characters is 64 by 64 dots.
Graphic plane	This is the plane on which 1-bit drawing with a single color is accomplished.
Color plane	This is the plane on which drawings with 256 colors are displayed.

Fig. 1-5

1.6 Transmission control characters, data and error commands

Character	HEX CODE	Description
ENQ	05H	Request to start terminal mode
EOT	04H	Request to end terminal mode
ACK	06H	Positive acknowledge character
NAK	15H	Negative acknowledge character
STX	02H	Transmission text (command) start
ETB	17H	Transmission text (data) end
ETX	03H	Transmission text (command, data) end
TRDT	10H	When data is to be transmitted, this command is placed at the head of the block before it is transmitted.
ESTS	11H	When an error status is to be transmitted, an error number is transmitted with this command preceding it.
EXTCMD	FFH	Extended command ID code (* added for VG-849)

Fig. 1-6

1.7 Error statuses

Error code	Description
“00”	This error occurs when an attempt has been made to save data when the memory card was not installed.
“01”	This error occurs when the program which was input is disabled when direct display or a program was executed.
“02”	This error occurs when the horizontal sync data is outside the 5.00 MHz ≤ Dot Clock ≤ 300.00 MHz range when direct display or a program was executed.
“03”	This error occurs when the horizontal sync data is outside the H Period ≥ Hsync + HBackp + Hdisp (dot) range when direct display or a program was executed.
“04”	This error occurs when the horizontal sync data is outside the H Period ≥ Hsync + HBackp + Hdisp (μs) range when direct display or a program was executed.
“05”	This error occurs when the horizontal sync data is outside the H Period ≥ HDstart + HDwidth (dot) range when direct display or a program was executed.
“06”	This error occurs when the horizontal sync data is outside the H Period ≥ HDstart + HDwidth (μs) range when direct display or a program was executed.
“16”	This error occurs when the correct data was not set in the output condition data.
“17”	This error occurs when the correct data was not set in the character pattern data.
“18”	This error occurs when the correct data was not set in the crosshatch pattern data.
“19”	This error occurs when the correct data was not set in the dot pattern data.
“20”	This error occurs when the correct data was not set in the circle pattern data.
“21”	This error occurs when the correct data was not set in the burst pattern data.
“22”	This error occurs when the correct data was not set in the window pattern data.
“23”	This error occurs when the correct data was not set in the color bar pattern data.
“24”	This error occurs when there is an error in a parameter.
“25”	This error occurs when there is an error in the data.
“26”	This error occurs when the sync signals have not been set.

Fig. 1-7

1.8 Command formats

The commands which are sent to the VG generator come in one of two formats: interchangeable commands or extended commands.

[Interchangeable commands] (= conventional commands)

STX	Command	ETX	

or

STX	Command	Parameter	ETX

[Extended commands]

STX	EXTCMD	Model code	Command	ETX	

or

STX	EXTCMD	Model code	Command	Parameter	ETX

EXTCMD: Extended command ID code (FFH)

Model code:

Code	Generator model	Code	Generator model
47H	VG-848	4EH	VG-837
48H	VG-835	4FH	VG-835-A
49H	VG-849 / 849A / 849B	50H	VG-849C
4AH	VG-858	51H	VG-859C
4BH	VG-830	52H	VG-835-B
4CH	VG-857	53H	VG-849C-A
4DH	VG-859 / 859A / 859B		

1.9 Basic formats

1.9.1 When setting commands are sent

Command transmission from computer to VG (PC → VG)

STX	Command	ETX

or

STX	Command	Parameter	ETX

Return value from VG to computer after command transmission (PC ← VG)

ACK

or

STX	ESTS	Error code	ETX

When data is required, transmission is as shown below only when the commands were sent and ACK was returned (PC → VG).

STX	TRDT	Data	ETB

or

STX	TRDT	Data	ETX

Return value from VG to computer after data transmission (PC ← VG)

ACK

or

STX	ESTS	Error code	ETX

Fig. 1-9-1

1.9.2 When the get command is sent

Command transmission from computer to VG (PC → VG)

STX	Command	ETX

or

STX	Command	Parameter	ETX

Return value from VG to computer after command transmission (PC ← VG)

ACK

or

STX	ESTS	Error code	ETX

Reception is as shown below only when ACK is returned. (PC ← VG)

STX	TRDT	Data	ETB

or

STX	TRDT	Data	ETX

Fig. 1-9-2

1.10 Communication protocol

1.10.1 Type 1

This is the sequence when the terminal commands are started.

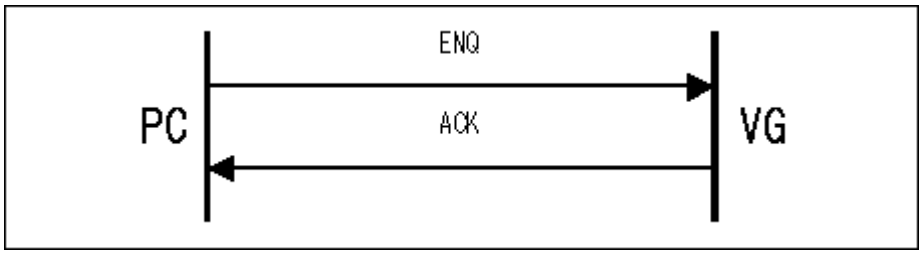


Fig. 1-10-1-1

Flow	Command	Send/receive direction
1	ENQ	Send
2	ACK	Receive

Fig. 1-10-1-2

1.10.2 Type 2

This is the sequence when commands consisting of only a command and parameters (if required) only are transmitted.

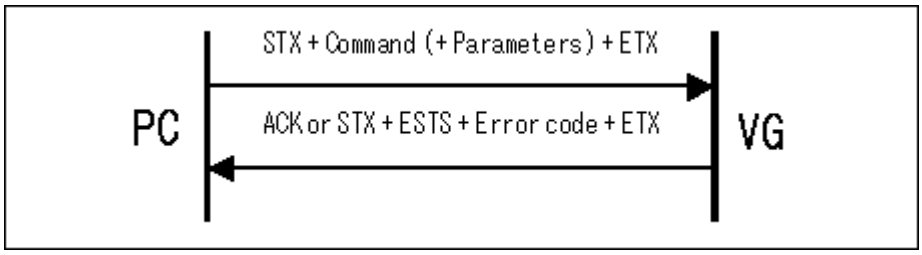


Fig. 1-10-2-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACK				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive

Fig. 1-10-2-2

1.10.3 Type 3

This is the sequence for receiving the VG data.

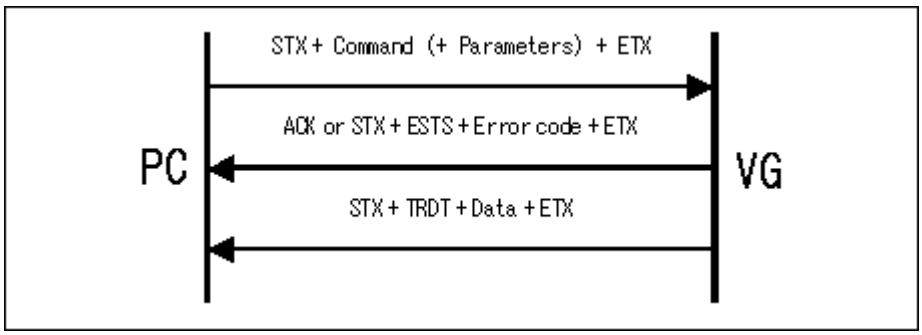


Fig. 1-10-3-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACK				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive
3	STX	TRDT	Data	ETX	Receive

Fig. 1-10-3-2

* The flow is terminated at 2b if communication failed.

1.10.4 Type 4

This is the sequence for sending the VG data.

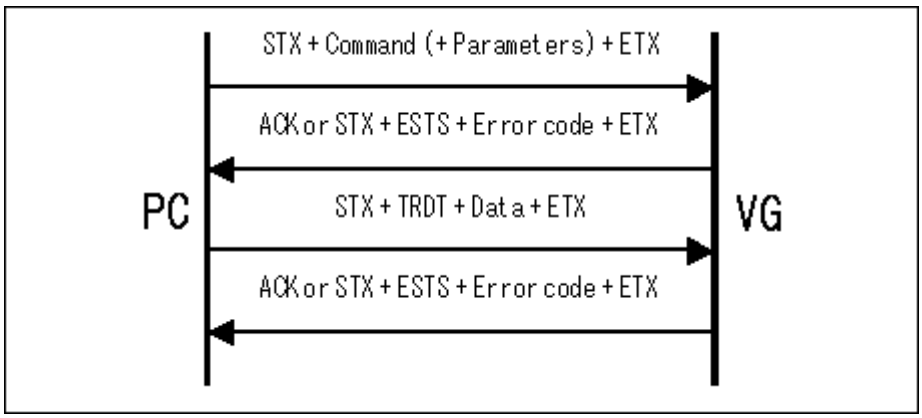


Fig. 1-10-4-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACK				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive
3	STX	TRDT	Data	ETX	Send
4a (successful)	ACK				Receive
4b (failed)	STX	ESTS	Error code	ETX	Receive

Fig. 1-10-4-2

* The flow is terminated at 2b if communication failed.

1.10.5 Type 5

This is the sequence for receiving the VG data. The data must be received for the desired number of times.

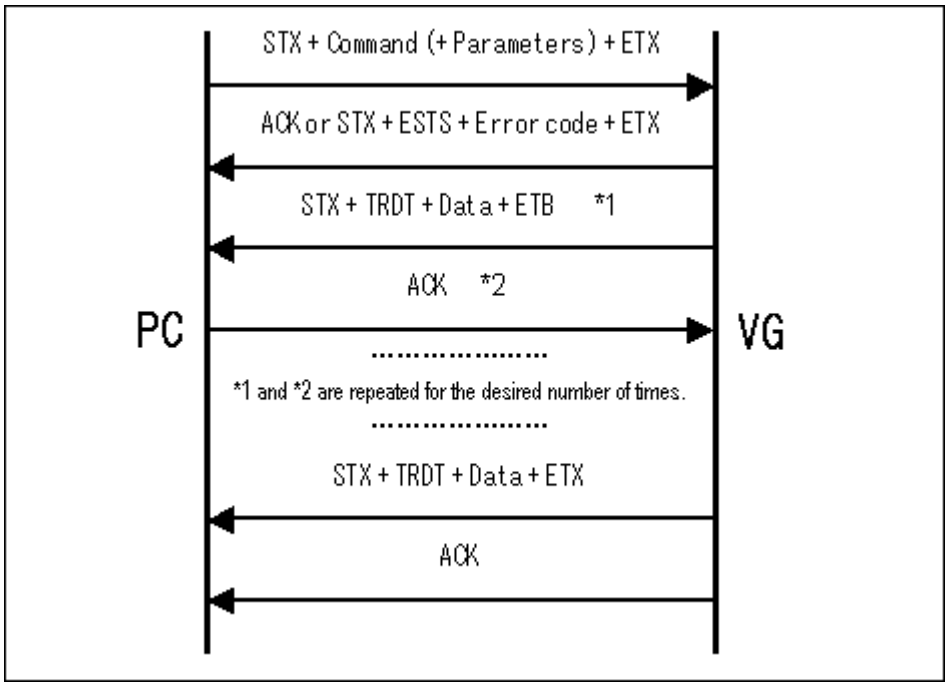


Fig. 1-10-5-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACK				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive
3	STX	TRDT	Data	ETB	Receive
4	ACK				Send
3 and 4 repeated for the desired number of times					
n-1	STX	TRDT	Data	ETX	Receive
n	ACK				Receive

Fig. 1-10-5-2

* The flow is terminated at 2b if communication failed.

1.10.6 Type 6

This is the sequence for sending the VG data. The data must be sent for the desired number of times.

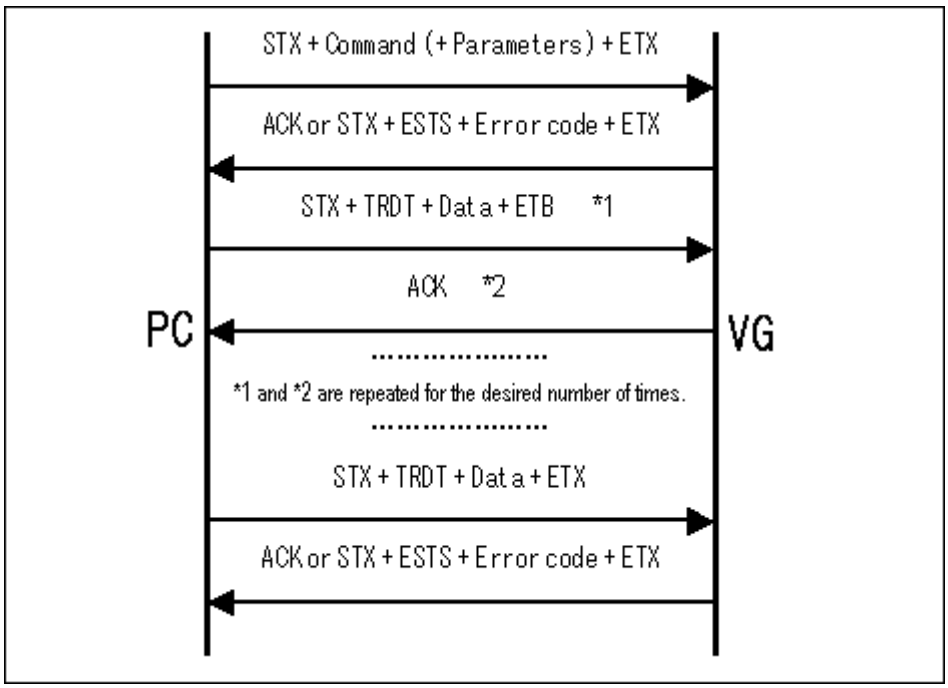


Fig. 1-10-6-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACKz				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive
3	STX	TRDT	Data	ETB	Send
4a (successful)	ACK				Receive
4b (failed)	STX	ESTS	Error code	ETX	Receive
3 and 4a or 4b are repeated for the desired number of times.					
n-1	STX	TRDT	Data	ETX	Send
na (successful)	ACK				Receive
nb (failed)	STX	ESTS	Error code	ETX	Receive

Fig. 1-10-6-2

* The flow is terminated at 2b or 4b if communication failed.

1.10.7 Type 7

This is the sequence for receiving the VG data. Unlike with type 3, “TRDT” is not received.

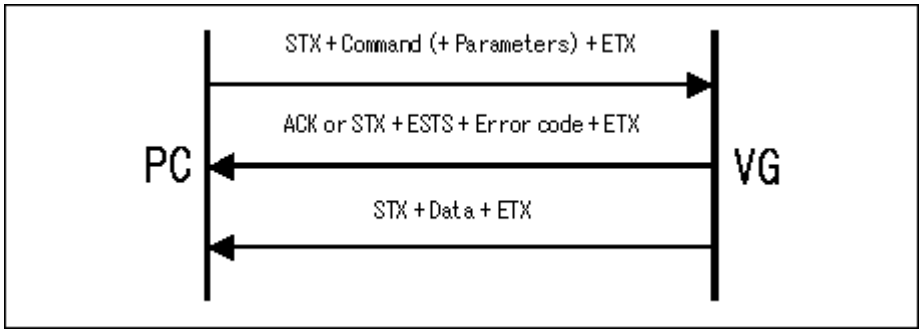


Fig. 1-10-7-1

Flow	Command				Send/receive direction
1	STX	Command	(Parameter)	ETX	Send
2a (successful)	ACK				Receive
2b (failed)	STX	ESTS	Error code	ETX	Receive
3	STX	Data	ETX		Receive

Fig. 1-10-7-2

* The flow is terminated at 2b if communication failed.

1.11 Precautions concerning drawing commands

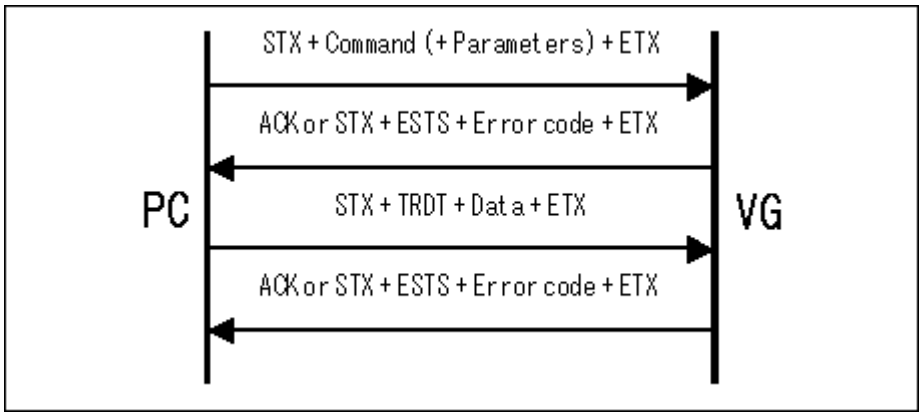
Two display planes are provided for the VG-848, 849, 835, 858, 859, 830 and 857 and the bank (plane) is switched between the front and rear before execution. Therefore, if the unit is operated while the drawing commands are being executed or if the drawing commands have been executed while the unit is being operated, the bank displayed may be switched in error and the rear bank (plane) may not be displayed as the user expects.
Take care when using the drawing commands while operating the unit and vice versa.

2 CONTROL COMMAND FORMATS

2.1 SHT [48H]: H timing data registration

Function : This command registers the H timing data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SHT	1 byte	48H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-1-1

Data :

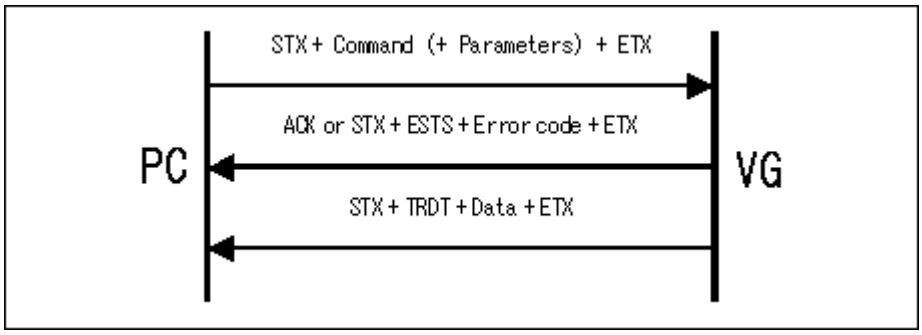
STX	1 byte	02H
TRDT	1 byte	10H
µ/dot	1 byte	“0” = µ “1” = dot
DOT CLOCK	5 bytes	Sequence of digits from top: 10^2, 10^1, 10^0, 10^{-1}, 10^{-2}
H-PERIOD	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
H-DISPLAY	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
H-SYNC	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
H-BACK-PORCH	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
HD-START	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
HD-WIDTH	4 bytes	For µ, sequence of digits from top: 10^1, 10^0, 10^{-1}, 10^{-2} For dots, sequence of digits from top: 10^3, 10^2, 10^1, 10^0
ETX	1 byte	03H

Fig. 2-1-2

2.2 LHT [42H]: H timing data reading

Function : This command reads the H timing data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LHT	1 byte	42H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

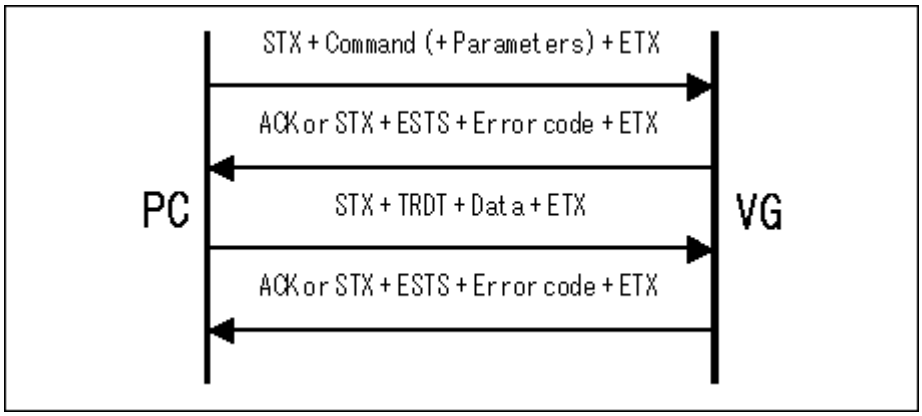
Fig. 2-2-1

Data : Same as Fig. 2-1-2

2.3 SVT [49H]: V timing data registration

Function : This command registers the V timing data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SVT	1 byte	49H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-3-1

Data :

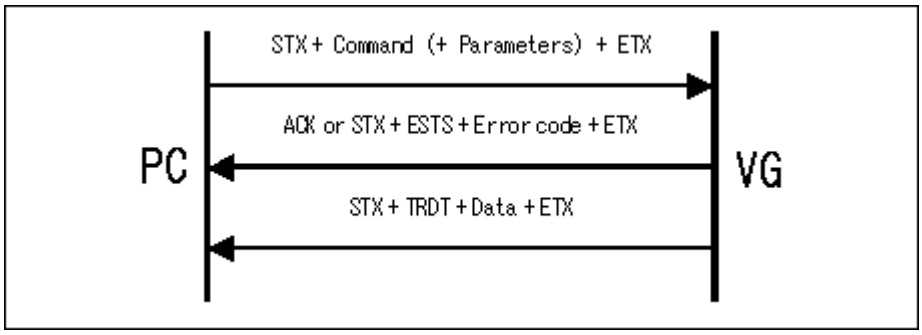
STX	1 byte	02H
TRDT	1 byte	10H
SCAN MODE	1 byte	“0” = NO INTER, “1” = INTER & sync, “2” = INTER & VIDEO
SERRATION	1 byte	“0” = OFF, “1” = 0.5H, “2” = 1H, “3” = EXOR
ENQ ON/OFF	1 byte	“0” = OFF, “1” = ON
V-TOTAL	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
V-SYNC	3 bytes	Sequence of digits from top: 10^1, 10^0, 10^{-1}
ENQ-FP	3 bytes	Sequence of digits from top: 10^1, 10^0, 10^{-1}
ENQ-BP	3 bytes	Sequence of digits from top: 10^1, 10^0, 10^{-1}
V-BACK-PORCH	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
V-DISPLAY	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
VD-START	5 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0, 10^{-1}
VD-WIDTH	5 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0, 10^{-1}
ETX	1 byte	03H

Fig. 2-3-2

2.4 LVT [43H]: V timing data reading

Function : This command reads the V timing data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LVT	1 byte	43H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

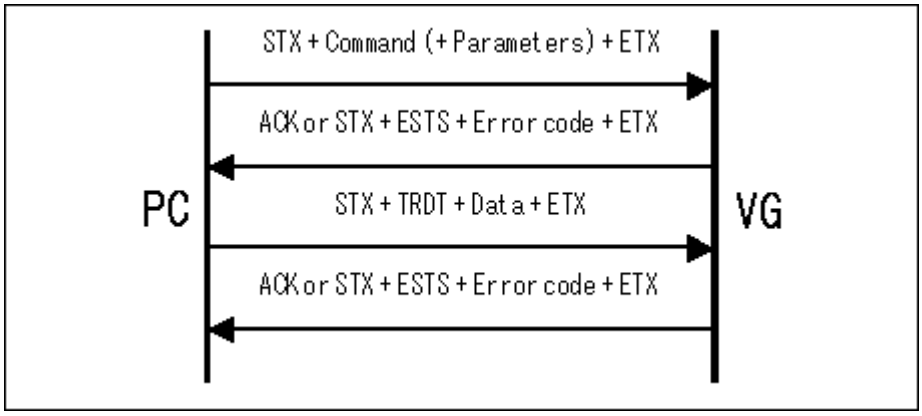
Fig. 2-4-1

Data : Same as Fig. 2-3-2.

2.5 SOT [4AH]: Output condition data registration

Function : This command registers the output condition data in the program whose number has been designated. The registered data is in either digital or analog form. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SOT	1 byte	4AH
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-5-1

Data :

(1) Digital data

STX	1 byte	02H
TRDT	1 byte	10H
CLOCK MODE	1 byte	“0” = 1/1 clock, “1” = 1/2 clock
HS	1 byte	“0” = NEGA, “1” = POSI
VS	1 byte	“0” = NEGA, “1” = POSI
CS	1 byte	“0” = NEGA, “1” = POSI
HD	1 byte	“0” = NEGA, “1” = POSI
VD	1 byte	“0” = NEGA, “1” = POSI
1ch RGB	1 byte	“0” = NEGA, “1” = POSI
2ch RGB	1 byte	“0” = NEGA, “1” = POSI
CLOCK	1 byte	“0” = NEGA, “1” = POSI
DISP	1 byte	“0” = NEGA, “1” = POSI
RZ/NRZ	1 byte	“0” = NRZ, “1” = RZ
SW0	1 byte	“0” = OFF, “1” = ON
SW1	1 byte	“0” = OFF, “1” = ON
DELAY MODE	1 byte	“0” = OFF, “1” = ON
CLOCK AREA	1 byte	“0” = DISP, “1” = ALL
DELAY TIME	1 byte	“1” = 4ns, “2” = 8ns, “3” = 12ns, “4” = 16ns, “5” = 20ns, “6” = 24ns, “7” = 28ns, “8” = 32ns
RGB BIT OUT	1 byte	“1” = 1bit, “2” = 2bit, “3” = 3bit, “4” = 4bit, “5” = 5bit, “6” = 6bit, “7” = 7bit, “8” = 8bit
R MASK	2 bytes	“00” to “FF”
G MASK	2 bytes	“00” to “FF”
B MASK	2 bytes	“00” to “FF”
ETX	1 byte	03H

Fig. 2-5-2

(2) Analog data

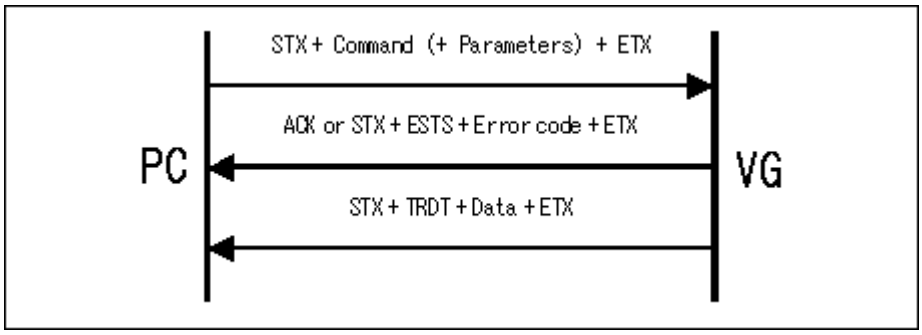
STX	1 byte	02H
TRDT	1 byte	10H
OUT PUT	1 byte	“0” = Analog, “1” = TTL
HS	1 byte	“0” = NEGA, “1” = POSI, “2” = OFF
VS	1 byte	“0” = NEGA, “1” = POSI, “2” = OFF
CS	1 byte	“0” = NEGA, “1” = POSI, “2” = OFF, “3” = HS, “4” = VS
HD	1 byte	“0” = NEGA, “1” = POSI
VD	1 byte	“0” = NEGA, “1” = POSI
RGB	1 byte	“0” = NEGA, “1” = POSI
RH GH BH	1 byte	“0” = NEGA, “1” = POSI
V/S	1 byte	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
RZ/NRZ	1 byte	“0” = NRZ, “1” = RZ
CLOCK	1 byte	“0” = NEGA, “1” = POSI
VIDEO LEVEL	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}
SET UP	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}
SYNC LEVEL	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}
ETX	1 byte	03H

Fig. 2-5-3

2.6 LOT [44H]: Output condition data reading

Function : This command reads the output condition data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LOT	1 byte	44H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

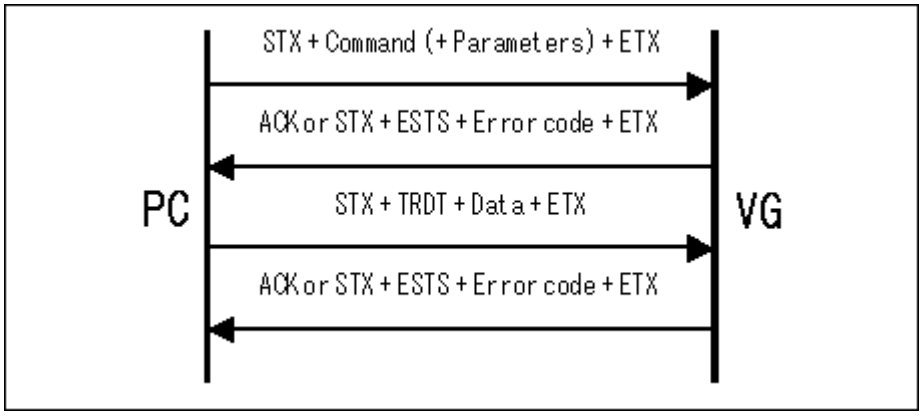
Fig. 2-6-1

Data : Same as Fig. 2-5-2 or Fig. 2-5-3.

2.7 SPT [4BH]: Pattern data registration

Function : This command registers the pattern data in the program whose number has been designated. It selects the pattern block to be set as a parameter and sends the corresponding data. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPT	1 byte	4BH
Program No.	1 to 3 bytes	“0” to “849”
Pattern block No.	2 bytes	“01” = Graphic color “02” = Character “03” = Crosshatch “04” = Dot “05” = Circle “06” = Burst “07” = Window “08” = Optional pattern 1 *1 “09” = Optional pattern 2 *1 “10” = Color bar “11” = Gray scale “12” = Half tone (Only with analog data) *1: If 2 digits (00 to 1F) are designated as the optional pattern code, use the [SPT2] (5BH) command since the [SPT] command cannot be used. Apart from the number of digits for the optional pattern code, the command usage is the same.
ETX	1 byte	03H

Fig. 2-7-1

Data :

(1) Graphic color data

STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
Graphic color (TTL)	1 byte	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
Graphic half tone	1 byte	“0” = None, “1” = RH, “2” = GH, “3” = RHGH, “4” = BH, “5” = RHBH, “6” = GHBH, “7” = RHGHBH
Background	1 byte	“0” = OFF, “1” = ON
ETX	1 byte	03H

Fig. 2-7-2

(2) Character data

STX	1 byte	02H
TRDT	1 byte	10H
Character format	1 byte	“0” = Format 0, “1” = Format 1, “2” = Format 2
Character font	1 byte	“0” = 5×7, “1” = 7×9, “2” = 16×16
Character code	2 bytes	“20” to “EF”
H cell size	2 bytes	“01” to “64”
V cell size	2 bytes	“01” to “64”
ETX	1 byte	03H

Fig. 2-7-3

(3) Crosshatch data

STX	1 byte	02H
TRDT	1 byte	10H
H interval	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
V interval	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
ETX	1 byte	03H

Fig. 2-7-4

(4) Dot data

STX	1 byte	02H
TRDT	1 byte	10H
H interval	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
V interval	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
ETX	1 byte	03H

Fig. 2-7-5

(5) Circle Data

STX	1 byte	02H
TRDT	1 byte	10H
Circle format	1 byte	“0” to “4”
ETX	1 byte	03H

Fig. 2-7-6

(6) Burst data

STX	1 byte	02H
TRDT	1 byte	10H
Burst format	1 byte	“0” to “3”
Interval	2 bytes	“01” to “99”
Step	2 bytes	“01” to “99”
ETX	1 byte	03H

Fig. 2-7-7

(7) Window data

STX	1 byte	02H
TRDT	1 byte	10H
Window mode	1 byte	“0” = %, “1” = Dot
H width	4 bytes	% = “0001” to “1000” (0.1 to 100.0%) Dots = “0001” and up
V width	4 bytes	% = “0001” to “1000” (0.1 to 100.0%) Dots = “0001” and up
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
Window color (TTL)	1 byte	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
Window half tone	1 byte	“0” = None, “1” = RH, “2” = GH, “3” = RHGH, “4” = BH, “5” = RHBH, “6” = GHBH, “7” = RHGHBH
Format	1 byte	“0” to “F”
Flicker interval	1 byte	“0” to “7”
ETX	1 byte	03H

Fig. 2-7-8

(8) Optional pattern 1 data

STX	1 byte	02H
TRDT	1 byte	10H
Optional pattern code	1 byte	“0” to “F”
ETX	1 byte	03H

Fig. 2-7-9

(9) Optional pattern 2 data

STX	1 byte	02H
TRDT	1 byte	10H
Optional pattern code	1 byte	“0” to “F”
ETX	1 byte	03H

Fig. 2-7-10

(10) Color bar data

STX	1 byte	02H
TRDT	1 byte	10H
MODE	1 byte	“0” = %, “1” = Dot
H width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
V width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
Direction H/V	1 byte	“0” = Horizontal, “1” = Vertical, “2” = Horizontally repeated, “3” = Vertically repeated
Color specification	16 bytes	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
ETX	1 byte	03H

Fig. 2-7-11

(11) Gray scale data

STX	1 byte	02H
TRDT	1 byte	10H
Direction H/V	1 byte	“0” = Horizontal, “1” = Vertical
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-7-12

(12) Half tone data

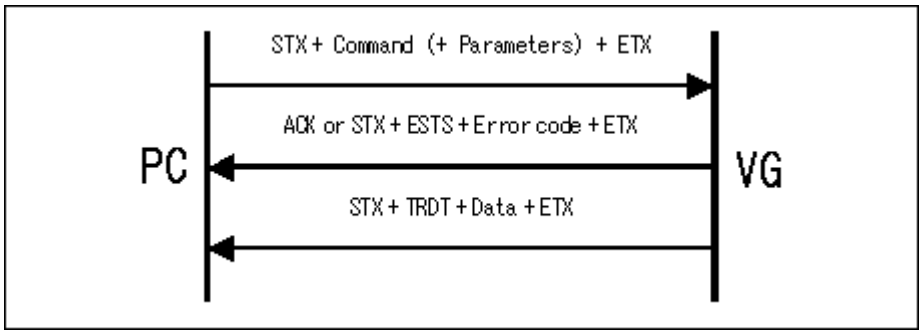
STX	1 byte	02H
TRDT	1 byte	10H
Direction H/V	1 byte	“0” = Horizontal, “1” = Vertical
Color specification	16 bytes	“0” = None, “1” = RH, “2” = GH, “3” = RHGH “4” = BH, “5” = RHBH, “6” = GHBH, “7” = RHGHBH
ETX	1 byte	03H

Fig. 2-7-13

2.8 LPT [45H]: Pattern data reading

Function : This command reads the pattern data in the program whose number has been designated. It selects the pattern block to be set as a parameter and sends the corresponding data.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LPT	1 byte	45H
Program No.	1 to 3 bytes	“0” to “999”
Pattern block No.	2 bytes	“01” = Graphic color “02” = Character “03” = Crosshatch “04” = Dot “05” = Circle “06” = Burst “07” = Window “08” = Optional pattern 1 *1 “09” = Optional pattern 2 *1 “10” = Color bar “11” = Gray scale “12” = Half tone (only with analog data) *1: If 2 digits (00 to 1F) are designated as the optional pattern code, use the [SPT2] (5BH) command since the [SPT] command cannot be used. Apart from the number of digits for the optional pattern code, the command usage is the same.
ETX	1 byte	03H

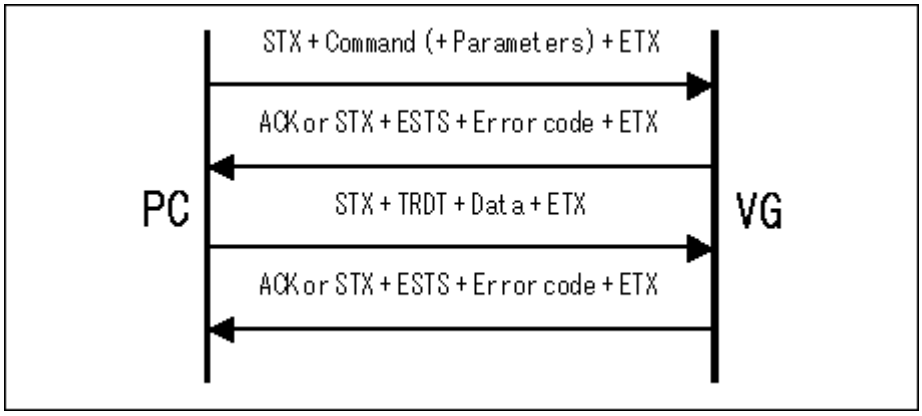
Fig. 2-8-1

Data : The data in Figs. 2-7-2 through 2-7-13 corresponding to the designated pattern block number is received.

2.9 SPD [4DH]: Program data registration

Function : This command registers all the data in the program whose number has been designated. The registered data is in either digital or analog form. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPD	1 byte	4DH
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-9-1

Data :

(1) Digital data

STX	1 byte	02H
TRDT	1 byte	10H
Horizontal timing	30 bytes	See Fig. 2-1-2.
Delimiter	1 byte	“,”
Vertical timing	34 bytes	See Fig. 2-3-2.
Delimiter	1 byte	“,”
Digital output condition	23 bytes	See Fig. 2-5-2.
Delimiter	1 byte	“,”
Graphic color	12 bytes	See Fig. 2-7-2.
Character	8 bytes	See Fig. 2-7-3.
Crosshatch	8 bytes	See Fig. 2-7-4.
Dot	8 bytes	See Fig. 2-7-5.
Circle	1 byte	See Fig. 2-7-6.
Burst	5 bytes	See Fig. 2-7-7.
Window	22 bytes	See Fig. 2-7-8.
Optional pattern 1	1 byte	See Fig. 2-7-9. * 2 bytes, “00” to “0F,” for digital data.
Optional pattern 2	1 byte	See Fig. 2-7-10. * 2 bytes, “00” to “0F,” for digital data.
Delimiter	1 byte	“,”
Color bar	26 bytes	See Fig. 2-7-11.
Delimiter	1 byte	“,”
Gray scale	49 bytes	See Fig. 2-7-12.
ETX	1 byte	03H

Fig. 2-9-2

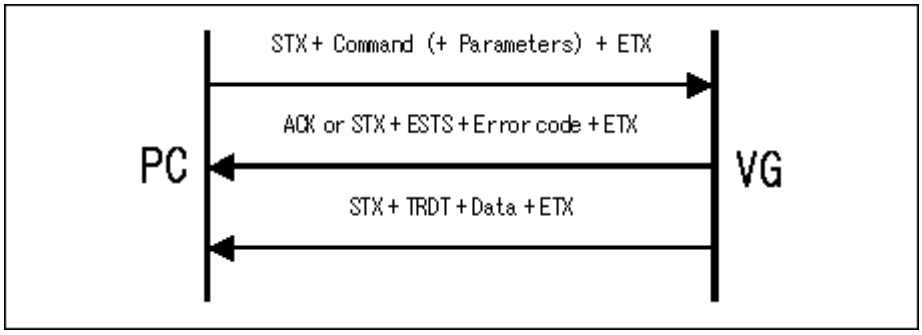
(2) Analog data

STX	1 byte	02H
TRDT	1 byte	10H
Horizontal timing	30 bytes	See Fig. 2-1-2.
Delimiter	1 byte	“,”
Vertical timing	34 bytes	See Fig. 2-3-2.
Delimiter	1 byte	“,”
Analog output condition	20 bytes	See Fig. 2-5-3.
Delimiter	1 byte	“,”
Graphic color	12 bytes	See Fig. 2-7-2.
Character	8 bytes	See Fig. 2-7-3.
Crosshatch	8 bytes	See Fig. 2-7-4.
Dot	8 bytes	See Fig. 2-7-5.
Circle	1 byte	See Fig. 2-7-6.
Burst	5 bytes	See Fig. 2-7-7.
Window	22 bytes	See Fig. 2-7-8.
Optional pattern 1	1 byte	See Fig. 2-7-9.
Optional pattern 2	1 byte	See Fig. 2-7-10.
Delimiter	1 byte	“,”
Color bar	26 bytes	See Fig. 2-7-11.
Delimiter	1 byte	“,”
Gray scale	49 bytes	See Fig. 2-7-12.
Delimiter	1 byte	“,”
Half tone	17 bytes	See Fig. 2-7-13.
ETX	1 byte	03H

Fig. 2-9-3

2.10 LPD [4CH]: Program data reading

Function : This command reads all the data in the program whose number has been designated.
Sequence : Type 3



Parameter:

STX	1 byte	02H
LPD	1 byte	4CH
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

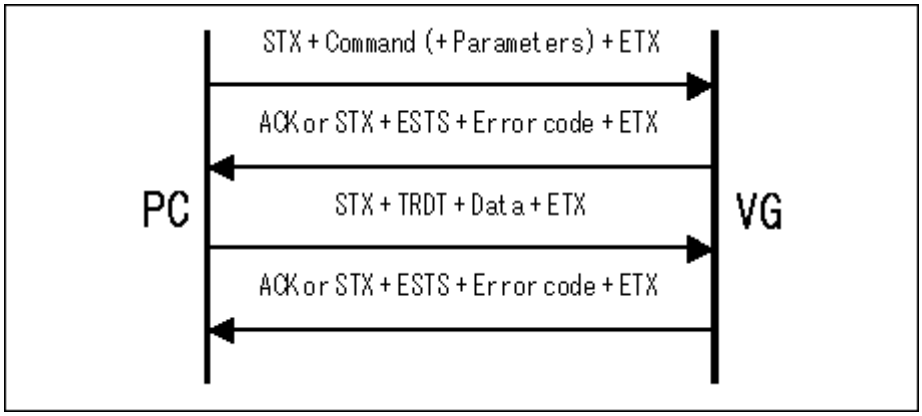
Fig. 2-10-1

Data : Same as Fig. 2-9-2 or Fig. 2-9-3.

2.11 SAT [46H]: Auto display data registration

Function : This command registers the data for executing auto display.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SAT	1 byte	46H
ETX	1 byte	03H

Fig. 2-11-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Interval time (sec.)	3 bytes	“000” to “999”
Block 1 (START)	3 bytes	“000” to “999”
Block 1 (END)	3 bytes	“000” to “999”
Block 2 (START)	3 bytes	“000” to “999”
Block 2 (END)	3 bytes	“000” to “999”
Block 3 (START)	3 bytes	“000” to “999”
Block 3 (END)	3 bytes	“000” to “999”
ETX	1 byte	03H

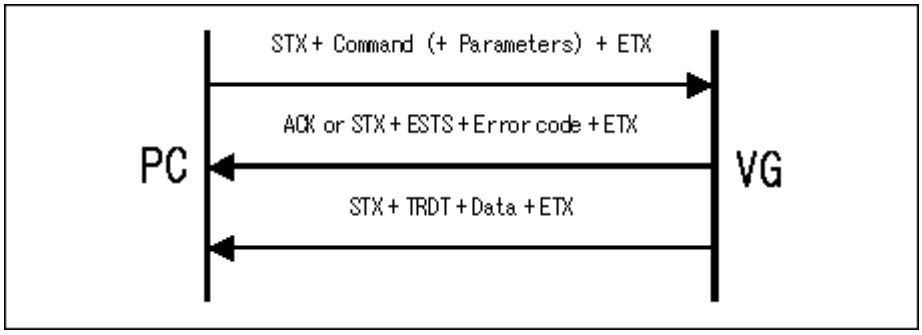
Fig. 2-11-2

* Set blocks 2 and 3 to “000” when only one block will be used.

2.12 AT [40H]: Auto display data reading

Function: This command receives the data for executing auto display.

Sequence: Type 3



Parameter:

STX	1 byte	02H
LAT	1 byte	40H
ETX	1 byte	03H

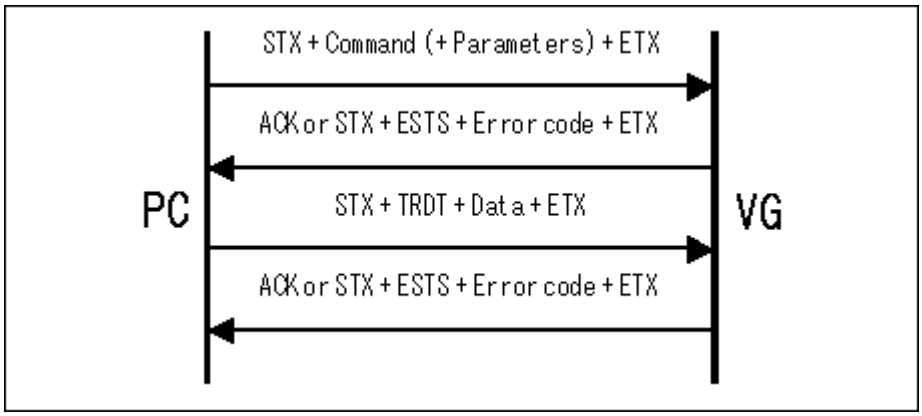
Fig. 2-12-1

Data: Same as Fig. 2-11-2.

2.13 PTS [47H]: Pattern select data registration

Function : This command registers the pattern select data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPTS	1 byte	47H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-13-1

Data :

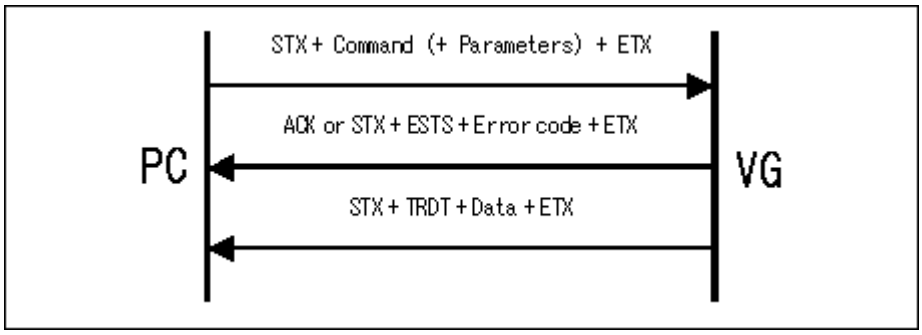
STX	1 byte	02H
TRDT	1 byte	10H
Pattern select	0 to 18 bytes	‘50H’ = CHARA ‘51H’ = CROSS ‘52H’ = DOTS ‘53H’ = CIRCLE ‘54H’ = + ‘55H’ = □ ‘56H’ = × ‘57H’ = COLOR ‘58H’ = GRAY ‘59H’ = BURST ‘5AH’ = WINDOW ‘5BH’ = OPTION1 ‘5CH’ = OPTION2 ‘5EH’ = R ‘5FH’ = G ‘60H’ = B ‘62H’ = INV ‘69H’ = CURSOR
ETX	1 byte	03H

Fig. 2-13-2

2.14 PTS [41H]: Pattern select data reading

Function : This command receives the pattern select data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LPTS	1 byte	41H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

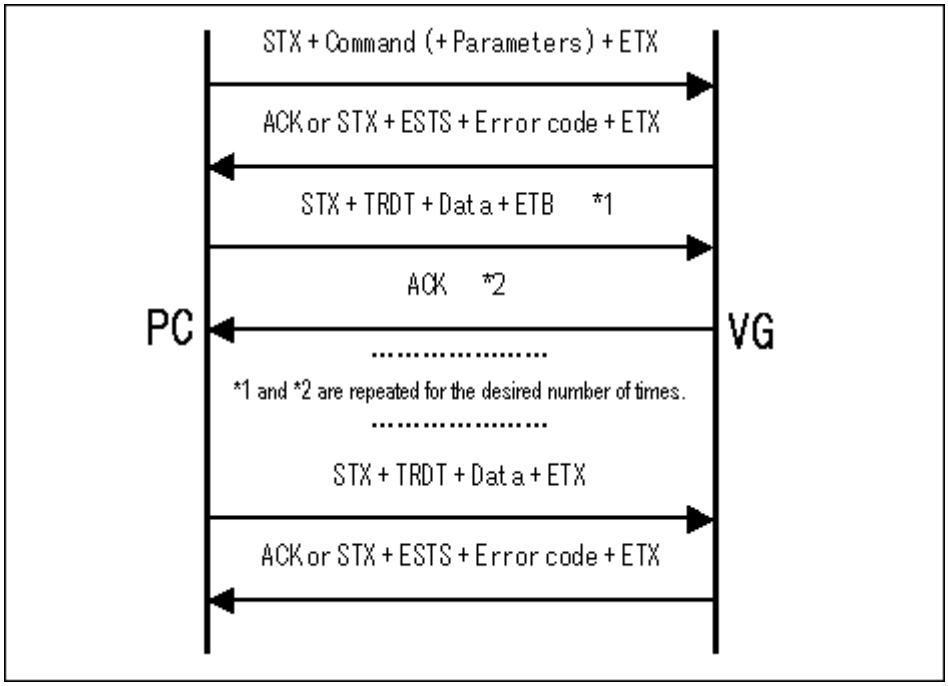
Fig. 2-14-1

Data : Same as Fig. 2-13-2.

2.15 CH [4FH]: Character data registration

Function : This command registers the data for the character whose number has been designated.

Sequence : Type 6



Parameter:

STX	1 byte	02H
SCH	1 byte	4FH
Character No.	1 byte	“0” to “F”
ETX	1 byte	03H

Fig. 2-15-1

Data :

The binary data of the character drawn inside the 64×64 cell is converted into ASCII code as shown below.

* Under the binary format, the “1” parts are what is set.

	Byte 1		Byte 2			Byte 7	Byte 8	
1	0011	0000	0011			0101	0101	1101
2	0100	1100	0100			0010	1011	1100
…								

↓ Binary → hexadecimal

	1	2	3			14	15	16
1	3H	0H	3H			5H	5H	DH
2	4H	CH	4H			2H	BH	CH
…								

↓ Hexadecimal → ASCII code

	1	2	3			14	15	16
1	33H	30H	33H			35H	35H	44H
2	34H	43H	34H			32H	42H	43H
…								

Fig. 2-15-2

The data is organized as follows:
8 bytes × 64 = 512 bytes
512 × 2 = 1024 bytes (ASCII code)
1024 bytes ÷ 128 bytes = 8
Since the amount of data transferred each time is always 128 bytes, the data is divided into 8 blocks, each of which is then transmitted and received.

The first 7 blocks are sent as shown below.

STX	1 byte	02H
TRDT	1 byte	10H
Character data	128 bytes	ASCII code
ETB	1 byte	17H

Fig. 2-15-3

The last block is sent as shown below.

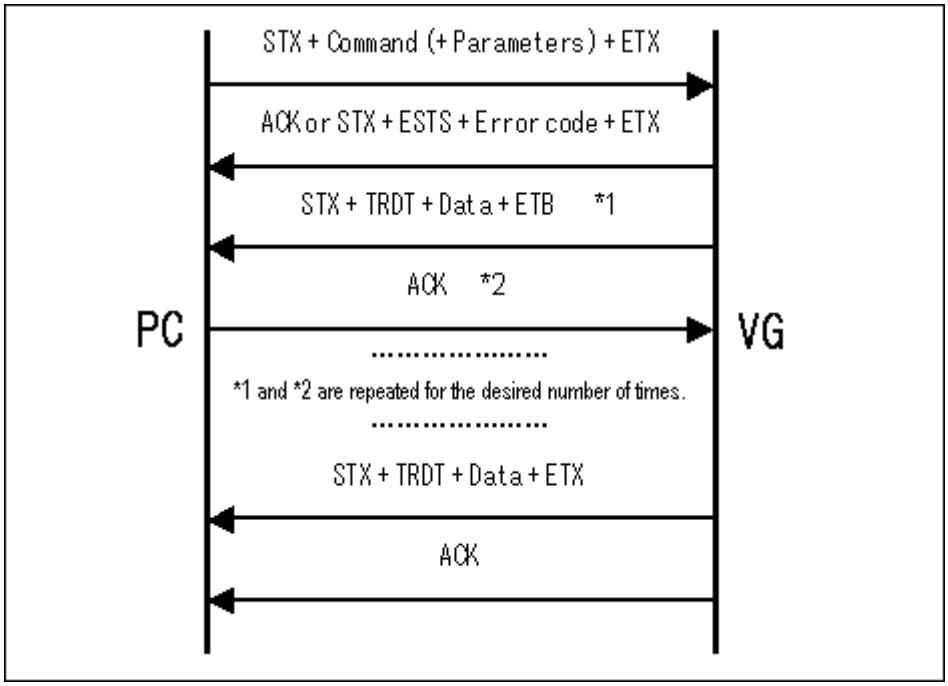
STX	1 byte	02H
TRDT	1 byte	10H
Character data	128 bytes	ASCII code
ETX	1 byte	03H

Fig. 2-15-4

2.16 LCH [4EH]: Character data reading

Function : This command reads the data for the character whose number has been designated.

Sequence : Type 5



Parameter:

STX	1 byte	02H
LCH	1 byte	4EH
Character No.	1 byte	“0” to “F”
ETX	1 byte	03H

Fig. 2-16-1

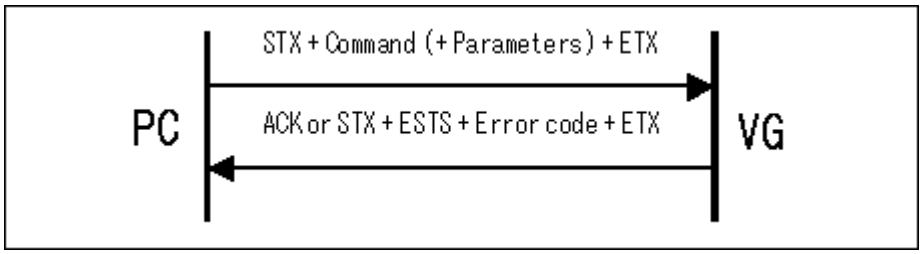
Data :

The first 7 blocks are received exactly as shown in Fig. 2-15-3, and the last block is received exactly as shown in Fig. 2-15-4.

2.17 EXPPN [07H]: Timing data execution

Function : This command executes only the timing data in the program whose number has been designated.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXPPN	1 byte	07H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

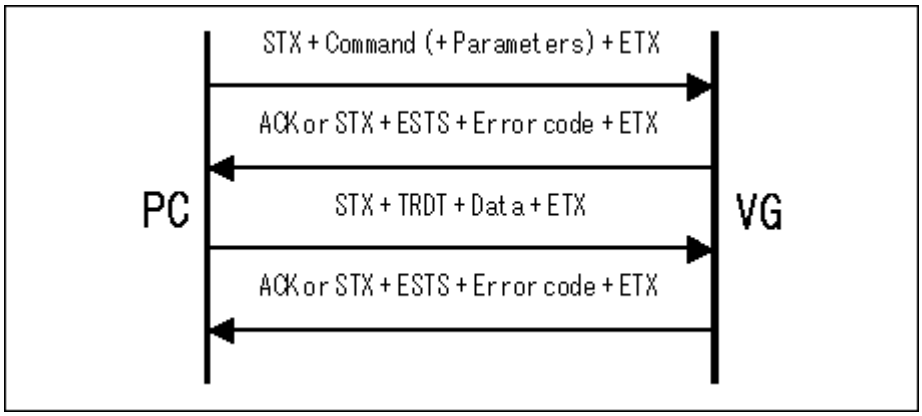
Fig. 2-17-1

Data : None

2.18 EXPBN [08H]: Program data setting/execution

Function : This command sends and executes the data in one program. It does not save the data on the memory card.

Sequence : Type 4



Parameter:

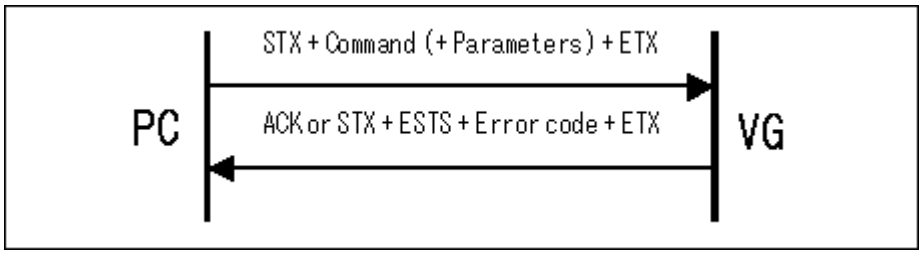
STX	1 byte	02H
EXPBN	1 byte	08H
ETX	1 byte	03H

Fig. 2-18-1

Data : Same as Fig. 2-9-2 or Fig. 2-9-3.

2.19 EXPDN [09H]: Program data execution 2 (registered program specifications)

Function : This command specifies the number of the direct display and executes it.
Sequence : Type 2



Parameter:

STX	1 byte	02H
EXPDN	1 byte	09H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

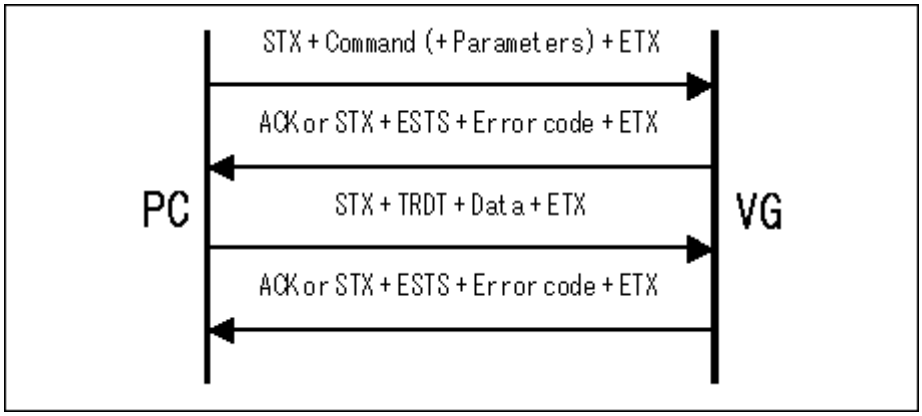
Fig. 2-19-1

Data : None

2.20 EXPON [0EH]: Pattern data output ON setting

Function : This command sets the designated pattern and signal to ON.

Sequence : Type 4



Parameter:

STX	1 byte	02H
EXPON	1 byte	0EH
ETX	1 byte	03H

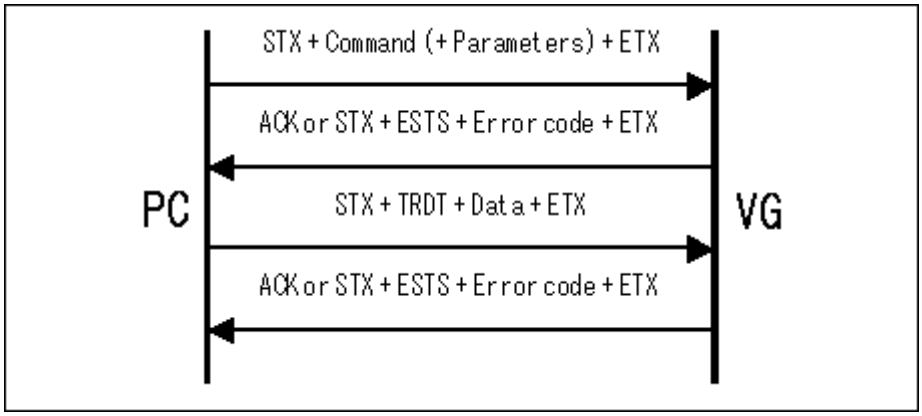
Fig. 2-20-1

Data : Same as Fig. 2-13-2.

2.21 EXPOFF [0FH]: Pattern data output OFF setting

Function : This command sets the designated pattern and signal to OFF.

Sequence : Type 4



Parameter:

STX	1 byte	02H
EXPOFF	1 byte	0FH
ETX	1 byte	03H

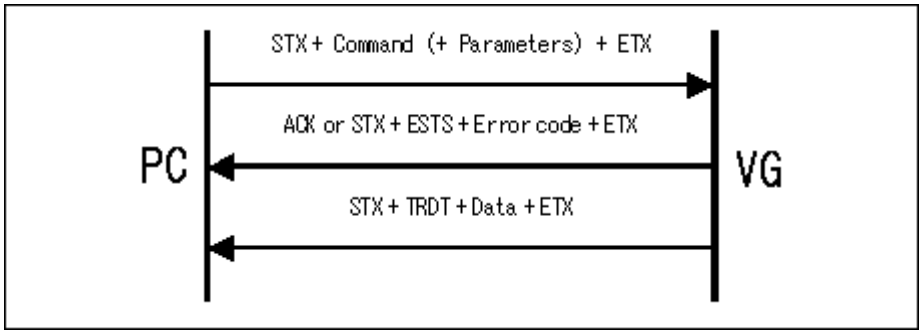
Fig. 2-21-1

Data : Same as Fig. 2-13-2.

2.22 DISPHV [28H]: Display dot count reading

Function : This command reads the number of display dots on the graphic plane.

Sequence : Type 3



Parameter:

STX	1 byte	02H
DISPHV	1 byte	28H
ETX	1 byte	03H

Fig. 2-22-1

Data :

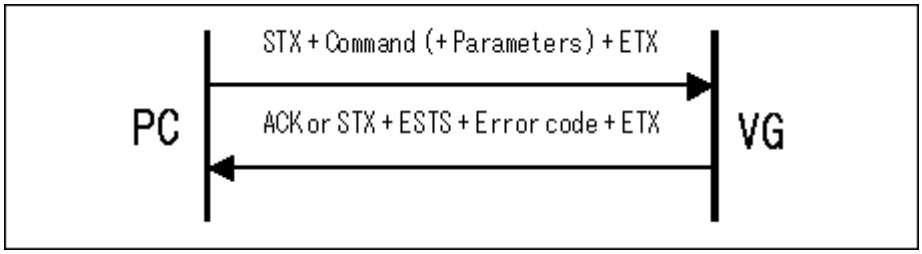
STX	1 byte	02H
TRDT	1 byte	10H
Number of H display dots	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
Number of V display dots	4 bytes	Sequence of digits from top: 10^3, 10^2, 10^1, 10^0
ETX	1 byte	03H

Fig. 2-22-2

2.23 INDC [29H]: Program No. incrementing/decrementing

Function: This command increments or decrements the direct display number.

Sequence: Type 2



Parameter:

STX	1 byte	02H
INDC	1 byte	29H
[+]/[-]	1 byte	'63H' = + '64H' = -
ETX	1 byte	03H

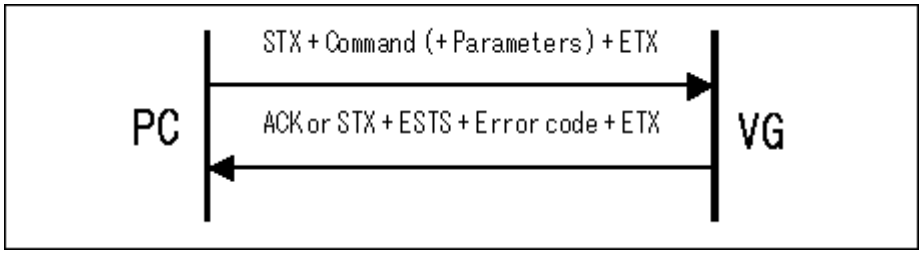
Fig. 2-23-1

Data: None

2.24 EXBN [0CH]: Current program execution

Function : This command executes the contents of the current program (in the buffer RAM).

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXBN	1 byte	0CH
ETX	1 byte	03H

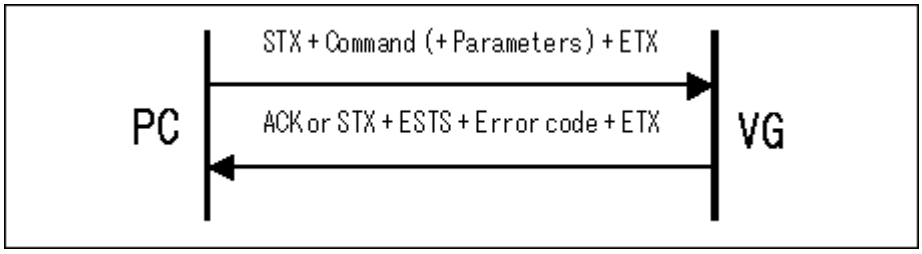
Fig. 2-24-1

Data : None

2.25 EXSGON [0BH]: Output signal ON/OFF

Function : This command turns ON or OFF each of the R, G, B, RHT, GHT and BHT signals. Designate the key codes whose signals are to be turned ON as the parameters. A signal corresponding to a key code which is not designated is OFF.

Sequence : Type 2



Parameter:

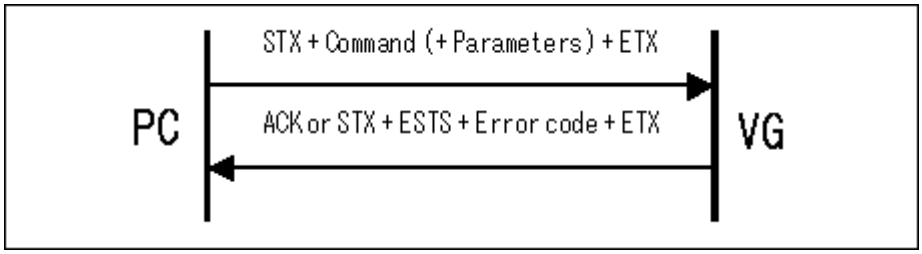
STX	1 byte	02H
EXSGON	1 byte	0BH
Key code	0 to 6 bytes	‘5EH’ = R ‘5FH’ = G ‘60H’ = B ‘65H’ = RH ‘66H’ = GH ‘67H’ = BH
ETX	1 byte	03H

Fig. 2-25-1

Data : None

2.26 EXSYNC [51H]: Separate sync ON/OFF

Function : This command turns ON or OFF each of the separate HS, VS and CS sync signals.
Sequence : Type 2



Parameter:

STX	1 byte	02H
EXSYNC	1 byte	51H
HS	1 byte	“0” = OFF, “1” = ON
VS	1 byte	“0” = OFF, “1” = ON
CS	1 byte	“0” = OFF, “1” = ON
ETX	1 byte	03H

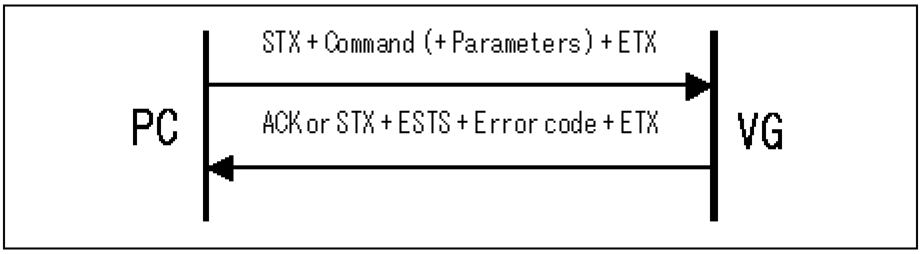
Fig. 2-26-1

Data : None

2.27 SGROUP [52H]: Group data registration

Function : This command registers the data in the group whose number has been designated. Any group number from 1 to 9 can be designated. When designating a number from 10 and up, use the [SGROUP3] command.

Sequence : Type 2



Parameter:

STX	1 byte	02H
SGROUP	1 byte	52H
GROUP No.	1 byte	“1” to “9”
Program No.	3 bytes	“001” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

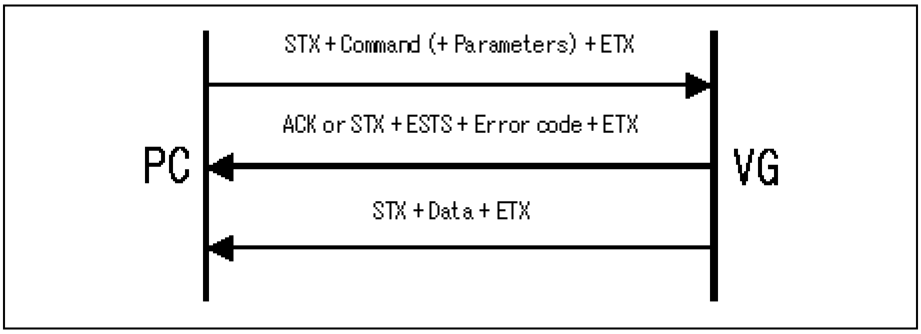
Fig. 2-27-1

Data : None

2.28 LGROUP [53H]: Group data reading

Function : This command reads the data in the group whose number has been designated. Any group number from 1 to 9 can be designated. When designating a number from 10 and up, use the [SGROUP3] command.

Sequence : Type 7



Parameter:

STX	1 byte	02H
LGROUP	1 byte	53H
GROUP No.	1 byte	"1" to "9"
ETX	1 byte	03H

Fig. 2-28-1

Data :

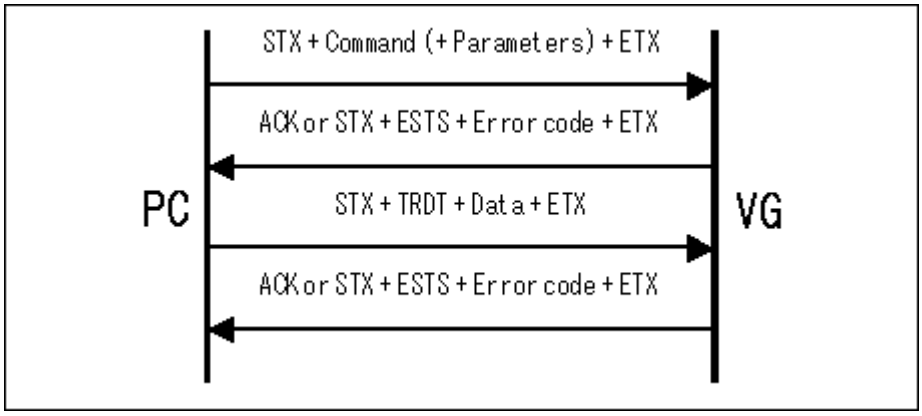
STX	1 byte	02H
Program No.	3 bytes	"001" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
Program No.	3 bytes	"000" to "999"
ETX	1 byte	03H

Fig. 2-28-2

2.29 SPT3 [A2H]: Pattern data registration (type 3)

Function : This command registers the pattern data in the program whose number has been designated. It selects the pattern block to be set as a parameter and sends the corresponding data. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPT3	1 byte	A2H
Program No.	1 to 3 bytes	“0” to “849”
Pattern block No.	2 bytes	“01” = Graphic color “02” = Character “03” = Crosshatch “04” = Dot “05” = Circle “06” = Burst “07” = Window “08” = Optional pattern 1 “09” = Optional pattern 2 “10” = Color bar “11” = Gray scale “13” = Cursor “14” = Action
ETX	1 byte	03H

Fig. 2-29-1

* Pattern block No.12 (half tone) is not available.

Data :

(1) Graphic color data

STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
Graphic color (TTL)	1 byte	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
Graphic half tone	1 byte	“0” = None, “1” = RH, “2” = GH, “3” = RHGH, “4” = BH, “5” = RHBH, “6” = GHBH, “7” = RHGHBH
Background	1 byte	“0” = OFF, “1” = ON
Background color R	3 bytes	“000” to “255”
Background color G	3 bytes	“000” to “255”
Background color B	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-29-2

(2) Character data

STX	1 byte	02H
TRDT	1 byte	10H
Character format	1 byte	“0” = Format 0, “1” = Format 1, “2” = Format 2
Character font	1 byte	“0” = 5×7, “1” = 7×9, “2” = 16×16
Character code	2 bytes	“20” to “FF”
H cell size	3 bytes	“01” to “255”
V cell size	3 bytes	“01” to “255”
ETX	1 byte	03H

Fig. 2-29-3

(3) Crosshatch data

STX	1 byte	02H
TRDT	1 byte	10H
Mode	1 byte	“0” = Lines, “1” = Dots
Format	1 byte	“0” = From center, “1” = From top left
H interval	4 bytes	“0000” to “9999”
V interval	4 bytes	“0000” to “9999”
H line width	2 bytes	“01” to “15”
V line width	2 bytes	“01” to “15”
ETX	1 byte	03H

Fig. 2-29-4

(4) Dot data

STX	1 byte	02H
TRDT	1 byte	10H
Mode	1 byte	“0” = Lines, “1” = Dots
Format	1 byte	“0” = From center, “1” = From top left
H interval	4 bytes	“0000” to “9999”
V interval	4 bytes	“0000” to “9999”
Size	2 bytes	“01” to “15”
Shape	1 byte	“0” = Round, “1” = Square
ETX	1 byte	03H

Fig. 2-29-5

(5) Circle data

STX	1 byte	02H
TRDT	1 byte	10H
Circle format	1 byte	“0” to “6”
Aspect ratio H	3 bytes	“001” to “255”
Aspect ratio V	3 bytes	“001” to “255”
ETX	1 byte	03H

Fig. 2-29-6

(6) Burst data

STX	1 byte	02H
TRDT	1 byte	10H
Burst format	1 byte	“0” to “3”
Interval	2 bytes	“01” to “99”
Step	2 bytes	“01” to “99”
ETX	1 byte	03H

Fig. 2-29-7

(7) Window data

STX	1 byte	02H
TRDT	1 byte	10H
Window mode	1 byte	“0” = %, “1” = Dot
H width	4 bytes	% = “0001” to “1000” (0.1 to 100.0%) Dots = “0001” and up
V width	4 bytes	% = “0001” to “1000” (0.1 to 100.0%) Dots = “0001” and up
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
Window color (TTL)	1 byte	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
Window half tone	1 byte	“0” = None, “1” = RH, “2” = GH, “3” = RHGH, “4” = BH, “5” = RHBH, “6” = GHBH, “7” = RHGHBH
Format	1 byte	“0” to “F” The coordinate data of format “E” are not supported by the terminal commands.
Flicker interval	1 byte	“0” to “7”
ETX	1 byte	03H

Fig. 2-29-8

(8) Optional pattern 1 data

STX	1 byte	02H
TRDT	1 byte	10H
Optional pattern code	2 bytes	“00” to “7F”
ETX	1 byte	03H

Fig. 2-29-9

(9) Optional pattern 2 data

STX	1 byte	02H
TRDT	1 byte	10H
Optional pattern code	2 bytes	“00” to “7F”
ETX	1 byte	03H

Fig. 2-29-10

(10) Color bar data

STX	1 byte	02H
TRDT	1 byte	10H
MODE	1 byte	“0” = %, “1” = Dot
Valid number	2 bytes	“00” to “16”
H width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
V width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
Direction H/V	1 byte	“0” = Horizontal, “1” = Vertical, “2” = Horizontally repeated, “3” = Vertically repeated
Color specification	16 bytes	“0” = None, “1” = R, “2” = G, “3” = RG, “4” = B, “5” = RB, “6” = GB, “7” = RGB
ETX	1 byte	03H

Fig. 2-29-11

(11) Gray scale data

STX	1 byte	02H
TRDT	1 byte	10H
MODE	1 byte	“0” = % “1” = Dot
Valid number	2 bytes	“00” to “16”
H width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
V width	4 bytes	% = “0001” to “1000” (0.0 to 100.0%) Dots = “0001” and up
Direction H/V	1 byte	“0” = Horizontal, “1” = Vertical
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
Level	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-29-12

(13) Cursor data

STX	1 byte	02H
TRDT	1 byte	10H
Shape	1 byte	“0” = 5×5, “1” = Full cross, “2” = Vertical line
Flicker	3 bytes	“000” to “007”
Coordinate display	1 byte	“0” = None, “1” = Type 1, “2” = Type 2
Step amount	3 bytes	“000” = 1 dot, “001” = 10 dots, “002” = 100 dots
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
Background R	3 bytes	“000” to “255”
Background G	3 bytes	“000” to “255”
Background B	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-29-13

(14) ActionData

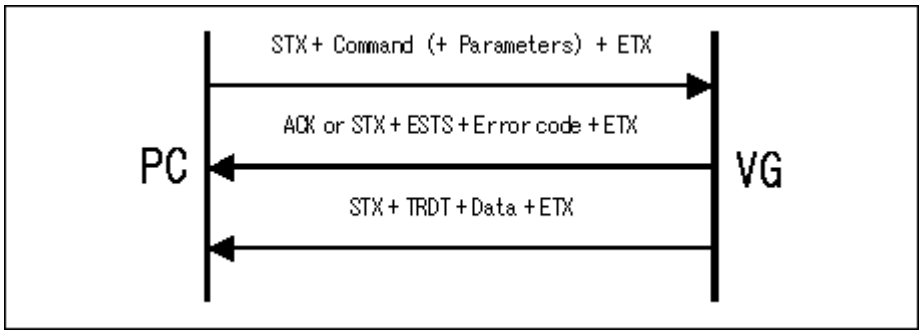
STX	1 byte	02H
TRDT	1 byte	10H
No. of internal V	3 bytes	“001” to “999”
Character flicker	1 byte	“0” = Absent, “1” = Present
Window flicker	1 byte	“0” = Absent, “1” = Present
Pattern scroll	1 byte	“0” = None, “1” = Character scrolling, “2” = Graphic scrolling, “3” = Both types of scrolling
Character scroll mode	1 byte	“0” = Left, “1” = Right, “2” = Up, “3” = Down, “4” = Top left, “5” = Bottom left, “6” = Top right, “7” = Bottom right, “8” = Move to display position
Graphic scroll mode	1 byte	“0” = Left, “1” = Right, “2” = Up, “3” = Down, “4” = Top left, “5” = Bottom left, “6” = Top right, “7” = Bottom right, “8” = Move to display position
Number of times repeated horizontally	2 bytes	“01” to “15”
Horizontal step	4 bytes	“0001” to “4096”
Number of times repeated vertically	2 bytes	“01” to “15”
Vertical step	4 bytes	“0001” to “4096”
Window scrolling	1 byte	“0” = None, “1” = Present
Window scroll mode	1 byte	“0” = Left, “1” = Right, “2” = Up, “3” = Down, “4” = Top left, “5” = Bottom left, “6” = Top right, “7” = Bottom right
Window scroll step	3 bytes	“001” to “255”
Palette scrolling	1 byte	“0” = None, “1” = Present
Palette scroll step sign	1 byte	“0” = +, “1” = -
Palette scroll stop	3 bytes	“000” to “128”
Start palette	3 bytes	“000” to “255”
End palette	3 bytes	“000” to “255”
Reserved	6 bytes	“000000”
ETX	1 byte	03H

Fig. 2-29-14

2.30 LPT3 [A1H]: Pattern data reading (type 3)

Function : This command reads the pattern data of the program whose number has been designated. It selects the pattern block to be set as a parameter and receives the corresponding data.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LPT3	1 byte	A1H
Program No.	1 to 3 bytes	“0” to “999”
Pattern block No.	2 bytes	“01” = Graphic color “02” = Character “03” = Crosshatch “04” = Dot “05” = Circle “06” = Burst “07” = Window “08” = Optional pattern 1 “09” = Optional pattern 2 “10” = Color bar “11” = Gray scale “13” = Cursor “14” = Action
ETX	1 byte	03H

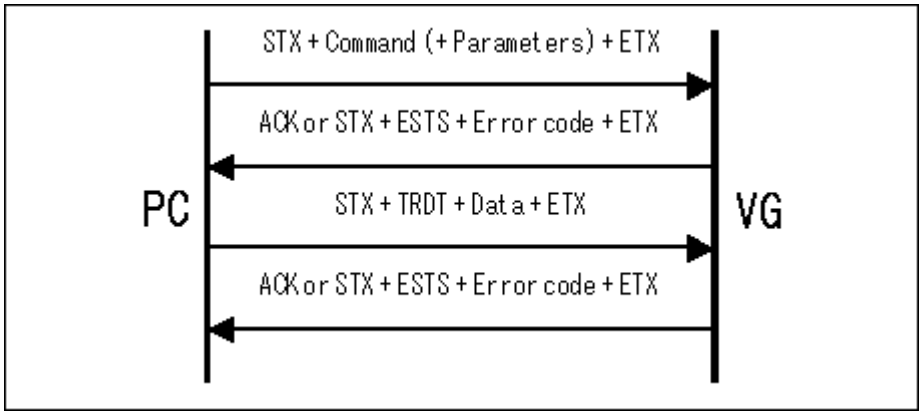
Fig. 2-30-1

Data : The data in Figs. 2-29-2 to 2-29-14 corresponding to the pattern block whose number has been designated is received.

2.31 SOT3 [A7H]: All output condition data registration (type 3)

Function : This command registers all the analog and digital output condition data of the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SOT3	1 byte	A7H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-31-1

Data :

STX	1 byte	02H	
TRDT	1 byte	10H	
OUT PUT	1 byte	“0” = Analog, “1” = TTL “2” = 1080 system, “3” = 1035 system “4” = 720 system, “5” = 483 system “6” = NTSC system, “7” = PAL system “8” = SECAM system	Analog data
HS	1 byte	“0” = NEGA “1” = POSI “2” = OFF	
VS	1 byte	“0” = NEGA “1” = POSI “2” = OFF	
CS	1 byte	“0” = NEGA “1” = POSI “2” = OFF “3” = HS “4” = VS	
HD	1 byte	“0” = NEGA “1” = POSI	
VD	1 byte	“0” = NEGA “1” = POSI	
RGB	1 byte	“0” = NEGA “1” = POSI	
RH GH BH	1 byte	“0” = NEGA “1” = POSI	
V/S	1 byte	“0” = None “1” = R “2” = G “3” = RG “4” = B “5” = RB “6” = GB “7” = RGB	
RZ/NRZ	1 byte	“0” = NRZ “1” = RZ	
CLOCK	1 byte	“0” = NEGA “1” = POSI	
VIDEO LEVEL	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}	
SET UP	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}	
SYNC LEVEL	3 bytes	Sequence of digits from top: 10^0, 10^{-1}, 10^{-2}	
Color difference table No.	1 byte	“0” to “9” or ‘70H’ to ‘79H’ (with YPbPr)	
CLOCK MODE	1 byte	“0” = 1/1 clock, “1” = 1/2 clock	Digital data
HS	1 byte	“0” = NEGA, “1” = POSI	
VS	1 byte	“0” = NEGA, “1” = POSI	

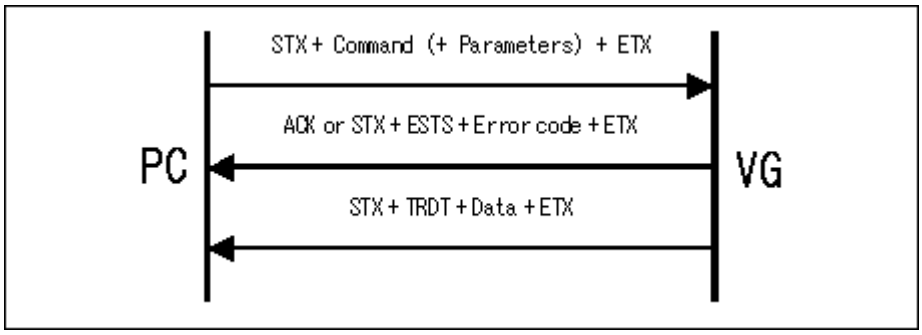
CS	1 byte	“0” = NEGA, “1” = POSI	
HD	1 byte	“0” = NEGA, “1” = POSI	
VD	1 byte	“0” = NEGA, “1” = POSI	
1ch RGB	1 byte	“0” = NEGA, “1” = POSI	
2ch RGB	1 byte	“0” = NEGA, “1” = POSI	
CLOCK	1 byte	“0” = NEGA, “1” = POSI	
DISP	1 byte	“0” = NEGA, “1” = POSI	Digital data
RZ/NRZ	1 byte	“0” = NRZ, “1” = RZ	
OSW0	1 byte	“0” = OFF, “1” = ON	
OSW1	1 byte	“0” = OFF, “1” = ON	
DELAY MODE	1 byte	“0” = OFF, “1” = ON	
CLOCK AREA	1 byte	“0” = DISP, “1” = ALL	
DELAY TIME	2 bytes	“00” to “31”	
RGB BIT OUT	1 byte	“1” = 1 bit, “2” = 2 bit, “3” = 3 bit, “4” = 4 bit, “5” = 5 bit, “6” = 6 bit, “7” = 7 bit, “8” = 8 bit	
R MASK	2 bytes	“00” to “FF”	
G MASK	2 bytes	“00” to “FF”	
B MASK	2 bytes	“00” to “FF”	
SW0SEL	1 byte	“0” = CS, “1” = VD, “2” = HD, “3” = OSW0, “4” = OSW1, “5” = GSW0, “6” = GSW1	
SW1SEL	1 byte	“0” = CS, “1” = VD, “2” = HD, “3” = OSW0, “4” = OSW1, “5” = GSW0, “6” = GSW1	
SW2SEL	1 byte	“0” = VS, “1” = VD, “2” = HD, “3” = OSW0, “4” = OSW1, “5” = GSW0, “6” = GSW1	
SW3SEL	1 byte	“0” = HS, “1” = VD, “2” = HD, “3” = OSW0, “4” = OSW1, “5” = GSW0, “6” = GSW1	
CLK/OUT	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>2ch clk</td><td>1ch clk</td><td>2ch out</td><td>1ch out</td></tr><tr><td colspan="4"></td><td colspan="4">0 = ON, 1 = High impedance</td></tr></table> ‘4xH’ is set on the basis of the above bit layout. The value that has raised each of the bits is substituted in x.	
Reserved	1 byte	‘40H’ (“@” in ASCII code)	
ETX	1 byte	03H	

Fig. 2-31-2

2.32 LOT3 [A6H]: All output condition data reading (type 3)

Function : This command reads all the analog and digital output condition data of the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LOT3	1 byte	A6H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

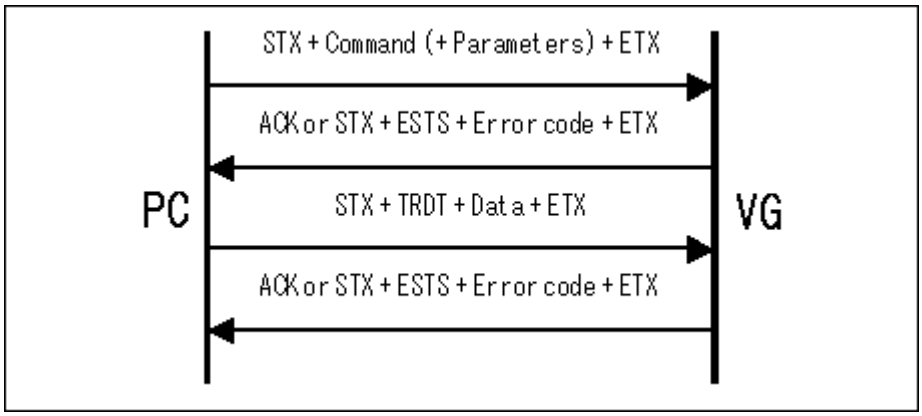
Fig. 2-32-1

Data : Same as Fig. 2-31-2.

2.33 SPD3 [A4H]: Program data registration (type 3)

Function : This command registers all the data in the program whose number has been designated. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPD3	1 byte	A4H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-33-1

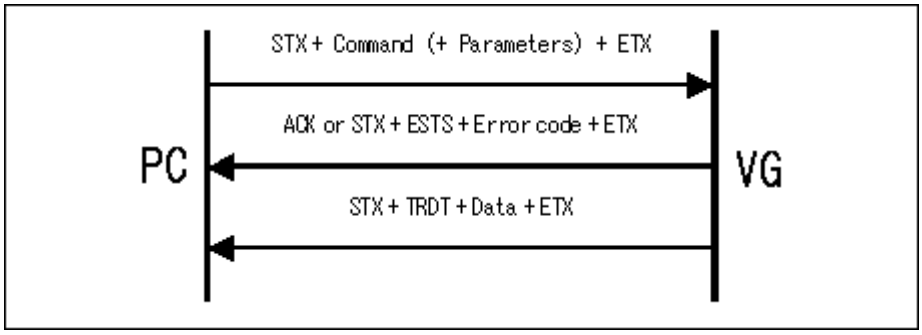
Data :

STX	1 byte	02H
TRDT	1 byte	10H
Horizontal timing	30 bytes	See Fig. 2-1-2
Delimiter	1 byte	“,”
Vertical timing	34 bytes	See Fig. 2-3-2
Delimiter	1 byte	“,”
Analog + digital output condition	51 bytes	See Fig. 2-31-2
Delimiter	1 byte	“,”
Graphic color	21 bytes	See Fig. 2-29-2
Character	10 bytes	See Fig. 2-29-3
Crosshatch	14 bytes	See Fig. 2-29-4
Dot	13 bytes	See Fig. 2-29-5
Circle	7 bytes	See Fig. 2-29-6
Burst	5 bytes	See Fig. 2-29-7
Window	22 bytes	See Fig. 2-29-8
Optional pattern 1	2 bytes	See Fig. 2-29-9
Optional pattern 2	2 bytes	See Fig. 2-29-10
Delimiter	1 byte	“,”
Color bar	28 bytes	See Fig. 2-29-11
Delimiter	1 byte	“,”
Gray scale	60 bytes	See Fig. 2-29-12
Delimiter	1 byte	“,”
Cursor	26 bytes	See Fig. 2-29-13
Delimiter	1 byte	“,”
Action	42 bytes	See Fig. 2-29-14
ETX	1 byte	03H

Fig. 2-33-2

2.34 LPD3 [A3H]: Program data reading (type 3)

Function : This command reads all the data of the program whose number has been designated.
Sequence : Type 3



Parameter:

STX	1 byte	02H
LPD	1 byte	A3H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

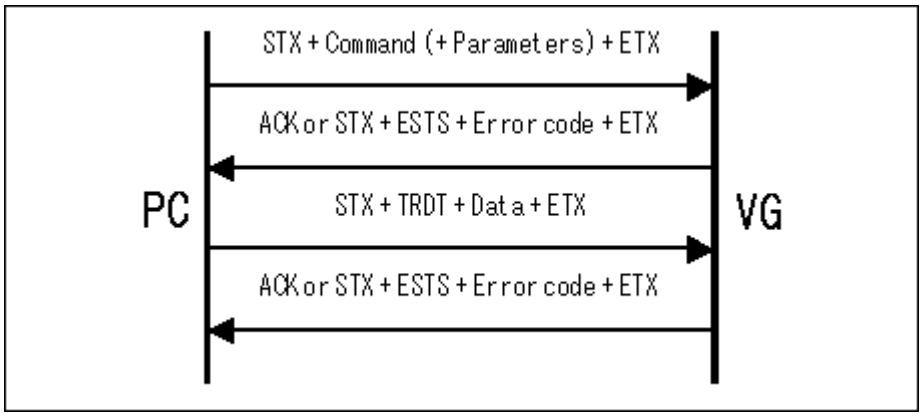
Fig. 2-34-1

Data : Same as Fig. 2-33-2.

2.35 EXPBN3 [A5H]: Program data setting/execution (type 3)

Function : This command sets the data of one program in the buffer RAM, and executes it. It does not save the data on the PC card.

Sequence : Type 4



Parameter:

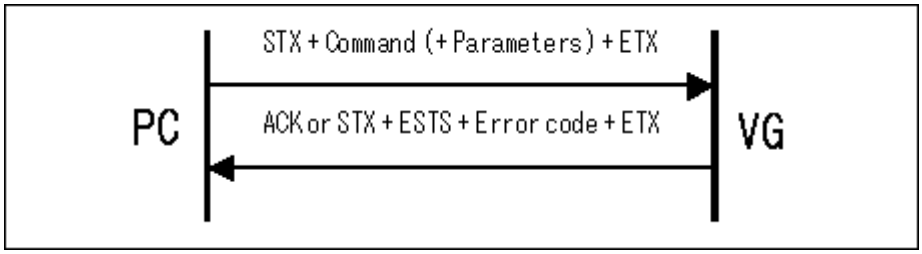
STX	1 byte	02H
EXPBN3	1 byte	A5H
ETX	1 byte	03H

Fig. 2-35-1

Data : Same as Fig. 2-33-2.

2.36 PNAMES3 [A8H]: Program name registration (type 3)

Function : This command registers the name of the program whose number has been designated.
Sequence : Type 2



Parameter:

STX	1 byte	02H
PNAMES3	1 byte	A8H
Program No.	1 to 3 bytes	“0” to “849”
Display position	1 byte	“0” = Center, “1” = Top left, “2” = Bottom left, “3” = Top right, “4” = Bottom right
Font size	1 byte	“0” = 5×7, “1” = 7×9, “2” = 16×16
Program name	1 to 20 bytes	ASCII code
ETX	1 byte	03H

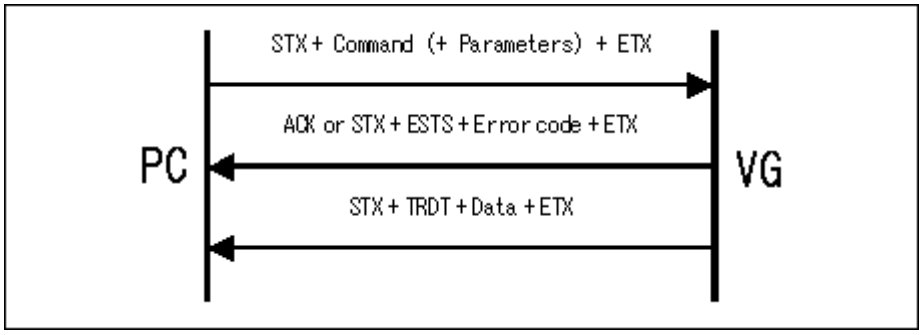
Fig. 2-36-1

Data : None

2.37 PNAMER3 [A9H]: Program name reading (type 3)

Function : This command reads the name of the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	-
PNAMER3	1 byte	-
Program No.	1 to 3 bytes	“1” to “999”
ETX	1 byte	-

Fig. 2-37-1

Data :

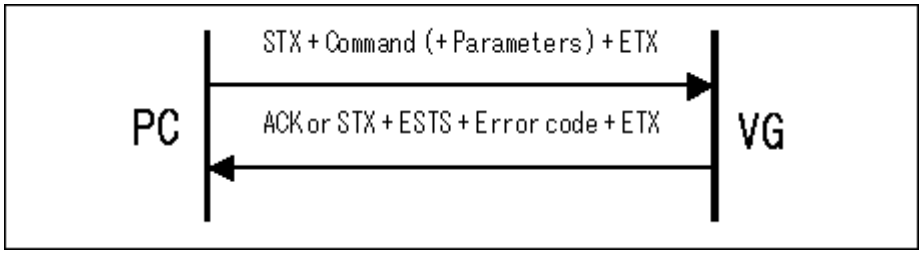
STX	1 byte	-
TRDT	1 byte	-
Display position	1 byte	“0” = Center, “1” = Top left, “2” = Bottom left, “3” = Top right, “4” = Bottom right
Font size	1 byte	“0” = 5×7, “1” = 7×9, “2” = 16×16
Program name	1 to 20 bytes	ASCII code
ETX	1 byte	-

Fig. 2-37-2

2.38 SGROUP3 [AAH]: Group number registration (type 3)

Function : This command registers the data in the group which has been designated.

Sequence : Type 2



Parameter:

STX	1 byte	02H	
SGROUP3	1 byte	AAH	
GROUP No.	2 bytes	“01” to “99”	
Reserved	4 bytes	“0000”	
Timing data program No.	3 bytes	“001” to “999”	Repeated 58 times in this unit (3×3×58 bytes)
Pattern data program No.	3 bytes	“001” to “999”	
ETX	1 byte	03H	

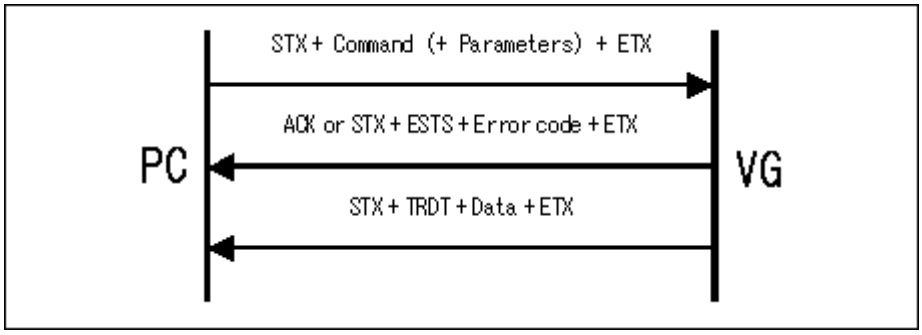
Fig. 2-38-1

Data : None

2.39 LGROUP3 [ABH]: Group number reading (type 3)

Function : This command reads the data of the group whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LGROUP3	1 byte	ABH
Group No.	2 bytes	“01” to “99”
ETX	1 byte	03H

Fig. 2-39-1

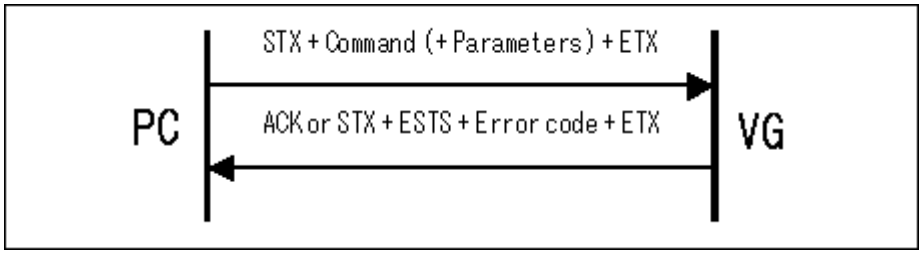
Data :

STX	1 byte	02H	
TRDT	1 byte	10H	
Reserved	4 bytes	“0000”	
Timing data program No.	3 bytes	“001” to “999”	Repeated 58 times in this unit (3×3×58 bytes)
Pattern data program No.	3 bytes	“001” to “999”	
ETX	1 byte	03H	

Fig. 2-39-2

2.40 GNAMES3 [ACH]: Group name registration (type 3)

Function : This command registers the name of the group whose number has been designated.
Sequence : Type 2



Parameter:

STX	1 byte	02H
GNAMES3	1 byte	ACH
Group No.	2 bytes	“01” to “99”
Group NAME	1 to 20 bytes	ASCII code
ETX	1 byte	03H

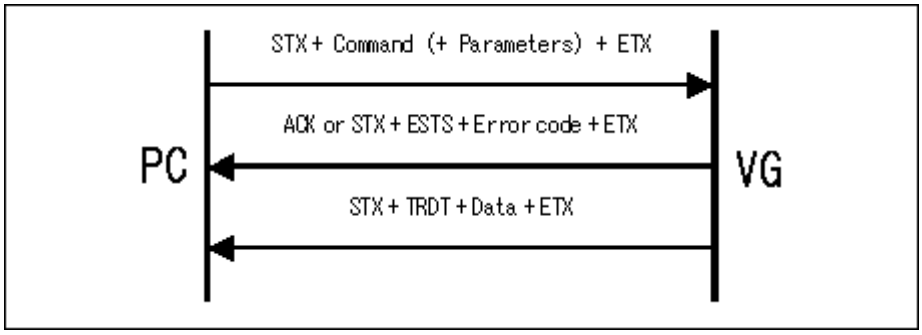
Fig. 2-40-1

Data : None

2.41 GNAMER3 [ADH]: Group name reading (type 3)

Function : This command reads the name of the group whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
GNAMER3	1 byte	ADH
Group No.	2 bytes	“01” to “99”
ETX	1 byte	03H

Fig. 2-41-1

Data :

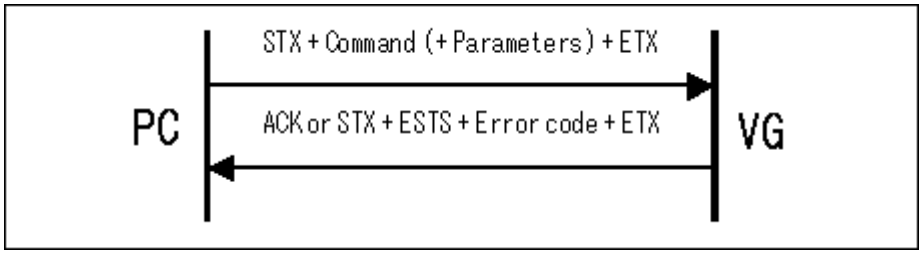
STX	1 byte	02H
TRDT	1 byte	10H
Group name	1 to 20 bytes	ASCII code
ETX	1 byte	03H

Fig. 2-41-2

2.42 SCFG3 [7FH]: Configuration data registration (type 3)

Function : This command registers the configuration data.

Sequence : Type 2



Parameter:

STX	1 byte	02H
SCFG3	1 byte	7FH
Program data device	1 byte	“0” = Memory card
Pattern display mode	1 byte	“0” = Single-action switching, “1” = Overwriting
Group No.	2 bytes	“00” = Group not used,“01” to “99” = Designated group executed
Beep tone	1 byte	“0” = OFF, “1” = ON
Baud rate	1 byte	“0” = 9600, “1” = 19200, “2” = 38400, “3” = 57600, “4” = 115200
Data length	1 byte	“0” = 7, “1” = 8
Parity	1 byte	“0” = None, “1” = Even, “2” = Odd,
Stop length	1 byte	“0” = 1, “1” = 2
ETX	1 byte	03H

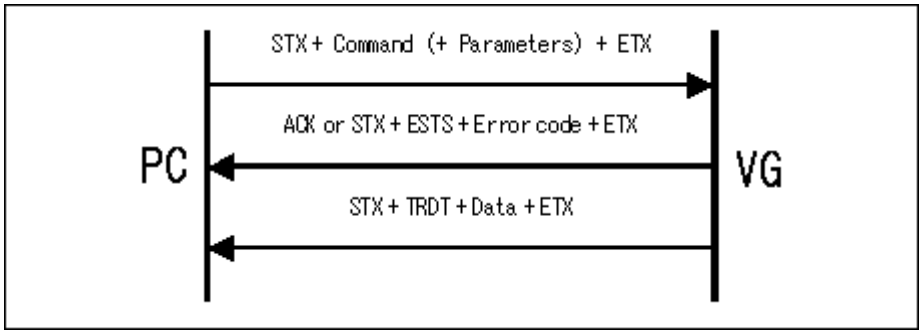
Fig. 2-42-1

Data : None

2.43 LCFG3 [7EH]: Configuration data reading (type 3)

Function : This command reads the configuration data.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LCFG3	1 byte	7EH
ETX	1 byte	03H

Fig. 2-43-1

Data :

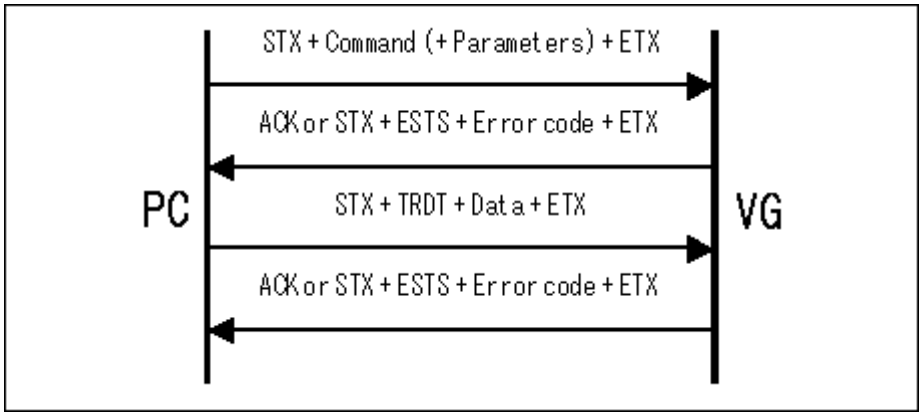
STX	1 byte	02H
TRDT	1 byte	10H
Program data device	1 byte	“0” = Memory card
Pattern display mode	1 byte	“0” = Single-action switching, “1” = Overwriting
Group No.	2 bytes	“00” = Group not used, “01” to “99” = Designated group executed
Beep tone	1 byte	“0” = OFF, “1” = ON
Baud rate	1 byte	“0” = 9600, “1” = 19200, “2” = 38400, “3” = 57600, “4” = 115200
Data length	1 byte	“0” = 7, “1” = 8
Parity	1 byte	“0” = None, “1” = Even, “2” = Odd
Stop length	1 byte	“0” = 1, “1” = 2
ETX	1 byte	03H

Fig. 2-43-2

2.44 SPbPrD [92H]: Color difference coefficient data registration

Function : This command registers the color difference coefficient data.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPbPrD	1 byte	92H
Color difference table No.	1 byte	“0” to “9”
ETX	1 byte	03H

Fig. 2-44-1

Data :

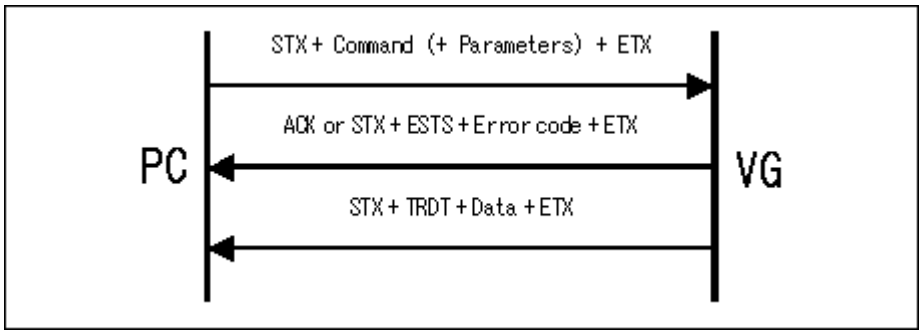
STX	1 byte	02H
TRDT	1 byte	10H
YR	5 bytes	“00000” to “10000” Set the total of YG and YB to not more than 10000.
YG	5 bytes	“00000” to “10000” Set the total of YR and YB to not more than 10000.
YB	5 bytes	“00000” to “10000” Set the total of YR and YG to not more than 10000.
PbR	5 bytes	“00000” to “05000” Set the total of PbG and PbB to not more than 10000.
PbG	5 bytes	“00000” to “05000” Set the total of PbR and PbB to not more than 10000.
PbB	5 bytes	“00000” to “05000” Set the total of PbR and PbG to not more than 10000.
PrR	5 bytes	“00000” to “05000” Set the total of PrR and PrG to not more than 10000.
PrG	5 bytes	“00000” to “05000” Set the total of PrR and PrB to not more than 10000.
PrB	5 bytes	“00000” to “05000” Set the total of PrR and PrG to not more than 10000.
ETX	1 byte	-

Fig. 2-44-2

2.45 LPbPrD [91H]: Color difference coefficient data reading

Function : This command reads the color difference coefficient data.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LPbPrD	1 byte	91H
Color difference table No.	1 byte	“0” to “9”
ETX	1 byte	03H

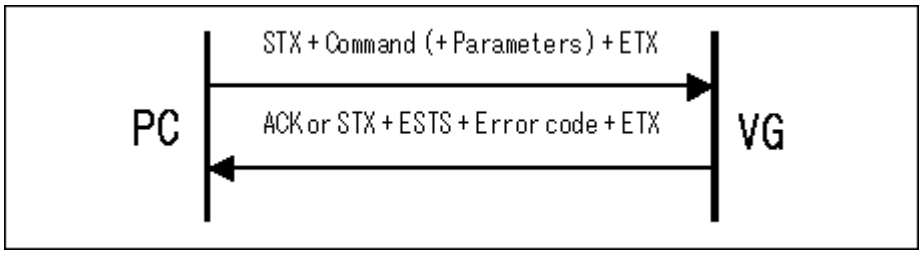
Fig. 2-45-1

Data : Same as Fig. 2-44-2.

2.46 PbPrDNAMES3 [93H]: Color difference coefficient data name registration (type 3)

Function : This command registers the name of the color coefficient data whose number has been designated.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GNAMES3	1 byte	93H
Color difference table No.	1 byte	“0” to “9”
Color difference name	1 to 20 bytes	ASCII code
ETX	1 byte	03H

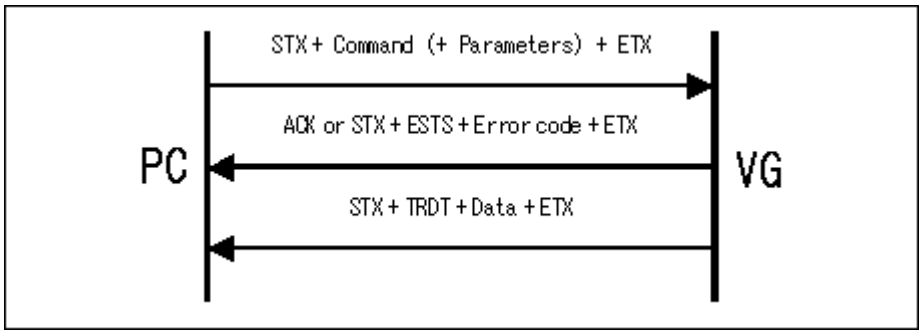
Fig. 2-46-1

Data : None

2.47 PbPrDNAMER3 [94H]: Color difference coefficient data name reading (type 3)

Function : This command reads the name of the color coefficient data whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
GNAMER3	1 byte	94H
Color difference table No.	1 byte	“0” to “9”
ETX	1 byte	03H

Fig. 2-47-1

Data :

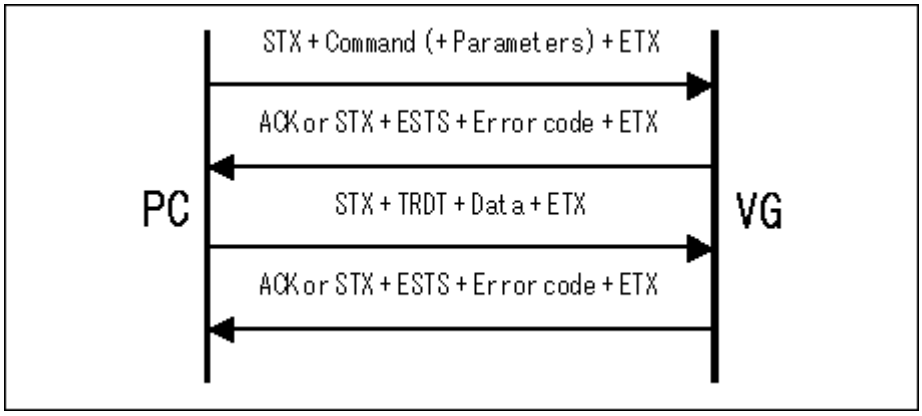
STX	1 byte	02H
TRDT	1 byte	10H
Color difference name	1 to 20 bytes	ASCII code
ETX	1 byte	03H

Fig. 2-47-2

2.48 CROSS_CTRL [2EH]: Cursor pattern control

Function : This command changes the setting for the angle of the cursor pattern. It is valid only when a cursor pattern has been output in advance. Send the data that corresponds to the command code which has been designated.

Sequence : Type 4



Parameter:

STX	1 byte	02H
CROSS_CTRL	1 byte	2EH
Command code	1 byte	“A” = Switch the coordinate display “B” = Change the flicker speed “C” = Change the cursor shape “D” = Change the background color “E” = Change the cursor color “F” = Change the cursor coordinates
ETX	1 byte	03H

Fig. 2-48-1

Data :

(A) Coordinate display

STX	1 byte	02H
TRDT	1 byte	10H
Display format	1 byte	“0” = (xxx,yyy,STEPaa) “1” = (R: a,G: b,B: c) (GATE:d, STEP:e) “2” = No display “3” = Top/bottom and left/right of “0” reversed “4” = Top/bottom and left/right of “1” reversed
ETX	1 byte	03H

Fig. 2-48-2

(B) Flicker speed

STX	1 byte	02H
TRDT	1 byte	10H
Flicker speed	1 byte	“0” = Flicker stopped “1” = Flickering every 16 blanking times “2” = Flickering every 8 blanking times
ETX	1 byte	03H

Fig. 2-48-3

(C) Cursor Shape

STX	1 byte	02H
TRDT	1 byte	10H
Cursor shape	1 byte	“0” = Full-screen cross cursor “1” = Vertical line “2” = 5×5 cross cursor “3” = Full-screen cross cursor RGB “4” = Vertical line RGB “5” = 5×5 cross cursor RGB
ETX	1 byte	03H

Fig. 2-48-4

(D) Background color

STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
ETX	1 byte	-

Fig. 2-48-5

(E) Cursor color

STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-48-6

(F) Cursor coordinates

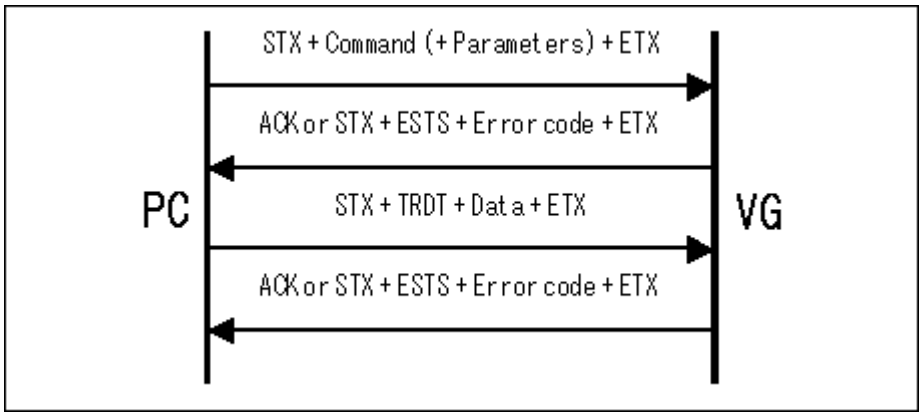
STX	1 byte	02H
TRDT	1 byte	10H
X coordinate	4 bytes	From “0000” to “H display size -1 (4 digits)
Y coordinate	4 bytes	From “0000” to “V display size -1 (4 digits)
ETX	1 byte	03H

Fig. 2-48-7

2.49 SDC [61H]: D connector output condition registration

Function : This command registers the D connector output conditions in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SDC	1 byte	61H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-49-1

Data :

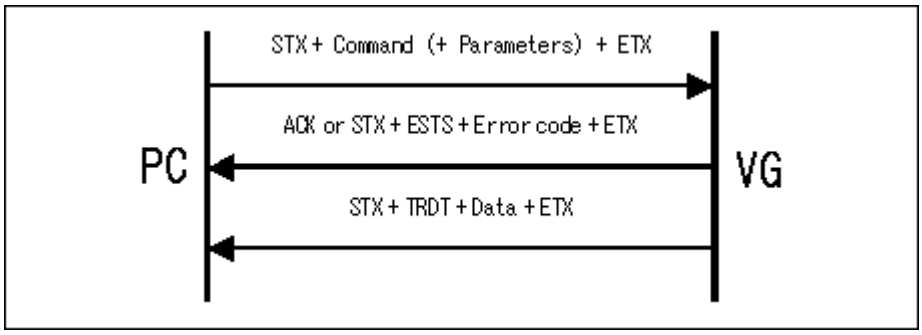
STX	1 byte	02H
TRDT	1 byte	10H
D connector line 1	1 byte	“0” = 480, “1” = 720, “2” = 1080
D connector line 2	1 byte	“0” = Interlace,”1” = Progressive
D connector line 3	1 byte	“0” = 4:3,”1” = 4:3LB,”2” = 16:9
ETX	1 byte	03H

Fig. 2-49-2

2.50 LDC [60H]: D connector output condition reading

Function : This command reads the D connector output conditions in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LDC	1 byte	60H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

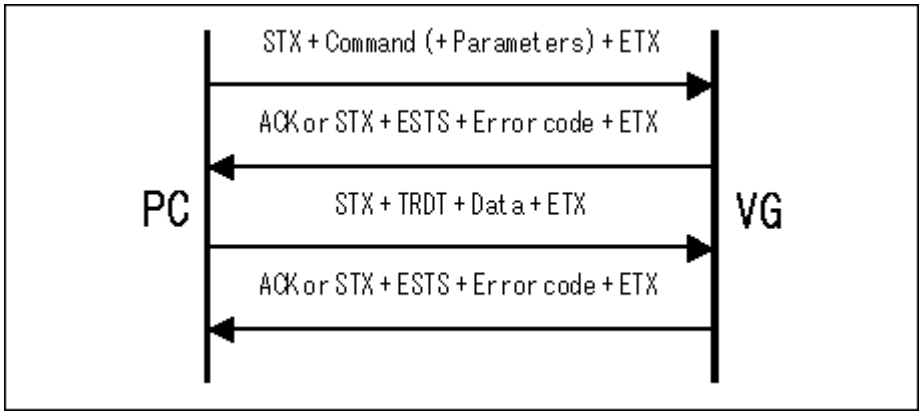
Fig. 2-50-1

Data : Same as Fig. 2-49-2.

2.51 SWP [63H]: Window pattern registration

Function : This command is valid when “Format E” has been selected during window pattern editing. It sends the window display center coordinates to the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SWP	1 byte	63H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-51-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Window #1 Horizontal center position (%)	4 bytes	“0000” to “1000” = 0.000% to 100.0%
Window #1 Vertical center position (%)	4 bytes	“0000” to “1000” = 0.000% to 100.0%
Window #2 Horizontal center position (%)	4 bytes	“0000” to “1000” = 0.000% to 100.0%
Window #2 Vertical center position (%)	4 bytes	“0000” to “1000” = 0.000% to 100.0%
ETX	1 byte	03H

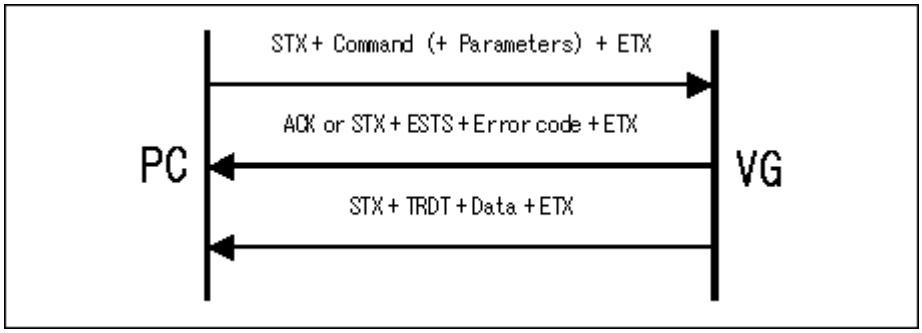
Fig. 2-51-2

* Window #2 is not displayed if “0000” has been selected as the setting for the H and V data of window #2.

2.52 LWP [62H]: Window pattern coordinate reading

Function : This command is valid when “Format E” has been selected during window pattern editing. It receives the window display center coordinates from the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LWP	1 byte	62H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

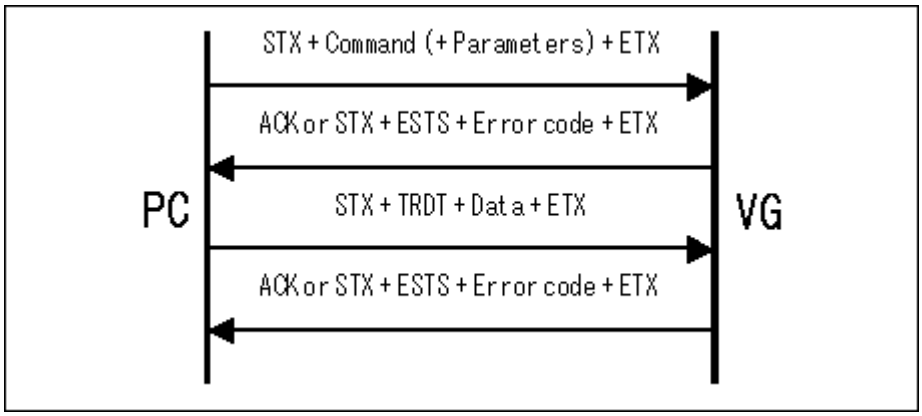
Fig. 2-52-1

Data : Same as Fig. 2-51-2.

2.53 SOM [65H]: Video output ON/OFF registration

Function : This command registers the video output ON/OFF statuses in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SOM	1 byte	65H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-53-1

Data :

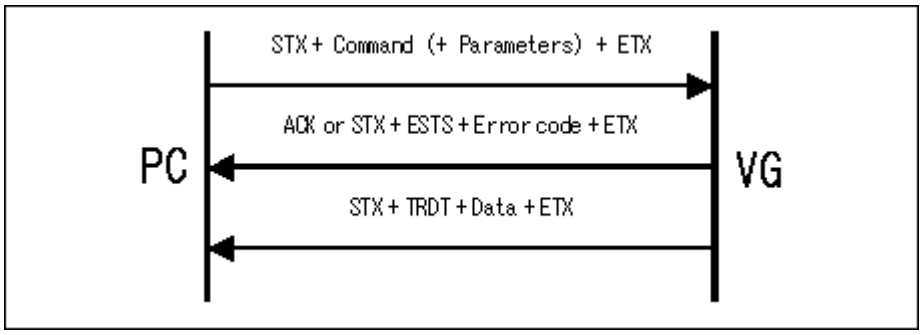
STX	1 byte	02H
TRDT	1 byte	10H
Analog output (BNC)	1 byte	“0” = OFF, “1” = ON
Analog output (D-SUB)	1 byte	“0” = OFF, “1” = ON
DVI (Digital)	1 byte	“0” = OFF, “1” = ON
DVI (Analog)	1 byte	“0” = OFF, “1” = ON
D connector output	1 byte	“0” = OFF, “1” = ON
Spare	1 byte	“0”
Spare	1 byte	“0”
Spare	1 byte	“0”
ETX	1 byte	03H

Fig. 2-53-2

2.54 LOM [64H]: Video output ON/OFF reading

Function : This command reads the video output ON/OFF statuses in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LOM	1 byte	64H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

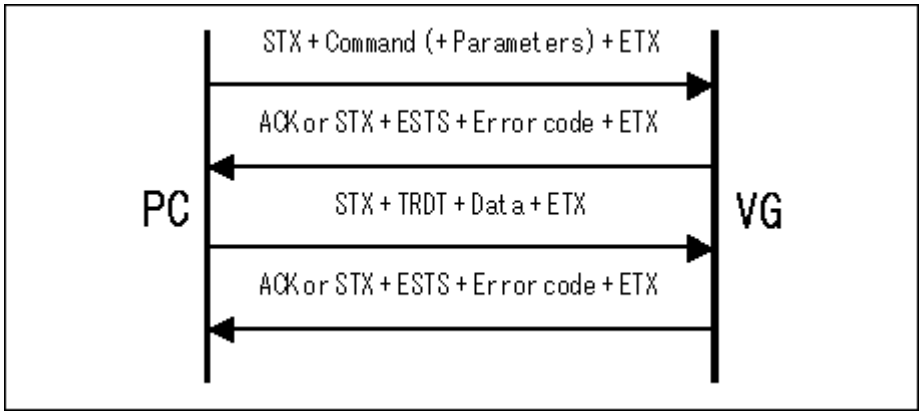
Fig. 2-54-1

Data : Same as Fig. 2-53-2.

2.55 SAD [67H]: Audio output condition registration

Function : This command registers the audio output condition setting data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SAD	1 byte	67H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-55-1

Data :

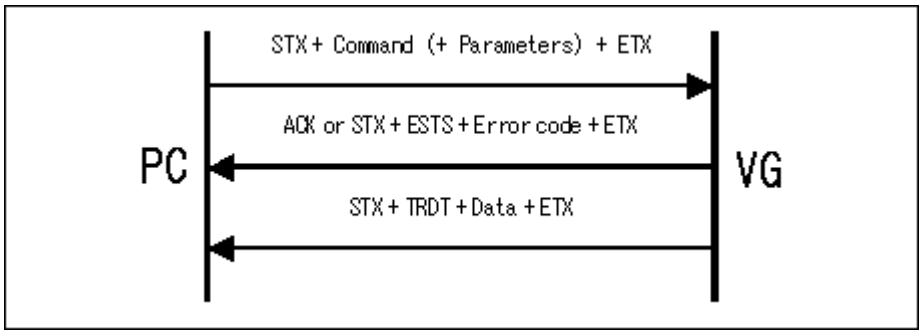
STX	1 byte	02H
TRDT	1 byte	10H
Freq L (Hz)	5 bytes	“00100” to “20000” = 100Hz to 20000Hz
Freq R (Hz)	5 bytes	“00100” to “20000” = 100Hz to 20000Hz
Level L (mV)	4 bytes	“0000” to “2000” = 0mV to 2000mV (unit: 50mV)
Level R (mV)	4 bytes	“0000” to “2000” = 0mV to 2000mV (unit: 50mV)
SWEEP	1 byte	“0” = OFF, “1” = Frequency, “2” = Level L, “3” = Level R
ETX	1 byte	03H

Fig. 2-55-2

2.56 LAD [66H]: Audio output condition reading

Function : This command reads the audio output condition setting data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LAD	1 byte	10H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

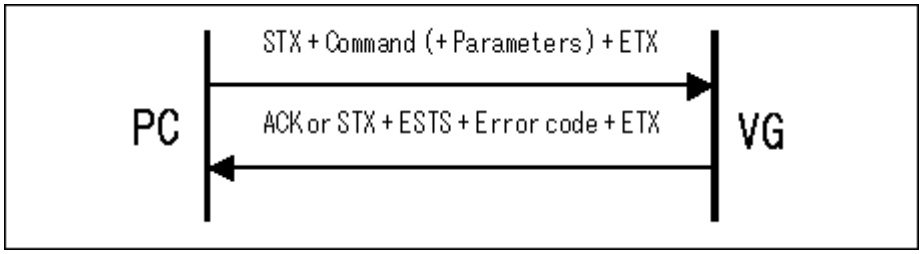
Fig. 2-56-1

Data : Same as Fig. 2-55-2.

2.57 SIPADR [F1H]: IP address registration

Function : This command registers the IP address setting data.

Sequence : Type 2



Parameter:

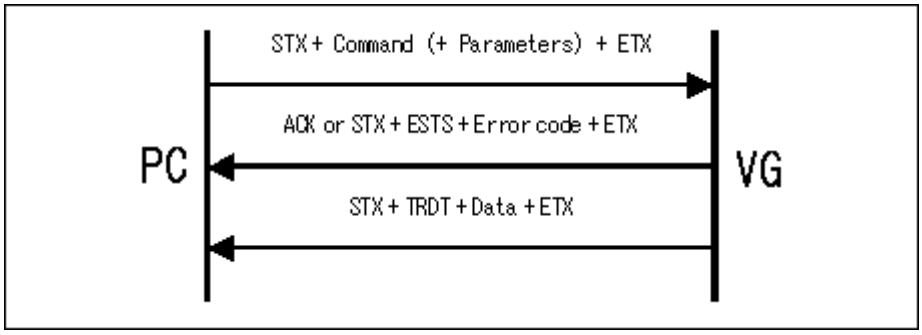
STX	1 byte	02H
SIPADR	1 byte	F1H
IP address	8 bytes	ASCII code (Hex)
Port number	3 bytes	ASCII code (Hex)
ETX	1 byte	03H

Fig. 2-57-1

2.58 LIPADR [F0H]: IP address reading

Function : This command reads IP address setting data.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LIPADR	1 byte	F0H
ETX	1 byte	03H

Fig. 2-58-1

Data :

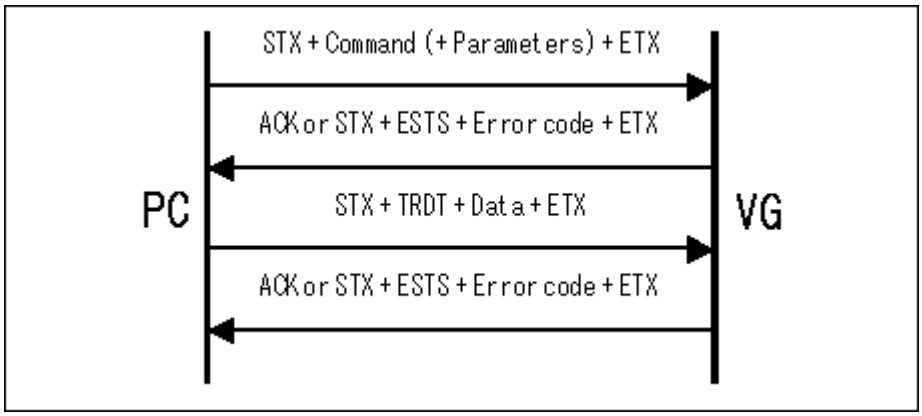
STX	1 byte	02H
TRDT	1 byte	10H
IP address	8 bytes	ASCII code (Hex) Example:192.168.0.10 → “C0A8000A”
Port number	4 bytes	ASCII code (Hex) Example:8000 → “1F40”
ETX	1 byte	03H

Fig. 2-58-2

2.59 SPDS [69H]: Pulldown scroll setting data registration

Function : This command sends the pulldown scroll setting data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SPDS	1 byte	69H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-59-1

Data :

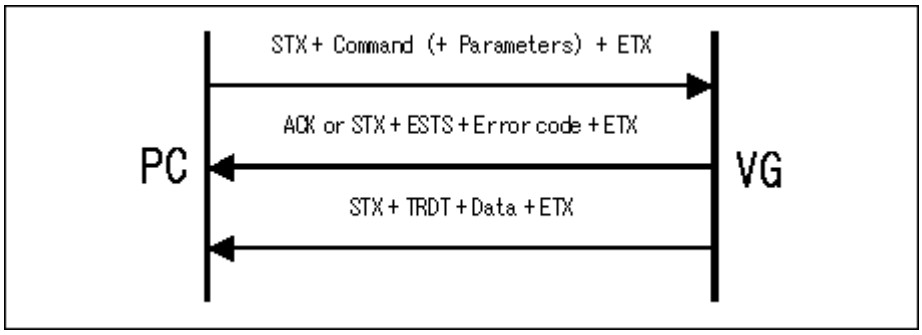
STX	1 byte	02H
TRDT	1 byte	10H
Interval 1	3 bytes	“001” to “255” = 1V to 255V
Interval 2	3 bytes	“000” to “255” = 0V to 255V
Interval 3	3 bytes	“000” to “255” = 0V to 255V
Interval 4	3 bytes	“000” to “255” = 0V to 255V
Graphic & character H-Step 1	4 bytes	“0001” to “0255” = 1 Step to 255 Step
Graphic & character H-Step 2	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Graphic & character H-Step 3	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Graphic & character H-Step 4	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Graphic & character V-Step 1	4 bytes	“0001” to “0255” = 1 Step to 255 Step
Graphic & character V-Step 2	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Graphic & character V-Step 3	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Graphic & character V-Step 4	4 bytes	“0000” to “0255” = 0 Step to 255 Step
Window Step 1	3 bytes	“001” to “255”
Window Step 2	3 bytes	“000” to “255”
Window Step 3	3 bytes	“000” to “255”
Window Step 4	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-59-2

2.60 LPDS [68H]: Pulldown scroll setting data reading

Function : This command reads the pulldown scroll setting data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LPDS	1 byte	68H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

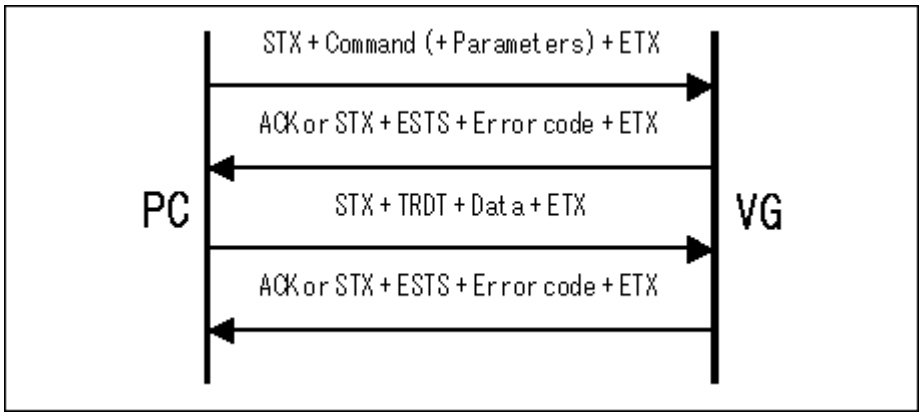
Fig. 2-60-1

Data : Same as Fig. 2-59-2.

2.61 SSC [6BH]: S connector output condition registration

Function : This command registers the S connector output conditions in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SSC	1 byte	6BH
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-61-1

Data :

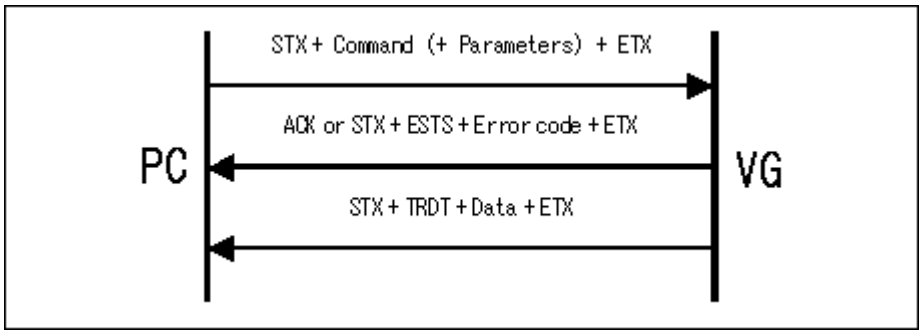
STX	1 byte	02H
TRDT	1 byte	10H
S connector 1	1 byte	“0” = NORMAL, “1” = LETTER BOX, “2” = SQUEEZE
ETX	1 byte	03H

Fig. 2-61-2

2.62 LSC [6AH]: S connector output condition reading

Function : This command reads the S connector output conditions in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LSC	1 byte	6AH
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

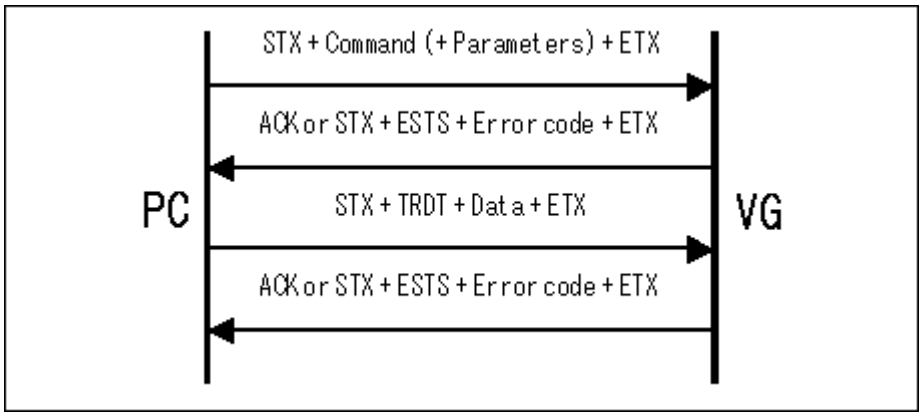
Fig. 2-62-1

Data : Same as Fig. 2-61-2.

2.63 SDVIM [6DH]: DVI output mode registration

Function : This command registers the DVI mode in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SDVIM	1 byte	6DH
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-63-1

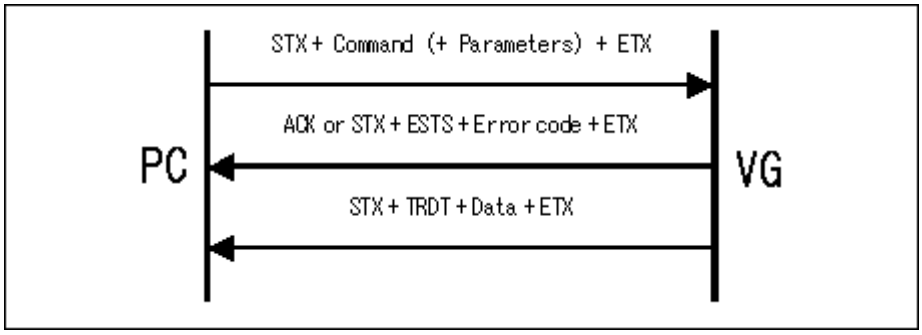
Data :

STX	1 byte	02H
TRDT	1 byte	10H
DVI MODE	1 byte	“0” = SINGLE, “1” = DUAL
ETX	1 byte	03H

Fig. 2-63-2

2.64 LDVIM [6CH]: DVI output mode reading

Function : This command reads the DVI mode in the program whose number has been designated.
Sequence : Type 3



Parameter:

STX	1 byte	02H
LDVIM	1 byte	6CH
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

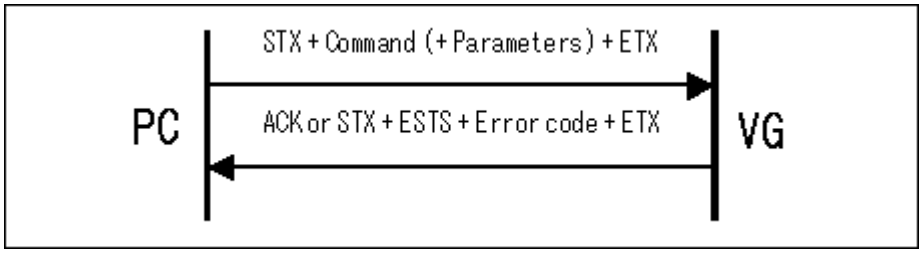
Fig. 2-64-1

Data : Same as Fig. 2-63-2.

2.65 SGADR [F3H]: Gateway IP address registration

Function : This command sends the IP address of the gateway. (In the VG-848, it is reserved and is only to be used in the event that the generator's functions are expanded. Even when its setting is registered, it will not function.)

Sequence : Type 2



Parameter:

STX	1 byte	02H
SGADR	1 byte	F3H
IP address	8 bytes	ASCII code (Hex) Example:192.168.0.10 → "C0A8000A"
ETX	1 byte	03H

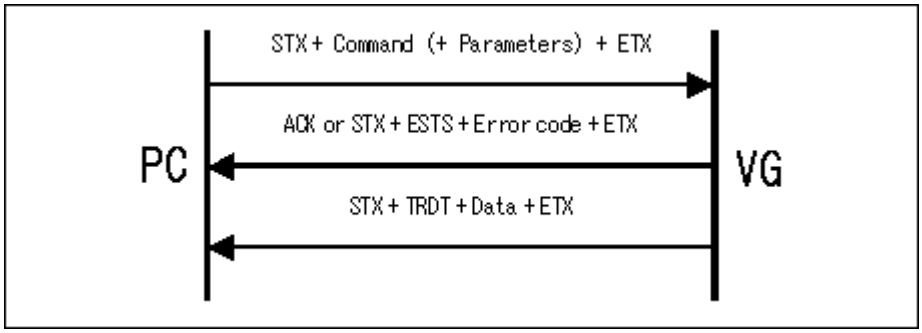
Fig. 2-65-1

Data : None

2.66 LGADR [F2H]: Gateway IP address reading

Function : This command reads the IP address of the gateway. (In the VG-848, it is reserved and is only to be used in the event that the generator's functions are expanded. Even when its setting is registered, it will not function.)

Sequence : Type 3



Parameter:

STX	1 byte	02H
LGADR	1 byte	F2H
ETX	1 byte	03H

Fig. 2-66-1

Data :

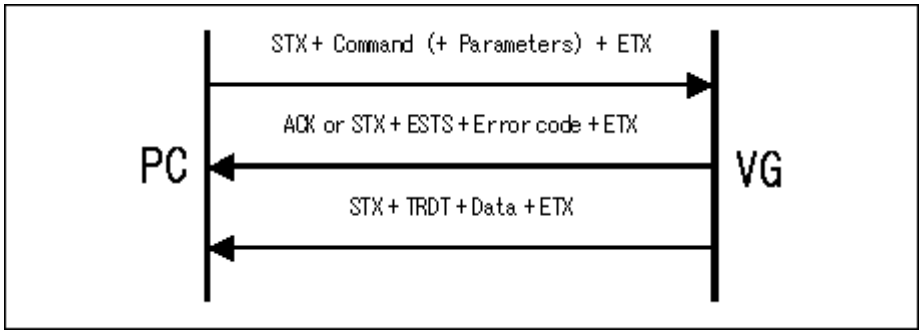
STX	1 byte	02H
TRDT	1 byte	10H
IP address	8 bytes	ASCII code (Hex) Example:192.168.0.10 → "C0A8000A"
ETX	1 byte	03H

Fig. 2-66-2

2.67 LDDC2B [C9H]: DDC2B data readout

Function : This command reads out EDID using DDC2B

Sequence : Type 3



Parameter:

STX	1 byte	02H
LDDC2B	1 byte	C9H
Device address	1 byte	A0H * Only A0H is valid
Head sub-address	4 bytes	“0000” to “07FF”
Number of read bytes	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-67-1

Data :

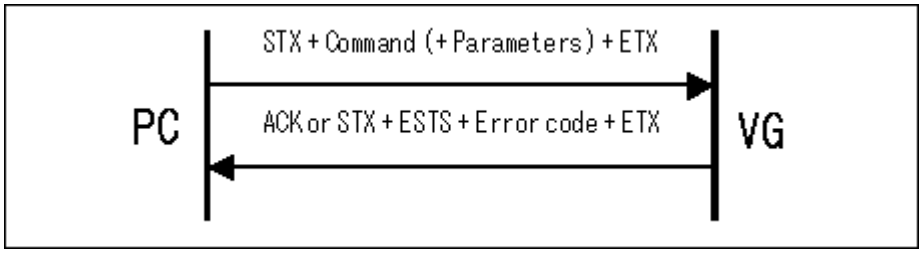
STX	1 byte	02H
TRDT	1 byte	10H
DATA	2 bytes (×Length)	“00” to “FF”
ETX	1 byte	03H

Fig. 2-67-2

2.68 SDDC2B [CAH]: DDC2B data registration

Function : This command writes EDID using DDC2B

Sequence : Type 2



Parameter:

STX	1 byte	02H
SDDC2B	1 byte	CAH
Device address	1 byte	A0H * Only A0H is valid
Head sub-address	4 bytes	“0000” to “07FF”
Number of write bytes	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 2-68-1

Data :

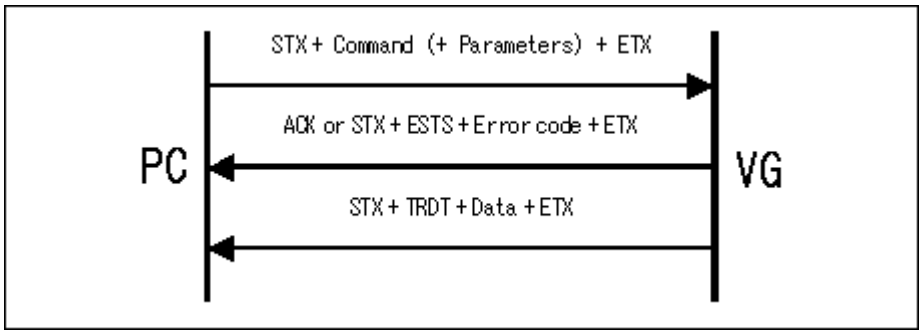
STX	1 byte	02H
TRDT	1 byte	10H
DATA	2 bytes (×Length)	“00” to “FF”
ETX	1 byte	03H

Fig. 2-68-2

2.69 SHDCPEN [80H]: HDCP valid/invalid capture

Function : This command captures valid or invalid for HDCP in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
SHDCPEN	1 byte	80H
Program No.	1 to 3 bytes	“0” to ”849”
ETX	1 byte	03H

Fig. 2-69-1

Data :

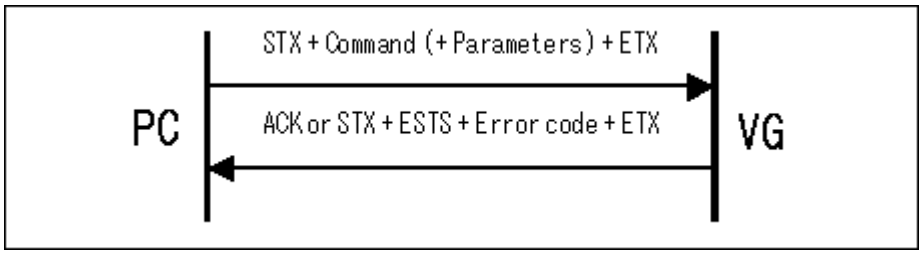
STX	1 byte	02H
TRDT	1 byte	10H
Valid/invalid	1 byte	“0” = VALID “1” = INVALID
ETX	1 byte	03H

Fig. 2-69-2

2.70 SHDCPEN [81H]: HDCP valid/invalid setting

Function : This command sets valid or invalid for HDCP in the program whose number has been designated.

Sequence : Type 2



Parameter:

STX	1 byte	02H
SHDCPEN	1 byte	81H
Program No.	1 to 3 bytes	“0” to ”849”
Valid/invalid	1 byte	“0” = VALID “1” = INVALID
ETX	1 byte	03H

Fig. 2-70-1

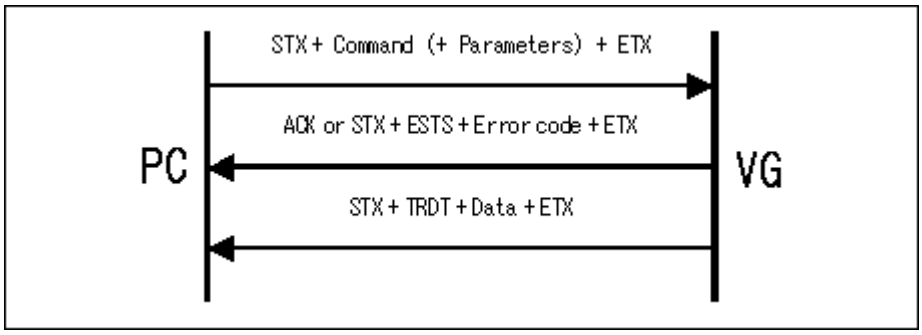
Data : None

* This setting takes effect only when “Program” has been selected for the execution mode (Exec. Mode) using FUNCC which is the HDCP setting function of the VG generator. For further details, refer to the instruction manual of the generator.

2.71 LOPTB [74H]: Option board data reading

Function : This command reads the Option board data in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LOPTB	1 byte	74H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

Fig. 2-71-1

Data :

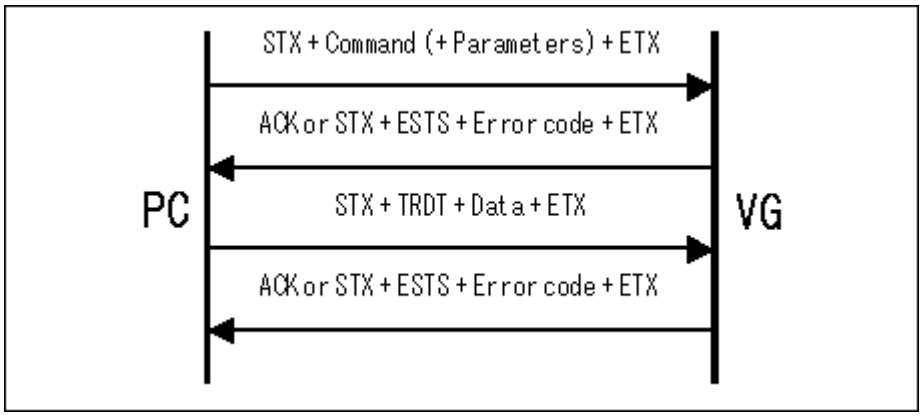
STX	1 BYTE	02H
TRDT	1 BYTE	10H
RGB1	1 BYTE	"0" = NEGA, "1" = POSI
OUT1	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK1	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC1	1 BYTE	"0" = Hi-Z, "1" = ON
POW1	1 BYTE	"0" = Hi-Z, "1" = ON
RGB2	1 BYTE	"0" = NEGA, "1" = POSI
OUT2	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK2	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC2	1 BYTE	"0" = Hi-Z, "1" = ON
POW2	1 BYTE	"0" = Hi-Z, "1" = ON
RGB3	1 BYTE	"0" = NEGA, "1" = POSI
OUT3	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK3	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC3	1 BYTE	"0" = Hi-Z, "1" = ON
POW3	1 BYTE	"0" = Hi-Z, "1" = ON
RGB4	1 BYTE	"0" = NEGA, "1" = POSI
OUT4	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK4	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC4	1 BYTE	"0" = Hi-Z, "1" = ON
POW4	1 BYTE	"0" = Hi-Z, "1" = ON
LVDS Split	1 BYTE	"0" to "6"
LVDS Dual	1 BYTE	"0" = MODE0(Singl) "1" = MODE1(Dual) "3" = MODE3
ETX	1 BYTE	03H

Fig. 2-71-2

2.72 SOPTB [75H]: Option board data registration

Function : This command registers the Option board data in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SOPTB	1 byte	75H
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-72-1

Data :

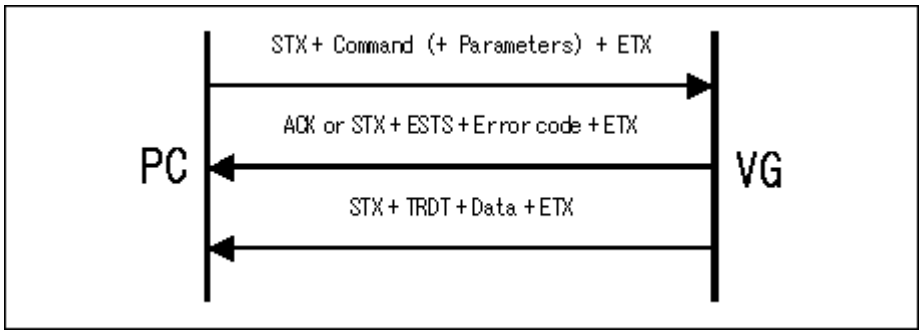
STX	1 BYTE	02H
TRDT	1 BYTE	10H
RGB1	1 BYTE	"0" = NEGA, "1" = POSI
OUT1	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK1	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC1	1 BYTE	"0" = Hi-Z, "1" = ON
POW1	1 BYTE	"0" = Hi-Z, "1" = ON
RGB2	1 BYTE	"0" = NEGA, "1" = POSI
OUT2	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK2	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC2	1 BYTE	"0" = Hi-Z, "1" = ON
POW2	1 BYTE	"0" = Hi-Z, "1" = ON
RGB3	1 BYTE	"0" = NEGA, "1" = POSI
OUT3	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK3	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC3	1 BYTE	"0" = Hi-Z, "1" = ON
POW3	1 BYTE	"0" = Hi-Z, "1" = ON
RGB4	1 BYTE	"0" = NEGA, "1" = POSI
OUT4	1 BYTE	"0" = Hi-Z, "1" = ON
CLOCK4	1 BYTE	"0" = Hi-Z, "1" = ON
SYNC4	1 BYTE	"0" = Hi-Z, "1" = ON
POW4	1 BYTE	"0" = Hi-Z, "1" = ON
LVDS Split	1 BYTE	"0" to "6"
LVDS Dual	1 BYTE	"0" = MODE0(Singl) "1" = MODE1(Dual) "3" = MODE3
ETX	1 BYTE	03H

Fig. 2-72-2

2.73 LOPTB2 [79H]: Option board data2 reading

Function : This command reads the Option board data2 in the program whose number has been designated.

Sequence : Type 3



Parameter:

STX	1 byte	02H
LOPTB2	1 byte	79H
Program No.	1 to 3 bytes	“0” to “999”
ETX	1 byte	03H

Fig. 2-73-1

Data :

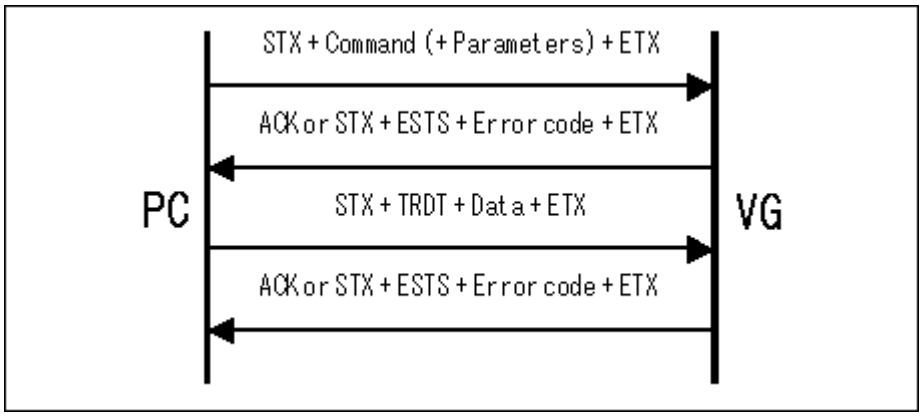
STX	1 BYTE	02H
TRDT	1 BYTE	10H
LVDS 1ch	1 BYTE	"0" = OFF, "1" = ON
LVDS 2ch	1 BYTE	"0" = OFF, "1" = ON
rsv1	1 BYTE	"0"
Output Select	1 BYTE	"0" = DVI "1" = Parallel "2" = 4Head LVDS "3" = 2Head LVDS
rsv2	1 BYTE	All "0"
ETX	1 BYTE	03H

Fig. 2-73-2

2.74 SOPTB2 [7AH]: Option board data2 registration

Function : This command registers the Option board data2 in the program whose number has been designated. If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 4



Parameter:

STX	1 byte	02H
SOPTB	1 byte	7AH
Program No.	1 to 3 bytes	“0” to “849”
ETX	1 byte	03H

Fig. 2-74-1

Data :

STX	1 BYTE	02H
TRDT	1 BYTE	10H
LVDS 1ch	1 BYTE	"0" = OFF, "1" = ON
LVDS 2ch	1 BYTE	"0" = OFF, "1" = ON
rsv1	1 BYTE	"0"
Output Select	1 BYTE	"0" = DVI "1" = Parallel "2" = 4Head LVDS "3" = 2Head LVDS
rsv2	1 BYTE	All "0"
ETX	1 BYTE	03H

Fig. 2-74-2

3 INDIVIDUAL DRAWING COMMAND FORMATS

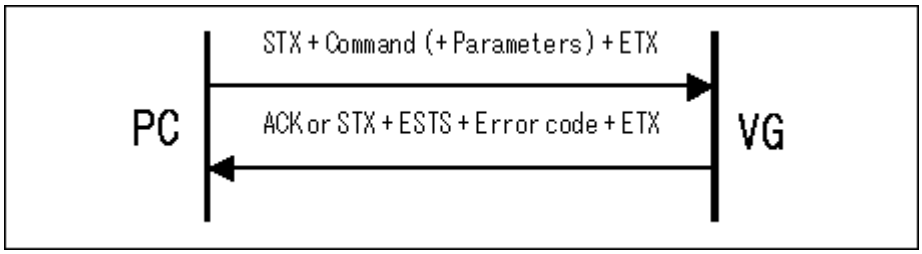
Execute the drawing commands after having set the sync signals.
Do not use the VG-848 to execute drawing commands to draw composite patterns. If it is used to draw composite patterns, the structure of the video memory is such that the patterns may not be drawn properly on the screen.

3.1 GCIRC [18H]: Circle drawing CCIRC [12H]: Circle deletion

3.1.1 GCIRC [18H]: Circle drawing

Function : This command draws circles on the graphic plane (1-bit plane). The center coordinates and radius of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GCIRC	1 byte	18H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

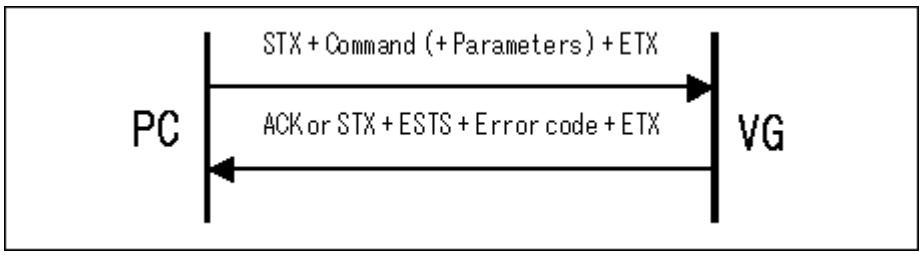
Fig. 3-1-1

* A sign code is provided for each of the center coordinates.

3.1.2 CCIRC [12H]: Circle deletion

Function : This command deletes the circles on the graphic plane (1-bit plane). The center coordinates and radius of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CCIRC	1 byte	12H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

Fig. 3-1-2

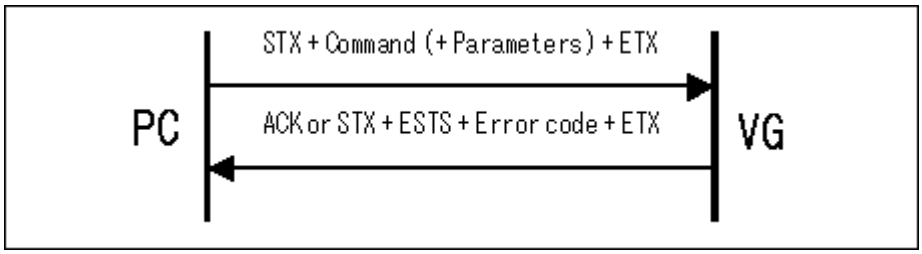
* A sign code is provided for each of the center coordinates.

3.2 GCIRCPA [D4H]: Filled-in circle drawing CCIRCPA [D5H]: Filled-in circle deletion

3.2.1 GCIRCPA [D4H]: Filled-in circle drawing

Function : This command draws filled-in circles on the graphic plane (1-bit plane). The center coordinates and radius of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GCIRCPA	1 byte	D4H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

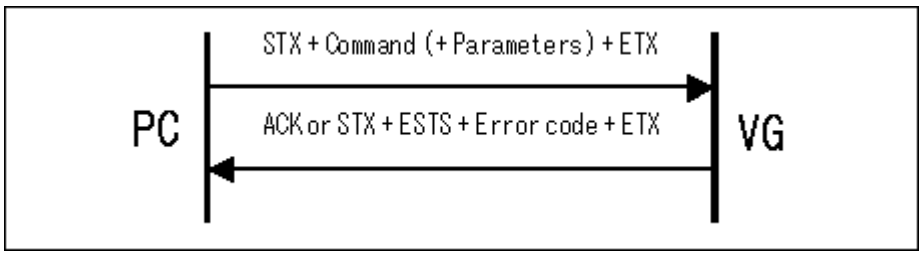
Fig. 3-2-1

* A sign code is provided for each of the center coordinates.

3.2.2 CCIRCPA [D5H]: Filled-in circle deletion

Function : This command deletes the filled-in circles on the graphic plane (1-bit plane). The center coordinates and radius of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CCIRCPA	1 byte	D5H
Center X coordinate	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	","
Center Y coordinate	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	","
Radius	1 to 4 bytes	"1" to "4095"
ETX	1 byte	03H

Fig. 3-2-2

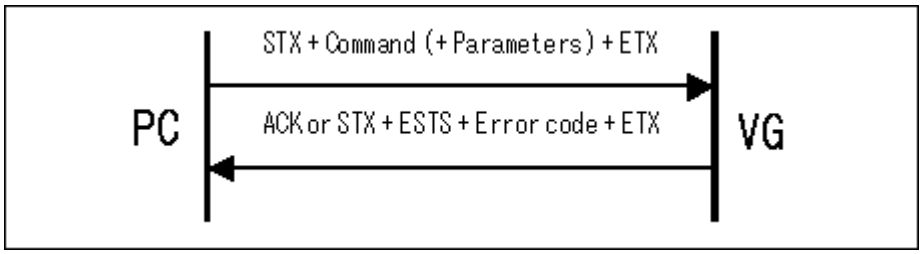
* A sign code is provided for each of the center coordinates.

3.3 GLINE [19H]: Straight line drawing CLINE [13H]: Straight line deletion

3.3.1 GLINE [19H]: Straight line drawing

Function : This command draws straight lines on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GLINE	1 byte	19H
Start point coordinate X	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Start point coordinate Y	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
End point coordinate X1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
End point coordinate Y1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
ETX	1 byte	03H

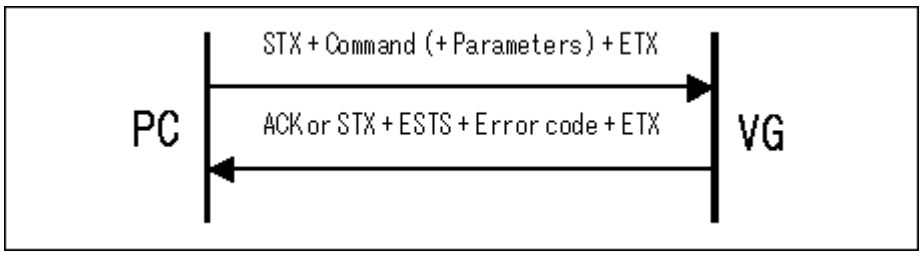
Fig. 3-3-1

* Sign codes are provided.

3.3.2 CLINE [13H]: Straight line deletion

Function : This command deletes straight lines on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CLINE	1 byte	13H
Start point coordinate X	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	","
Start point coordinate Y	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	","
End point coordinate X1	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	","
End point coordinate Y1	2 to 5 bytes	"0" to "4095", example: 100 → "0100" Sign codes for byte 0: "0" = +, "1" = - * In numerical value terms, the settings range from -2048 to +4096.
ETX	1 byte	03H

Fig. 3-3-2

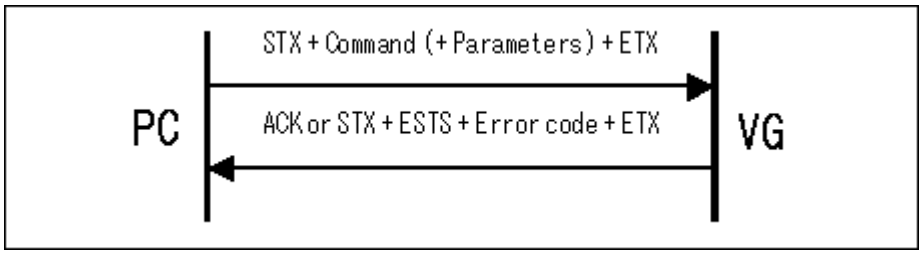
* Sign codes are provided.

3.4 GPSET [1BH]: Dot drawing CPSET [14H]: Dot deletion

3.4.1 GPSET [1BH]: Dot drawing

Function : This command draws dots on the graphic plane (1-bit plane). Coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

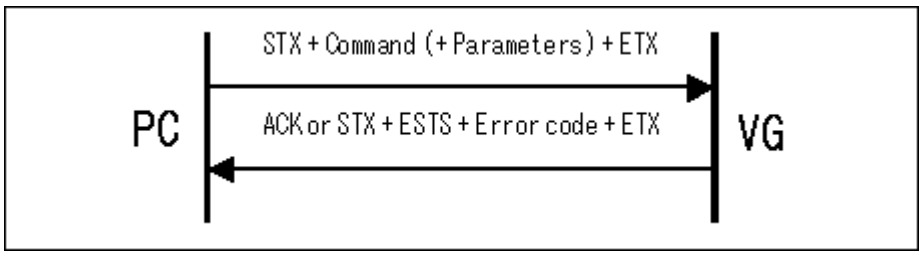
STX	1 byte	02H
GPSET	1 byte	1BH
X coordinate	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Y coordinate	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-4-1

3.4.2 CPSET [14H]: Dot deletion

Function : This command deletes the dots on the graphic plane (1-bit plane). Coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

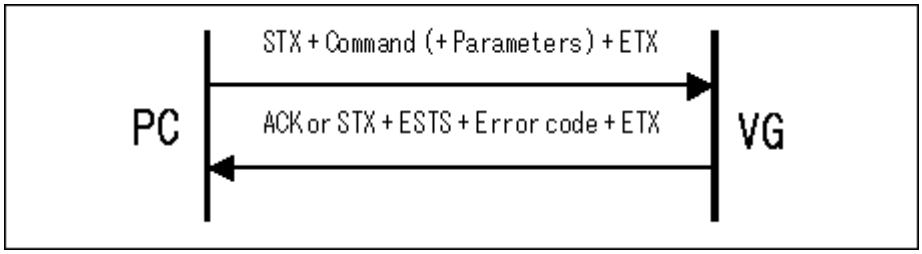
STX	1 byte	02H
CPSET	1 byte	14H
X coordinate	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Y coordinate	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-4-2

3.5 ACLR [23H]: Drawing planes all clear

Function : This command clears the graphic (1-bit) and color (8-bit) planes.

Sequence : Type 2



Parameter:

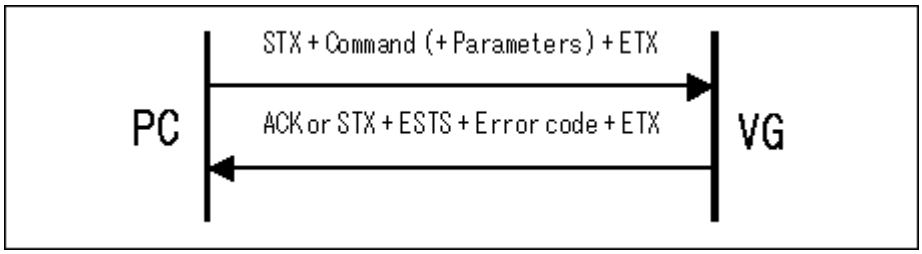
STX	1 byte	02H
ACLR	1 byte	23H
ETX	1 byte	03H

Fig. 3-5-1

3.6 COCLR [24H]: Color clear

Function : This command clears the graphic and color planes. It operates in the same way as the ACLR [23H] command.

Sequence : Type 2



Parameter:

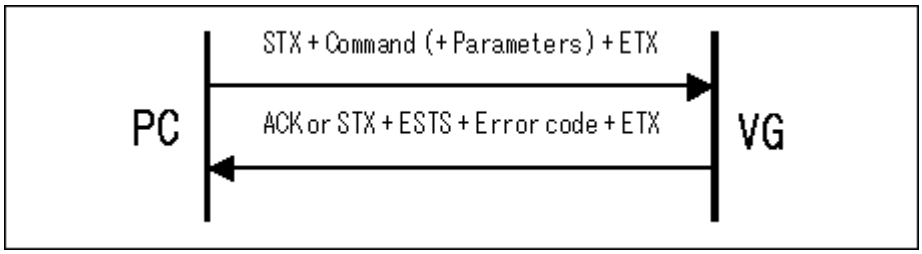
STX	1 byte	02H
COCLR	1 byte	24H
ETX	1 byte	03H

Fig. 3-6-1

3.7 GCLR [25H]: Graphic plane clear

Function : This command clears the graphic and color planes. It operates in the same way as the ACLR [23H] command.

Sequence : Type 2



Parameter:

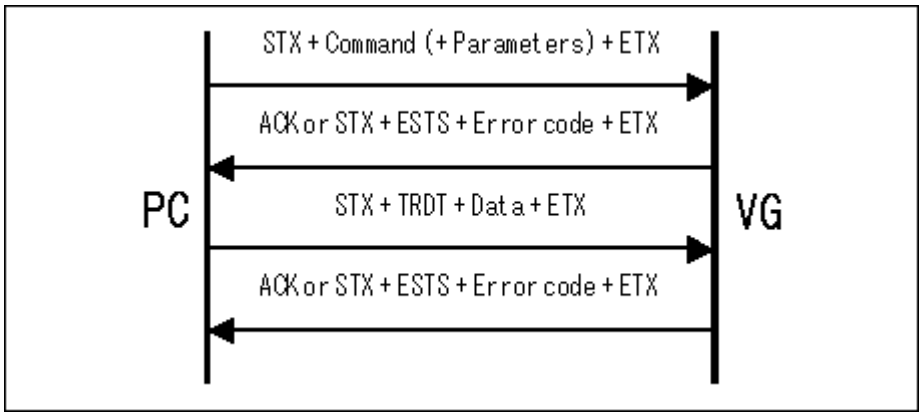
STX	1 byte	02H
GCLR	1 byte	25H
ETX	1 byte	03H

Fig. 3-7-1

3.8 COLOR [26H]: Color bar color setting

Function : This command displays the 256 colors of the color bar plane (8-bit plane). It divides the color bar plane into 16 parts horizontally and 16 parts vertically.

Sequence : Type 4



Parameter:

STX	1 byte	02H
COLOR	1 byte	26H
ETX	1 byte	03H

Fig. 3-8-1

Data : 256×3 (RGB)×3 (levels) = 2304, Send all 2304 bytes of data in succession.

STX	1 byte	02H
TRDT	1 byte	10H
R1	3 bytes	“000” to “255”
G1	3 bytes	“000” to “255”
B1	3 bytes	“000” to “255”
	•	
	•	
	•	
R256	3 bytes	“0” to “255”
G256	3 bytes	“0” to “255”
B256	3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-8-2

* Refer to the figure below for R1 to R256, G1 to G256 and B1 to B256.

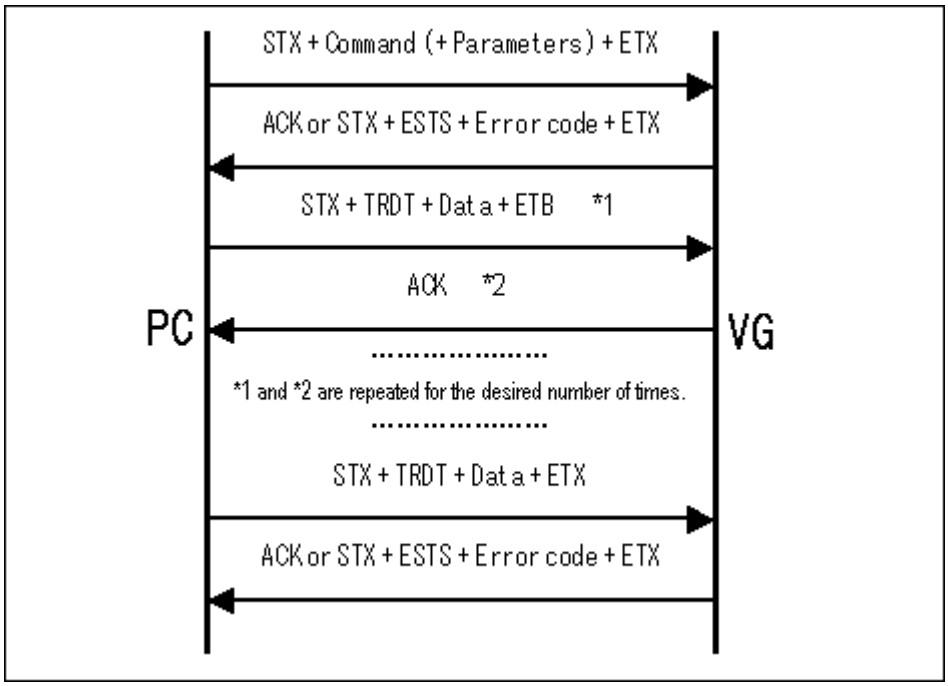
	Horizontal 1	Horizontal 2	…	Horizontal 15	Horizontal 16
Vertical 1	R1 G1 B1	R2 G2 B2	…	R15 G15 B15	R16 G16 B16
Vertical 2	R17 G17 B17	R18 G18 B18	…	R31 G31 B31	R32 G32 B32
⋮	⋮	⋮	⋮	⋮	⋮
Vertical 15	R225 G225 B225	R226 G226 B226	…	R239 G239 B239	R240 G240 B240
Vertical 16	R241 G241 B241	R242 G242 B242	…	R255 G255 B255	R256 G256 B256

Fig. 3-8-3

3.9 GCHAR [27H]: Character drawing

Function : This command writes the points designated on the graphic plane (1-bit plane) into characters. The font size and display coordinates are designated as the parameters.

Sequence : Type 6



Parameter:

STX	1 byte	02H
GCHAR	1 byte	27H
Font size	1 byte	“0” = 5×7, “1” = 7×9, “2” = 16×16
Data delimiter	1 byte	“,”
X coordinate	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Y coordinate	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-9-1

Data : Character data

STX	1 byte	02H
TRDT	1 byte	10H
Character code	MAX128 bytes	Max. 128 characters
ETB	1 byte	17H

•
• <Block 1> to <Block h>
•

STX	1 byte	02H
TRDT	1 byte	10H
Character code	MAX128 bytes	Max. 128 characters
ETX	1 byte	03H

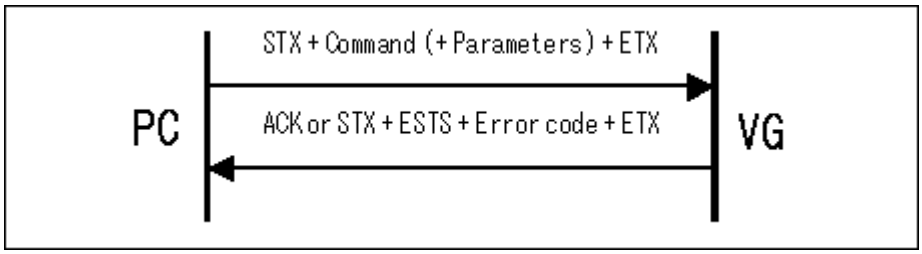
Fig. 3-9-2

3.10 GSQRE [D0H]: Square drawing CSQRE [D1H]: Square deletion

3.10.1 GSQRE [D0H] Square drawing

Function : This command draws squares on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GSQRE	1 byte	D0H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

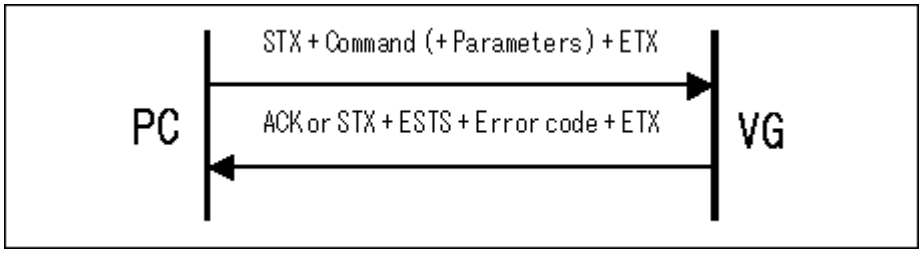
Fig. 3-10-1

* X < X1, Y < Y1

3.10.2 CSQRE [D1H] Square deletion

Function : This command deletes the squares on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CSQRE	1 byte	D1H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-10-2

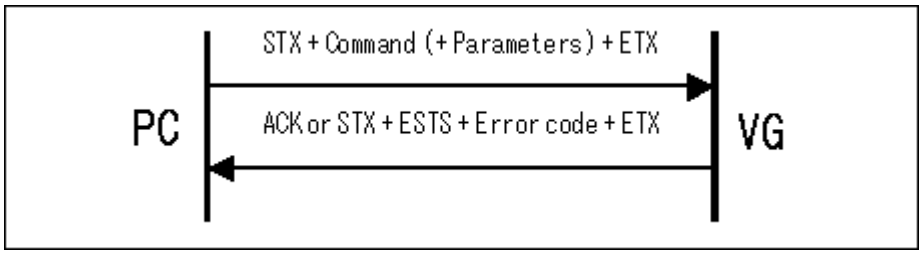
* X < X1, Y < Y1

3.11 GSQPA [31H]: Filled-in square drawing CSQPA [32H]: Filled-in square deletion

3.11.1 GSQPA [31H]: Filled-in square drawing

Function : This command draws filled-in squares on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GSQPA	1 byte	31H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

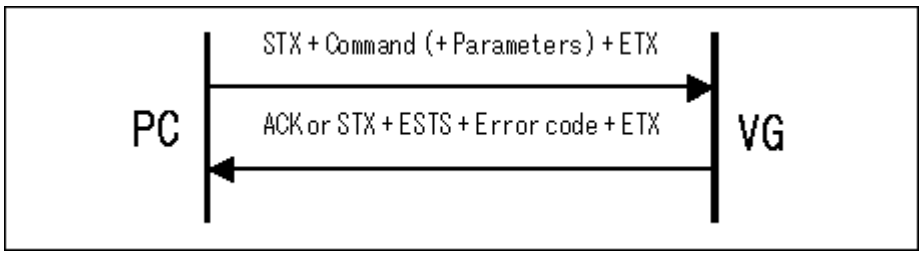
Fig. 3-11-1

* X < X1, Y < Y1

3.11.2 CSQPA [32H]: Filled-in square deletion

Function : This command deletes the filled-in squares on the graphic plane (1-bit plane). The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CSQPA	1 byte	32H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-11-2

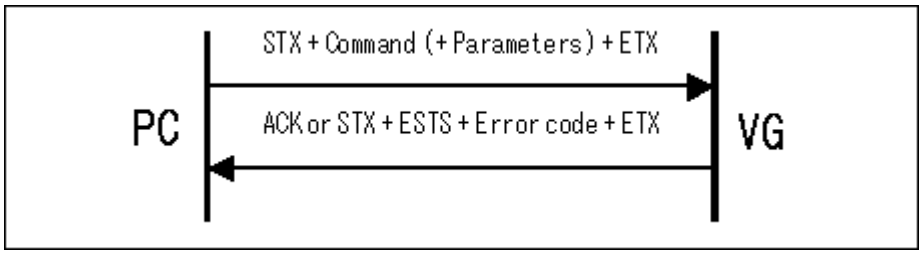
* X < X1, Y < Y1

3.12 WINDW [3CH]: Window drawing CWIND [2AH]: Window deletion

3.12.1 WINDW [3CH]: Window drawing

Function : This command draws the windows. The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

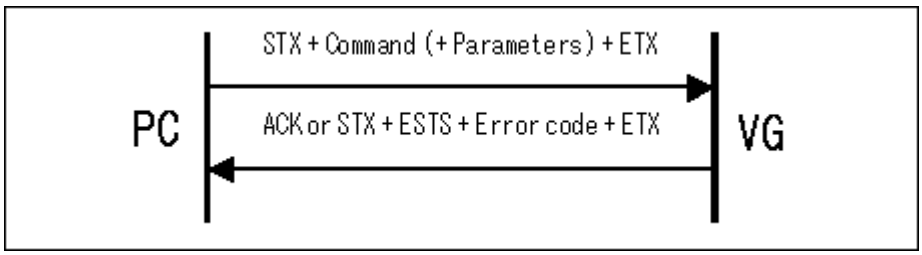
STX	1 byte	02H
WINDW	1 byte	3CH
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-12-1

3.12.2 CWIND [2AH]: Window deletion

Function : This command deletes the windows. The start and end point coordinates are designated as the parameters.

Sequence : Type 2



Parameter:

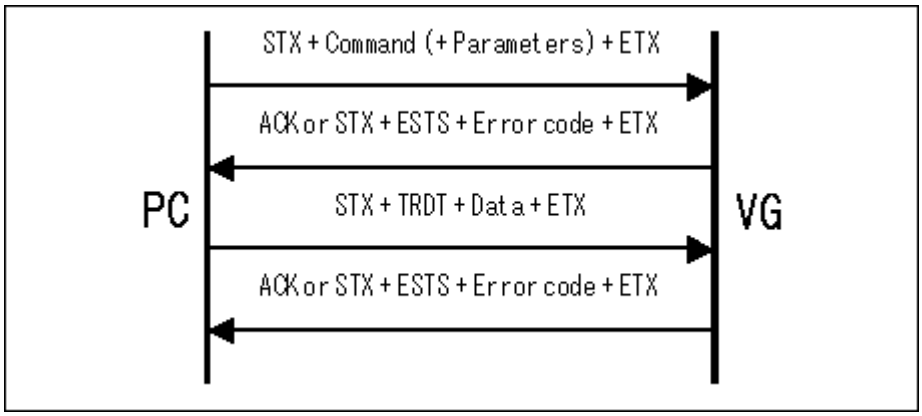
STX	1 byte	02H
CWIND	1 byte	2AH
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-12-2

3.13 WINDCL [3DH]: Window color setting

Function : This command sets the window colors. The R, G and B colors are designated as the parameters.

Sequence : Type 4



Parameter:

STX	1 byte	02H
WINDCL	1 byte	3DH
ETX	1 byte	03H

Fig. 3-13-1

Data :

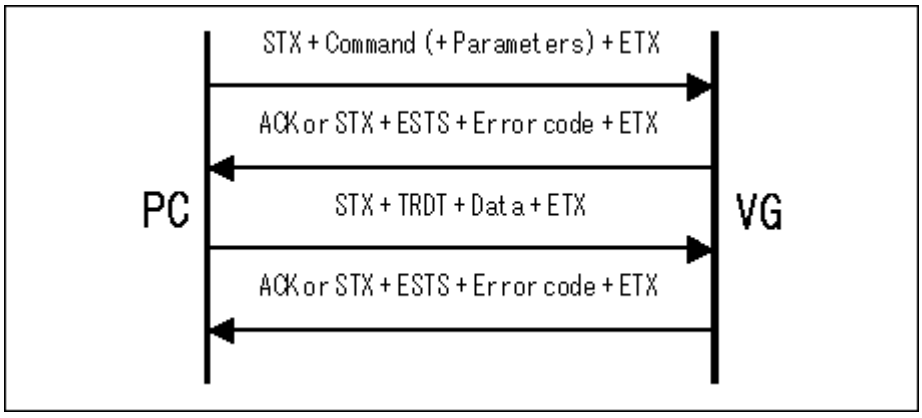
STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 3-13-2

3.14 GRPHCL [3BH]: Graphic color setting

Function : This command sets the colors of the graphic plane (1-bit plane). The R, G and B colors are designated as the parameters.

Sequence : Type 4



Parameter:

STX	1 byte	02H
GRPHCL	1 byte	3BH
ETX	1 byte	03H

Fig. 3-14-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
R	3 bytes	“000” to “255”
G	3 bytes	“000” to “255”
B	3 bytes	“000” to “255”
ETX	1 byte	03H

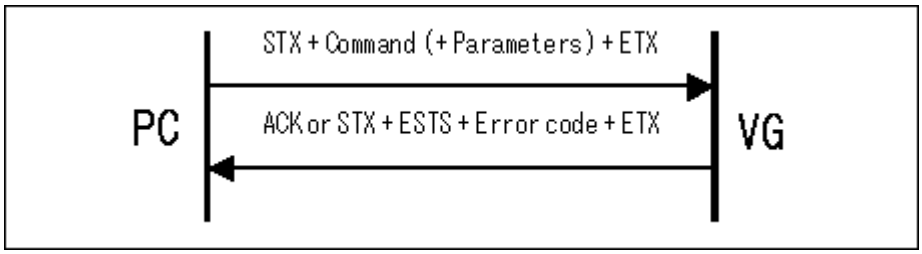
Fig. 3-14-2

3.15 GTRIPA [D2H]: Filled-in triangle drawing CTRIPA [D3H]: Filled-in triangle deletion

3.15.1 GTRIPA [D2H]: Filled-in triangle drawing

Function : This command draws filled-in triangles on the graphic plane (1-bit plane). The coordinates of the three points are designated as the parameters.

Sequence : Type 2



Parameter:

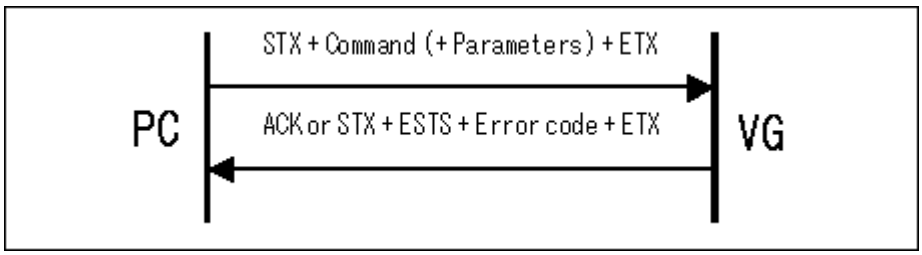
STX	1 byte	02H
GTRIPA	1 byte	D2H
Coordinate X1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
ETX	1 byte	03H

Fig. 3-15-1

3.15.2 CTRIPA [D3H]: Filled-in triangle deletion

Function : This command deletes the filled-in triangles on the graphic plane (1-bit plane). The coordinates of the three points are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CTRIPA	1 byte	D3H
Coordinate X1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
ETX	1 byte	03H

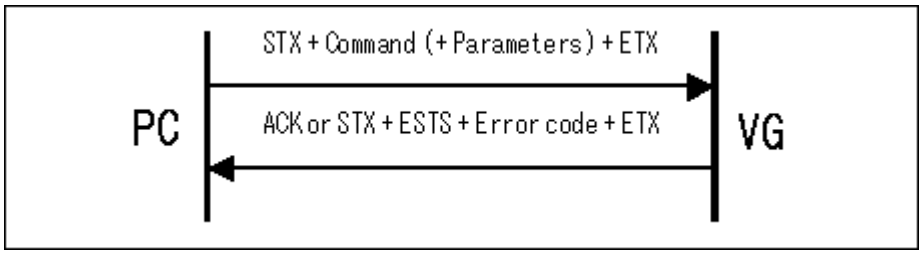
Fig. 3-15-2

3.16 GELPS [D6H]: Ellipsis drawing CELPS [D7H]: Ellipsis deletion

3.16.1 GELPS [D6H]: Ellipsis drawing

Function : This command draws ellipses on the graphic plane (1-bit plane). The center coordinates and radii of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

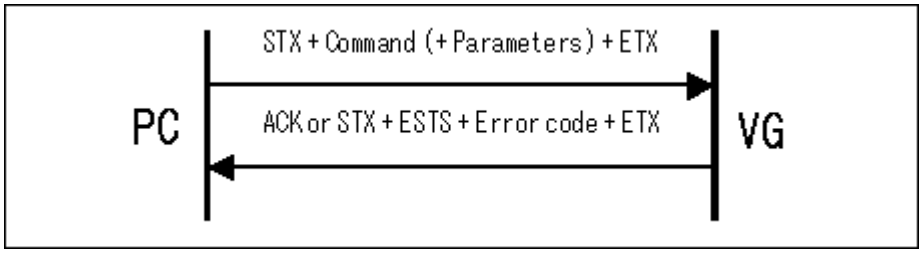
STX	1 byte	02H
GELPS	1 byte	D6H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

Fig. 3-16-1

3.16.2 CELPS [D7H]: Ellipsis deletion

Function : This command deletes the ellipses on the graphic plane (1-bit plane). The center coordinates and radii of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
CELPS	1 byte	D7H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

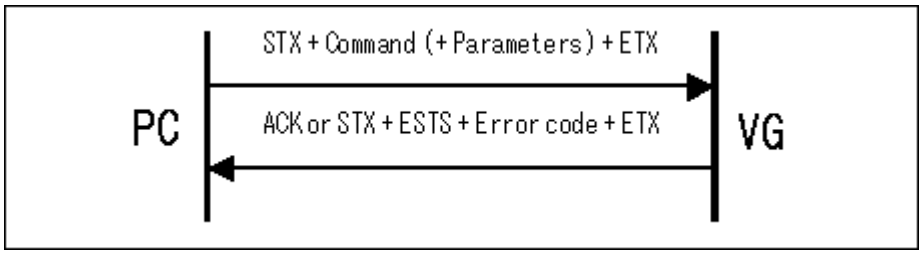
Fig. 3-16-2

3.17 GELPSPA [D8H]: Filled-in ellipsis drawing CELPSPA [D9H]: Filled-in ellipsis deletion

3.17.1 GELPSPA [D8H]: Filled-in ellipsis drawing

Function : This command draws filled-in ellipses on the graphic plane (1-bit plane). The center coordinates and radii of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

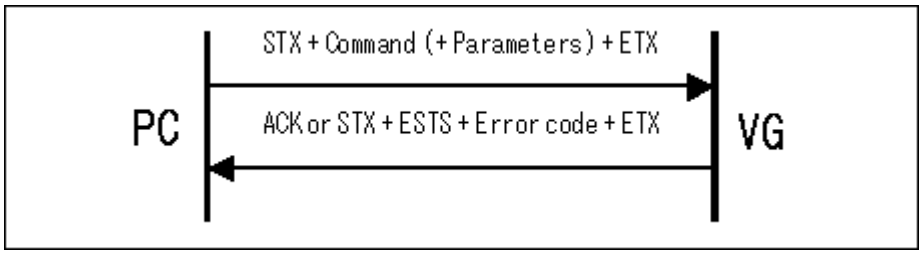
STX	1 byte	02H
GELPSPA	1 byte	D8H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

Fig. 3-17-1

3.17.2 CELPSPA [D9H]: Filled-in ellipsis deletion

Function : This command deletes the filled-in ellipses on the graphic plane (1-bit plane). The center coordinates and radii of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

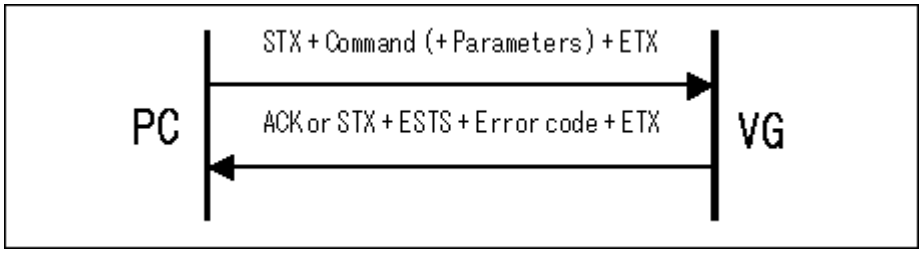
STX	1 byte	02H
CELPSPA	1 byte	D9H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
ETX	1 byte	03H

Fig. 3-17-2

3.18 GBITBLT [DAH]: 1-bit plane copying

Function : This command copies the data in the graphic plane area. The top left coordinates and the size of the transfer source as well as the top left coordinates of the transfer destination are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
GBITBLT	1 byte	DAH
Transfer source top left coordinate SRC-X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Transfer source top left coordinate SRC-Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Size SIZE-X	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Size SIZE-Y	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Transfer destination top left coordinate DST-X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Transfer destination top left coordinate DST-Y	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

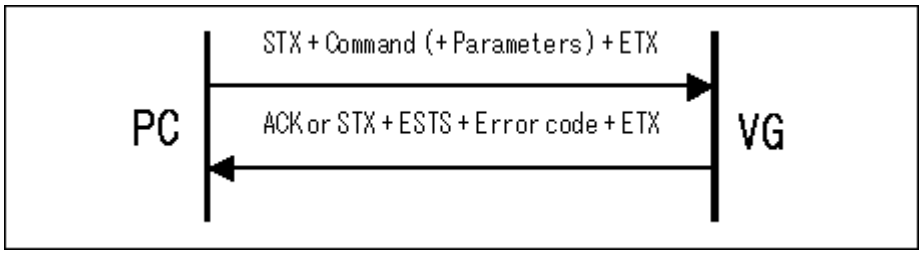
Fig. 3-18-1

3.19 G8CIRC [E0H]: Circle drawing (color designation) G8CIRCPA [E6H]: Filled-in circle drawing (color designation)

3.19.1 G8CIRC [E0H]: Circle drawing (color designation)

Function : This command draws circles on the color bar plane (8-bit plane). The center coordinates and radius and color of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

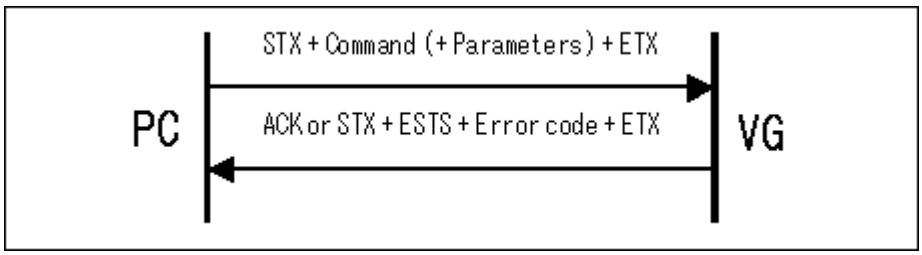
STX	1 byte	02H
G8CIRC	1 byte	E0H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-19-1

3.19.2 G8CIRCPA [E6H]: Filled-in circle drawing (color designation)

Function : This command draws filled-in circles on the color bar plane (8-bit plane). The center coordinates and radius and color of the circle are designated as the parameters.

Sequence : Type 2



Parameter:

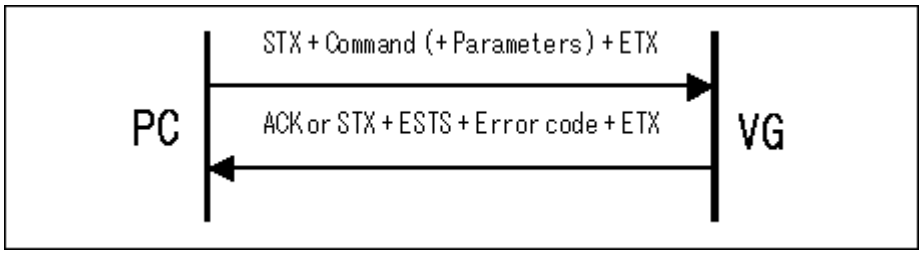
STX	1 byte	02H
G8CIRCPA	1 byte	E6H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-19-2

3.20 G8LINE [E1H]: Straight line drawing (color designation)

Function : This command draws straight lines on the color bar plane (8-bit plane). The start and end point coordinates and the color are designated as the parameters.

Sequence : Type 2



Parameter:

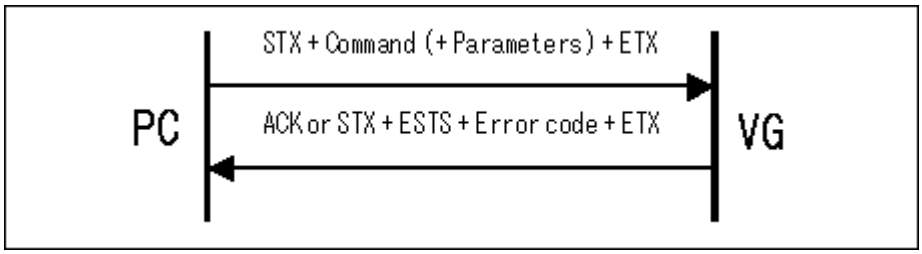
STX	1 byte	02H
G8LINE	1 byte	E1H
Start point coordinate X	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Start point coordinate Y	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
End point coordinate X1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
End point coordinate Y1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-20-1

3.21 G8PSET [E2H]: Dot drawing (color designation)

Function : This command draws dots on the color bar plane (8-bit plane). The coordinates and color are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
G8PSET	1 byte	E2H
Coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

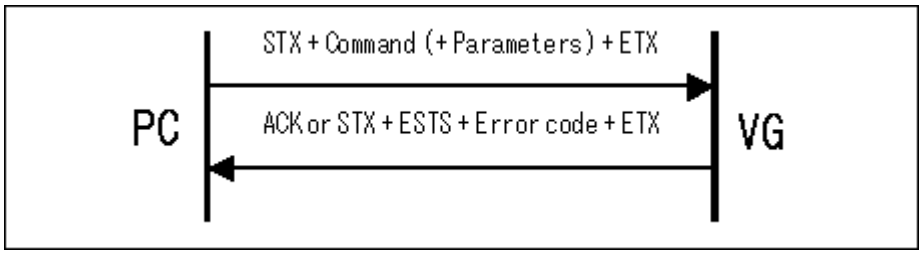
Fig. 3-21-1

3.22 G8SQRE [E4H]: Square drawing (color designation) G8SQPA [E3H]: Filled-in square drawing (color designation)

3.22.1 G8SQRE [E4H]: Square drawing (color designation)

Function : This command draws squares on the color bar plane (8-bit plane). The start and end point coordinates and the color are designated as the parameters.

Sequence : Type 2



Parameter:

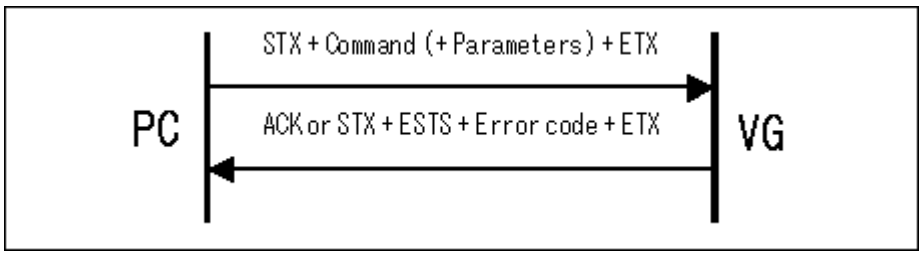
STX	1 byte	02H
G8SQRE	1 byte	E4H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-22-1

3.22.2 G8SQPA [E3H]: Filled-in square drawing (color designation)

Function : This command draws filled-in squares on the color bar plane (8-bit plane). The start and end point coordinates and the color are designated as the parameters.

Sequence : Type 2



Parameter:

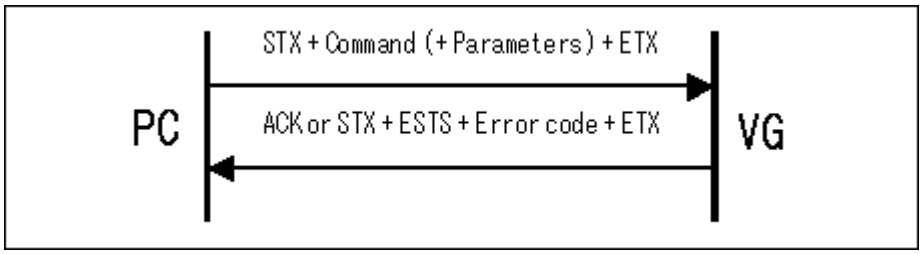
STX	1 byte	02H
G8SQPA	1 byte	E3H
Top left coordinate X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Top left coordinate Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate X1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Bottom right coordinate Y1	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-22-2

3.23 G8TRIPA [E5H]: Filled-in triangle drawing (color designation)

Function : This command draws filled-in triangles on the color bar plane (8-bit plane). The coordinates of the three points and the color are designated as the parameters.

Sequence : Type 2



Parameter:

STX	1 byte	02H
G8TRIPA	1 byte	E5H
Coordinate X1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y1	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y2	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate X3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Coordinate Y3	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-23-1

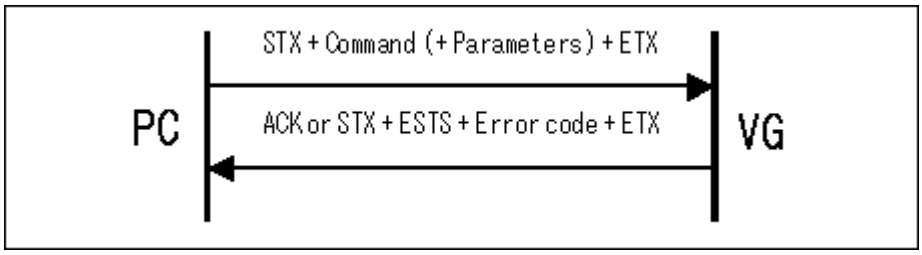
* Execute this command after having set the sync signals.

3.24 G8ELPS [E7H]: Ellipsis drawing (color designation) G8ELPSPA [E8H]: Filled-in ellipsis drawing (color designation)

3.24.1 G8ELPS [E7H]: Ellipsis drawing (color designation)

Function : This command draws ellipses on the color bar plane (8-bit plane). The center coordinates, radii and color of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

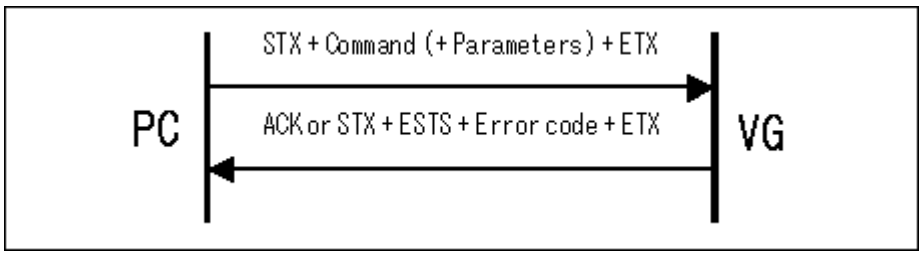
STX	1 byte	02H
G8ELPS	1 byte	E7H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-24-1

3.24.2 G8ELPSPA [E8H]: Filled-in ellipsis drawing (color designation)

Function : This command draws filled-in ellipses on the color bar plane (8-bit plane). The center coordinates, radii and color of the ellipse are designated as the parameters.

Sequence : Type 2



Parameter:

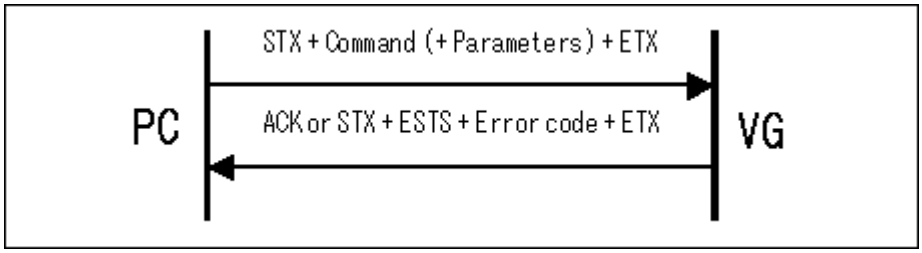
STX	1 byte	02H
G8ELPSPA	1 byte	E8H
Center X coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Center Y coordinate	2 to 5 bytes	“0” to “4095”, example: 100 → “0100” Sign codes for byte 0: “0” = +, “1” = - * In numerical value terms, the settings range from -2048 to +4096.
Data delimiter	1 byte	“,”
Radius RX	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Radius RY	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Color	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-24-2

3.25 G8BITBLT [E9H]: Color plane copying (color designation)

Function : This command copies areas on the color bar plane (8-bit plane). The top left coordinates and size of the transfer source as well as the top left coordinates of the transfer destination are designated as the parameters.

Sequence : Type 2



Parameter:

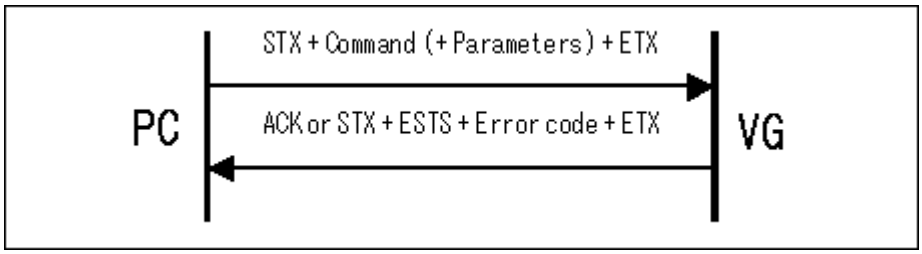
STX	1 byte	02H
G8BITBLT	1 byte	E9H
Transfer source top left coordinate SRC-X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Transfer source top left coordinate SRC-Y	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Size SIZE-X	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Size SIZE-Y	1 to 4 bytes	“1” to “4095”
Data delimiter	1 byte	“,”
Transfer destination top left coordinate DST-X	1 to 4 bytes	“0” to “4095”
Data delimiter	1 byte	“,”
Transfer destination top left coordinate DST-Y	1 to 4 bytes	“0” to “4095”
ETX	1 byte	03H

Fig. 3-25-1

3.26 G8COLOR [EAH]: Color mode setting

Function : This command sets the display colors on the color bar plane (8-bit plane). The color mode is designated as the parameters.

Sequence : Type 2



Parameter:

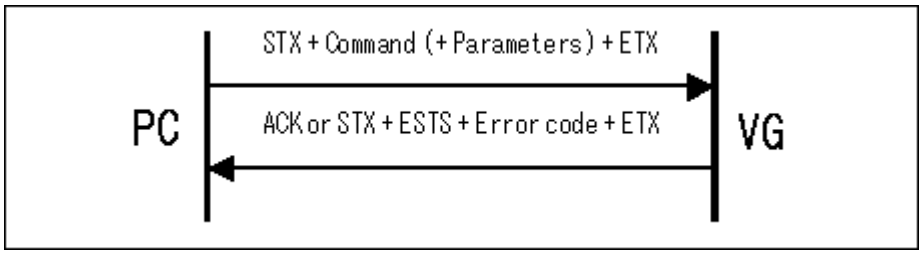
STX	1 byte	02H
G8COLOR	1 byte	EAH
Color mode	1 byte	“0” = Gray mode with 256 gradations “1” = 256-color mode
ETX	1 byte	03H

Fig. 3-26-1

3.27 G8COLOR2 [ECH]: Palette setting

Function : This command sets the display colors on the color bar plane (8-bit plane). The palette number and R, G and B colors are designated as the parameters.

Sequence : Type 2



Parameter:

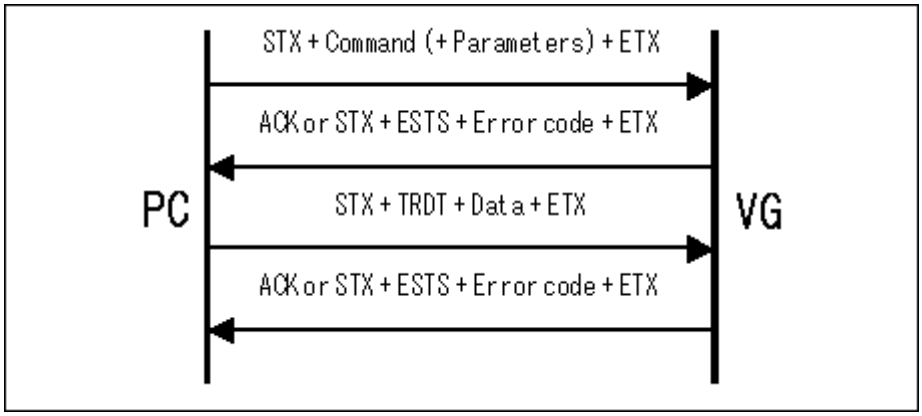
STX	1 byte	02H
G8COLOR2	1 byte	ECH
Palette No.	1 to 3 bytes	“0” to “255”
Data delimiter	1 byte	“,”
R	1 to 3 bytes	“0” to “255”
Data delimiter	1 byte	“,”
G	1 to 3 bytes	“0” to “255”
Data delimiter	1 byte	“,”
B	1 to 3 bytes	“0” to “255”
ETX	1 byte	03H

Fig. 3-27-1

3.28 LEVEL_CHG [98H]: Output level setting

Function : This command changes the output level of the VG generator.

Sequence : Type 4



Parameter:

STX	1 byte	02H
LEVEL_CHG	1 byte	98H
Command code	1 byte	“A” = Sets the level value. “B” = Increase and decrease of the level value
ETX	1 byte	03H

Fig. 3-28-1

Data :

(A) The level value setting

STX	1 byte	02H
TRDT	1 byte	10H
Analog/digital	1 byte	“0” = Analog “1” = Digital
Level value	3 bytes	• For analog data: ”030” to ”120” (0.30V to 1.20V) • For digital data: ”000” to ”255”
ETX	1 byte	03H

Fig. 3-28-2

(B) The level value setting

STX	1 byte	02H
TRDT	1 byte	10H
Analog/digital	1 byte	“0” = Analog “1” = Digital
INC/DEC	1 byte	63H = INC (+)、64H = DEC (-)
ETX	1 byte	03H

Fig. 3-28-3

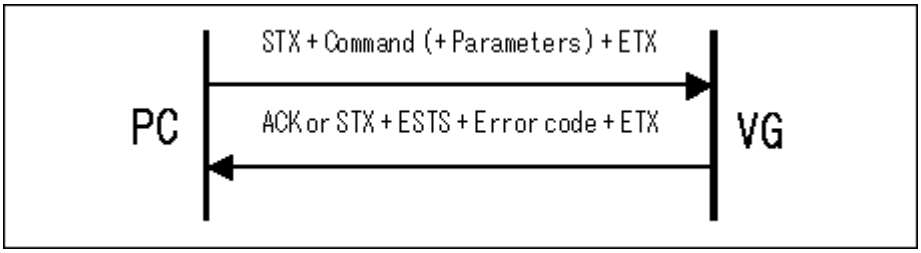
4 FORMAT FOR EACH EXTENDED COMMAND

4.1 [20H]: Dot clock frequency (in 1 Hz increments) registration

Function : This command registers the dot clock frequency (below 1 kHz) in the program whose number is designated. If the program number is 0, it writes the data into the buffer RAM. The dot clock frequency is combined with the dot clock frequency of the interchangeable data using the following formula.
Dot clock frequency of interchangeable data + dot clock frequency (below 1 kHz)

Example: Dot clock frequency of interchangeable data = 123.45MHz
Dot clock frequency = 6789Hz (0.006789MHz)
⇒ As a result, a frequency of 123.456789 MHz is obtained.

Sequence : Type 2



Command + parameter:

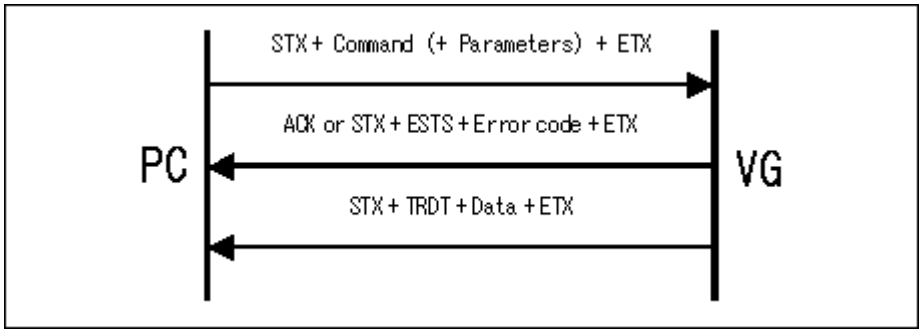
STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	20H
Program No.	3 bytes	“000” to “849”
Dot clock frequency (below 1 kHz)	4 bytes	“0000” to “9999” (0.000000 to 0.009999MHz)
ETX	1 byte	03H

Fig. 4-1-1

4.2 [21H]: Dot clock frequency (in 1 Hz increments) reading

Function : This command reads the dot clock frequency (below 1 kHz) in the program whose number is designated.
In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	21H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-2-1

Data :

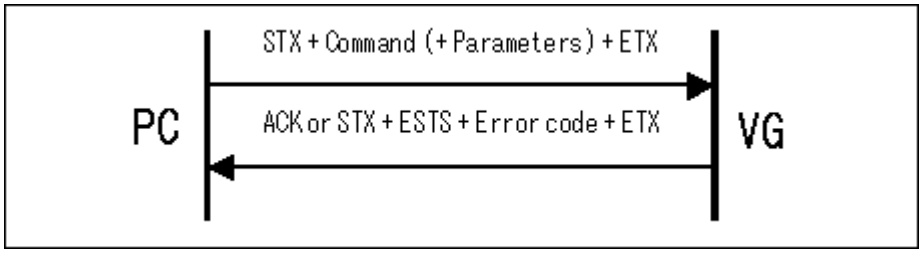
STX	1 byte	02H
TRDT	1 byte	10H
Dot clock frequency (below 1 kHz)	4 bytes	“0000” to “9999” (0.000000 to 0.009999MHz)
ETX	1 byte	03H

Fig. 4-2-2

4.3 [22H]: 2nd field V timing data registration

Function : This command registers the 2nd field V timing data in the program whose number is designated.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	22H
Program No..	3 bytes	“000” to “999”
Field mode	1 byte	‘0’ = Conventional mode ‘1’ = Mode compatible with 2nd field
V-SYNC	3 bytes	“000” to “999” (00.0 to 99.9H) *1 Sequence of digits from top: 10^1,10^0,10^{-1}
ENQ-FP	3 bytes	“000” to “999” (00.0 to 99.9H) *1 Sequence of digits from top: 10^1,10^0,10^{-1}
ENQ-BP	3 bytes	“000” to “999” (00.0 to 99.9H) *1 Sequence of digits from top: 10^1,10^0,10^{-1}
V-BACK-PORCH	4 bytes	“0000” to “9999” (000.0 to 999.9H) *1 Sequence of digits from top: 10^2,10^1,10^0,10^{-1}
V-DISPLAY	4 bytes	“0000” to “9999” (0000 to 9999H) Sequence of digits from top: 10^3,10^2,10^1,10^0
V Total extended data (0.1H increments)	1 byte	‘0’ to ‘9’ (0.0 to 0.9H) *2
V Backp extended data (0.1H increments) of 1st field	1 byte	‘0’ to ‘9’ (0.0 to 0.9H) *2
V Backp extended data (0.1H increments) of 2nd field	1 byte	‘0’ to ‘9’ (0.0 to 0.9H) *2
Reserved	4 bytes	“0000”
ETX	1 byte	03H

Fig. 4-3-1

CAUTION

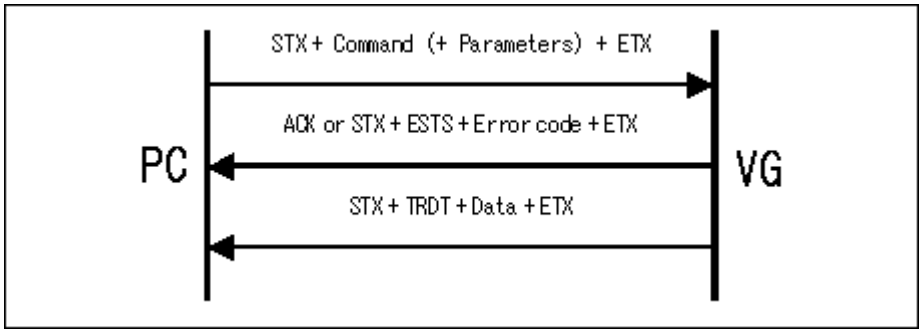
*1: Although the value of a decimal point can be set between 0 to 9, however, it is rectified by 0 (or 5) in VG and outputted.

*2: Although it can be set between 0 to 9, however, it is rectified by 0 (or 5) in VG and outputted.

4.4 [23H]: 2nd field V timing data reading

Function : This command reads the 2nd field V timing data in the program whose number is designated.
In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	23H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-4-1

Data :

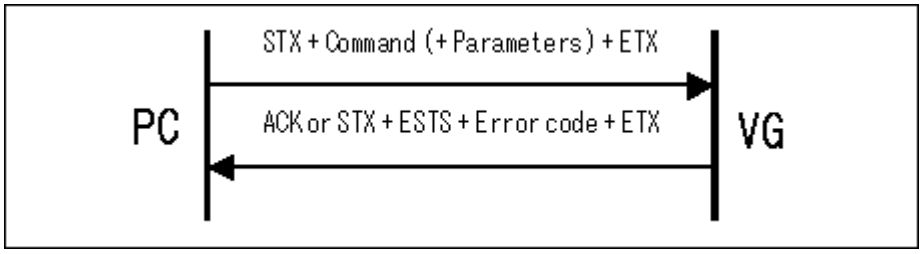
STX	1 byte	02H
TRDT	1 byte	10H
Field mode	1 byte	‘0’ = Conventional mode ‘1’ = Mode compatible with 2nd field
V-SYNC	3 bytes	“000” to “999” (00.0 to 99.9H) Sequence of digits from top: 10^1,10^0,10^{-1}
ENQ-FP	3 bytes	“000” to “999” (00.0 to 99.9H) Sequence of digits from top: 10^1,10^0,10^{-1}
ENQ-BP	3 bytes	“000” to “999” (00.0 to 99.9H) Sequence of digits from top: 10^1,10^0,10^{-1}
V-BACK-PORCH	4 bytes	“0000” to “9999” (000.0 to 999.9H) Sequence of digits from top: 10^3,10^2,10^1,10^0
V-DISPLAY	4 bytes	“0000” to “9999” (0000 to 9999H) Sequence of digits from top: 10^2,10^1,10^0,10^{-1}
V Total extended data (0.1H increments)	1 byte	‘0’ to ‘9’ (0.0 to 0.9H)
V Backp extended data (0.1H increments) of 1st field	1 byte	‘0’ to ‘9’ (0.0 to 0.9H)
V Backp extended data (0.1H increments) of 2nd field	1 byte	‘0’ to ‘9’ (0.0 to 0.9H)
Spare	4 bytes	“0000”
ETX	1 byte	03H

Fig. 4-4-2

4.5 [24H]: Priority output port registration

Function : This command registers the priority output port in the program whose number is designated.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Command + parameter:

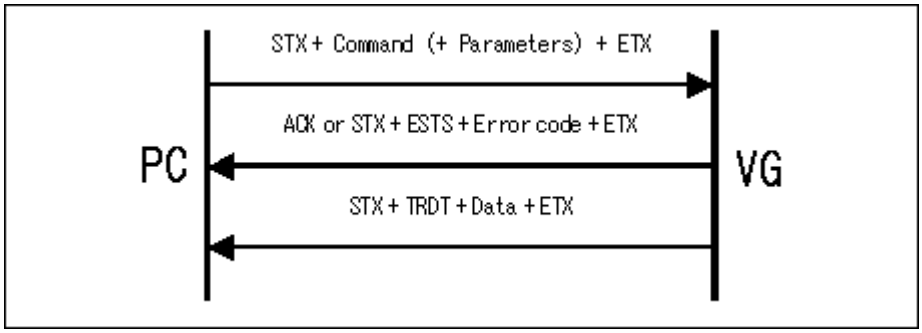
STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	24H
Program No.	3 bytes	“000” to “849”
Priority port No.	1 byte	“0” to “2” (0 = Analog, 1 = DVI, 2 = HDMI)
ETX	1 byte	03H

Fig. 4-5-1

4.6 [25H]: Priority output port reading

Function : This command reads the priority output port in the program whose number is designated. In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	25H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-6-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Priority port No.	1 byte	“0” to “2” (0 = Analog, 1 = DVI, 2 = HDMI)
ETX	1 byte	03H

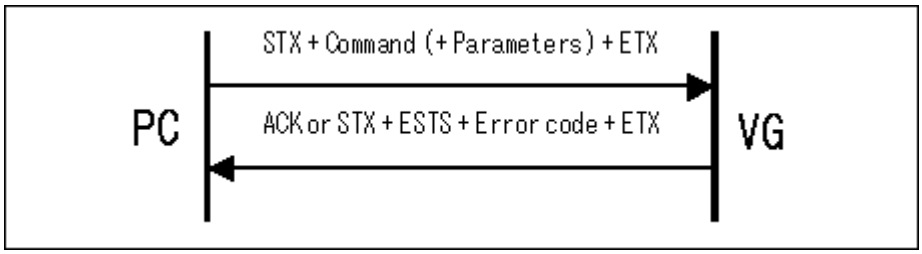
Fig. 4-6-2

4.7 [26H]: HDMI data registration

4.7.1 [26H]: Outline of HDMI data registration command

Function : This command registers the HDMI data in the program whose number is designated.
The sub-command corresponding to the data block to be registered is selected, and the relevant data is sent.
If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	26H
SUBCMD	1 byte	20H = ALL 21H = HDMI Mode 22H = Video Format 23H = Video Level 24H = Video Level (User) 25H = Color space 26H = Sync signal polarity 27H = Repetition 28H = Audio Source 29H = Audio Internal 2AH = InfoFrame AVI 2BH = InfoFrame SPD 2CH = InfoFrame Audio 2DH = InfoFrame MPEG
Program No.	3 bytes	“000” to “849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-7-1

4.7.2 [26H]: HDMI data registration [20H] ALL parameters

The format which links 20H (Video Format) to 2DH (InfoFrame MPEG) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.7.3 [26H]: HDMI data registration [21H] HDMI Mode parameter

HDMI Mode	1 byte	“0” = OFF “1” = HDMI “2” = DVI

Fig. 4-7-3

4.7.4 [26H]: HDMI data registration [22H] Video Format parameters

Video Format	1 byte	“0” = RGB “1” = YCbCr444 “2” = YCbCr422 (16bit) “3” = YCbCr422 (20bit) “4” = YCbCr422 (24bit) * The settings are as listed below for the VG-849C and 859C. “0” = RGB (24bit) “1” = YCbCr444 (24bit) “2” = YCbCr422 (16bit) “3” = YCbCr422 (20bit) “4” = YCbCr422 (24bit) “5” = RGB (30bit) “6” = RGB (36bit) “7” = YCbCr444 (30bit) “8” = YCbCr444 (36bit)

Fig. 4-7-4

4.7.5 [26H]: HDMI data registration [23H] Video Level parameter

Video Level	1 byte	“0” = FULL “1” = LIMITTED “2” = USER

Fig. 4-7-5

4.7.6 [26H]: HDMI data registration [24H] Video Level (USER) parameters

Video Level (USER) minimum value	4 bytes	“0000” to “4095” *
Video Level (USER) maximum value	4 bytes	“0000” to “4095” *

Fig. 4-7-6

* The ranges of the settings corresponding to the Video Format setting are listed in the table below.

Video Format	Setting range
RGB	“0000” to “0255”
YCbCr444	“0000” to “0255”
YCbCr422 (16bit)	“0000” to “0255”
YCbCr422 (20bit)	“0000” to “1023”
YCbCr422 (24bit)	“0000” to “4095”

4.7.7 [26H]: HDMI data registration [25H] Color difference coefficient parameters

YR	5 bytes	“00000” to “10000” The total value of YG and YB is set to 10000 or less.
YG	5 bytes	“00000” to “10000” The total value of YR and YB is set to 10000 or less.
YB	5 bytes	“00000” to “10000” The total value of YR and YG is set to 10000 or less.
PbR	5 bytes	“00000” to “05000” The total value of PbG and PbB is set to 10000 or less.
PbG	5 bytes	“00000” to “05000” The total value of PbR and PbB is set to 10000 or less.
PbB	5 bytes	“00000” to “05000” The total value of PbR and PbG is set to 10000 or less.
PrR	5 bytes	“00000” to “05000” The total value of PrR and PrG is set to 10000 or less.
PrG	5 bytes	“00000” to “05000” The total value of PrR and PrB is set to 10000 or less.
PrB	5 bytes	“00000” to “05000” The total value of PrR and PrG is set to 10000 or less.

Fig. 4-7-7

4.7.8 [26H]: HDMI data registration [26H] Sync signal polarity parameters

HS polarity	1 byte	“0” = NEGA “1” = POSI “2” = OFF
VS polarity	1 byte	“0” = NEGA “1” = POSI “2” = OFF

Fig. 4-7-8

4.7.9 [26H]: HDMI data registration [28H] Repetition parameter

Repetition	2 bytes	“01” to “10”

Fig. 4-7-9

4.7.10 [26H]: HDMI data registration [28H] AudioSource parameters

Audio Source	1 byte	“0” = OFF “1” = TOSLINK “2” = COAX “3” = ANALOG “4” = INTERNAL
Audio Samp	1 byte	“0” = 48KHz “1” = 44.1KHz “2” = 32KHz
Audio Width	1 byte	“0” = 16bit “1” = 20bit “2” = 24bit

Fig. 4-7-10

4.7.11 [26H]: HDMI data registration [29H] AudioInternal parameters

AUDIO INTERNAL LLLEVEL	4 bytes 5 bytes 6 bytes	* The maximum value varies depending on the setting established by Audio Width. 16bit : “0” to “0×7FFF” 20bit : “0” to “0×7FFFF” 24bit : “0” to “0×7FFFFF”
AUDIO INTERNAL RLLEVEL	4 bytes 5 bytes 6 bytes	* The maximum value varies depending on the setting established by Audio Width. 16bit : “0” to “0×7FFF” 20bit : “0” to “0×7FFFF” 24bit : “0” to “0×7FFFFF”
AUDIO INTERNAL LFREQ	5 bytes	“0” to “1/2Hz of frequency set by Audio Samp” (10 kHz with 32 kHz setting)
AUDIO INTERNAL RFREQ	5 bytes	“0” to “1/2Hz of frequency set by Audio Samp” (10 kHz with 32 kHz setting)
AUDIO INTERNAL SWEEP	1 byte	“0” = OFF “1” = FREQ

Fig. 4-7-11

4.7.12 [26H]: HDMI data registration [2AH] InfoFrame AVI parameters

Info Frame AVI Type	1 byte	“2” = 2
Info Frame AVI Ver	1 byte	“1” = 1 “2” = 2
Info Frame AVI Scan Info	1 byte	“0” = No Data “1” = Over “2” = Under
Info Frame AVI Bar Info	1 byte	“0” = not valid “1” = Vert “2” = Horiz “3” = Vert&Horiz
Info Frame AVI Active Format Info	1 byte	“0” = No Data “1” = valid
Info Frame AVI RGB or YCbCr	1 byte	“0” = RGB “1” = YCbCr422 “2” = YCbCr444
Info Frame AVI Active Frame Aspect	1 byte	“0” = Picture “1” = 4:3 “2” = 16:9 “3” = 14:9
Info Frame AVI Picture Aspect	1 byte	“0” = No Data “1” = 4:3 “2” = 16:9
Info Frame AVI Colorimetry	1 byte	“0” = No Data “1” = SMPTE “2” = ITU709 “3” = Extend * This can be set for the VG-849C and 859C only.
Info Frame AVI Video Code	2 bytes	“0” to “34”
Info Frame AVI Repetition	2 bytes	“0” to “10”
Info Frame AVI TopBar	5 bytes	“0” to “65535”
Info Frame AVI BottomBar	5 bytes	“0” to “65535”
Info Frame AVI LBar	5 bytes	“0” to “65535”
Info Frame AVI RBar	5 bytes	“0” to “65535”
Info Frame AVI Scaling	1 byte	“0” = unknown “1” = Horiz “2” = Vert “3” = Horiz&Vert

Fig. 4-7-12

4.7.13 [26H]: HDMI data registration [2BH] InfoFrame SPD parameters

Info Frame SPD Type	1 byte	“3” = 3
Info Frame SPD Ver	1 byte	“1” = 1 “2” = 2
Info Frame SPD Vendor Name	8 bytes	* 8 ASCII characters (if fewer than 8 characters, enter a space or spaces after the characters to bring the total to 8 characters)
Info Frame SPD Product	16 bytes	* 16 ASCII characters (if fewer than 16 characters, enter a space or spaces after the characters to bring the total to 16 characters)
Info Frame SPD Source Device	1 byte	“0” = unknown “1” = DIgiSTB “2” = DVD “3” = DVHS “4” = HDD “5” = DVC “6” = DSC “7” = CD “8” = Game “9” = PC “A” = Blu-Ray Disc (BD) “B” = Super Audio CD

Fig. 4-7-13

4.7.14 [26H]: HDMI data registration [2CH] InfoFrame Audio parameters

Info Frame Audio Type	1 byte	“4” = 4
Info Frame Audio Ver	1 byte	“1” = 1
Info Frame Audio Channel Count	1 byte	“0” = Refer “1” = 2ch “2” = 3ch “3” = 4ch “4” = 5ch “5” = 6ch “6” = 7ch “7” = 8ch
Info Frame Audio Coding Type	1 byte	“0” = Refer “1” = IEC60958 “2” = AC3 “3” = MPEG1 “4” = MP3 “5” = MPEG2 “6” = AAC “7” = DTS “8” = ATRAC “9” = OneBitAudio “A” = DolbyDigital+ “B” = DTS-HD “C” = MLP “D” = DST * This can be set for the VG-849C and 859C only. “E” = WMA Pro * This can be set for the VG-849C and 859C only.
Info Frame Audio Samp Size	1 byte	“0” = Refer “1” = 16bit “2” = 20bit “3” = 24bit
Info Frame Audio Samp Freq	1 byte	“0” = Refer “1” = 32kHz “2” = 44.1kHz “3” = 48kHz “4” = 88.2kHz “5” = 96kHz “6” = 176.4kHz “7” = 192kHz
Info Frame Audio Channel Alloc	2 bytes	“0” to “31”
Info Frame Audio Level Shift	2 bytes	“0” to “15”dB
Info Frame Audio Down-mix	1 byte	“0” = Permitted “1” = Prohibitd

Fig. 4-7-14

4.7.15 [26H]: HDMI data registration [2DH] InfoFrame MPEG parameters

Info Frame MPEG Type	1 byte	“5” = 5
Info Frame MPEG Ver	1 byte	“1” = 1
Info Frame MPEG Frame	1 byte	“0” = Unknown “1” = I Pic “2” = B Pic “3” = P Pic
Info Frame MPEG Field Repeat	1 byte	“0” = New “1” = Repeated
Info Frame MPEG Bit Rate	10 bytes	“0” to “4294967295”Hz

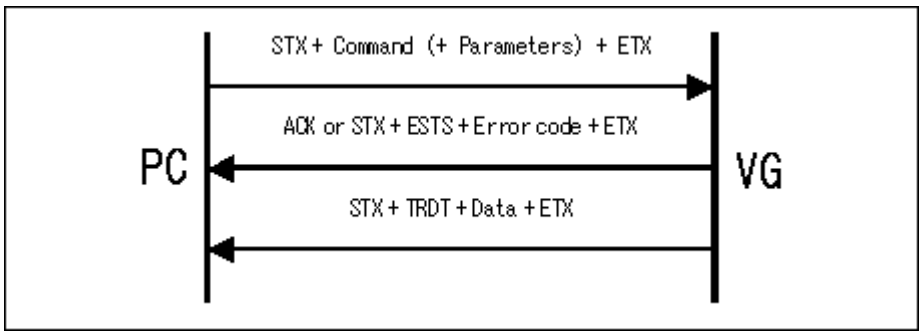
Fig. 4-7-15

4.8 [27H]: HDMI data capture

4.8.1 [27H]: Outline of HDMI data capture command

Function : This command captures the HDMI data in the program whose number is designated.
The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	27H
SUBCMD	1 byte	20H = ALL 21H = HDMI Mode 22H = Video Format 23H = Video Level 24H = Video Level (User) 25H = Color space 26H = Sync signal polarity 27H = Repetition 28H = Audio Source 29H = Audio Internal 2AH = InfoFrame AVI 2BH = InfoFrame SPD 2CH = InfoFrame Audio 2DH = InfoFrame MPEG
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-8-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
CAPTURE DATA	-	-
ETX	1 byte	03H

Fig. 4-8-2

4.8.2 [27H]: HDMI data capture [20H] ALL parameters

The format which links 20H (Video Format) to 2DH (InfoFrame MPEG) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.8.3 [27H]: HDMI data capture [21H] HDMI Mode parameter

Same as Fig. 4-7-3.

4.8.4 [27H]: HDMI data capture [22H] Video Format parameters

Same as Fig. 4-7-4.

4.8.5 [27H]: HDMI data capture [23H] Video Level parameter

Same as Fig. 4-7-5.

4.8.6 [27H]: HDMI data capture [24H] Video Level (USER) parameters

Same as Fig. 4-7-6.

4.8.7 [27H]: HDMI data capture [25H] Color difference coefficient parameters

Same as Fig. 4-7-7.

4.8.8 [27H]: HDMI data capture [26H] Sync signal polarity parameters

Same as Fig. 4-7-8.

4.8.9 [27H]: HDMI data capture [27H] Repetition parameter

Same as Fig. 4-7-9.

4.8.10 [27H]: HDMI data capture [28H] AudioSource parameters

Same as Fig. 4-7-10.

4.8.11 [27H]: HDMI data capture [29H] AudioInternal parameters

Same as Fig. 4-7-11.

4.8.12 [27H]: HDMI data capture [2AH] InfoFrame AVI parameters

Same as Fig. 4-7-12.

4.8.13 [27H]: HDMI data capture [2BH] InfoFrame SPD parameters

Same as Fig. 4-7-13.

4.8.14 [27H]: HDMI data capture [2CH] InfoFrame Audio parameters

Same as Fig. 4-7-14.

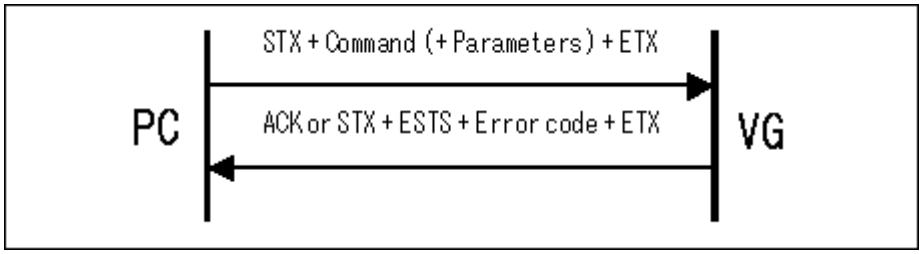
4.8.15 [27H]: HDMI data capture [2DH] InfoFrame MPEG parameters

Same as Fig. 4-7-15.

4.9 [28H]: Internal program table selection

Function : This command selects the tables in the internal program.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	28H
Internal program table No.	1 byte	0 = Table1, 1 = Table2, 2 = Table3 (*)
ETX	1 byte	03H

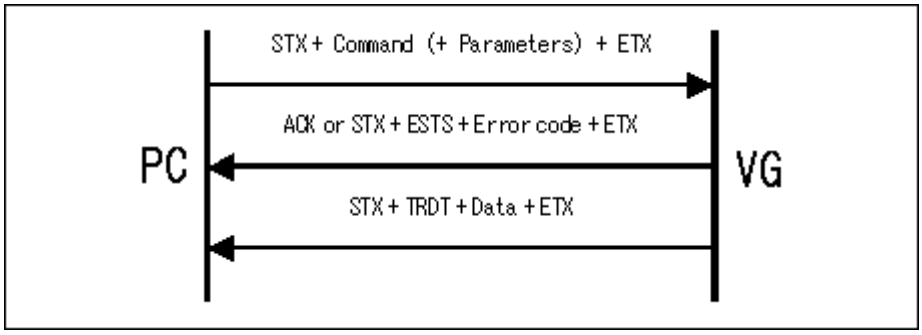
Fig. 4-9-1

* “Table3” is supported only by the VG-849B and 859B and by the VG-849C and 859C.

4.10 [29H]: Current internal program table No. capture

Function : This command captures the currently set program table No.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	29H
ETX	1 byte	03H

Fig. 4-10-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Internal program table No.	1 byte	0 = Table1, 1 = Table2, 2 = Table3 (*)
ETX	1 byte	03H

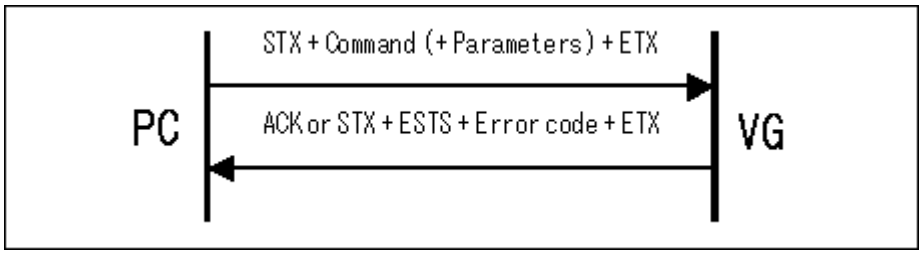
Fig. 4-10-2

* “Table3” is supported only by the VG-849B and 859B and by the VG-849C and 859C.

4.11 [2AH]: Sweep extended data setting

Function : This command sets the extended data for the audio sweep.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	2AH
Program No.	3 bytes	“000” to “849”
Step	2 bytes	“00” = 40msec “01” = 60msec “02” = 80msec “03” = 100msec “04” = 120msec “05” = 140msec “06” = 160msec “07” = 180msec “08” = 200msec “09” = 220msec “10” = 240msec “11” = 260msec “12” = 280msec “13” = 300msec “14” = 320msec “15” = 340msec
Number of updates	2 bytes	“00” to “15”
Minimum frequency	3 bytes	“002” to “200”
Maximum frequency	3 bytes	“002” to “200”
Frequency step	3 bytes	“002” to “198”
ETX	1 byte	03H

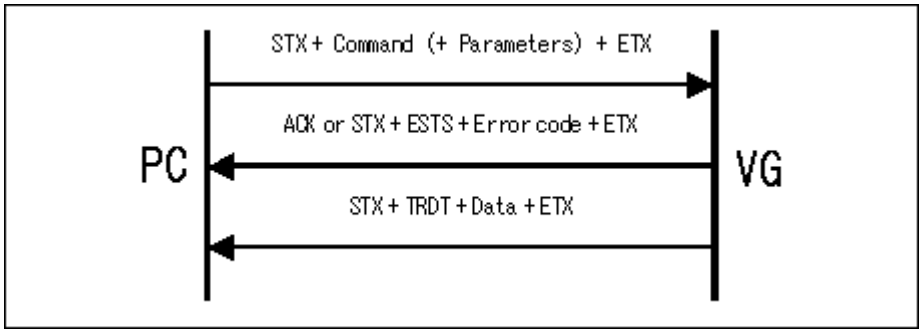
Fig. 4-11-1

Data : None

4.12 [2BH]: Sweep extended data capture

Function : This command captures the extended data for the audio sweep.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	2BH
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-12-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Step	2 bytes	“00” = 40msec “01” = 60msec “02” = 80msec “03” = 100msec “04” = 120msec “05” = 140msec “06” = 160msec “07” = 180msec “08” = 200msec “09” = 220msec “10” = 240msec “11” = 260msec “12” = 280msec “13” = 300msec “14” = 320msec “15” = 340msec
Number of updates	2 bytes	“00” to “15”
Minimum frequency	3 bytes	“002” to “200”

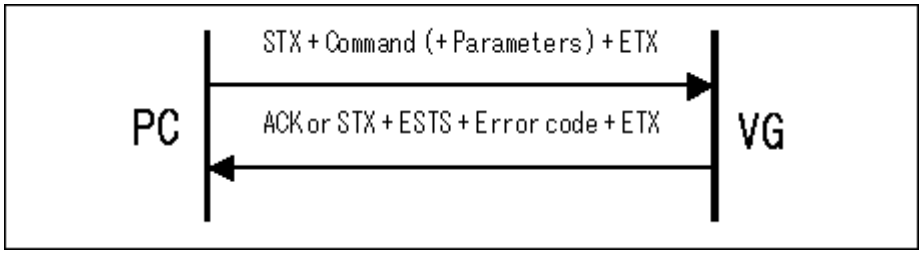
Maximum frequency	3 bytes	“002” to “200”
Frequency step	3 bytes	“002” to “198”
ETX	1 byte	03H

Fig. 4-12-2

4.13 [2CH]: Auto display group No. setting

Function : This sets the number of the auto display group.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	2CH
Auto display group No.	2 bytes	“00” to “99”
ETX	1 byte	03H

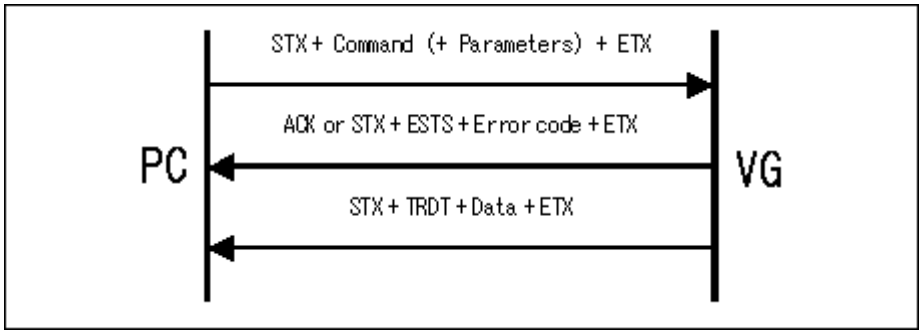
Fig. 4-13-1

Data : None

4.14 [2DH]: Auto display group No. capture

Function : This command captures the number of the auto display group.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	2DH
ETX	1 byte	03H

Fig. 4-14-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Auto display group No.	2 bytes	“00” to “99”
ETX	1 byte	03H

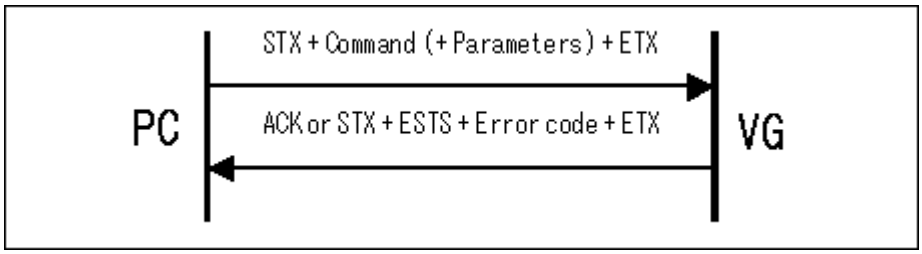
Fig. 4-14-2

4.15 [31H]: Caption & V-Chip data setting

Function : This command sets the caption and V-Chip program data.
If the program number is 0, it writes the data into the buffer RAM.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	31H
Program No.	3 bytes	“000” to “849”
Caption data No.	2 bytes	“00” to “20”
Caption mode	1 byte	“0” = OFF “1” = CC1 “2” = CC2 “3” = CC3 “4” = CC4 “5” = TXT1 “6” = TXT2 “7” = TXT3 “8” = TXT4
Caption style	1 byte	“0” = POPON “1” = ROLLUP “2” = PAINTON
Caption delay	2 bytes	“00” to “10” (sec)
Caption loop time	2 bytes	“00” to “10” (sec)
V-Chip system	1 byte	“0” = OFF “1” = MPAA “2” = U.S.TV “3” = CanadianEnglish “4” = CanadianFrench
V-Chip_MPAA	1 byte	“0” = G “1” = PG “2” = PG13 “3” = R “4” = NC17 “5” = X “6” = NoRated “7” = N/A
V-Chip_USTV1	1 byte	“0” = Y “1” = Y7 “2” = G

		“3” = PG “4” = 14 “5” = MA
V-Chip_USTV2	1 byte	40H = None 41H = FV 42H = V 43H = S 44H = L 45H = D
V-Chip_ENGLISH	1 byte	“0” = E “1” = C “2” = C8+ “3” = G “4” = PG “5” = 14+ “6” = 18+
V-Chip_FRENCH	1 byte	“0” = E “1” = G “2” = 8ANS+ “3” = 13ANS+ “4” = 16ANS+ “5” = 18ANS+
V-Chip_INTERVAL	4 bytes	“0001” to “1023” (V)
ETX	1 byte	03H

Fig. 4-15-1

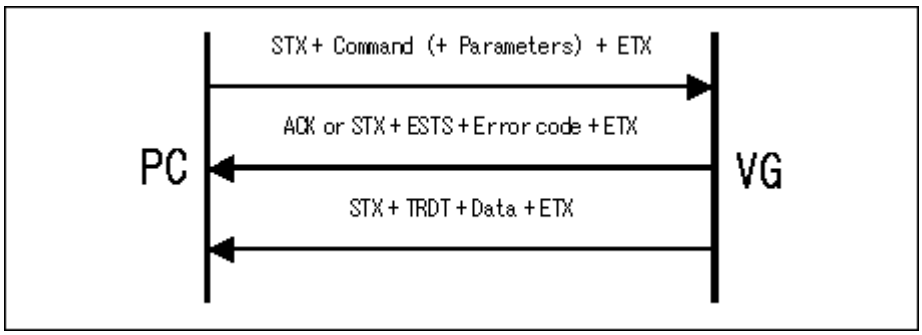
Data : None

4.16 [32H]: Caption & V-chip data capture

Function : This command captures the caption and V-Chip program data.
In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

*** This command can be used only when the license has been purchased.**

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	32H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-16-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Caption data No.	2 bytes	“00” to “20”
Caption mode	1 byte	“0” = OFF “1” = CC1 “2” = CC2 “3” = CC3 “4” = CC4 “5” = TXT1 “6” = TXT2 “7” = TXT3 “8” = TXT4
Caption style	1 byte	“0” = POPON “1” = ROLLUP “2” = PAINTON
Caption delay	2 bytes	“00” to “10”
Caption loop time	2 bytes	“00” to “10”
V-Chip system	1 byte	“0” = OFF “1” = MPAA “2” = U.S.TV “3” = CanadianEnglish “4” = CanadianFrench

V-Chip_MPAA	1 byte	“0” = G “1” = PG “2” = PG13 “3” = R “4” = NC17 “5” = X “6” = NoRated “7” = N/A
V-Chip_USTV1	1 byte	“0” = Y “1” = Y7 “2” = G “3” = PG “4” = 14 “5” = MA
V-Chip_USTV2	1 byte	40H = None 41H = FV 42H = V 43H = S 44H = L 45H = D
V-Chip_ENGLISH	1 byte	“0” = E “1” = C “2” = C8+ “3” = G “4” = PG “5” = 14+ “6” = 18+
V-Chip_FRENCH	1 byte	“0” = E “1” = G “2” = 8ANS+ “3” = 13ANS+ “4” = 16ANS+ “5” = 18ANS+
V-Chip_INTERVAL	4 bytes	“0001” to “1023” (V)
ETX	1 byte	03H

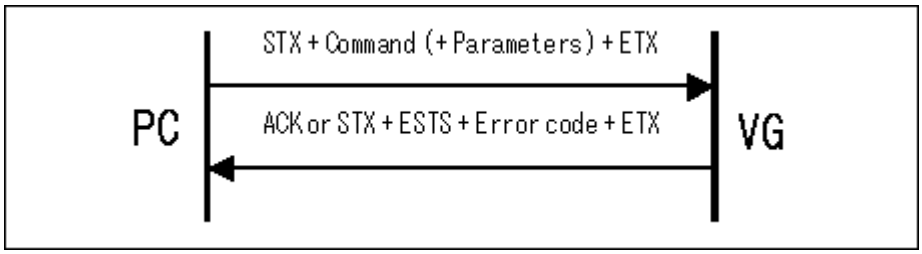
Fig. 4-16-2

4.17 [33H]: User caption data setting 1

Function : This command sets the user caption mode and style data.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	33H
User No.	2 bytes	“01” to “20”
FLASH_WRITE	1 byte	“0” = Current data is updated only. “1” = Data is updated and written on the flash memory card.
Caption mode	1 byte	“0” = CC1 “1” = CC2 “2” = CC3 “3” = CC4 “4” = TXT1 “5” = TXT2 “6” = TXT3 “7” = TXT4
Caption style	1 byte	“0” = POPON “1” = ROLLUP2 “2” = ROLLUP3 “3” = ROLLUP4 “4” = PAINTON
ETX	1 byte	03H

Fig. 4-17-1

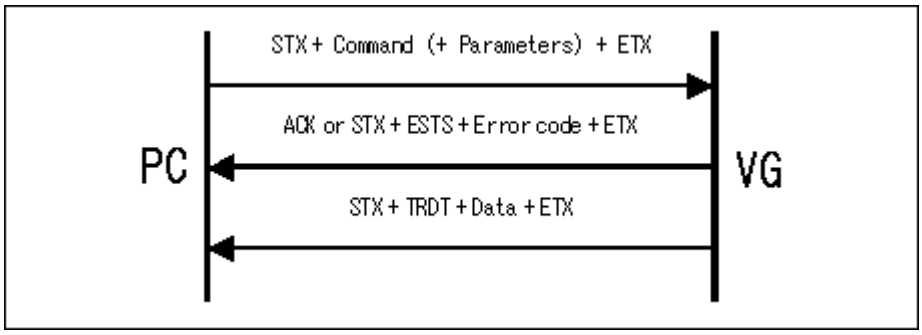
Data : None

4.18 [34H]: User caption data capture 1

Function : This command captures the user caption mode and style data.

*** This command can be used only when the license has been purchased.**

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	34H
User No.	2 bytes	“01” to “20”
ETX	1 byte	03H

Fig. 4-18-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
FLASH_WRITE	1 byte	“0” = Current data is updated only. “1” = Data is updated and written on the flash memory card.
Caption mode	1 byte	“0” = CC1 “1” = CC2 “2” = CC3 “3” = CC4 “4” = TXT1 “5” = TXT2 “6” = TXT3 “7” = TXT4
Caption style	1 byte	“0” = POPON “1” = ROLLUP2 “2” = ROLLUP3 “3” = ROLLUP4 “4” = PAINTON
ETX	1 byte	03H

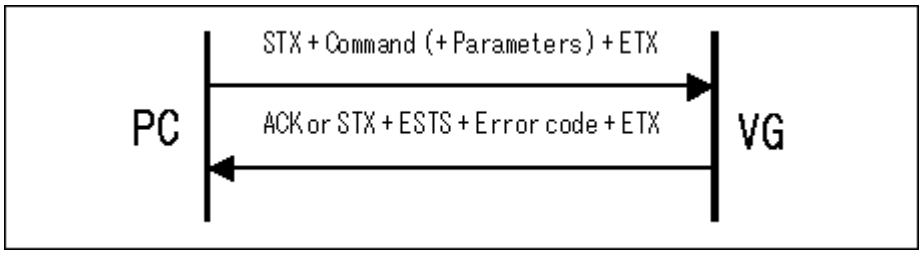
Fig. 4-18-2

4.19 [35H]: User caption data setting 2

Function : This command sets the user caption data.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	35H
User No.	2 bytes	“01” to “20”
ROW	2 bytes	“00”to”14” (in the text mode, however, the article name is entered in 00, and any data for 13 and 14 is canceled)
FLASH_WRITE	1 byte	“0” = Current data is updated only. “1” = Data is updated and written on the flash memory card.
ASCII or BINALLY	1 byte	“0” = ASCII “1” = BINALLY
ROW_ENABLE	1 byte	“0” = Disable “1” = Enable
Start position	2 bytes	“00” to “31”
Character color	1 byte	“0” = White “1” = Green “2” = Blue “3” = Cyan “4” = Red “5” = Yellow “6” = Magenta
Background color	1 byte	“0” = White “1” = Green “2” = Blue “3” = Cyan “4” = Red “5” = Yellow “6” = Magenta “7” = Black
Caption data foreground	1 byte	“0” = OFF “1” = ON
Caption data background setting	1 byte	“0” = Opaque (background color) “1” = Semi-Transparent “2” = Transparent
Underline	1 byte	“0” = OFF “1” = ON

Italics	1 byte	“0” = OFF “1” = ON
Flash	1 byte	“0” = OFF “1” = ON
Data length	3 bytes	“000” to “128” (bytes)
Caption data	3 bytes	Variable (in the binary mode, ASCII code must be used to input the number data directly; examples: 0×2a → “2A,” 0×00 → “00”)
ETX	1 byte	03H

Fig. 4-19-1

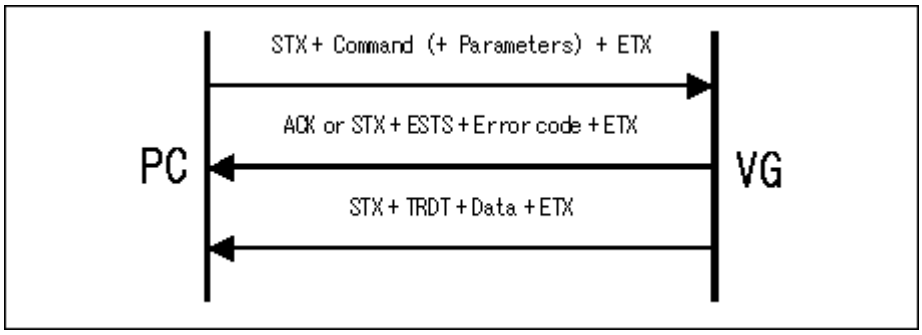
Data : None

4.20 [36H]: User caption data capture 2

Function : This command captures the user caption data.

*** This command can be used only when the license has been purchased.**

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	36H
User No.	2 bytes	“01” to “20”
ROW	2 bytes	“00” to “14” (in the text mode, however, the article name is entered in 00, and any data for 13 and 14 is canceled)
ETX	1 byte	03H

Fig. 4-20-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
FLASH_WRITE	1 byte	“0” = Current data is updated only. “1” = Data is updated and written on the flash memory card.
ASCII or BINALLY	1 byte	“0” = ASCII “1” = BINALLY
ROW_ENABLE	1 byte	“0” = Disable “1” = Enable
Start position	2 bytes	“00” to “31”
Character color	1 byte	“0” = White “1” = Green “2” = Blue “3” = Cyan “4” = Red “5” = Yellow “6” = Magenta

Background color	1 byte	“0” = White “1” = Green “2” = Blue “3” = Cyan “4” = Red “5” = Yellow “6” = Magenta “7” = Black
Caption data foreground	1 byte	“0” = OFF “1” = ON
Caption data background setting	1 byte	“0” = Opaque (background color) “1” = Semi-Transparent “2” = Transparent
Underline	1 byte	“0” = OFF “1” = ON
Italics	1 byte	“0” = OFF “1” = ON
Flash	1 byte	“0” = OFF “1” = ON
Data length	3 bytes	“000” to “128” (bytes)
Caption data	3 bytes	Variable (in the binary mode, ASCII hexadecimal code must be used to input the number data; examples: 0×2a → “2A,” 0×00 → “00”)
ETX	1 byte	03H

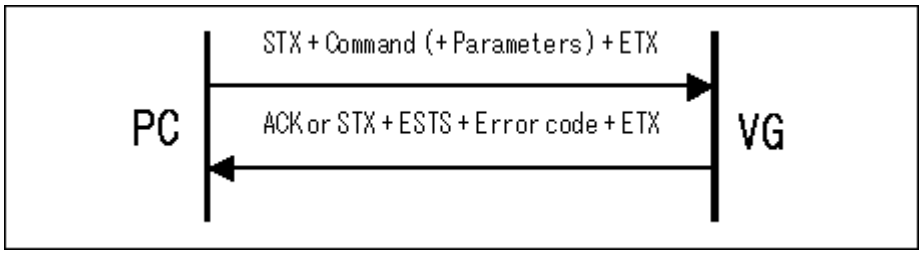
Fig. 4-20-2

4.21 [37H]: User caption data execution

Function : This command specifies the user number and executes the user caption data.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Parameter:

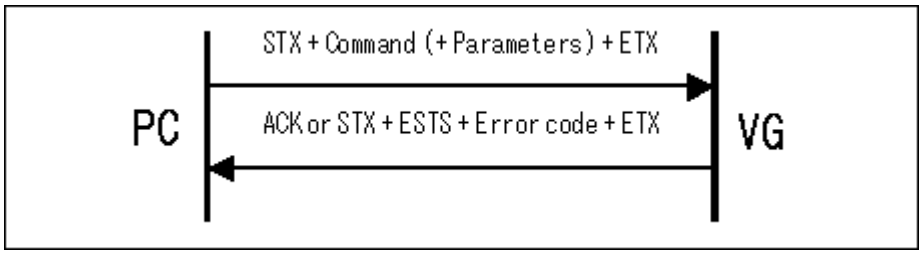
STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	37H
User No.	2 bytes	“01” → “20”
ETX	1 byte	03H

Fig. 4-21-1

4.22 [38H]: Aspect ratio mode setting

Function : This command sets the aspect ratio mode data.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	38H
Program No.	3 bytes	“000” to “849”
Aspect ratio mode	1 byte	“0” = 4:3 “1” = 16:9 “2” = resolution “3” = user
User aspect ratio mode H	3 bytes	“000” to “255”
User aspect ratio mode V	3 bytes	“000” to “255”
ETX	1 byte	03H

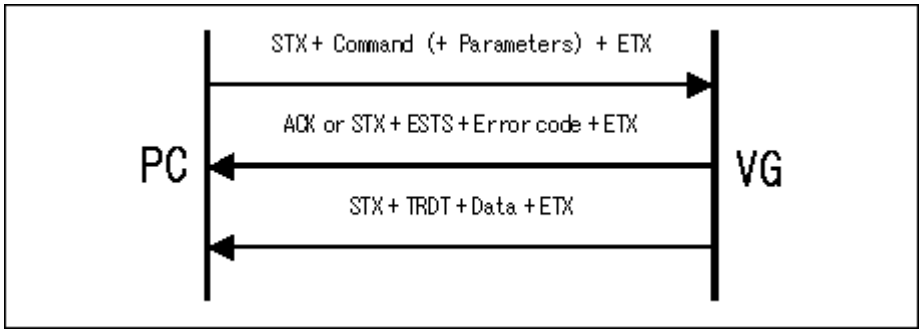
Fig. 4-22-1

Data : None

4.23 [39H]: Aspect ratio mode capture

Function : This command captures the aspect ratio mode data.
In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	39H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-23-1

Data :

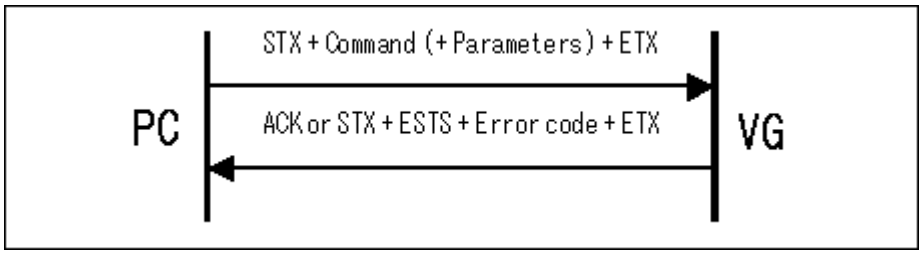
STX	1 byte	02H
TRDT	1 byte	10H
Aspect ratio mode	1 byte	“0” = 4:3 “1” = 16:9 “2” = resolution “3” = user
User aspect ratio mode H	3 bytes	“000” to “255”
User aspect ratio mode V	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 4-23-2

4.24 [3AH]: AFD data setting

Function : This command sets the AFD data.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	3AH
Program No.	3 bytes	“000” to “849”
AFD aspect ratio mode	1 byte	“0” = 4:3 “1” = 16:9
AFD type	2 bytes	“00” to “12”
AFD Color R	3 bytes	“000” to “255”
AFD Color G	3 bytes	“000” to “255”
AFD Color B	3 bytes	“000” to “255”
AFD BG Color R	3 bytes	“000” to “255”
AFD BG Color G	3 bytes	“000” to “255”
AFD BG Color B	3 bytes	“000” to “255”
AFD BAR Color R	3 bytes	“000” to “255”
AFD BAR Color G	3 bytes	“000” to “255”
AFD BAR Color B	3 bytes	“000” to “255”
ETX	1 byte	03H

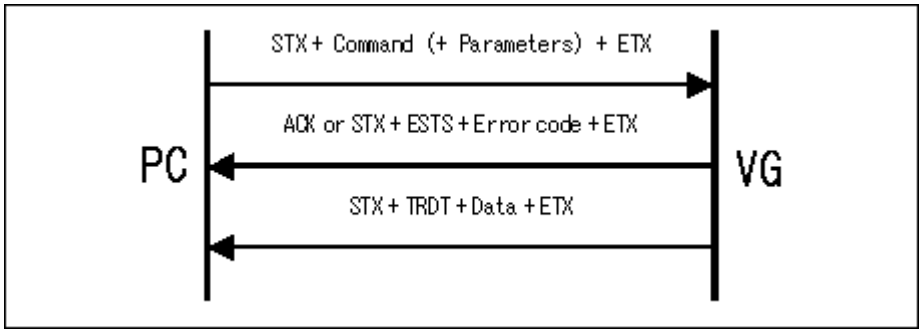
Fig. 4-24-1

Data : None

4.25 [3BH]: AFD data capture

Function : This command captures the AFD data.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	3BH
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-25-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
AFD aspect ratio mode	1 byte	“0” = 4:3 “1” = 16:9
AFD type	2 bytes	“00” to “12”
AFD Color R	3 bytes	“000” to “255”
AFD Color G	3 bytes	“000” to “255”
AFD Color B	3 bytes	“000” to “255”
AFD BG Color R	3 bytes	“000” to “255”
AFD BG Color G	3 bytes	“000” to “255”
AFD BG Color B	3 bytes	“000” to “255”
AFD BAR Color R	3 bytes	“000” to “255”
AFD BAR Color G	3 bytes	“000” to “255”
AFD BAR Color B	3 bytes	“000” to “255”
ETX	1 byte	03H

Fig. 4-25-2

4.26 [3CH]: 2-head LVDS bit ON/OFF data setting

* Refer to Command 4.50 [5AH]: LVDS BIT ON/OFF data setting.

4.27 [3DH]: 2-head LVDS bit ON/OFF data capture

* Refer to Command 4.51 [5BH]: LVDS BIT ON/OFF data setting.

4.28 [3EH]: 12-bit LVDS bit ON/OFF data setting

* Refer to Command 4.50 [5AH]: LVDS BIT ON/OFF data setting.

4.29 [3FH]: 12-bit LVDS bit ON/OFF data capture

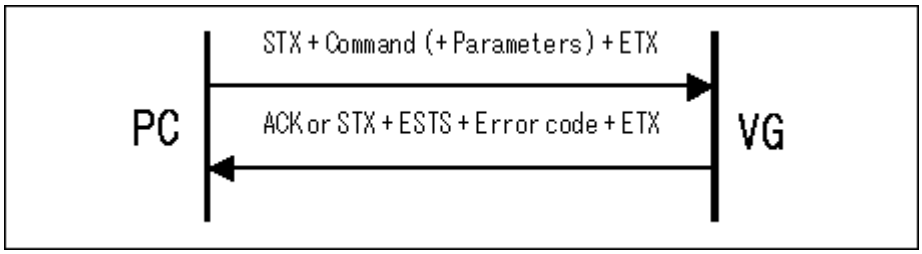
* Refer to Command 4.51 [5BH]: LVDS BIT ON/OFF data setting.

4.30 [40H]: Teletext data setting

Function : This command sets the teletext data.
If the program number is 0, it writes the data into the buffer RAM.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	40H
Program No.	3 bytes	“000” to “849”
Teletext	1 byte	“0” = OFF, “1” = ON
Receive channel	2 bytes	“01” to “20”
Send channel	2 bytes	“01” to “20”
Data transfer mode	1 byte	“0” = 4Line, “1” = 8Line
Channel 1	3 bytes	“100” to “899”
Channel 2	3 bytes	“100” to “899”
Channel 3	3 bytes	“100” to “899”
Channel 4	3 bytes	“100” to “899”
Channel 5	3 bytes	“100” to “899”
Channel 6	3 bytes	“100” to “899”
Channel 7	3 bytes	“100” to “899”
Channel 8	3 bytes	“100” to “899”
Channel 9	3 bytes	“100” to “899”
Channel 10	3 bytes	“100” to “899”
Channel 11	3 bytes	“100” to “899”
Channel 12	3 bytes	“100” to “899”
Channel 13	3 bytes	“100” to “899”
Channel 14	3 bytes	“100” to “899”
Channel 15	3 bytes	“100” to “899”
Channel 16	3 bytes	“100” to “899”
Channel 17	3 bytes	“100” to “899”
Channel 18	3 bytes	“100” to “899”
Channel 19	3 bytes	“100” to “899”
Channel 20	3 bytes	“100” to “899”
ETX	1 byte	03H

Fig. 4-30-1

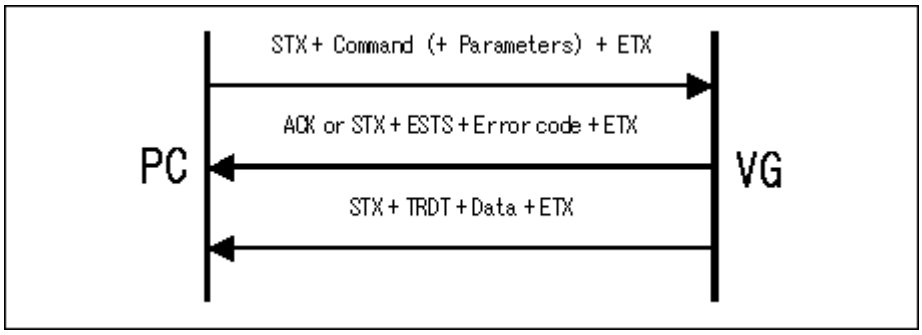
Data : None

4.31 [41H]: Teletext data capture

Function : This command captures the teletext data. In the case of programs with numbers from 850 to 999, it reads the data of the internal program.

*** This command can be used only when the license has been purchased.**

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848, 49H : VG-849 / 849A / 849B, 4AH : VG-858 4BH : VG-830, 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	41H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-31-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Teletext	1 byte	“0” = OFF, “1” = ON
Receive channel	2 bytes	“01” to “20”
Send channel	2 bytes	“01” to “20”
Data transfer mode	1 byte	“0” = 4Line, “1” = 8Line
Channel 1	3 bytes	“100” to “899”
Channel 2	3 bytes	“100” to “899”
Channel 3	3 bytes	“100” to “899”
Channel 4	3 bytes	“100” to “899”
Channel 5	3 bytes	“100” to “899”
Channel 6	3 bytes	“100” to “899”
Channel 7	3 bytes	“100” to “899”
Channel 8	3 bytes	“100” to “899”
Channel 9	3 bytes	“100” to “899”
Channel 10	3 bytes	“100” to “899”
Channel 11	3 bytes	“100” to “899”
Channel 12	3 bytes	“100” to “899”
Channel 13	3 bytes	“100” to “899”
Channel 14	3 bytes	“100” to “899”

Channel 15	3 bytes	“100” to “899”
Channel 16	3 bytes	“100” to “899”
Channel 17	3 bytes	“100” to “899”
Channel 18	3 bytes	“100” to “899”
Channel 19	3 bytes	“100” to “899”
Channel 20	3 bytes	“100” to “899”

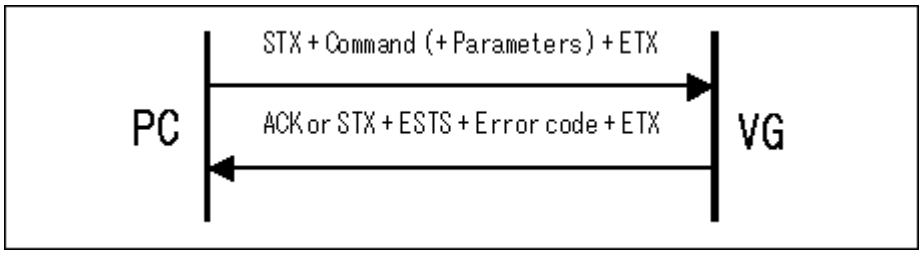
Fig. 4-31-2

4.32 [42H]: 10-bit data registration

4.32.1 [42H]: Outline of 10-bit data registration command

Function : This command registers the 10-bit data contained in the program whose number is designated. The sub-command corresponding to the data block to be registered is selected, and the relevant data is sent.
If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Command + Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	42H
SUBCMD	1 byte	20H = ALL 21H = Graphic color 22H = Background color 23H = Window color 24H = Gray scale level 25H = RGB 26H = Cursor color 27H = Cursor background color
Program No.	3 bytes	“000” to “849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-32-1

4.32.2 [42H]: 10-bit data registration [20H] ALL parameters

The format which links 21H (Graphic color) to 27H (Cursor background color) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.32.3 [42H]: 10-bit data registration [21H] Graphic color parameters

Graphic color (R)	4 bytes	“0000” to “1023”
Graphic color (G)	4 bytes	“0000” to “1023”
Graphic color (B)	4 bytes	“0000” to “1023”

Fig. 4-32-3

4.32.4 [42H]: 10-bit data registration [22H] Background color parameters

Background color (R)	4 bytes	“0000” to “1023”
Background color (G)	4 bytes	“0000” to “1023”
Background color (B)	4 bytes	“0000” to “1023”

Fig. 4-32-4

4.32.5 [42H]: 10-bit data registration [23H] Window color parameters

Window color (R)	4 bytes	“0000” to “1023”
Window color (G)	4 bytes	“0000” to “1023”
Window color (B)	4 bytes	“0000” to “1023”

Fig. 4-32-5

4.32.6 [42H]: 10-bit data registration [24H] Gray scale level parameters

Gray scale level (L0)	4 bytes	“0000” to “1023”
Gray scale level (L1)	4 bytes	“0000” to “1023”
Gray scale level (L2)	4 bytes	“0000” to “1023”
Gray scale level (L3)	4 bytes	“0000” to “1023”
Gray scale level (L4)	4 bytes	“0000” to “1023”
Gray scale level (L5)	4 bytes	“0000” to “1023”
Gray scale level (L6)	4 bytes	“0000” to “1023”
Gray scale level (L7)	4 bytes	“0000” to “1023”
Gray scale level (L8)	4 bytes	“0000” to “1023”
Gray scale level (L9)	4 bytes	“0000” to “1023”
Gray scale level (LA)	4 bytes	“0000” to “1023”
Gray scale level (LB)	4 bytes	“0000” to “1023”
Gray scale level (LC)	4 bytes	“0000” to “1023”
Gray scale level (LD)	4 bytes	“0000” to “1023”
Gray scale level (LE)	4 bytes	“0000” to “1023”
Gray scale level (LF)	4 bytes	“0000” to “1023”

Fig. 4-32-6

4.32.7 [42H]: 10-bit data registration [25H] RGB parameter

RGB number of output bits	2 bytes	“01” to “10”

Fig. 4-32-7

4.32.8 [42H]: 10-bit data registration [26H] Cursor color parameters

Cursor color (R)	4 bytes	“0000” to “1023”
Cursor color (G)	4 bytes	“0000” to “1023”
Cursor color (B)	4 bytes	“0000” to “1023”

Fig. 4-32-8

4.32.9 [42H]: 10-bit data registration [27H] Cursor background color parameters

Cursor background color (R)	4 bytes	“0000” to “1023”
Cursor background color (G)	4 bytes	“0000” to “1023”
Cursor background color (B)	4 bytes	“0000” to “1023”

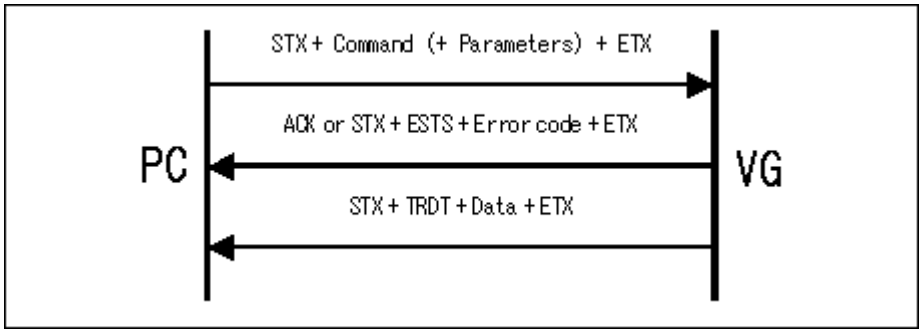
Fig. 4-32-9

4.33 [43H]: 10-bit data capture

4.33.1 [43H]: Outline of 10-bit data capture command

Function : This command captures the 10-bit data contained in the program whose number is designated.
The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	43H
SUBCMD	1 byte	20H = ALL 21H = Graphic color 22H = Background color 23H = Window color 24H = Gray scale level 25H = RGB 26H = Cursor color 27H = Cursor background color
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-33-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Capture data	-	-
ETX	1 byte	03H

Fig. 4-33-2

4.33.2 [43H]: 10-bit data capture [20H] ALL parameters

The format which links 21H (Graphic color) to 27H (Cursor background color) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.33.3 [43H]: 10-bit data capture [21H] Graphic color parameters

Same as shown in Fig. 4-32-3.

4.33.4 [43H]: 10-bit data capture [22H] Background color parameters

Same as shown in Fig. 4-32-4.

4.33.5 [43H]: 10-bit data capture [23H] Window color parameters

Same as shown in Fig. 4-32-5.

4.33.6 [43H]: 10-bit data capture [24H] Gray scale level parameters

Same as shown in Fig. 4-32-6.

4.33.7 [43H]: 10-bit data capture [25H] RGB parameter

Same as shown in Fig. 4-32-7.

4.33.8 [43H]: 10-bit data capture [26H] Cursor color parameters

Same as shown in Fig. 4-32-8.

4.33.9 [43H]: 10-bit data capture [27H] Cursor background color parameters

Same as shown in Fig. 4-32-9.

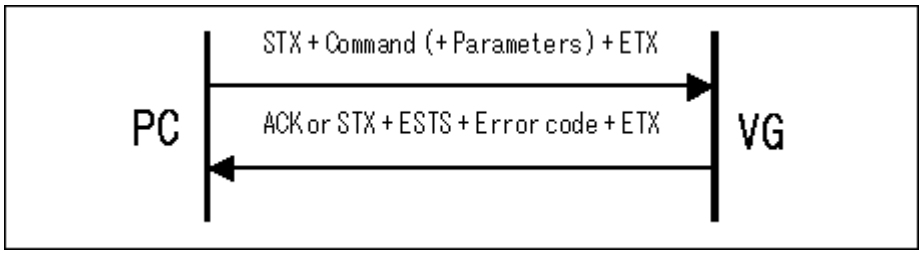
4.34 [44H]: Macrovision data registration

4.34.1 [44H]: Outline of Macrovision data registration command

Function : This command registers the Macrovision data contained in the program whose number is designated. The sub-command corresponding to the data block to be registered is selected, and the relevant data is sent.
If the program number is 0, the command writes the data into the buffer RAM.

*** This command can be used only when the license has been purchased.**

Sequence : Type 2



Command + Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	44H
SUBCMD	1 byte	20H = ALL 21H = MODE
Program No.	3 bytes	“000” to “849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-34-1

4.34.2 [44H]: Macrovision data registration [20H] ALL parameters

The format is the same as for 21H (MODE) shown on the following page.

* The diagram has been omitted. Refer to the descriptions on the following pages.

4.34.3 [44H]: Macrovision data registration [21H] MODE parameters

MODE	1 byte	“0” to “5”

Fig. 4-34-2

*** The values which can be set differ depending on the timing data.**
The figure below shows which values can be set for each timing data.

(Apart from TV signal)	0 = OFF
(NTSC)	0 = OFF 1 = DVD/STB Type 1 2 = DVD/STB Type 2 3 = DVD/STB Type 3 4 = VHS Japan 1 5 = VHS Japan 2
(PAL)	0 = OFF 1 = DVD/STB 2 = VHS
(SECAM)	0 = OFF 1 = DVD/STB 2 = VHS
(NTSC-M)	0 = OFF 1 = DVD/STB Type 1 2 = DVD/STB Type 2 3 = DVD/STB Type 3 4 = VHS USA 5 = VHS USA obs.
(NTSC-443)	0 = OFF 1 = DVD/STB
(PAL-60)	0 = OFF 1 = DVD/STB
(PAL-M)	0 = OFF 1 = DVD/STB
(PAL-N)	0 = OFF 1 = DVD/STB 2 = VHS
(PAL-Nc)	0 = OFF 1 = DVD/STB 2 = VHS

Fig. 4-34-3

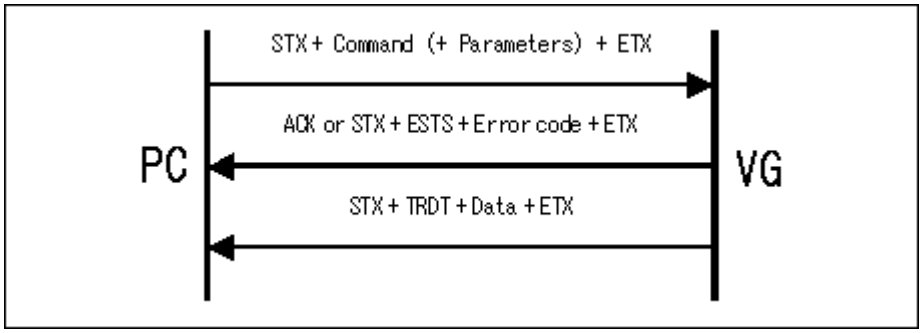
4.35 [45H]: Macrovision data capture

4.35.1 [45H]: Outline of Macrovision data capture command

Function : This command captures the Macrovision data contained in the program whose number is designated.
The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

*** This command can be used only when the license has been purchased.**

Sequence : Type 3



Command + Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	45H
SUBCMD	1 byte	20H = ALL 21H = MODE
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-35-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Capture data	-	-
ETX	1 byte	03H

Fig. 4-35-2

4.35.2 [45H]: Macrovision data capture [20H] ALL parameters

The format is the same as for 21H (MODE) shown below.

* The diagram has been omitted. Refer to the descriptions on the following pages.

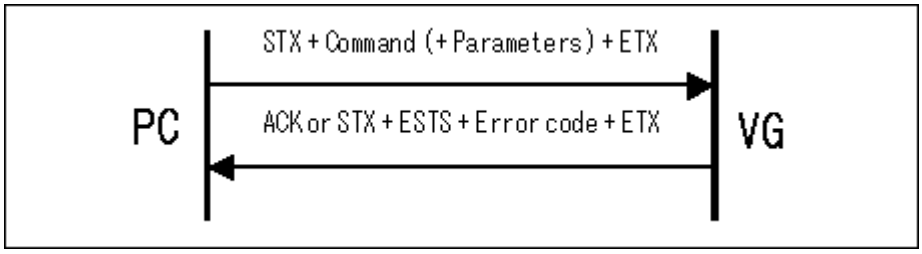
4.35.3 [45H]: Macrovision data capture [21H] MODE parameters

Same as shown in Fig. 4-35-2.

4.36 [46H]: DisplayEnable data registration

Function : This command registers the DisplayEnable signal data contained in the program whose number is designated. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	4CH : VG-857
CMD	1 byte	46H
Program No.	3 bytes	“000” to “849”
Ch1	1 byte	“0” = Low, “1” = High
Ch2	1 byte	“0” = Low, “1” = High
ETX	1 byte	03H

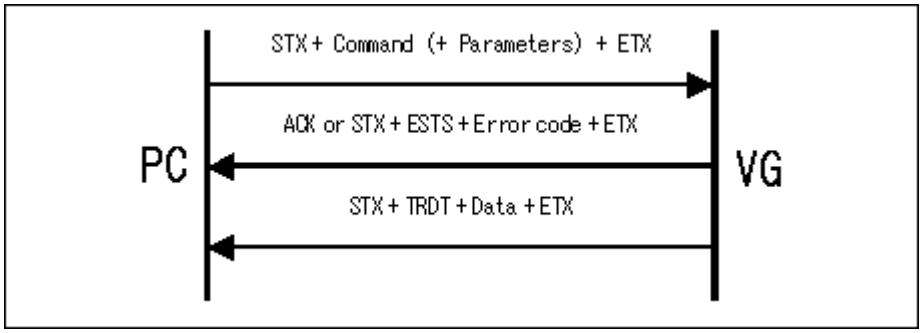
Fig. 4-36-1

Data : None

4.37 [47H]: DisplayEnable data capture

Function : This command captures the DisplayEnable signal data contained in the program whose number is designated.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	4CH : VG-857
CMD	1 byte	47H
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-37-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Ch1	1 byte	“0” = Low, “1” = High
Ch2	1 byte	“0” = Low, “1” = High
ETX	1 byte	03H

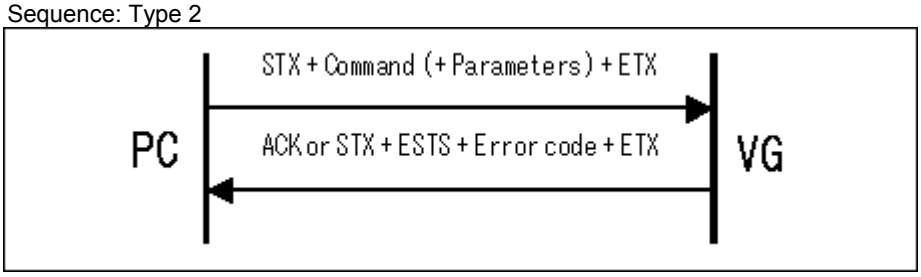
Fig. 4-37-2

4.38 [48H]: Config expansion data registration

4.38.1 [48H] :outline of Config expansion data registration command

Function : this command is to register Config expansion data.
Select the sub command that corresponds to the registered data block. Then, send the corresponded data.

Sequence: Type 2



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 BYTE	48H
SUBCMD	1 BYTE	21H = DDC transportation port 22H = output bit mode
Parameter	-	-
ETX	1 BYTE	03H

Fig 4.38.1

4.38.2 [48H] : Config expansion data registration [21H] DDC transportation port parameter

Port	1 BYTE	"0" = Disable "1" = DVI "2" = D-SUB "3" = HDMI

Fig. 4.38.2

4.38.3 [48H] : Config expansion data registration [22H] Output bit mode parameter

*** This sub command is available only for VG-835, VG-835-A, VG-835-B VG-857.**

Mode	1 BYTE	"0" = 8bit "1" = 10bit "2" = LUT 10bit "3" = 12bit *** only for supported model** "4" = EXT 10bit *** only for supported model**
Switch mode	1 BYTE	"0" = Only the mode switch "1" = Only the mode preservation "2" = Mode switch & preservation

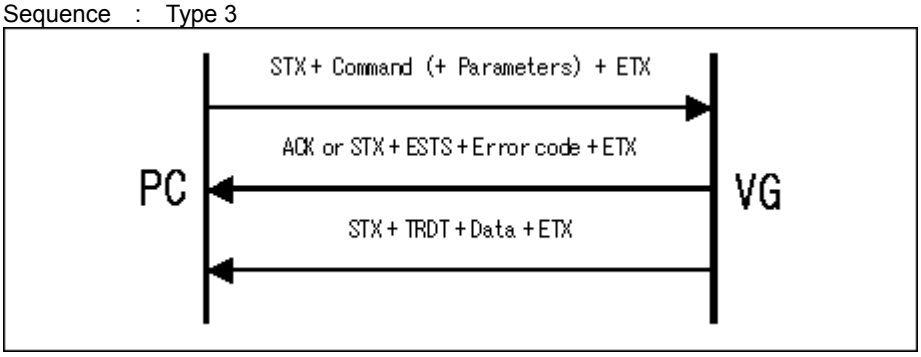
Fig. 4.38.3

4.39. [49H] : Config expansion data capture

4.39.1. [49H] : outline of Config expansion data capture command

Function : this function is to capture Config expansion data
Select the sub command that corresponds to the captured data block. Then, send the corresponded data.

Sequence : Type 3



Command + Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 BYTE	49H
SUBCMD	1 BYTE	21H = DDC transportation port 22H = output bit mode
ETX	1 BYTE	03H

Fig. 4.39.1

Data :

STX	1 BYTE	02H
TRDT	1 BYTE	10H
Capture data	-	-
ETX	1 BYTE	03H

Fig. 4.39.2

4.39.2. [49H]: Config expansion data capture [21H] DDC transportation port parameter

Same as Fig. 4.38.2.

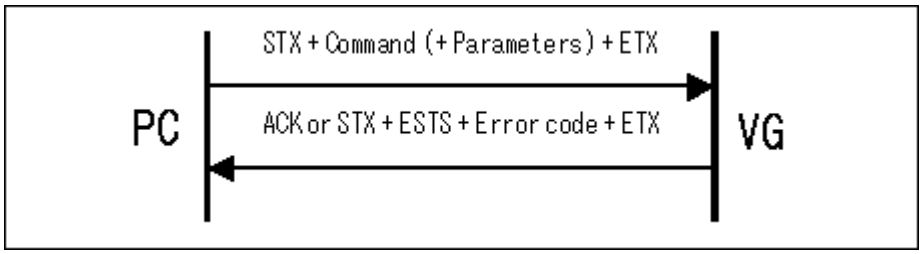
4.39.3. [49H] : Config expansion data capture [22H] Output bit mode parameter

Mode	1 BYTE	"0" = 8bit "1" = 10bit "2" = LUT 10bit "3" = 12bit *** only for supported model** "4" = EXT 10bit *** only for supported model**

4.40 [4CH]: IA-575 data registration

Function : This command registers the IA-575 data for the program whose number is designated. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	4CH
Program No.	3 bytes	“000” to ”849”
Scart	1 byte	“0” = Y/C “1” = VBS “2” = RGB
Timing	1 byte	“0” = No Signal “1” = Pal “2” = SECAM
Pattern	1 byte	“0” = ColorBars “1” = BlueField
ETX	1 byte	03H

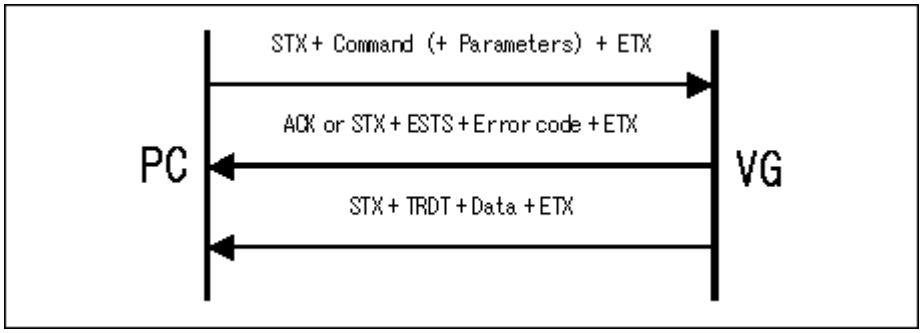
Fig. 4-40-1

Data : None

4.41 [4DH]: IA-575 data capture

Function : This command captures the IA-575 data for the program whose number is designated. In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	4DH
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-41-1

Data :

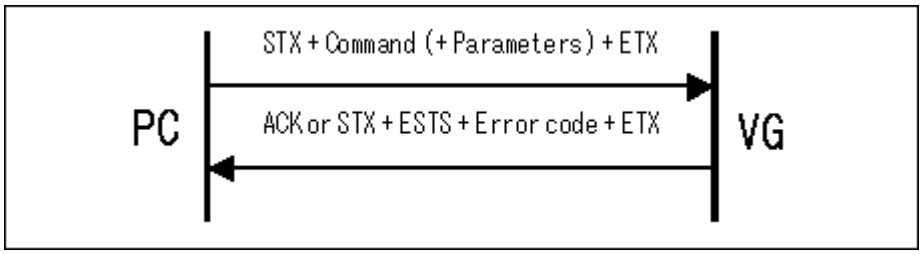
STX	1 byte	02H
TRDT	1 byte	10H
Scart	1 byte	“0” = Y/C “1” = VBS “2” = RGB
Timing	1 byte	“0” = No Signal “1” = Pal “2” = SECAM
Pattern	1 byte	“0” = ColorBars “1” = BlueField
ETX	1 byte	03H

Fig. 4-41-2

4.42 [4EH]: 4-level window flicker data registration

Function : This command registers the 4-level window flicker data for the program whose number is designated.
The sub-command corresponding to the data block to be registered is selected, and the relevant data is sent.
If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	4EH
SUBCMD	1 byte	20H = ALL 21H = TIME 22H = LEVEL 8bit 23H = LEVEL 10bit 24H = LEVEL 12bit
Program No.	3 bytes	“000” to ”849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-42-1

4.42.1 [4EH]: 4-level window flicker data registration [20H] ALL parameters

This command formats the data in which the following 21H (TIME) to 24H (LEVEL 12-bit) parameters are linked together in the sequence of the sub commands.

* Figures are omitted here. Refer to the descriptions on the following pages.

4.42.2 [4EH]: 4-level window flicker data registration [21H] TIME parameters

TIME 0	3 bytes	“000” to “255”
TIME 1	3 bytes	“000” to “255”
TIME 2	3 bytes	“000” to “255”
TIME 3	3 bytes	“000” to “255”

Fig. 4-42-2

4.42.3 [4EH]: 4-level window flicker data registration [22H] LEVEL 8-bit parameters

Level 0 (R)	3 bytes	“000” to ”255”
Level 0 (G)	3 bytes	“000” to ”255”
Level 0 (B)	3 bytes	“000” to ”255”
Level 1 (R)	3 bytes	“000” to ”255”
Level 1 (G)	3 bytes	“000” to ”255”
Level 1 (B)	3 bytes	“000” to ”255”
Level 2 (R)	3 bytes	“000” to ”255”
Level 2 (G)	3 bytes	“000” to ”255”
Level 2 (B)	3 bytes	“000” to ”255”
Level 3 (R)	3 bytes	“000” to ”255”
Level 3 (G)	3 bytes	“000” to ”255”
Level 3 (B)	3 bytes	“000” to ”255”

Fig. 4-42-3

4.42.4 [4EH]: 4-level window flicker data registration [23H] LEVEL 10-bit parameters

Level 0 (R)	4 bytes	“000” to ”1023”
Level 0 (G)	4 bytes	“000” to ”1023”
Level 0 (B)	4 bytes	“000” to ”1023”
Level 1 (R)	4 bytes	“000” to ”1023”
Level 1 (G)	4 bytes	“000” to ”1023”
Level 1 (B)	4 bytes	“000” to ”1023”
Level 2 (R)	4 bytes	“000” to ”1023”
Level 2 (G)	4 bytes	“000” to ”1023”
Level 2 (B)	4 bytes	“000” to ”1023”
Level 3 (R)	4 bytes	“000” to ”1023”
Level 3 (G)	4 bytes	“000” to ”1023”
Level 3 (B)	4 bytes	“000” to ”1023”

Fig. 4-42-4

4.42.5 [4EH]: 4-level window flicker data registration [24H] LEVEL 12-bit parameters

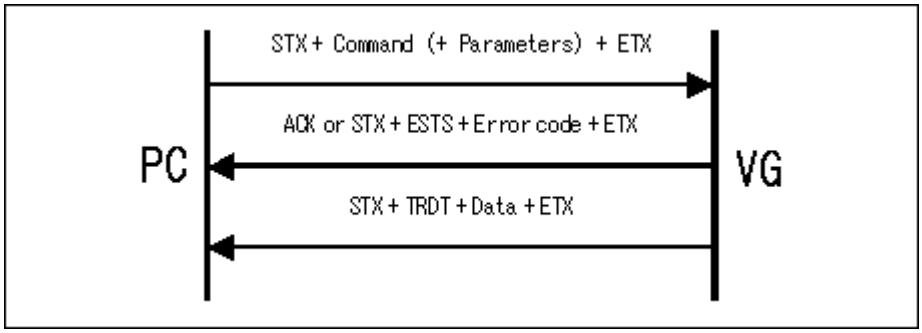
Level 0 (R)	4 bytes	“000” to ”4095”
Level 0 (G)	4 bytes	“000” to ”4095”
Level 0 (B)	4 bytes	“000” to ”4095”
Level 1 (R)	4 bytes	“000” to ”4095”
Level 1 (G)	4 bytes	“000” to ”4095”
Level 1 (B)	4 bytes	“000” to ”4095”
Level 2 (R)	4 bytes	“000” to ”4095”
Level 2 (G)	4 bytes	“000” to ”4095”
Level 2 (B)	4 bytes	“000” to ”4095”
Level 3 (R)	4 bytes	“000” to ”4095”
Level 3 (G)	4 bytes	“000” to ”4095”
Level 3 (B)	4 bytes	“000” to ”4095”

Fig. 4-42-5

4.43 [4FH]: 4-level window flicker data capture

Function : This command captures the 4-level window flicker data for the program whose number is designated.
The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	4FH
SUBCMD	1 byte	20H = ALL 21H = TIME 22H = LEVEL 8bit 23H = LEVEL 10bit 24H = LEVEL 12bit
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-43-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Capture data	-	-
ETX	1 byte	03H

Fig. 4-43-2

4.43.1 [4FH]: 4-level window flicker data capture [20H] ALL parameters

This command formats the data in which the following 21H (TIME) to 24H (12-bit) parameters are linked together in the sequence of the sub commands.

* Figures are omitted here. Refer to the descriptions on the following pages.

4.43.2 [4FH]: 4-level window flicker data capture [21H] TIME parameters

Same as Fig. 4-42-2.

4.43.3 [4FH]: 4-level window flicker data capture [22H] LEVEL 8-bit parameters

Same as Fig. 4-42-3.

4.43.4 [4FH]: 4-level window flicker data capture [23H] LEVEL 10-bit parameters

Same as Fig. 4-42-4.

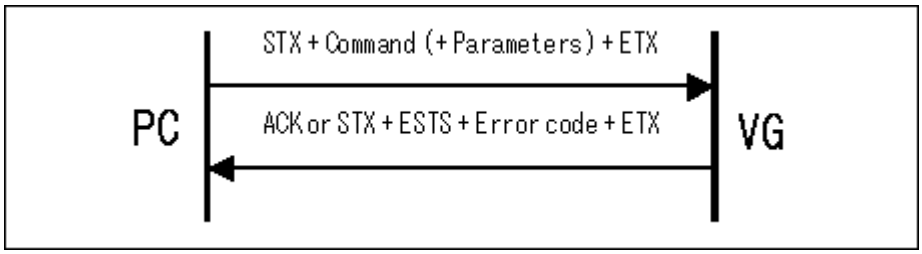
4.43.5 [4FH]: 4-level window flicker data capture [24H] LEVEL 12-bit parameters

Same as Fig. 4-42-5.

4.44 [52H]: ACP data registration

Function : This command registers the ACP data for the program whose number is designated. If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	52H
Program No.	3 bytes	“000” to ”849”
ACP Type	1 byte	“0” = Generic Audio “1” = IEC60958 Audio “2” = DVD Audio “3” = Super Audio CD
DVD-Audio Type	1 byte	“0” to “1”
Copy Permission	1 byte	“0” to “3”
Copy Number	1 byte	“0” to “7”
Quality	1 byte	“0” to “3”
Transaction	1 byte	“0” to “1”
ISRC1 Cont	1 byte	“0” to “1”
ISRC1 Valid	1 byte	“0” to “1”
ISRC1 Status	1 byte	“0” = Starting “1” = Intermediate “2” = Ending
Validity Info.	1 byte	“0” = No Validity “1” = ISRC “2” = UPC/EAN “3” = UPC/EAN & ISRC
Catalogue code	13 bytes	“0000000000000” to “9999999999999”
Country code	2 bytes	“00” to “ZZ” (‘0’ to ‘9’ & ‘A’ to ‘Z’)
Fisrst owner code	3 bytes	“000” to “ZZZ” (‘0’ to ‘9’ & ‘A’ to ‘Z’)
Year of recording code	2 bytes	“00” to “99”
Recording (item) code	5 bytes	“00000” to “99999”
ETX	1 byte	03H

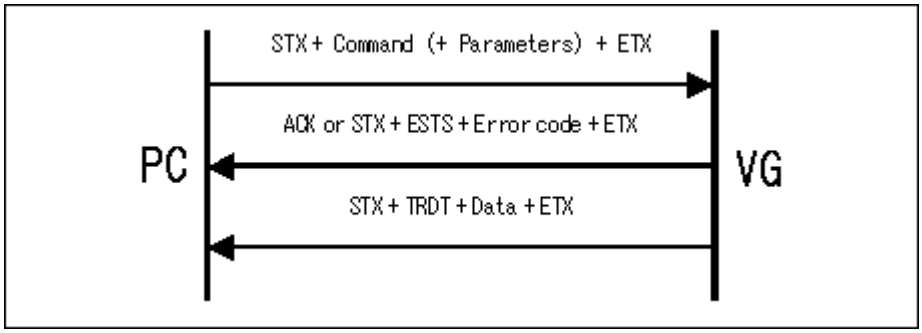
Fig. 4-44-1

Data : None

4.45 [53H]: ACP data capture

Function : This command captures the ACP data for the program whose number is designated. In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	53H
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-45-1

Data :

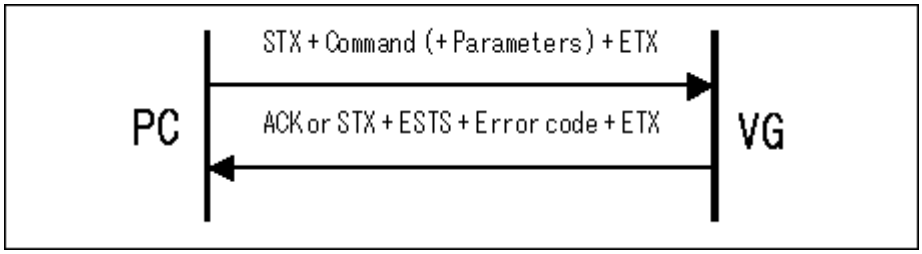
STX	1 byte	02H
TRDT	1 byte	10H
ACP Type	1 byte	“0” = Generic Audio “1” = IEC60958 Audio “2” = DVD Audio “3” = Super Audio CD
DVD-Audio Type	1 byte	“0” to “1”
Copy Permission	1 byte	“0” to “3”
Copy Number	1 byte	“0” to “7”
Quality	1 byte	“0” to “3”
Transaction	1 byte	“0” to “1”
ISRC1 Cont	1 byte	“0” to “1”
ISRC1 Valid	1 byte	“0” to “1”
ISRC1 Status	1 byte	“0” = Starting “1” = Intermediate “2” = Ending
Validity Info.	1 byte	“0” = No Validity “1” = ISRC “2” = UPC/EAN “3” = UPC/EAN & ISRC
Catalogue code	13 bytes	“0000000000000” to “9999999999999”
Country code	2 bytes	“00” to “ZZ” (‘0’ to ‘9’ & ‘A’ to ‘Z’)
Fisrst owner code	3 bytes	“000” to “ZZZ” (‘0’ to ‘9’ & ‘A’ to ‘Z’)
Year of recording code	2 bytes	“00” to “99”
Recording (item) code	5 bytes	“00000” to “99999”
ETX	1 byte	03H

Fig. 4-45-2

4.46 [54H]: HDMI extended data setting

Function : This command sets the HDMI extended data.

Sequence : Type 2



Parameter:

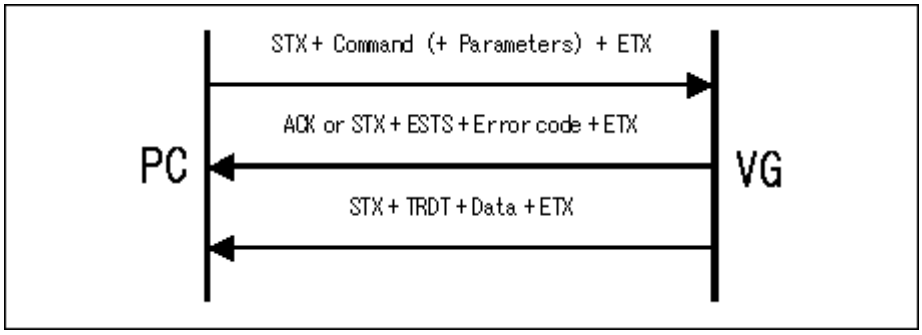
STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	54H
Program No.	3 bytes	“000” to ”849”
LPCM Ch	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>7ch+ 8ch</td><td>5ch+ 6ch</td><td>3ch+ 4ch</td><td>1ch+ 2ch</td></tr><tr><td colspan="4"></td><td colspan="4">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
InfoFrame ON/OFF	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>MPEG</td><td>Audio</td><td>SPD</td><td>AVI</td></tr><tr><td colspan="4"></td><td colspan="4">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
ACP ON/OFF	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>ISRC2</td><td>ISRC1</td><td>ACP</td></tr><tr><td colspan="5"></td><td colspan="3">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
Count_A	3 bytes	“000” to ”255”
Count_S	3 bytes	“000” to ”255”
Count_U	3 bytes	“000” to ”255”
Q_A	1 byte	“0” to ”1”
Q_S	1 byte	“0” to ”1”
Q_U	1 byte	“0” to ”1”
Move_A	1 byte	“0” to ”1”
Move_S	1 byte	“0” to ”1”
Move_U	1 byte	“0” to ”1”
Quant	1 byte	“0” = Default “1” = Limited “2” = Full
ExtColor	1 byte	“0” = xyYCC601 “1” = xyYCC709
ITContent	1 byte	“0” = No Data “1” = IT Content
Reserved	11 bytes	All ”0”
ETX	1 byte	03H

Fig. 4-46-1

4.47 [55H]: HDMI extended data capture

Function : This command captures the HDMI extended data.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	55H
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-47-1

Data :

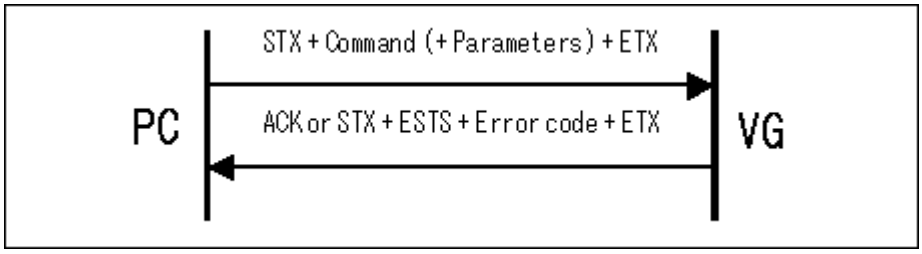
STX	1 byte	02H
TRDT	1 byte	10H
LPCM Ch	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>7ch+ 8ch</td><td>5ch+ 6ch</td><td>3ch+ 4ch</td><td>1ch+ 2ch</td></tr><tr><td colspan="4"></td><td colspan="4">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
InfoFrame ON/OFF	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>MPEG</td><td>Audio</td><td>SPD</td><td>AVI</td></tr><tr><td colspan="4"></td><td colspan="4">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
ACP ON/OFF	1 byte	<table><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>ISRC2</td><td>ISRC1</td><td>ACP</td></tr><tr><td colspan="5"></td><td colspan="3">0 = OFF, 1 = ON</td></tr></table>‘4xH’ is set on the basis of the bit array above. The x’s are substituted by the values established for the respective bits.
Count_A	3 bytes	“000” to ”255”
Count_S	3 bytes	“000” to ”255”
Count_U	3 bytes	“000” to ”255”
Q_A	1 byte	“0” to ”1”
Q_S	1 byte	“0” to ”1”
Q_U	1 byte	“0” to ”1”
Move_A	1 byte	“0” to ”1”
Move_S	1 byte	“0” to ”1”
Move_U	1 byte	“0” to ”1”
Reserved	14 bytes	All ”0”
ETX	1 byte	03H

Fig. 4-47-2

4.48 [56H]: Black insertion data registration

Function : This command registers the black insertion data for the program whose number is designated.
If the program number is 0, the command writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	56H
Program No.	3 bytes	“000” to ”849”
Black insertion valid/invalid	1 byte	“0” = Invalid “1” = Valid
Type	1 byte	“0” = All “1” = Left “2” = Right
ON (display) time	3 bytes	“000” to “255” (v)
OFF (black insertion) time	3 bytes	“000” to “255” (v)
ETX	1 byte	03H

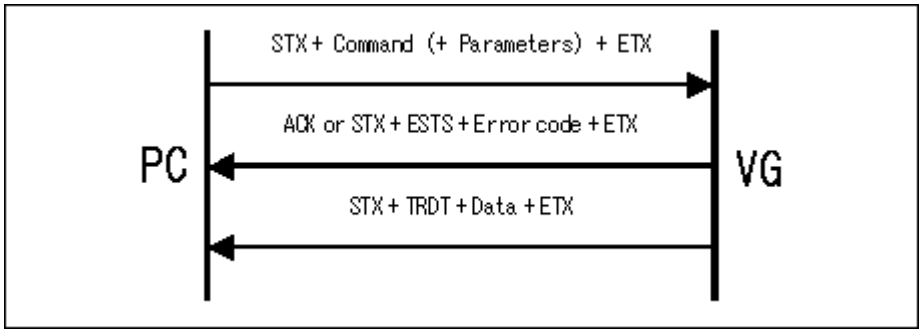
Fig. 4-48-1

Data : None

4.49 [57H]: Black insertion data capture

Function : This command captures the black insertion data for the program whose number is designated.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	57H
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-49-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Black insertion valid/invalid	1 byte	“0” = Invalid “1” = Valid
Type	1 byte	“0” = All “1” = Left “2” = Right
ON (display) time	3 bytes	“000” to “255” (v)
OFF (black insertion) time	3 bytes	“000” to “255” (v)
ETX	1 byte	03H

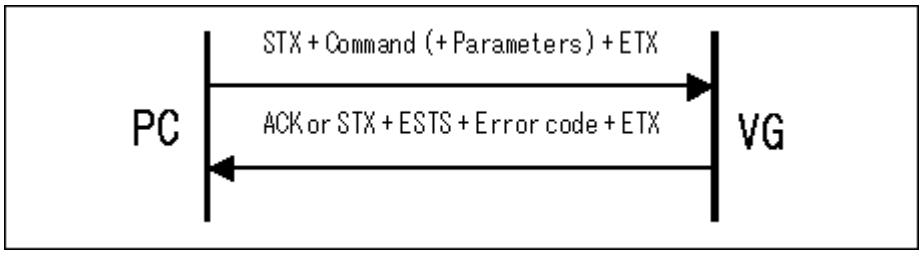
Fig. 4-49-2

4.50 [58H]: 12-bit data registration

4.50.1 [58H]: Outline of 12-bit data registration command

Function : This command registers the 12-bit data in the program whose number is designated. The sub-command corresponding to the data block to be registered is selected, and therelevant data is sent.
If the program number is 0, the command wries the data into the buffer RAM.

Sequence : Type 2



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	58H
SUBCMD	1 byte	20H = ALL 21H = Graphic Color 22H = Background color 23H = Window color 24H = Gray Scale Level 25H = RGB 26H = Cursor Color 27H = Cursor Background Color
Program No.	3 bytes	“000” to “849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-50-1

4.50.2 [58H]: 12-bit data registration [20H] ALL parameters

The format which links 21H (Graphic color) to 27H (Cursor Background Color) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.50.3 [58H]: 12-bit data registration [21H] Graphic color parameters

Graphic color (R)	4 bytes	“0000” to “4095”
Graphic color (G)	4 bytes	“0000” to “4095”
Graphic color (B)	4 bytes	“0000” to “4095”

Fig. 4-49-3

4.50.4 [58H]: 12-bit data registration [22H] Background color parameters

Background color (R)	4 bytes	“0000” to “4095”
Background color (G)	4 bytes	“0000” to “4095”
Background color (B)	4 bytes	“0000” to “4095”

Fig. 4-49-4

4.50.5 [58H]: 12-bit data registration [23H] Window color paramters

Window color (R)	4 bytes	“0000” to “4095”
Window color (G)	4 bytes	“0000” to “4095”
Window color (B)	4 bytes	“0000” to “4095”

Fig. 4-49-5

4.50.6 [58H]: 12-bit data registration [24H] Gray scale level parameters

Gray scale level (L0)	4 bytes	“0000” to “4095”
Gray scale level (L1)	4 bytes	“0000” to “4095”
Gray scale level (L2)	4 bytes	“0000” to “4095”
Gray scale level (L3)	4 bytes	“0000” to “4095”
Gray scale level (L4)	4 bytes	“0000” to “4095”
Gray scale level (L5)	4 bytes	“0000” to “4095”
Gray scale level (L6)	4 bytes	“0000” to “4095”
Gray scale level (L7)	4 bytes	“0000” to “4095”
Gray scale level (L8)	4 bytes	“0000” to “4095”
Gray scale level (L9)	4 bytes	“0000” to “4095”
Gray scale level (LA)	4 bytes	“0000” to “4095”
Gray scale level (LB)	4 bytes	“0000” to “4095”
Gray scale level (LC)	4 bytes	“0000” to “4095”
Gray scale level (LD)	4 bytes	“0000” to “4095”
Gray scale level (LE)	4 bytes	“0000” to “4095”
Gray scale level (LF)	4 bytes	“0000” to “4095”

Fig. 4-49-6

4.50.7 [58H]: 12-bit data registration [25H] RGB parameter

RGB output bit number	2 bytes	“01” to “12”

Fig. 4-49-7

4.50.8 [58H]: 12-bit data registration [26H] Cursor color parameters

Cursor color (R)	4 bytes	“0000” to “4095”
Cursor color (G)	4 bytes	“0000” to “4095”
Cursor color (B)	4 bytes	“0000” to “4095”

Fig. 4-49-8

4.50.9 [58H]: 12 bit data registration [27H] Cursor background color parameters

Cursor background color (R)	4 bytes	“0000” to “4095”
Cursor background color (G)	4 bytes	“0000” to “4095”
Cursor background color (B)	4 bytes	“0000” to “4095”

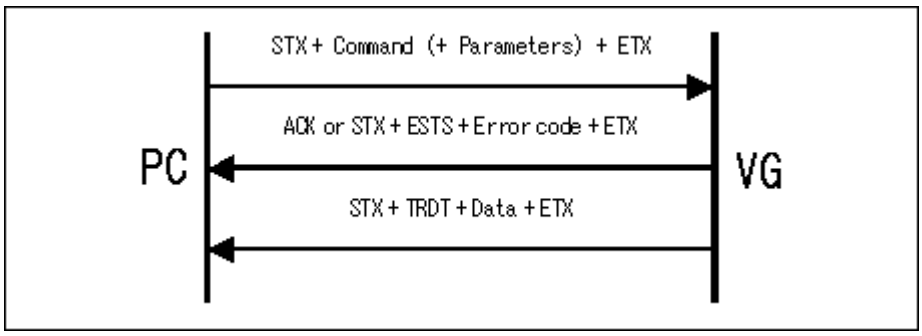
Fig. 4-49-9

4.51 [59H]: 12-bit data capture

4.51.1 [59H]: Outline of 12-bit data capture command

Function : This command captures the 12-bit data in the program whose number is designated.
The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	59H
SUBCMD	1 byte	20H = ALL 21H = Graphic Color 22H = Background color 23H = Window color 24H = Gray Scale Level 25H = RGB 26H = Cursor Color 27H = Cursor Background Color
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-51-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Capture data	-	-
ETX	1 byte	03H

Fig. 4-51-2

4.51.2 [59H]: 12-bit data capture [20H] ALL parameters

The format which links 21H (Graphic color) to 27H (Cursor background color) shown on the following pages in the sequence of the sub-commands is used.

* The diagrams have been omitted. Refer to the descriptions on the following pages.

4.51.3 [59H]: 12-bit data capture - [21H] Graphic color parameters

Same as Fig. 4-50-3.

4.51.4 [59H]: 12-bit data capture [22H] Background color parameters

Same as Fig. 4-50-4.

4.51.5 [59H]: 12-bit data capture [23H] Window color parameters

Same as Fig. 4-50-5.

4.51.6 [59H]: 12-bit data capture [24H] Gray scale level parameters

Same as Fig. 4-50-6.

4.51.7 [59H]: 12-bit data capture [25H] RGB parameter

Same as Fig. 4-50-7.

4.51.8 [59H]: 12-bit data capture [26H] Cursor color parameters

Same as Fig. 4-50-8.

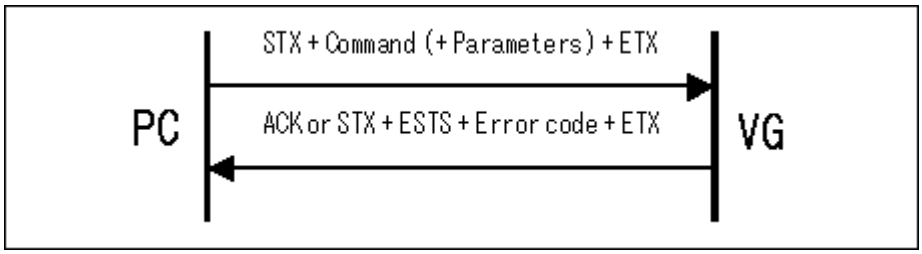
4.51.9 [59H]: 12-bit data capture [27H] Cursor background color parameters

Same as Fig. 4-50-9.

4.52 [5AH]: LVDS bit ON/OFF data setting

Function : This command sets the bit ON/OFF data of the LVDS.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4EH : VG-837 4FH : VG-835-A 52H : VG-835-B
CMD	1 byte	5AH
Program No.	3 bytes	“000” to “849”
LVDS R bit R0 to R11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON *1
LVDS G bit G0 to G11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON *1
LVDS B bit B0 to B11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON *1
ETX	1 byte	03H

Fig. 4-52-1

Data : None

*1
The data setting of 8, 10 and 12bit is shown below.

e.g.) when “1” is all set.

BIT	11	10	9	8	7	6	5	4	3	2	1	0
12	1	1	1	1	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1	1	1	0	0
8	1	1	1	1	1	1	1	1	0	0	0	0

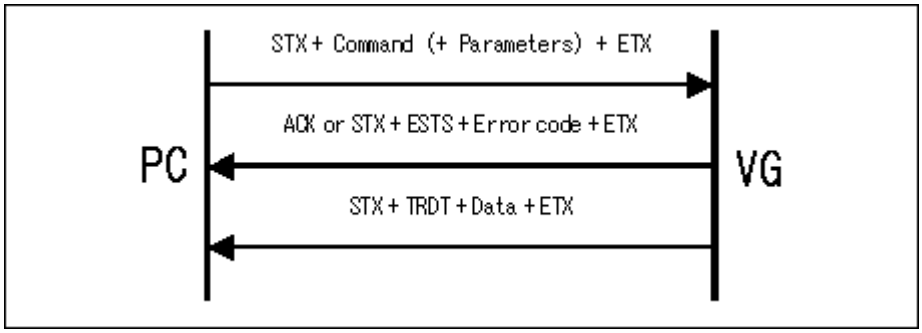
Bit number is different from VG that is connected.

	8 BIT	10 BIT	12 BIT
VG-835	○	○	×
VG-857	○	○	×
VG-837	○	○	×
VG-835-A	○	○	○

4.53 [5BH]: LVDS bit ON/OFF data capture

Function : This command captures the bit ON/OFF data of the LVDS.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4EH: VG-837 4FH: VG-835-A 52H : VG-835-B
CMD	1 byte	5BH
Program No.	3 bytes	“000” to “999”
ETX	1 byte	03H

Fig. 4-53-1

Data :

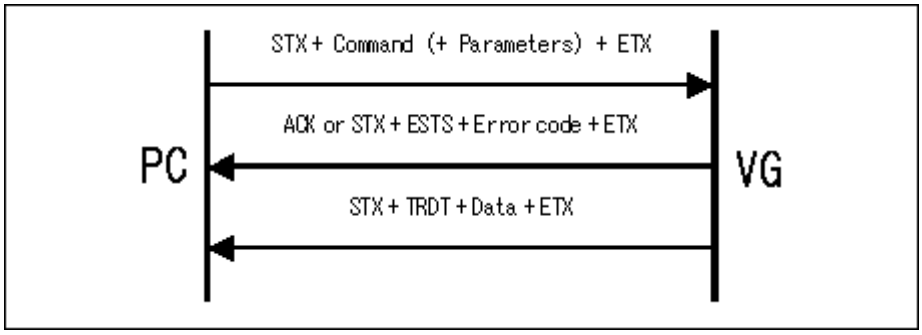
STX	1 byte	02H
TRDT	1 byte	10H
LVDS R bit R0 to R11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON
LVDS G bit G0 to G11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON
LVDS B bit B0 to B11	(12 bytes) 1 byte each	“0” = OFF, “1” = ON
ETX	1 byte	03H

Fig. 4-53-2

4.54 [5CH]: Connected VG generator serial No. capture

Function : This command captures the serial number of the connected VG generator.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	5CH
ETX	1 byte	03H

Fig. 4-54-1

Data :

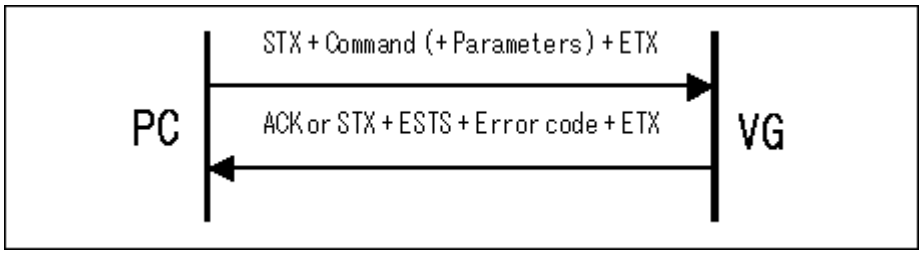
STX	1 byte	02H
TRDT	1 byte	10H
Serial No.	7 bytes	“0000000” to “9999999”
ETX	1 byte	03H

Fig. 4-54-2

4.55 [5EH]: Parallel board internal bus setting

Function : This command sets the internal bus of the parallel board.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4FH : VG-835-A 52H : VG-835-B
CMD	1 byte	5EH
Program No.	3 bytes	“000” to ”849”
Internal bus	1 byte	“0” = 1/1 Clock “1” = 1/2 Clock “2” = 1/4 Clock
ETX	1 byte	03H

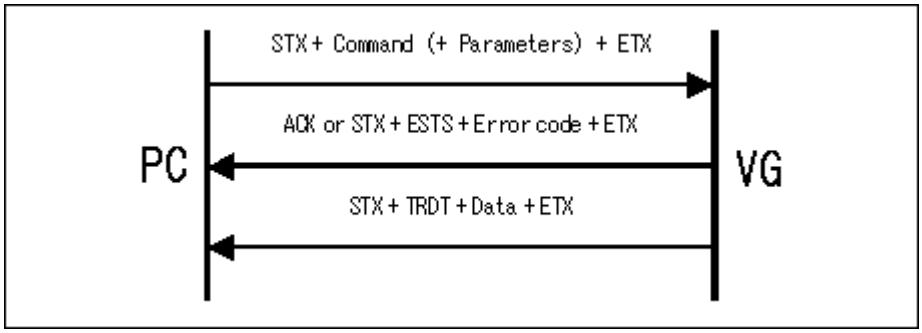
Fig. 4-55-1

Data : None

4.56 [5FH]: Parallel board internal bus capture

Function : This command captures the internal bus of the parallel board.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	48H : VG-835 4CH : VG-857 4FH : VG-835-A 52H : VG-835-B
CMD	1 byte	5FH
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-56-1

Data :

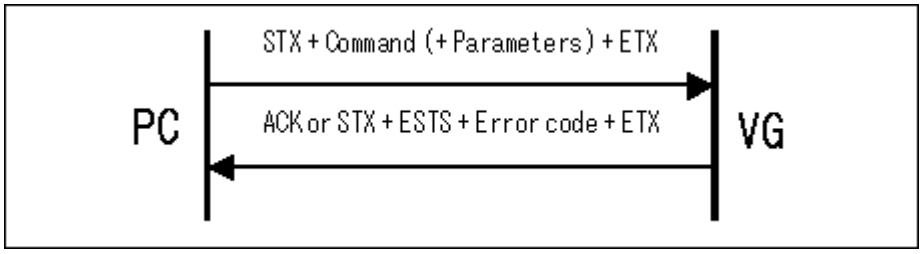
STX	1 byte	02H
TRDT	1 byte	10H
Internal bus	1 byte	“0” = 1/1 Clock “1” = 1/2 Clock “2” = 1/4 Clock
ETX	1 byte	03H

Fig. 4-56-2

4.57 [60H]: 16-level window flicker data registration

Function : This command registers the 16-level window flicker data for the program whose number is designated.
The sub-command corresponding to the data block to be registered is selected, and the relevant data is sent.
In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	60H
SUBCMD	1 byte	20H = ALL 21H = TIME 22H = LEVEL 8bit 23H = LEVEL 10bit 24H = LEVEL 12bit
Program No.	3 bytes	“000” to ”849”
Parameter	-	-
ETX	1 byte	03H

Fig. 4-57-1

4.57.1 [60H]: 16-level window flicker data registration [20H] ALL parameters

This command formats the data in which the following 21H (TIME) to 24H (LEVEL 12-bit) parameters are linked together in the sequence of the sub commands.

* Figures are omitted here. Refer to the descriptions on the following pages.

4.57.2 [60H]: 16-level window flicker data registration [21H] TIME parameters

TIME 0	3 bytes	“000” to “255”
TIME 1	3 bytes	“000” to “255”
TIME 2	3 bytes	“000” to “255”
TIME 3	3 bytes	“000” to “255”
≀	≀	≀
TIME 13	3 bytes	“000” to “255”
TIME 14	3 bytes	“000” to “255”
TIME 15	3 bytes	“000” to “255”

Fig. 4-57-2

4.57.3 [60H]: 16-level window flicker data registration [22H] LEVEL 8-bit parameters

Level 0 (R)	3 bytes	“000” to ”255”
Level 0 (G)	3 bytes	“000” to ”255”
Level 0 (B)	3 bytes	“000” to ”255”
Level 1 (R)	3 bytes	“000” to ”255”
Level 1 (G)	3 bytes	“000” to ”255”
Level 1 (B)	3 bytes	“000” to ”255”
Level 2 (R)	3 bytes	“000” to ”255”
Level 2 (G)	3 bytes	“000” to ”255”
Level 2 (B)	3 bytes	“000” to ”255”
≀	≀	≀
Level 14 (R)	3 bytes	“000” to ”255”
Level 14 (G)	3 bytes	“000” to ”255”
Level 14 (B)	3 bytes	“000” to ”255”
Level 15 (R)	3 bytes	“000” to ”255”
Level 15 (G)	3 bytes	“000” to ”255”
Level 15 (B)	3 bytes	“000” to ”255”

Fig. 4-57-3

4.57.4 [60H]: 16-level window flicker data registration [23H] LEVEL 10-bit parameters

Level 0 (R)	4 bytes	“000” to ”1023”
Level 0 (G)	4 bytes	“000” to ”1023”
Level 0 (B)	4 bytes	“000” to ”1023”
Level 1 (R)	4 bytes	“000” to ”1023”
Level 1 (G)	4 bytes	“000” to ”1023”
Level 1 (B)	4 bytes	“000” to ”1023”
Level 2 (R)	4 bytes	“000” to ”1023”
Level 2 (G)	4 bytes	“000” to ”1023”
Level 2 (B)	4 bytes	“000” to ”1023”
≀	≀	≀
Level 14 (R)	4 bytes	“000” to ”1023”
Level 14 (G)	4 bytes	“000” to ”1023”
Level 14 (B)	4 bytes	“000” to ”1023”
Level 15 (R)	4 bytes	“000” to ”1023”
Level 15 (G)	4 bytes	“000” to ”1023”
Level 15 (B)	4 bytes	“000” to ”1023”

Fig. 4-57-4

4.57.5 [60H]: 16-evel window flicker data registration [24H] LEVEL 12-bit parameters

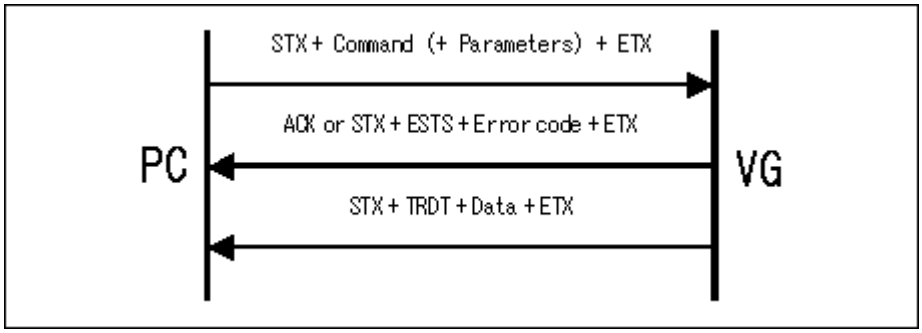
Level 0 (R)	4 bytes	“000” to ”4095”
Level 0 (G)	4 bytes	“000” to ”4095”
Level 0 (B)	4 bytes	“000” to ”4095”
Level 1 (R)	4 bytes	“000” to ”4095”
Level 1 (G)	4 bytes	“000” to ”4095”
Level 1 (B)	4 bytes	“000” to ”4095”
Level 2 (R)	4 bytes	“000” to ”4095”
Level 2 (G)	4 bytes	“000” to ”4095”
Level 2 (B)	4 bytes	“000” to ”4095”
≀	≀	≀
Level 14 (R)	4 bytes	“000” to ”4095”
Level 14 (G)	4 bytes	“000” to ”4095”
Level 14 (B)	4 bytes	“000” to ”4095”
Level 15 (R)	4 bytes	“000” to ”4095”
Level 15 (G)	4 bytes	“000” to ”4095”
Level 15 (B)	4 bytes	“000” to ”4095”

Fig. 4-57-5

4.58 [61H]: 16-level window flicker data capture

Function : This command captures the 16-level window flicker data for the program whose number is designated. The sub-command corresponding to the data block to be captured is selected, and the relevant data is sent.In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 byte	61H
SUBCMD	1 byte	20H = ALL 21H = TIME 22H = LEVEL 8bit 23H = LEVEL 10bit 24H = LEVEL 12bit
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-58-1

Data :

STX	1 byte	02H
TRDT	1 byte	10H
Capture data	-	-
ETX	1 byte	03H

Fig. 4-58-2

4.58.1 [61H]: 16-level window flicker data capture [20H] ALL parameters

This command formats the data in which the following 21H (TIME) to 24H (12-bit) parameters are linked together in the sequence of the sub commands.

* Figures are omitted here. Refer to the descriptions on the following pages.

4.58.2 [61H]: 16-level window flicker data capture [21H] TIME parameters

Same as Fig. 4-57-2.

4.58.3 [61H]: 16-level window flicker data capture [22H] LEVEL 8-bit parameters

Same as Fig. 4-57-3.

4.58.4 [61H]: 16-level window flicker data capture [23H] LEVEL 10-bit parameters

Same as Fig. 4-57-4.

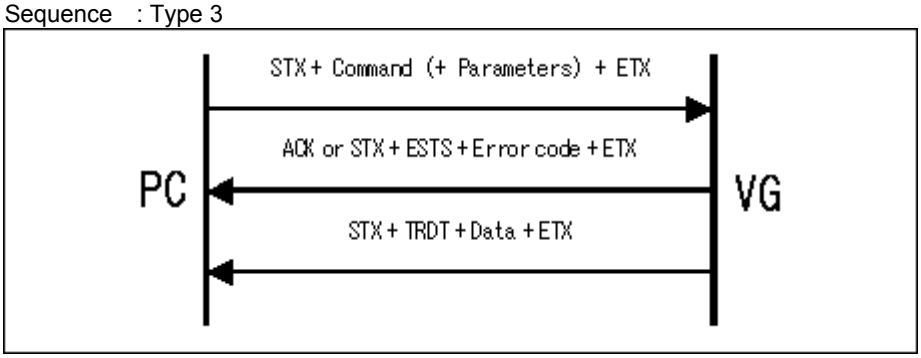
4.58.5 [61H]: 16-level window flicker data capture [24H] LEVEL 12-bit parameters

Same as Fig. 4-57-5.

4.59. [62H] : Capture status

Function : this function is to capture data status from designated sub command.
Select the sub command that corresponds to the captured data. Then, send the corresponded data.

Sequence : Type 3



Command + Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	47H : VG-848 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	62H
SUBCMD	1 BYTE	20H = KSV(HDCP) 21H or later : reserve
ETX	1 BYTE	03H

Fig. 4.59.1

Data:

STX	1 BYTE	02H
TRDT	1 BYTE	10H
Capture data	-	-
ETX	1 BYTE	03H

Fig. 4.59.2

4.59.1. [62H] : Capture status [20H] KSV data

KSV (Transmitter)	10 BYTE	"0000000000" to "FFFFFFFFFF"
Delimination	1 BYTE	","
KSV (Receiver)	10 BYTE	"0000000000" to "FFFFFFFFFF"

Fig. 4.59.3

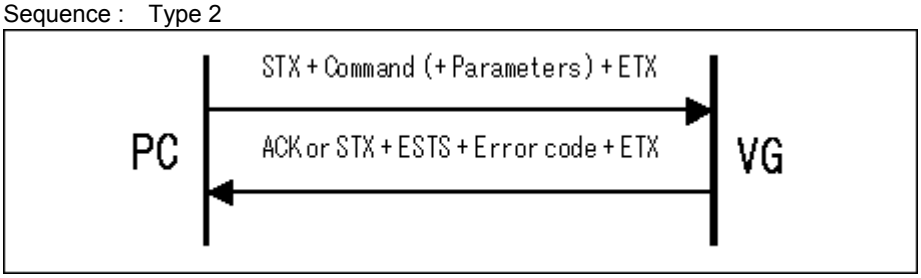
*1 When HDCP is not executed, NAK is sent after receiving the command.

*2 Since it has HDCP execution time, set time out period more than 10 sec.

4.60. [63H] : Pattern data execution

Function : this function is to execute only the program numbers that are designated.

Sequence : Type 2



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	47H : VG-848 48H : VG-835 49H : VG-849 / 849A / 849B 4AH : VG-858 4BH : VG-830 4CH : VG-857 4DH : VG-859 / 859A / 859B 4EH : VG-837 4FH : VG-835-A 50H : VG-849C 51H : VG-859C 52H : VG-835-B 53H : VG-849C-A
CMD	1 BYTE	63H
Program No.	3 BYTE	"000" to "849"
ETX	1 BYTE	03H

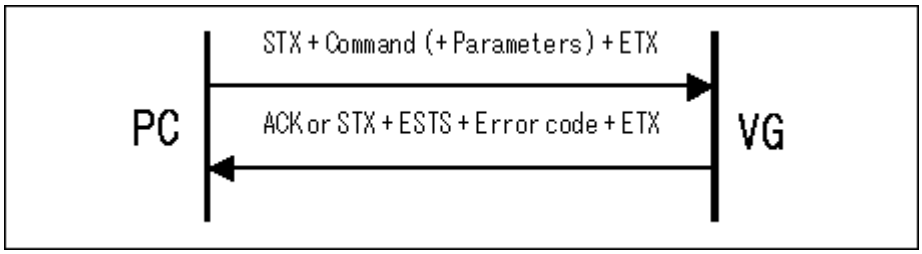
Fig. 4.60.1

Data : none

4.61 [64H]: CEC data registration

Function : This command registers the CEC data for the program whose number is designated.
If the program number is 0, it writes the data into the buffer RAM.

Sequence : Type 2



Parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	64H
Program No.	3 bytes	“000” to ”849”
CEC Mode	1 byte	“0” = Monitor “1” = Sending “2” = Respond
VG Logcal Address	1 byte	“0” to “F”
TX Destination	1 byte	“0” to “F”
RX Initiator	1 byte	“0” to “F”
RX Destination	1 byte	“0” to “F”
TX OpeCode	2 bytes	“00” to “FF”
TX Parameter Num	2 bytes	“00” to “14”
TX Parameter[14]	2 bytes ×14	“00” to “FF”
RX OpeCode	2 bytes	“0” to “FF”
RX Parameter Num	2 bytes	“0” to “14”
RX Parameter[14]	2 bytes ×14	“00” to “FF”
ETX	1 byte	03H

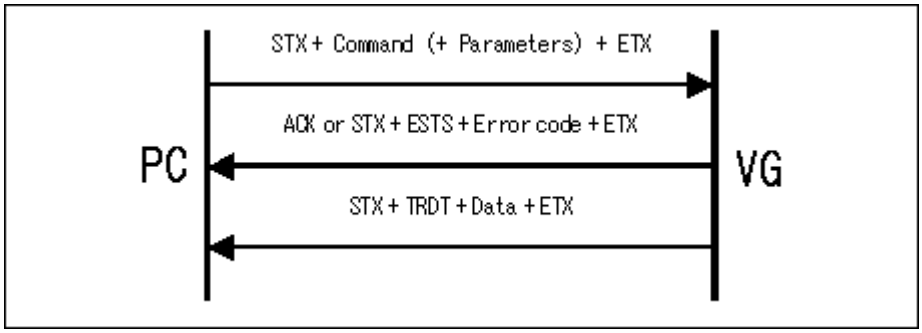
Fig. 4-61-1

Data : None

4.62 [65H]: CEC data capture

Function : This command captures the CEC data for the program whose number is designated. In the case of programs with numbers from 850 to 999, the command reads the data of the internal program.

Sequence : Type 3



Command + parameter:

STX	1 byte	02H
EXTCMD	1 byte	FFH
Model code	1 byte	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 byte	65H
Program No.	3 bytes	“000” to ”999”
ETX	1 byte	03H

Fig. 4-62-1

Data :

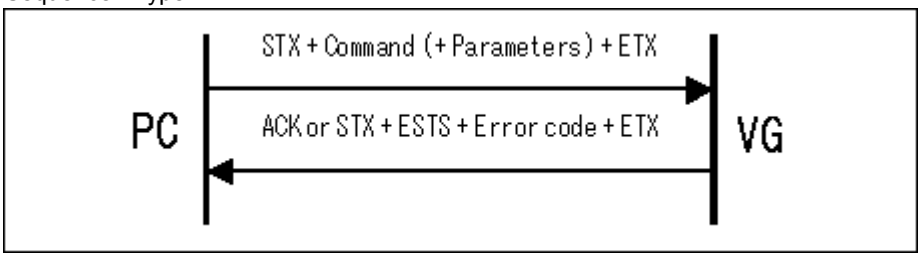
STX	1 byte	02H
TRDT	1 byte	10H
CEC Mode	1 byte	“0” = Monitor “1” = Sending “2” = Respond
VG Logcal Address	1 byte	“0” to “F”
TX Destination	1 byte	“0” to “F”
RX Initiator	1 byte	“0” to “F”
RX Destination	1 byte	“0” to “F”
TX OpeCode	2 bytes	“00” to “FF”
TX Parameter Num	2 bytes	“00” to “14”
TX Parameter[14]	2 bytes ×14	“00” to “FF”
RX OpeCode	2 bytes	“0” to “FF”
RX Parameter Num	2 bytes	“0” to “14”
RX Parameter[14]	2 bytes ×14	“00” to “FF”
ETX	1 byte	03H

Fig. 4-62-2

4.63. [66H]: GamutMeta data register

Function : this function is to register Gamut Meta data of the program numbers that are designated.
When program number is 0, it is written in a buffer RAM.

Sequence : Type 2



Parameter

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	66H
Program No.	3 BYTE	"000"～"849"
ON/OFF	1 BYTE	"0"=OFF、"1"=ON
Next_Field	1 BYTE	"0" to "1"
No_Current_GBD	1 BYTE	"0" to "1"
GBD_profile	1 BYTE	"0" = P0 "1" = P1 "2" = P2 "3" = P3
Affected_Gamut_Seq_Num	2 BYTE	"00" to "15"
Current_Gamut_Seq_Num	2 BYTE	"00" to "15"
Packet_Seq	1 BYTE	"0" to "3"
Format_Flag	1 BYTE	"0" = Vertices/Facets "1" = Range
GBD_Color_Precision	1 BYTE	"0" = 8bit "1" = 10bit "2" = 12bit
GBD_Color_Space_Vertex	1 BYTE	"0" = ITU_R BT.709 "1" = xvYCC601 "2" = xvYCC709 "3" = XYZ
Number_Vertices	1 BYTE	"4" to "X" ※1
Packeted_GBD_Vertices_Data	4 BYTE x 25	"0000" to "4095" ※2
GBD_Color_Space_Range	1 BYTE	"0" = Reserved "1" = xvYCC601 "2" = xvYCC709 "3" = Reserved
Packeted_Range_Data (MinRedData)	11 BYTE	0th BYTE is sine code: "0"=+,"1"=- 1st BYTE to 10th BYTE are data part *3
Packeted_Range_Data (MaxRedData)	11 BYTE	Ditto
Packeted_Range_Data (MinGreenData)	11 BYTE	Ditto
Packeted_Range_Data (MaxGreenData)	11 BYTE	Ditto
Packeted_Range_Data (MinBlueData)	11 BYTE	Ditto
Packeted_Range_Data (MaxBlueData)	11 BYTE	Ditto

ETX	1 BYTE	03H

Fig. 4.63.1

Data : none

*1 The range of value of Number_Vertices corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Number_Vertices
0 (8bit)	4 to 8
1 (10bit)	4 to 6
2 (12bit)	4 to 5

*2 The range of value of Packeted_GBD_Vertices_Data corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Packeted_GBD_Vertices_Data
0 (8bit)	0 to 255
1 (10bit)	0 to 1023
2 (12bit)	0 to 4095

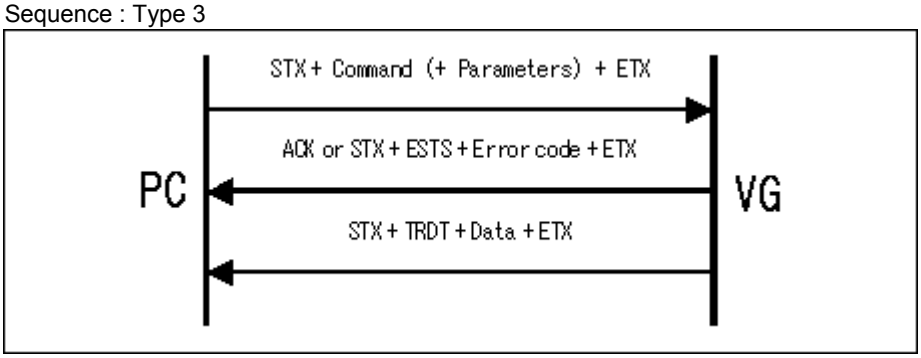
*3 The range of value of Packeted_Range_Data corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Packeted_Range_Data
0 (8bit)	0 to 396875 (100000 times of actual value)
1 (10bit)	0 to 39921875 (10000000 times of actual value)
2 (12bit)	0 to 3998046875 (1000000000 times of actual value)

4.64. [67H]: GamutMeta data capture

Function : this function is to capture GamutMeta data of the designated program No.
When program No. 850 to 999 is selected, internal program data is read.

Sequence : Type 3



Command + Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	67H
Program No.	3 BYTE	"000" to "999"
ETX	1 BYTE	03H

Fig. 4.64.1

Data:

STX	1 BYTE	02H
TRDT	1 BYTE	10H
ON/OFF	1 BYTE	"0"=OFF、"1"=ON
Next_Field	1 BYTE	"0" to "1"
No_Current_GBD	1 BYTE	"0" to "1"
GBD_profile	1 BYTE	"0" = P0 "1" = P1 "2" = P2 "3" = P3
Affected_Gamut_Seq_Num	2 BYTE	"00" to "15"
Current_Gamut_Seq_Num	2 BYTE	"00" to "15"
Packet_Seq	1 BYTE	"0" to "3"
Format_Flag	1 BYTE	"0" = Vertices/Facets "1" = Range
GBD_Color_Precision	1 BYTE	"0" = 8bit "1" = 10bit "2" = 12bit
GBD_Color_Space_Vertex	1 BYTE	"0" = ITU_R BT.709 "1" = xvYCC601 "2" = xvYCC709 "3" = XYZ
Number_Vertices	1 BYTE	"4" to "X" ※1
Packeted_GBD_Vertices_Data	4 BYTE x 25	"0000" to "4095" ※2
GBD_Color_Space_Range	1 BYTE	"0" = Reserved "1" = xvYCC601 "2" = xvYCC709 "3" = Reserved
Packeted_Range_Data (MinRedData)	11 BYTE	0th BYTE is sine code: "0"=+,"1"=- 1st BYTE to 10th BYTE are data part *3
Packeted_Range_Data (MaxRedData)	11 BYTE	Ditto

Packeted_Range_Data (MinGreenData)	11 BYTE	Ditto
Packeted_Range_Data (MaxGreenData)	11 BYTE	Ditto
Packeted_Range_Data (MinBlueData)	11 BYTE	Ditto
Packeted_Range_Data (MaxBlueData)	11 BYTE	Ditto
ETX	1 BYTE	03H

Fig. 4.64.2

∗1 The range of value of Number_Vertices corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Number_Vertices
0 (8bit)	4 to 8
1 (10bit)	4 to 6
2 (12bit)	4 to 5

∗2 The range of value of Packeted_GBD_Vertices_Data corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Packeted_GBD_Vertices_Data
0 (8bit)	0 to 255
1 (10bit)	0 to 1023
2 (12bit)	0 to 4095

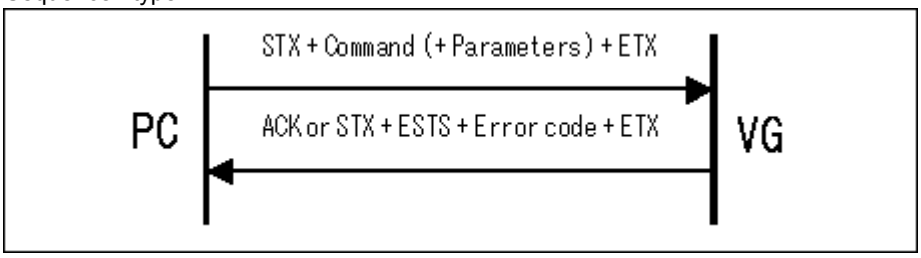
∗3 The range of value of Packeted_Range_Data corresponds to GBD_Color_Precision and becomes as below.

GBD_Color_Precision	Packeted_Range_Data
0 (8bit)	0 to 396875 (100000 times of actual value)
1 (10bit))	0 to 39921875 (10000000 times of actual value)
2 (12bit)	0 to 3998046875 (1000000000 times of actual value)

4.65. [68H]: LipSync data setting

Function : this function is to set LipSync data of designated program number.
When Program No. is 0, the data is written in Buffer RAM.

Sequence : type 2



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	68H
Program No.	3 BYTE	"000"～"849"
Mode	1 BYTE	"0" = DELAY "1" = EDID
ON(display) time	3 BYTE	"000" to "255"
OFF(black insert) time	3 BYTE	"000" to "255"
Sine code of DELAY time	1 BYTE	"0" = Positive "1" = Negative
DELAY time	3 BYTE	"000" to "500"
ETX	1 BYTE	03H

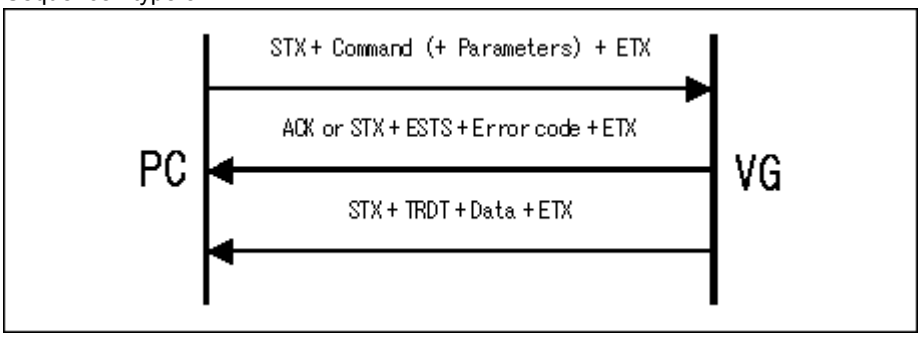
Fig. 4.65.1

Data : none

4.66. [69H]: LipSync data capture

Function :this function is to capture LipSync data of designated program No.
When program No. 850 to 999 is selected, internal program data is read.

Sequence : type 3



Parameter

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	69H
Program No.	3 BYTE	"000" to "999"
ETX	1 BYTE	03H

Fig. 4.66.1

Data:

STX	1 BYTE	02H
TRDT	1 BYTE	10H
Mode	1 BYTE	"0" = DELAY "1" = EDID
ON(display) time	3 BYTE	"000" to "255"
OFF(black insert) time	3 BYTE	"000" to "255"
Sine code of DELAY time	1 BYTE	"0" = Positive "1" = Negative
DELAY time	3 BYTE	"000" to "500"
ETX	1 BYTE	03H

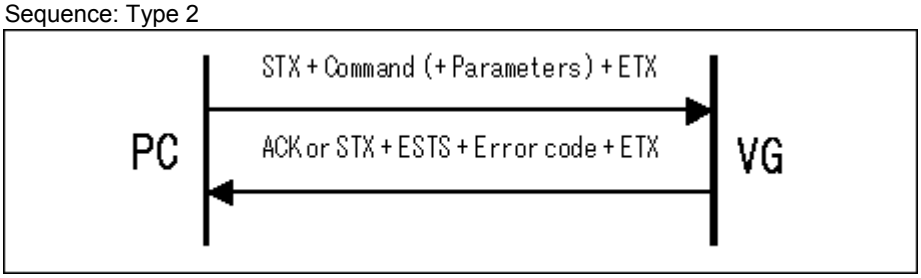
Fig. 4.66.2

4.67. [6AH]: 0.5/0.25Pixel scroll data setting

Function : this function is to set 0.5/0.25Pixel scroll data of designated program No.
When Program No. is 0, the data is written in Buffer RAM.

*** This command can be available by purchasing license from ASTRODESIGN.**

Sequence: Type 2



Parameter

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	6AH
Program No.	3 BYTE	"000" to "849"
Moving unit	5 BYTE	"00000" to "25500"
Moving direction	1 BYTE	"0" = Left, "1" = Right
ETX	1 BYTE	03H

Fig.4.67.1

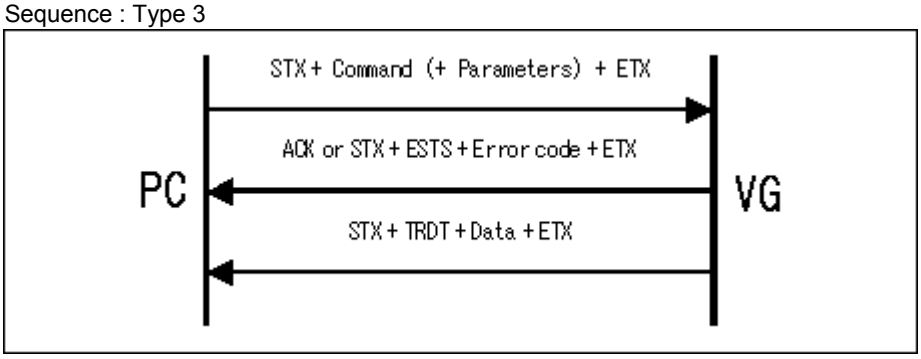
Data : none

4.68. [6BH]: 0.5/0.25Pixel scroll data capture

Function : this function is to capture 0.5/0.25Pixel scroll data of designated program No.
When program No. 850 to 999 is selected, internal program data is read.

*** This command can be available by purchasing license from ASTRODESIGN.**

Sequence : Type 3



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	69H
Program No.	3 BYTE	"000" to "999"
ETX	1 BYTE	03H

Fig.4.68.1

Data:

STX	1 BYTE	02H
TRDT	1 BYTE	10H
Moving unit	5 BYTE	"00000" to "25500"
Moving direction	1 BYTE	"0" = Left, "1" = Right
ETX	1 BYTE	03H

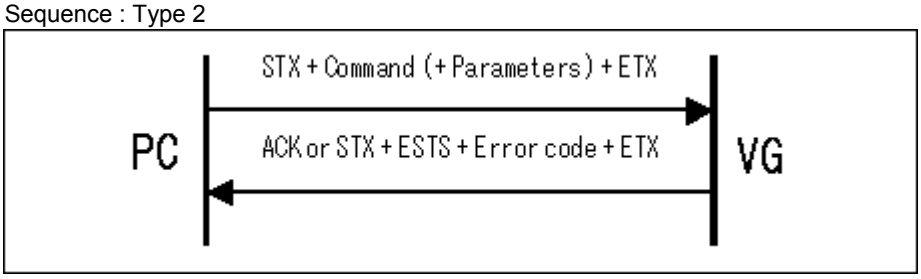
Fig.4.68.2

4.69. [6EH]: DDC/CI data setting

Function : this function is to set DDC/CI data of designated program No.
When Program No. is 0, the data is written in Buffer RAM.

*** This command can be available by purchasing license from ASTRODESIGN.**

Sequence : Type 2



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	6EH
Program No.	3 BYTE	"000" to "849"
Port	1 BYTE	"0" = DVI , "1" = D-SUB
Mode	1 BYTE	"0" = Get , "1" = Set
VCP code	2 BYTE	"00" to "FF"
Setting value	5 BYTE	"00000" to "65535"
ETX	1 BYTE	03H

Fig.4.69.1

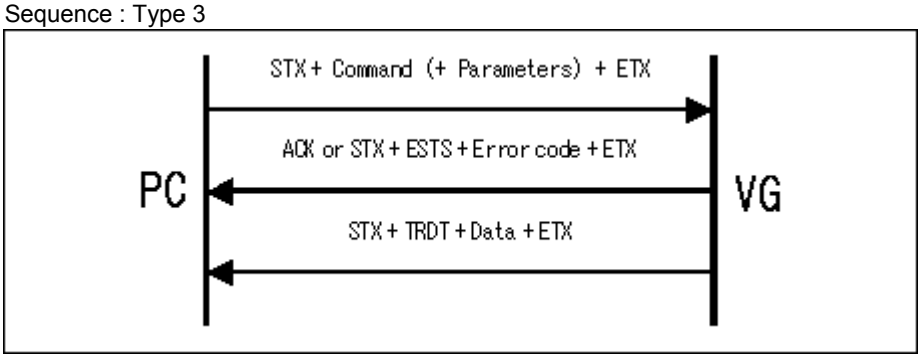
Data : none

4.70. [6FH]: DDC/CI data capture

Function : this function is to capture DDC/CI data of designated program No.
When program No. 850 to 999 is selected, internal program data is read.

*** This command can be available by purchasing license from ASTRODESIGN.**

Sequence : Type 3



Parameter:

STX	1 BYTE	02H
EXTCMD	1 BYTE	FFH
Model code	1 BYTE	49H : VG-849 / 849A / 849B 4DH : VG-859 / 859A / 859B 50H : VG-849C 51H : VG-859C 53H : VG-849C-A
CMD	1 BYTE	6FH
Program No.	3 BYTE	"000" to "999"
ETX	1 BYTE	03H

Fig.4.70.1

Data:

STX	1 BYTE	02H
TRDT	1 BYTE	10H
Port	1 BYTE	"0" = DVI , "1" = D-SUB
Mode	1 BYTE	"0" = Get , "1" = Set
VCP code	2 BYTE	"00" to "FF"
Setting value	5 BYTE	"00000" to "65535"
ETX	1 BYTE	03H

Fig.4.70.2

4.71 Extended command correspondence table

○: Supported; ×: not supported; △: can be used after the license has been purchased.

		Generator model name								
		VG-848 /VG-858	VG-849 *1 /VG-859 *2	VG-835	VG-830	VG-857	VG-837	VG-835-A /VG-835-B	VG-849C /VG-859C	VG-849C-A
Extended commands	20H, 21H	○	○	○	○	○	○	○	○	
	22H, 23H	×	○	×	×	×	×	×	○	
	24H, 25H	×	○	×	×	×	×	×	○	
	26H, 27H	×	○	×	×	×	×	×	○	
	28H, 29H	○	○	○	○	○	○	○	○	
	2AH, 2BH	○	○	○	○	○	○	○	○	
	2CH, 2DH	○	○	○	○	○	○	○	○	
	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	○	○	○	○	○	○	○	○	○
	4CH, 4DH	○	○	×	○	×	×	×	○	
	4EH, 4FH	○	○	○	○	○	○	○	○	
	52H, 53H	×	○	×	×	×	×	×	○	
	54H, 55H	×	○	×	×	×	×	×	○	
	56H, 57H	○	○	○	○	○	○	○	○	
	58H, 59H	×	×	○	×	×	○	○	△	
	5AH, 5BH	×	×	○	×	○	○	○	△	
	5CH	○	○	○	○	○	○	○	○	
	5EH, 5FH	×	×	○	×	○	×	○	×	
	60H, 61H	△	△	△	△	△	△	△	△	
	62H	○	○	×	○	×	×	×	○	○
	63H	○	○	○	○	○	○	○	○	○
	64H, 65H	×	△	×	×	×	×	×	△	
	66H, 67H	×	×	×	×	×	×	×	○	○

	68H, 69H	×	×	×	×	×	×	×	○	○
	6AH, 6BH	×	×	×	×	×	×	×	△	△
	6EH, 6FH	×	△	×	×	×	×	×	△	△

Fig. 4-71-1

*1) VG-849 / 849A / 849B
*2) VG-859 / 859A / 859B

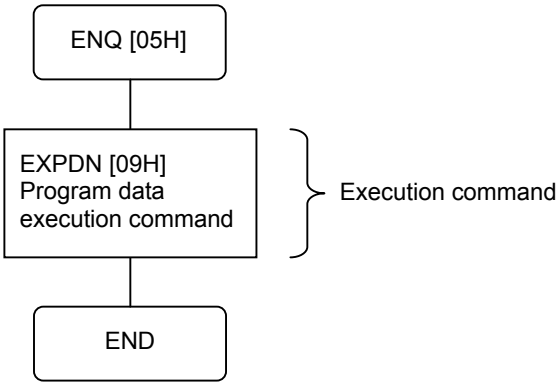
5 EXAMPLES OF OPERATION

5.1 Executing the internal program data

Example: In the example presented below, it is assumed that internal program No.888 is to be executed.

Program number	
No.	888

5.1.1 Flow of commands used



5.1.2 Command settings

Program data execution: [09H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
EXPDN	0×09	
Program No.	0×38	“8”
	0×38	“8”
	0×38	“8”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

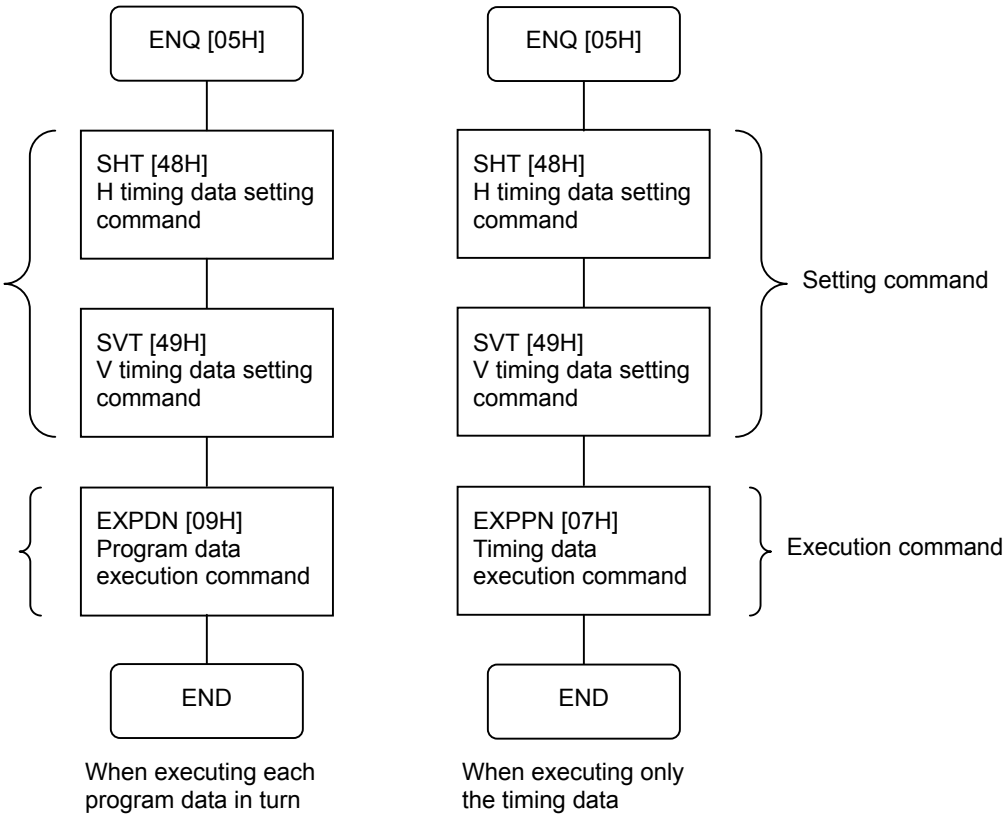
5.2 Setting and executing the H and V timing data

Shown below are the command settings up to the stage where the H and V timing data is set and executed.

Example: It is assumed that the H and V timing data listed below are set in program No.001 and that the program is then executed.

H Timing		V Timing	
µ/dot	1	SCAN MODE	0
DotClock	65.00MHz	V-TOTAL	804 H
H-PERIOD	1352 dot	V-DISPLAY	768 H
H-DISPLAY	1024 dot	V-SYNC	4 H
H-SYNC	96 dot	V-BACK-PORCH	29 H
H-BACK-PORCH	202 dot	ENQ-FP	0 H
HD-START	0 dot	ENQ-BP	0 H
HD-WIDTH	0 dot	SERRATION	0 H
		ENQ ON/OFF	0 H
		VD-START	0 H
		VD-WIDTH	0 H

5.2.1 Flow of commands used



5.2.2 Settings using the H timing setting command

H timing data registration: [48H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
SHT	0×48	“H”
Program No.	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
µ/dot = dot	0×31	“1”
DotClock = 65.00	0×30	“0”
	0×36	“6”
	0×35	“5”
	0×30	“0”
	0×30	“0”
H-PERIOD = 1352	0×31	“1”
	0×33	“3”
	0×35	“5”
	0×32	“2”
H-DISPLAY = 1024	0×31	“1”
	0×30	“0”
	0×32	“2”
	0×34	“4”
H-SYNC = 96	0×30	“0”
	0×30	“0”
	0×39	“9”
	0×36	“6”
H-BACK-PORCH = 202	0×30	“0”
	0×32	“2”
	0×30	“0”
	0×32	“2”
HD-START = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
HD-WIDTH = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.2.3 Settings using the V timing setting command

V timing data registration: [49H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
SVT	0×49	“I”
Program No.	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
SCAN MODE = NonInterlace	0×30	“0”
SERRATION = OFF	0×30	“0”
ENQ ON/OFF = OFF	0×30	“0”
V-TOTAL = 804	0×30	“0”
	0×38	“8”
	0×30	“0”
	0×34	“4”
V-SYNC = 4.0	0×30	“0”
	0×34	“4”
	0×30	“0”
ENQ-FP = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
ENQ-BP = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
V-BACK-PORCH = 29	0×30	“0”
	0×30	“0”
	0×32	“2”
	0×39	“9”
V-DISPLAY = 768	0×30	“0”
	0×37	“7”
	0×36	“6”
	0×38	“8”
VD-START = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
VD-WIDTH = 0	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.2.4 Settings using the program data execution command

Program data execution: [09H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
EXPDN	0×09	
Program No.	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.2.5 Settings using the timing data execution command

Timing data execution: [07H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
EXPPN	0×07	
Program No.	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

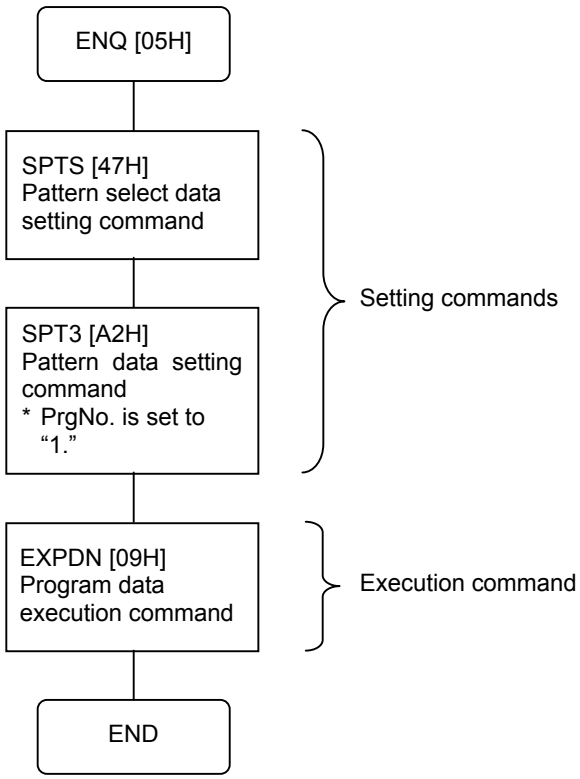
5.3 Setting and executing the pattern data

Example: It is assumed that the color bar data listed below is set and then executed.

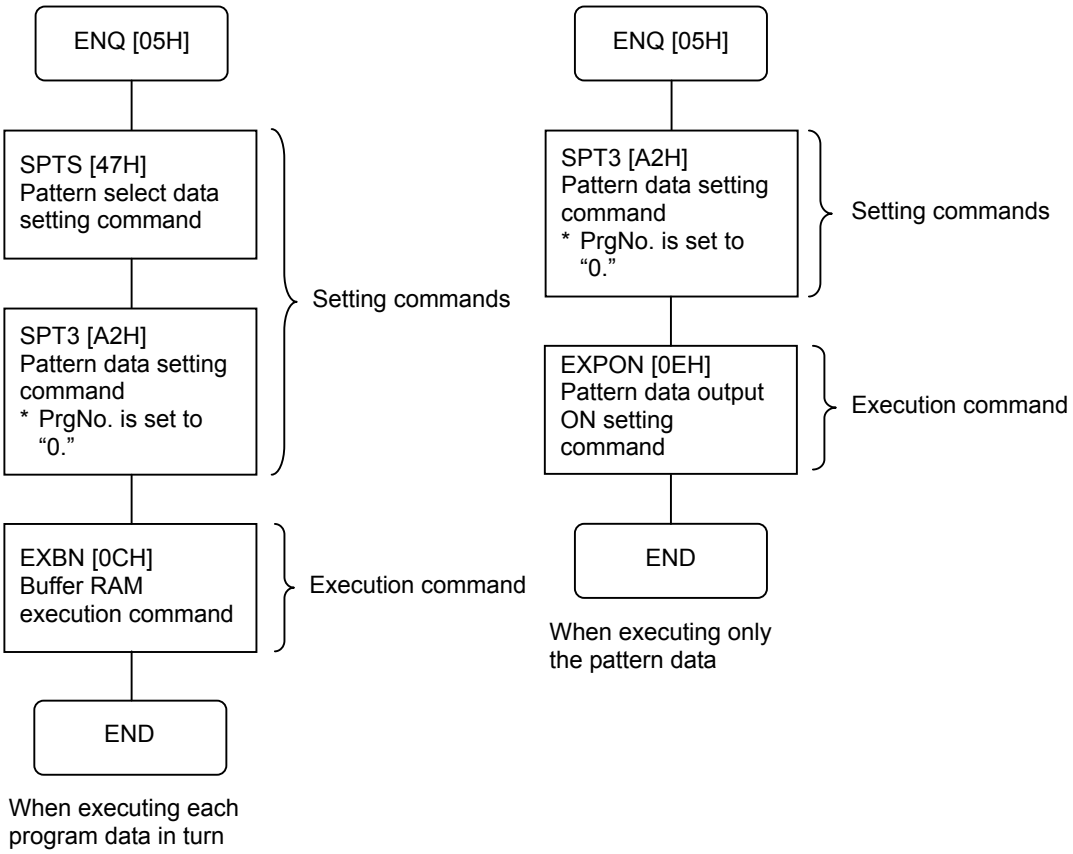
Color bar	
Mode	%
Number of valid colors	16
H width	6.3%
V width	6.3%
Direction H/V	Horizontal
Color designation 1	White
Color designation 2	Yellow
Color designation 3	Cyan
Color designation 4	Green
Color designation 5	Magenta
Color designation 6	Red
Color designation 7	Blue
Color designation 8	Black
Color designation 9	White
Color designation 10	Yellow
Color designation 11	Cyan
Color designation 12	Green
Color designation 13	Magenta
Color designation 14	Red
Color designation 15	Blue
Color designation 16	Black

5.3.1 Flow of commands used

(1) When registering the pattern data on a PC card and executing it (assuming that the data is set in program No.1)



(2) When sending the data to the buffer RAM and executing it without registering the pattern data on the PC card



5.3.2 Settings using the pattern select data setting command

Pattern select data registration: [47H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
SPTS	0×47	“G”
Program No.	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
Pattern select = Color bars	0×57	“W”
R	0×5E	“^”
G	0×5F	“_”
B	0×60	“`”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.3.3 Settings using the pattern data setting command

Pattern data registration: [A2H] command
Parameter:

Setting item		Setting	
		Binary	ASCII
STX		0×02	
SPT3		0×A2	
Program No.	When registering the data on a card	0×31	“1”
	When setting the data in the buffer RAM	0×30	“0”
Pattern block No.		0×31	“1”
		0×30	“0”
ETX		0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
MODE = %	0×30	“0”
Number of valid colors = 16	0×31	“1”
	0×36	“6”
H width = 6.3%	0×30	“0”
	0×30	“0”
	0×36	“6”
	0×33	“3”
V width = 6.3%	0×30	“0”
	0×30	“0”
	0×36	“6”
	0×33	“3”
Direction H/V = Horizontal	0×30	“0”
Color designation1 = White	0×37	“7”
Color designation2 = Yellow	0×33	“3”
Color designation3 = Cyan	0×36	“6”
Color designation4 = Green	0×32	“2”
Color designation5 = Magenta	0×35	“5”
Color designation6 = Red	0×31	“1”
Color designation7 = Blue	0×34	“4”
Color designation8 = Black	0×30	“0”
Color designation9 = White	0×37	“7”
Color designation10 = Yellow	0×33	“3”
Color designation11 = Cyan	0×36	“6”
Color designation12 = Green	0×32	“2”
Color designation13 = Magenta	0×35	“5”
Color designation14 = Red	0×31	“1”
Color designation15 = Blue	0×34	“4”
Color designation16 = Black	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.3.4 Settings using the program data execution command

Same as for “Settings using the program data execution command” in section 5.2.4.

5.3.5 Settings using the program data execution command (buffer RAM)

Buffer RAM program data execution: [0CH] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
EXBN	0×0C	
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.3.6 Settings using the pattern output ON setting command

Pattern data output ON: [0EH] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
EXPON	0×0E	
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
Pattern select = Color bars	0×57	“W”
R	0×5E	“^”
G	0×5F	“_”
B	0×60	“`”
ETX	0×03	

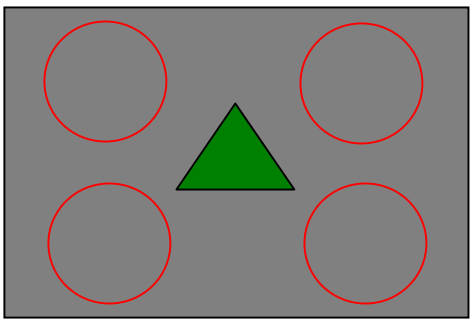
* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.4 Setting and executing drawn pattern data

Example: It is assumed that the pattern shown below is to be drawn.

*1 It is assumed that the program data of the user's choice has been set ahead of time. It is also assumed that the data has been set in internal program No.890.

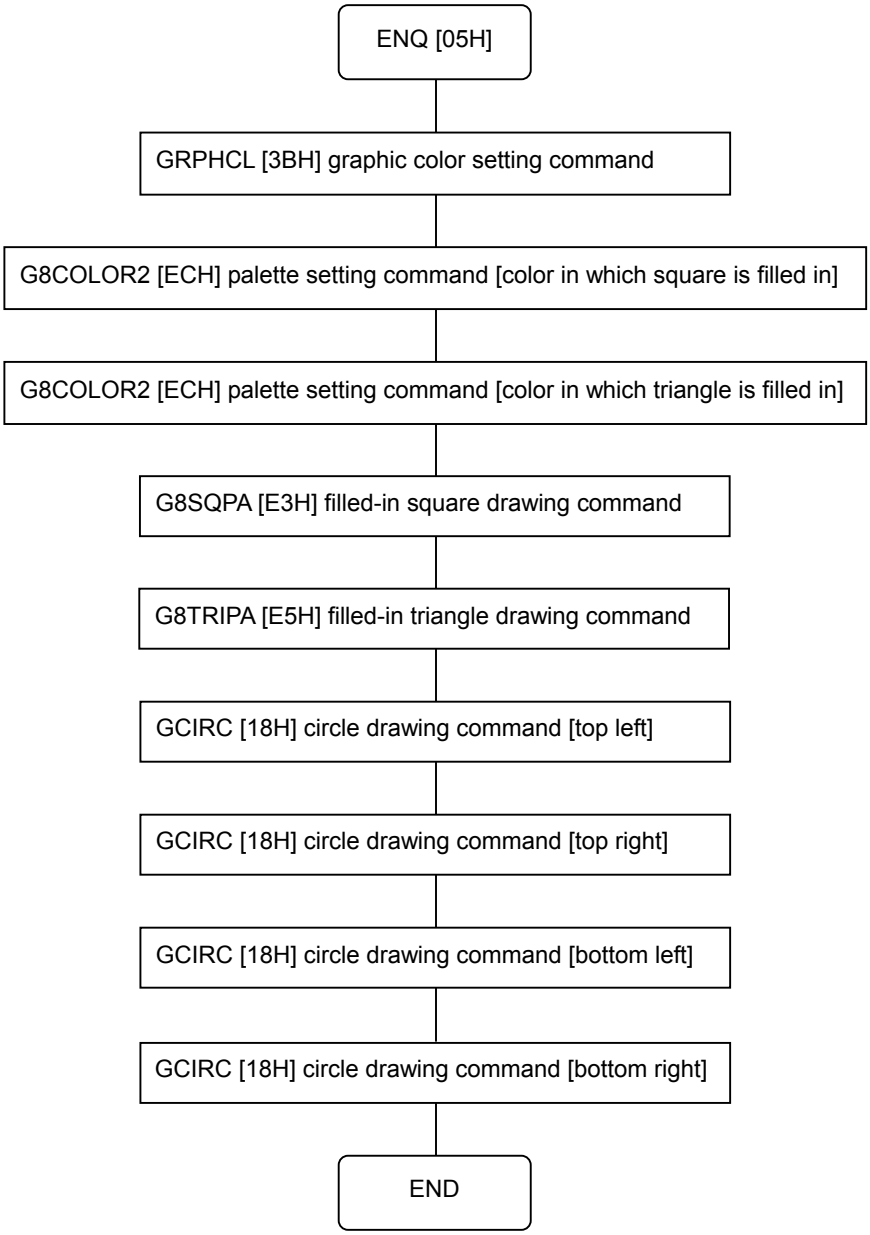
*2 It is assumed that the status is such that no pattern is output after the program data has been executed.



Listed in the table below are the drawing functions which are used.

Graphic plane (1-bit plane)	
Circle drawing	Top left (256,192), radius 150
	Top right (768,192), radius 150
	Bottom left (256,576), radius 150
	Bottom right (768,576), radius 150
Graphic color setting	R:255, G:0, B:0
Color bar plane (8-bit plane)	
Filled-in square drawing	Full screen display (background)
Filled-in triangle drawing	(512,268), (412,442), (612,442)
Palette setting No.0	For filling in the square R:127, G:127, B:127
Palette setting No.1	For filling in the triangle R:0, G:255, B:0

5.4.1 Flow of commands used



5.4.2 Settings using the graphic color setting command

Graphic color setting: [3BH] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
GRPHCL	0×3B	";"
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  The following data is sent when ACK has been received.

Data :

Setting item	Setting	
	Binary	ASCII
STX	0×02	
TRDT	0×10	
R	0×32	"2"
	0×35	"5"
	0×35	"5"
G	0×30	"0"
	0×30	"0"
	0×30	"0"
B	0×30	"0"
	0×30	"0"
	0×30	"0"
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.4.3 Settings using the color palette setting command

Color palette setting: [ECH] command

(1) Setting the colors in which to fill in the squares

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
G8COLOR2	0×EC	
Palette No.	0×30	“0”
Data delimiter	0×2C	“,”
R	0×31	“1”
	0×32	“2”
	0×37	“7”
Data delimiter	0×2C	“,”
G	0×31	“1”
	0×32	“2”
	0×37	“7”
Data delimiter	0×2C	“,”
B	0×31	“1”
	0×32	“2”
	0×37	“7”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

(2) Setting the colors in which to fill in the triangles

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
G8COLOR2	0×EC	“;”
Palette No.	0×30	“0”
Data delimiter	0×2C	“,”
R	0×30	“0”
Data delimiter	0×2C	“,”
G	0×32	“2”
	0×35	“5”
	0×35	“5”
Data delimiter	0×2C	“,”
B	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

5.4.4 Settings using the filled-in square drawing command

Pattern select data registration: [E3H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
G8SQPA	0×E3	
Top left coordinate X	0×30	“0”
Data delimiter	0×2C	“,”
Top left coordinate Y	0×30	“0”
Data delimiter	0×2C	“,”
Bottom right coordinate X1	0×31	“1”
	0×30	“0”
	0×32	“2”
	0×33	“3”
Data delimiter	0×2C	“,”
Bottom right coordinate Y1	0×37	“7”
	0×36	“6”
	0×37	“7”
Data delimiter	0×2C	“,”
Color	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.4.5 Settings using the filled-in triangle drawing command

Filled-in triangle drawing: [E5H] command
Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
G8TRIPA	0×E5	
Coordinate X1	0×30	“0”
	0×35	“5”
	0×31	“1”
	0×32	“2”
Data delimiter	0×2C	“,”
Coordinate Y1	0×30	“0”
	0×32	“2”
	0×36	“6”
	0×38	“8”
Data delimiter	0×2C	“,”
Coordinate X2	0×30	“0”
	0×34	“4”
	0×31	“1”
	0×32	“2”
Data delimiter	0×2C	“,”
Coordinate Y2	0×30	“0”
	0×34	“4”
	0×34	“4”
	0×32	“2”
Data delimiter	0×2C	“,”
Coordinate X3	0×30	“0”
	0×36	“6”
	0×31	“1”
	0×32	“2”
Data delimiter	0×2C	“,”
Coordinate Y3	0×30	“0”
	0×34	“4”
	0×34	“4”
	0×32	“2”
Data delimiter	0×2C	“,”
Color	0×31	“1”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator.
  ACK is received if the data was transferred normally.

5.4.6 Settings using the circle drawing command

Circle drawing: [18H] command

(1) Top left circle

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
GCIRC	0×18	
Center X coordinate	0×30	“0”
	0×32	“2”
	0×35	“5”
	0×36	“6”
Data delimiter	0×2C	“,”
Center Y coordinate	0×30	“0”
	0×31	“1”
	0×39	“9”
	0×32	“2”
Data delimiter	0×2C	“,”
Radius	0×30	“0”
	0×31	“1”
	0×35	“5”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

(2) Top right circle

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
GCIRC	0×18	
Center X coordinate	0×30	“0”
	0×37	“7”
	0×36	“6”
	0×38	“8”
Data delimiter	0×2C	“,”
Center Y coordinate	0×30	“0”
	0×31	“1”
	0×39	“9”
	0×32	“2”
Data delimiter	0×2C	“,”
Radius	0×30	“0”
	0×31	“1”
	0×35	“5”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

(3) Bottom left circle

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
GCIRC	0×18	
Center X coordinate	0×30	“0”
	0×32	“2”
	0×35	“5”
	0×36	“6”
Data delimiter	0×2C	“,”
Center Y coordinate	0×30	“0”
	0×35	“5”
	0×37	“7”
	0×36	“6”
Data delimiter	0×2C	“,”
Radius	0×30	“0”
	0×31	“1”
	0×35	“5”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

(4) Bottom right circle

Parameter:

Setting item	Setting	
	Binary	ASCII
STX	0×02	
GCIRC	0×18	
Center X coordinate	0×30	“0”
	0×37	“7”
	0×36	“6”
	0×38	“8”
Data delimiter	0×2C	“,”
Center Y coordinate	0×30	“0”
	0×35	“5”
	0×37	“7”
	0×36	“6”
Data delimiter	0×2C	“,”
Radius	0×30	“0”
	0×31	“1”
	0×35	“5”
	0×30	“0”
ETX	0×03	

* In this example, ACK or the error status is received from the VG generator. ACK is received if the data was transferred normally.

TERMINAL COMMAND Instruction Manual

NOTICE

- An incorrectly collated manual or a manual with missing pages will be replaced.
-
-
- The contents of this manual are subject to change without prior notice due to improvements.
- The manufacturer will not be liable for any outcome which results from the incorrect operation of this generator.
- All inquiries concerning this product should be addressed to your dealer or to the manufacturer at the contact numbers or addresses given below.
- The products and product names mentioned in this manual are the trademarks and registered trademarks of the companies concerned.

T0072C

ASTRODESIGN,Inc.
URL http://www.astrodesign.co.jp
● For more information, please contact us :
Business Unit 2
TEL.+81-(0)3-5734-6302 FAX.+81-(0)3-5734-6104
1-5-2 Minami-yukigaya,Ota-ku,Tokyo,145-066 Japan