

EPSON OPOS ADK MANUAL

APPLICATION DEVELOPMENT GUIDE

Graphic Display(DM-D500)

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Section 1. Introduction

This manual describes the method of use and related items, including device-specific precautions, when the GraphicDisplay device is used with EPSON OPOS ADK.

Before the GraphicDisplay can be used, the EPSON OPOS ADK should be installed and the devices to be used should be set using the SetupPOS utility. For setting methods, please see the Section 2 of this manual.

This manual applies to the following devices.

Device List

EPSON DM-D500

Compatibility mode

The compatibility mode for upward compatibility was added in OPOS Ver2.60.

For the details of the compatibility mode, please refer to “EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE Compatibility Mode”.

Section 2. Details on Settings

This section describes connection configurations and how to make the settings for the GraphicDisplay(DM-D500) devices.

2.1 Device Information

The following table lists the DeviceDescription and DeviceName for each device model.

Device Name	I/F	DeviceDescription	DeviceName
DM-D500	S(Y)	EPSON DM-D500 (Y) GraphicDisplay	DM-D500
	S(PATH)	EPSON DM-D500 (PATH) GraphicDisplay	DM-D500
	U	EPSON DM-D500U GraphicDisplay	DM-D500U

I/F indicate the connected interface.

The following is the list of the two connecting interfaces.

S: Serial

U: USB

In addition, there are Y-connection (Y) and pass-through connection (Path) in the Serial connection. Use the pass-through connection when a device is stand-alone connected.

2.2 References of Firmware Versions

Refer to the release notes (Relnote.txt).

2.3 Settings of DIP Switches and Hardware

Confirm that the following settings have been made correctly.

1) DIP Switches

Dip-SW 1

No.	Setting	
1	OFF	Settable
2	OFF	Settable
3	OFF	Settable
4	OFF	Settable
5	OFF	Settable
6	ON	Settable
7	OFF	Settable
8	ON	Settable

Dip-SW 2

No.	Setting	
1	OFF	Settable
2	OFF	Recommended
3	OFF	Fixed at OFF
4	OFF	Recommended
5	OFF	Fixed at OFF
6	OFF	Fixed at OFF
7	OFF	Fixed at OFF
8	OFF	Fixed at OFF

Explanation of DIP Switches

Dip-SW1 Sets information related to communications.

Dip-SW2 Sets information related to operations.

2.4 Setting of Devices

The SetupPOS utility should be used for setting devices. Regarding how to use the SetupPOS utility, please refer to "EPSON OPOS ADK MANUAL User's Manual (Installer/ SetupPOS/ TMUSB)".

1) Setting of USB Devices

When using a USB port, select devices with "U" appended to the end of the device name using the SetupPOS utility.

DM-D500U

2) Device Specific Settings

1. Default setting of character mode

The character mode of the device window can be set with the GraphicDisplay. Using the device-specific settings, the character mode settings can be changed. The following table lists the character modes that can be specified.

	Character Mode 1	Character Mode 2	Character Mode 3	Character Mode 4	Character Mode 5
Number of lines (Device Rows)	4	8	3	2	2
Number of characters (Device Columns)	32	42	32	32	20
2-byte-character. Display	Possible	Not possible	Possible	Possible	Not possible
Glyph character Height (GlyphHeight)	16	7	16	16	16
Glyph character Width (GlyphWidth)	8	5	8	8	8
ScreenModeList	4x32	8x42	3x32	2x32	2x20

In the initial setting, the character mode is set to character mode 1.

2. Bitmap

Start the TMFlogo utility by clicking the [TMFlogo] button. You can register the bitmap in NVRAM on the display.

2.5 Port Information

1) Port Information when Serial Port is used

The port information that can be set with the SetupPOS utility is as follows.

Item	Setting range
Baud rate	2400, 4800, 9600, 19200, 38400, 57600, 115200
Bit length	7 Bit, 8 Bit
Parity	NONE, ODD, EVEN
Stop bit	1 Bit
Handshake	DTR/DSR
Output buffer length [byte] ^{*1}	32 to 1024
Output interval time [ms] ^{*1}	0 to 9999

^{*1} This information does not appear when using TMPort port.

The default settings are as shown in the following table.

Item	Setting
Baud rate	9600
Bit length	8 bits
Parity	NONE
Stop bit	1 bits
Handshake	DTR/DSR
Output buffer length [byte] ^{*1}	1024
Output interval time [ms] ^{*1}	2500

^{*1} This information does not appear when using TMPort port.

2) Port Information when Using Parallel Port

Not applicable

3) Port Information when Using USB Port

Refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

4) Port Information when Using Ethernet Port

Not applicable

2.6 Connection Configuration Topology

Refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110 / DM-D210)".

Section 3. Function Details

This section describes the functions of the GraphicDisplay(DM-D500) device in details. Supplementary explanation of the parts not described in detail in "UPOS" is also given here.

3.1 CheckHealth Method

Refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

3.2 Property Set Values and Default Values

3.2.1 Capability Set Values

Capability Name	Set value (DM-D500)
CapBlink	DISP_CB_BLINKALL
CapBrightness	TRUE
CapCharacterSet	DISP_CCS_KANJI*1
CapDescriptors	FALSE
CapHMarquee	TRUE
CapVMarquee	FALSE
CapICharWait	TRUE
CapPowerReporting	OPOS_PR_STANDARD
CapBlinkRate	TRUE
CapCursorType	DISP_CCT_NONE
CapCustomGlyph	TRUE
CapReadBack	DISP_CRB_SINGLE
CapReverse	DISP_CR_REVERSEEACH
CapBitmap	FALSE
CapMapCharacterSet	FALSE
CapScreenMode	FALSE

*1 Becomes DISP_CCS_KANA in accordance with device-specific setting.

3.2.2 Property Default Set Values and Setting Ranges

- Brightness setting

Set value	DeviceBrightness
0-19	0%
20-39	20%
40-59	40%
60-79	60%
80-100	100% *1

*1 Default Value

- Code page

Set values	Page No.
254	Page 254
255	Page 255
437 *1	Page 0
850	Page 2
852	Page 18
858	Page 19
860	Page 3
863	Page 4
865	Page 5
866	Page 17
936	Page 1
998	Page 0
999	Page 16
1252	Page 16

*1 Default Value

- Set value of other properties

Property name	Set value
DeviceWindow	4
DeviceRows	Depends on the character mode *1
DeviceColumns	Depends on the character mode *1
DeviceDescriptors	0
CustomGlyphList	20-7E
GlyphHeight	Depends on the character mode *1
GlyphWidth	Depends on the character mode *1
MapCharacterSet	FALSE
MaximumX	0
MaximumY	0
ScreenMode	0
ScreenModeList	Depends on the character mode *1

*1 For the DM-D500, the property value is different depending on the character mode. Refer to "Device Specific Settings" in the Section 2.

3.3 Supplementary Explanation of Functions

Refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE
LineDisplay (DM-D110/ DM-D210)".

3.4 Device Statistics

The DeviceStatistics function is added in response to the compliance of the
"UPOS 1.8".

Please refer to the "EPSON OPOS ADK MANUAL APPLICATION GUIDE
Device Statistics" for the details of the Device Statistics.

Section 4. Expanded Functions

This section describes only those of the expanded functions of the LineDisplay that are specific of the GraphicDisplay. For the common LineDisplay functions, please refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

4.1 DirectIO Function

The usage of the DirectIO method and DirectIOEvent event is described in the following.

4.1.1 DirectIO Method

Syntax **DirectIO** *Command* As Long, *pData* As Long, *pString* As String

1) DISP_DI_GRAPHIC

Parameters	Explanation
<i>Command</i>	DISP_DI_GRAPHIC
<i>pData</i>	Not used. DISP_DI_DUMMY has already been entered.
<i>pString</i>	Not used. Blank character string is entered.

Remarks This is a command for creating a graphic mode window. After this command is sent, it becomes possible to create the graphics mode window using the CreateWindow method for creating windows. In this case, the parameter for the CreateWindow method is specified in dpi.
The settings for graphic mode creations specified by this command remain valid until the CreateWindow method is executed.
Only one graphic mode window can be created. If a graphic mode window already exists, this command will fail.

Return Either of the following values is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO is successful.
OPOS_E_CLOSED	Control is closed.
OPOS_E_ILLEGAL	A graphic mode window has already been created.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

2) DISP_DI_SETIMAGE

Parameter	Explanation
<i>Command</i>	DISP_DI_SETIMAGE
<i>pData</i>	Specifies the registration number of the bitmap to be registered.
<i>pString</i>	Specifies the file name of the bitmap to be registered. If a blank character string is specified, the bitmap registered in the specified number is deleted.

Remarks Registers the bitmap. The bitmap registered here can be displayed in the graphic mode window. To register multiple bitmaps, the registration number should be changed for each registration. In this case, specify the numbers consecutively without skipping any numbers. I.e., it is not possible to register number 3 after registration of 1. Specify 2 after 1. Up to 225 bitmaps can be registered. However, further registration is not possible if the total size of the registered files exceeds 4 Kbytes (in case of black and white bitmap).
When a graphic-mode window is created, it is not possible to register bitmaps. When the window exists, once delete the window, then create again.

Return Either of the following values is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO was successful.
OPOS_E_CLOSED	Control is closed.
OPOS_E_ILLEGAL	A graphic mode window has already been created.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

3) DISP_DI_GETMODE

Parameters	Explanation
<i>Command</i>	DISP_DI_GETMODE
<i>pData</i>	The window mode of the current window is entered here.
<i>pString</i>	Not used. Blank character string is entered.

Remarks The current window mode can be checked. If the current window is a character mode window, DISP_DI_MODE_CHARACTER is entered for *pData*. If the mode is graphic mode, DISP_DI_MODE_GRAPHICS is entered.

Return Either of the following values is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO was successful.
OPOS_E_CLOSED	Control is closed.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

4) DISP_DI_SETFONT

Parameter	Explanation
<i>Command</i>	DISP_DI_SETFONT
<i>pData</i>	Specifies the font to be set. Select DISP_DI_FONT_A or DISP_DI_FONT_B.
<i>pString</i>	Not used. Blank character string is entered.

Remarks Specifies the character font to be displayed. Specifiable fonts are Font A and Font B. The default is Font A. The font specified by this command is available only in the graphic mode window. The font can be specified only for 1-byte characters. The font specification is not applied to 2-byte characters (kanji or hiragana).

Return Either of the following values is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO was successful.
OPOS_E_CLOSED	Control is closed.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

5) DISP_DI_GW_STYLE

Parameters	Explanation
<i>Command</i>	DISP_DI_GW_STYLE
<i>pData</i>	Specifies the style of the graphic window. Select DISP_DI_GW_NORMAL or DISP_DI_GW_TRANSPARENT.
<i>pString</i>	Not used. Blank character string is entered.

Remarks Specifies the display mode of the graphic window. The transparent mode can be set for the graphic window can be set. This command cannot be executed when the graphic window is created. When specifying DISP_DI_GW_NORMAL in pData, the normal mode is set. When specifying DISP_DI_GW_TRANSPARENT, the transparent mode is set. The default is the normal mode.

Return Either of the following values is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO was successful.
OPOS_E_CLOSED	Control is closed.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

6) DISP_DI_FLASH_BITMAP

Parameters	Explanation
<i>Command</i>	DISP_DI_FLASH_BITMAP
<i>pData</i>	NV bit image number
<i>pString</i>	Not used. An empty character string enters.

Remarks The bitmap registered in NVRAM is displayed. **When the current window is not a graphic mode window, this command cannot be executed.**

Return One of the following is returned and stored in the ResultCode property.

Value	Meaning
OPOS_SUCCESS	DirectIO operation is successful.
OPOS_E_CLOSED	Control is closed.
OPOS_E_ILLEGAL	The current window is not a graphic mode window.
Others	See the section on ResultCode.

Prerequisites Open, Claim & Enable

4.1.2 DirectIOEvent Event

Not applicable

4.2 List of Commands Usable with DirectIO

Refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE
LineDisplay (DM-D110/ DM-D210)".

4.3 Escape Sequence List

The GraphicDisplay provides escape sequences. To use the expanded functions, specify any of these escape sequences in the DisplayText(At) method. The following table lists the escape sequences supported by the GraphicDisplay.

Command	Meaning	Mode* ¹
ESC bC	The character strings following this command are highlighted.	L / G
ESC rvC	The character strings following this command are shown as reversed characters.	L / G
ESC N	Cancels the attributes of the set characters.	L / G
ESC #B	Displays the registered bitmap. (# is the registration number)	G
ESC 1C	Sets the size of characters following this command to normal.	G
ESC 2C	Sets the width of characters following this command to double.	G
ESC 3C	Sets the height of characters following this command to double height.	G
ESC 4C	Sets both the width and height of characters following this command to double	G
ESC #hC	Sets the width of characters following this command. # indicates the scale factor. The range is from 1 to 8.	G
ESC #vC	Sets the height of characters following this command. # indicates the scale factor. The range is from 1 to 8.	G

*¹ L/G is a common command for both characters and graphics. G is a command only for graphics.

Section 5. Specific Programming

This section describes only the programming of those of the LineDisplay expanded functions that are specific to the GraphicDisplay.

For parts shared with the LineDisplay, refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

5.1 Escape Sequences

The escape sequence is used when character attributes are changed and bitmaps are displayed. For the escape sequence commands, see the Section 4 of this manual.

The following is a programming example for a highlighted display.

```
Dim RC As Long
```

```
Dim ESC As String
```

```
Dim Data As String
```

```
ESC = Chr(&H1B)
```

' ESC character code

```
Data = "ABCDEFGH"
```

' Character string to be displayed

```
RC = OPOSLineDisplay1.DisplayText(
    ESC + "|bC" + Data,
    DISP_DT_NORMAL)
```

```
If RC=OPOS_SUCCESS Then
```

```
    `Success
```

```
Else
```

```
    `Error
```

```
End If
```

5.2 Graphic Functions

DM-D500 has a function for the registration and the display of bitmaps. In order to display a bitmap, it is first necessary to register the bitmap that user wants to display. Following this, a graphic mode window should be created, and the bitmap can be displayed after the bitmap display escape sequence is sent. For the escape sequences, see the Section 4 and the Section 5 of this manual.

The following explains the methods for bitmap registration and creation of the graphic mode windows.

5.2.1 Bitmap Registration

The DirectIO method is used for registration of bitmaps. For the DirectIO method specifications, see the Section 4 of this manual. The DirectIO command to be used is DISP_DI_SETIMAGE.

The following is a programming example for registration of a bitmap.

```
Dim RC As Long
Dim Number As Long
Dim FileName As String
Number=1
FileName="C:\Bmp\Logo.Bmp"
RC= OPOSLineDisplay1.DirectIO(
    DISP_DI_SETIMAGE, ` Registration command
    Number,            ` Registration number
    FileName)          ` Registration file name
If RC=OPOS_SUCCESS Then
    `Bitmap is registered
Else
    `Error
End If
```

5.2.2 Creation of Graphic Mode Window

It is necessary to create a graphic mode window in order to display bitmaps. DirectIO and the CreateWindow methods are used to create the graphic mode window. For the DirectIO method specifications, see the Section 4 of this manual. The DirectIO command to be used is DISP_DI_GRAPHIC. For the CreateWindow method specifications, refer to the LineDisplay section of "UPOS". When creating the graphic mode window, the argument of the CreateWindow methods is specified using dot units.

The following is a programming example for creating the graphic mode window.

```
Dim RC As Long
Dim Dummy As Long
Dim Data As String
Dummy = DISP_DI_DUMMY
Data = ""
RC= OPOSLineDisplay1.DirectIO(
    DISP_DI_GRAPHIC, `Specifies the graphic mode
    Dummy,           `Normally DISP_DI_DUMMY
    Data)            `Not used
If RC=OPOS_SUCCESS Then
    `Specification successful
    RC=OPOSLineDisplay1.CreateWindow(
        0,           ` Start point (vertical) for viewport
        0,           ` Start point (horizontal) for viewport
        64,          ` Height of viewport
        128,         ` Width of viewport
        64,          ` Height of logical window
        256)         ` Width of logical window
End if
if RC<>OPOS_SUCCESS Then
    `Error
End If
```

Section 6. Error Information

This section describes the error codes that may result from execution of GraphicDisplay(DM-D500) methods. The common properties and methods are described in "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE GENERAL DEVELOPMENT". Refer to this guide for more information.

6.1 ResultCode List

The ResultCode and ResultCodeExtended values when the methods are executed are basically the same as for LineDisplay. The following describes the GraphicDisplay-specific ResultCode and ResultCodeExtended codes. For the codes not described here, refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

Method name	ResultCode	ResultCodeExtended	Meaning
DirectIO	OPOS_E_ILLEGAL	0	A graphic mode window already exists.
		OPOS_EDISP_TOOBIG	The size of the registered bitmaps file is too large.
	OPOS_E_EXTENDED	OPOS_EDISP_BADFORMAT	Specified file is abnormal.

6.2 Remedial Actions for Principal Errors

ResultCodeExtended	Remedy
OPOS_EDISP_TOOBIG	The size of the bitmap that you want to register is too large. Make the bitmap smaller by reducing its size, etc. The total size that can be registered is 4 Kbytes*. If several bitmaps are to be registered, ensure that the total size of the bitmaps is less than 4 Kbytes*. (* When the bitmap is black and white one.)
OPOS_EDISP_BADFORMAT	The image file formats that can be registered are Black and White BMP, 16-color BMP, and 256-color BMP only. Do not specify any file format other than BMP. When specifying a BMP format file, please confirm the number of colors.

Please also refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/ DM-D210)".

Section 7. Warnings

- GraphicDisplay supports DM-D500 only.
When displaying the characters using the DisplayText(At) method, the DisplayText(At) method fails if the character size exceeds the window size. Please note this restriction when displaying the "Double Width" or "Double Height" characters.
- Depending on the operating environment, there can be a case of missing data when transmitting data via serial port. In order to prevent such cases of missing data, it is recommended to set a smaller value for the FIFO setting for the serial communication. (Recommended value: "1")
- The escape sequence that changes the display attribute of the character is effective only once in DisplayText(At). (For instance, "ESC|bC 123" is output with DisplayText, and then "456" is output with DisplayText afterwards. As a result, "123" is emphasized, but "456" is not emphasized and displayed in the default state.)
- The DisplayText(At) method fails if the size of the character exceeds the range of the view port when the character size is set.
- When DISP_DT_REVERSE and DISP_DT_BLINK_REVERSE are specified using the DisplayText(At) method, the reversing display of the character is not released even if the character attribute is released with ESC|N.
- If the ReadCharacterAtCursor method is executed when there is no character information at the cursor position, character code 127 is returned in the character mode window or character code 0 in the graphic mode window. (In the graphic mode window, character code 0 is returned when there is no character information at the cursor position even if it is displayed. For instance, when "1" (character code 49) is displayed at the cursor position (0,0) by using the DisplayTextAt method, information on the character is stored in the leading one dot (cursor (0,0)). Therefore, while the character information (character code 49) can be acquired at the cursor position (0,0), the character information cannot be acquired in places other than the leading one dot. Therefore, character code 0 is returned.)

- The number of Glyph characters that can be defined by the DefineGlyph method is 95.
- The height and width of the foreign character that can be registered is decided depending on the character mode set by "Device Specific Setting" at the character mode window. Moreover, it is decided by the setting font in the graphic mode.

For instance, when the character mode 1 is selected, the size that can be registered is 16 in height and 8 in width. When the character mode 2 is selected, the size that can be registered is 7 in height and 5 in width.

- When both the character mode and the graphic mode windows exist, and the height and width of a different Glyph definition in each mode is set, the height and width of Glyph that can be defined are heights and widths supported by both windows.

For instance, when the character mode 2 (7 in height and 5 in width) and font A (16 in height and 8 in width) are selected in the graphic mode, the foreign character of 7 in height and 5 in width, and 16 in height and 8 in width can be registered. At this time, you do not need to be concerned about the mode of the current window.

- The Glyph information registered by the DefineGlyph method cannot be displayed because the registration is released when the power supply of the display is turned off and on.
- The following cautions are about the graphic mode:
 - Several restrictions exist concerning registration of bitmaps. The maximum number that can be registered is 255. The total data volume of registered bitmaps is limited to up to 4 Kbytes. If the graphic mode window has already been created, registration is not possible.
 - The display position in the graphic mode window can be changed in dot unit. This makes it possible to display characters overlapped but this part is not controlled. When the characters are displayed overlapped, the operation is not guaranteed. When the characters are displayed overlapped due to the change of the font, the operation is not guaranteed either.
 - Characters and images can be displayed simultaneously in the graphic mode window. If characters and images are displayed overlapped, the fundamental rule is that images will have priority, but this restriction does not apply in the Marquee mode.

- When a graphic mode window is created, the overall operation of DM-D500 will become extremely slow. As a result, take note that there are a good deal of difficulties involved in displaying a large amount of characters and using the Marquee mode.
- When specifying the transparent mode, recognizing the displayed contents may be difficult since the characters may overlap the window displayed behind the characters. When specifying the transparent mode, please make sure if the character display position is correct.
- Handlings of displayed content on the window deleted by DestroyWindow method are different between the graphic mode and the character mode.

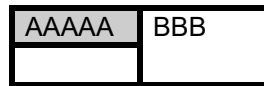
The details are as follows:

The displayed content remains on the display even after the deletion of the window in the character mode.

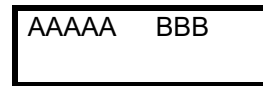
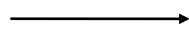
The displayed content on the display is deleted at the same time with the deletion of the window in the graphic mode.

Example:

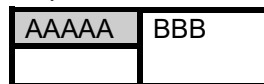
Character window



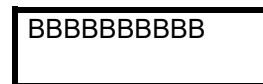
DestroyWindow



Graphic window

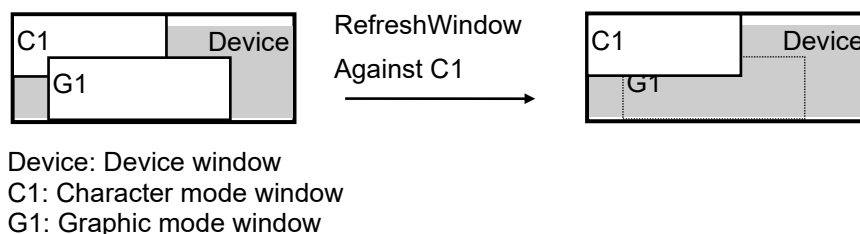


DestroyWindow



- The graphic mode window has the disposition different from the Character mode window and the device window.
The graphic mode window goes to the backmost face unconditionally when the character mode window comes to the foremost face.

Example: Switching of the windows in the case a graphic window exists



The graphic mode window goes to the backmost face as expressed in the above right figure when the RefreshWindow method is executed against the character mode window under the condition of the above left figure, which expresses the graphic mode window located in the foremost face, the character mode window located behind of it, and the device window located in the backmost face.

- DM-D500 is not supported for TM-H6000V.

Please also refer to "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE LineDisplay (DM-D110/DM-D210)".