SHARP®

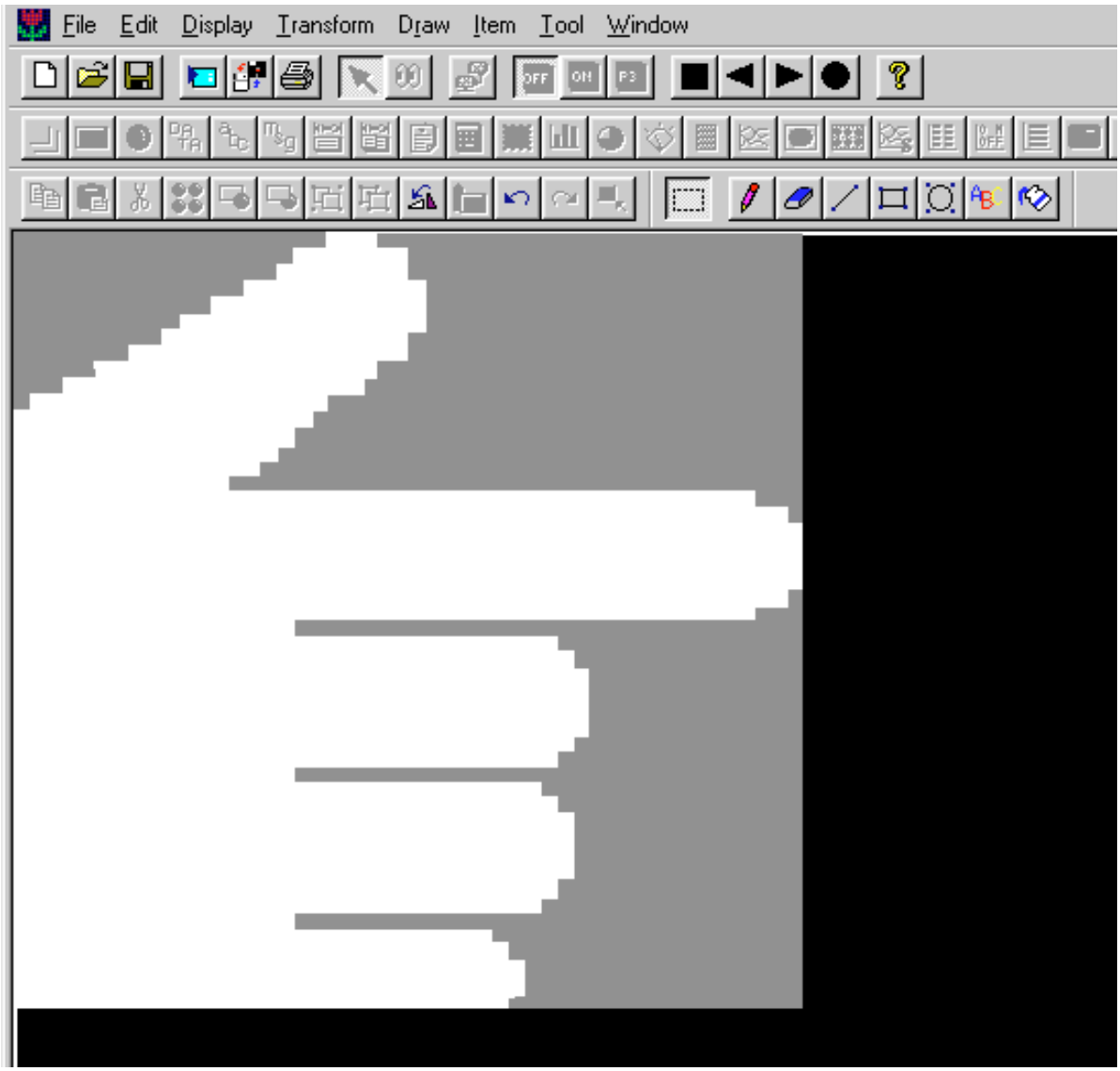
Version 1.0
Produced in Mar. 1999

Control Terminal

Model name

Screen edit software ***ZM-71SE***

User's Manual/Tutorial



Thank you for purchasing the drawing/editing software of ZM series for Windows95/NT (ZM-71SE).
This manual leads you to understand the outline and the functions of the drawing/editing software of ZM series for Windows 95/NT (ZM-71SE) and to master it effectly, by making each example of each chapter.
Read this manual thoroughly to completely familiarize yourself with the operation according to the examples.
Keep this manual for future reference. We are confident that this manual will be helpful whenever you encounter a problem.

Note

- In this manual, ZM-70 and ZM-80 are expressed as follows.

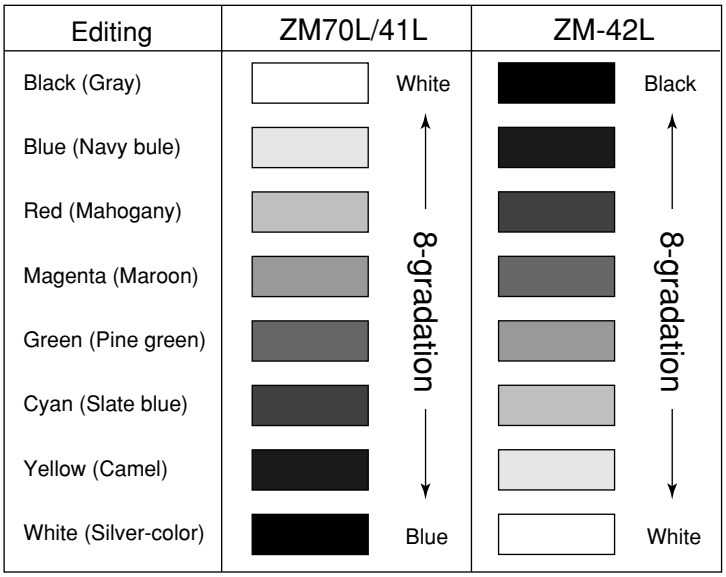
Expression in this manual	Module name
ZM-70	ZM-41L, ZM-70D, ZM-70T, ZM-70L
ZM-80	ZM-42D/L, ZM-52D, ZM-72D/T, ZM-82D/T/TV

Note

- This module is made in accordance with Japanese domestic specifications. Its guarantee clauses are described in a separate guarantee card (packed together with the module). When this module is used outside Japan, these guarantee clauses are not applicable. In addition, the guarantee should be understood as a guarantee of the delivered product as a single unit and every other damages or losses due to damage or malfunction of the product will not be included in this guarantee.
- Should you have any questions and inquiries, please feel free to contact our dealers.
- The whole or partial photocopy of this booklet is prohibited.
- Contents of this booklet may be revised for improvement without notice.

Color of ZM Series Monochrome Type

The following is the color list of ZM Series monochrome types. Refer when editing a file.



*8-gradation colors may be flickering on ZM Series. Using 2-gradation colors is recommended.

*If the editing file which has 16 colors on the screen editing is changed into '8-color' editing file, each color is changed into the color of ( ).

Safety precautions

Read this manual and attached documents carefully before installation, operation, maintenance and checking in order to use the machine correctly. Understand all of the machine knowledge, safety information, and cautions before starting to use. In this instruction manual, safety precautions are ranked into "danger" and "caution" as follows.

Danger : Wrong handling may possibly lead to death or heavy injury.

Caution : Wrong handling may possibly lead to medium or light injury.

Even in the case of Caution, a serious result may be experienced depending on the circumstances. Anyway, important points are mentioned. Be sure to observe them strictly.

The picture signs of Prohibit and Compel are explained below.

: It means don'ts. For example, prohibition of disassembly is indicated as ( ).

: It means a must. For example, obligation of grounding is indicated as ( ).

1) Installation

Caution

- Use in the environments specified in the catalog and instruction manual.
  Electric shock, fire or malfunction may be caused when used in the environments of high temperature, high humidity, dusty or corrosive atmosphere, vibration or impact.
- Install according to the manual.
  Wrong installation may cause drop, trouble or malfunction.
- Never admit wire chips or foreign matter
  Or fire, trouble or malfunction may be caused.

2) Wiring

Compel

- Be sure to ground.
  Unless grounded, electric shock or malfunction may be caused.

Caution

- Connect the rated power source.
  Connection of a wrong power source may cause a fire.
- Wiring should be done by qualified electrician.
  Wrong wiring may lead to fire, trouble or electric shock.

3) Use

⚠ Danger

- Don’t touch the terminal while the power is being supplied or you may have on electric shock.
- Assemble the emergency stop circuit and interlock circuit outside of the control terminal. Otherwise breakdown or accident damage of the machine may be caused by the trouble of the control terminal.

4) Maintenance

Prohibit

- Don’t disassemble or modify the modules.
  Or fire, breakdown or malfunction may be caused.

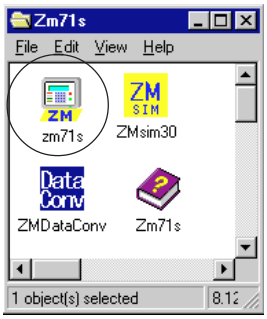
Contents

1 Opening and Closing a File

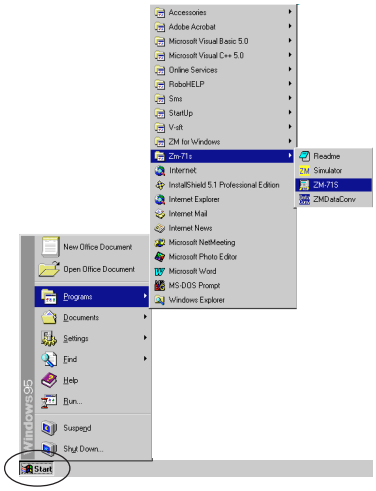
This chapter describes how to open and close a file on ZM-71SE (screen editing software for Windows 95/98/NT4.0).

Starting the Software

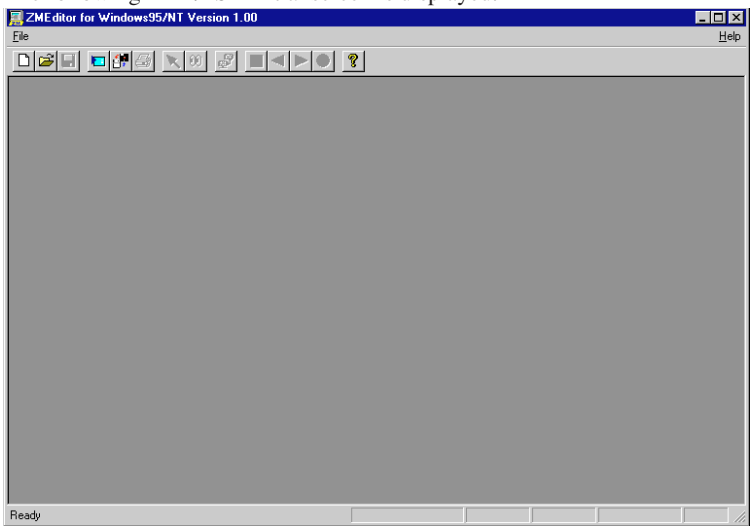
1. Double-click the program icon. Or, click [Start] of Windows 95, and click [Programs], [Zm-71s] then [ZM-71S].



or



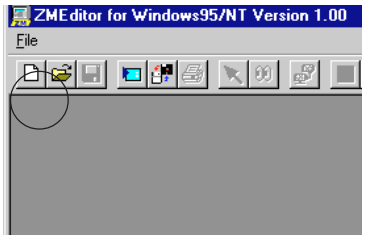
2. The following ZM-71SE initial screen is displayed.



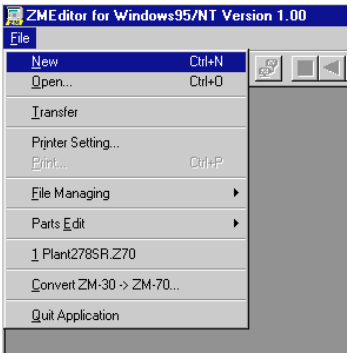
Opening a File

Opening a New File

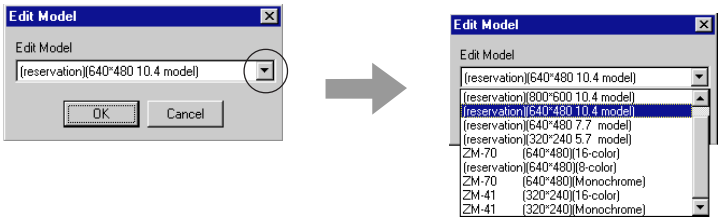
1. Click the [New] icon in the tool bar, or select [New] from the [File] menu.



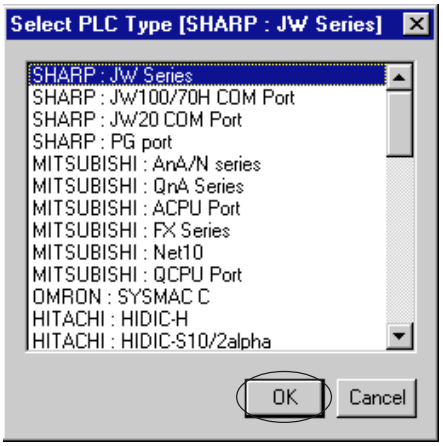
or



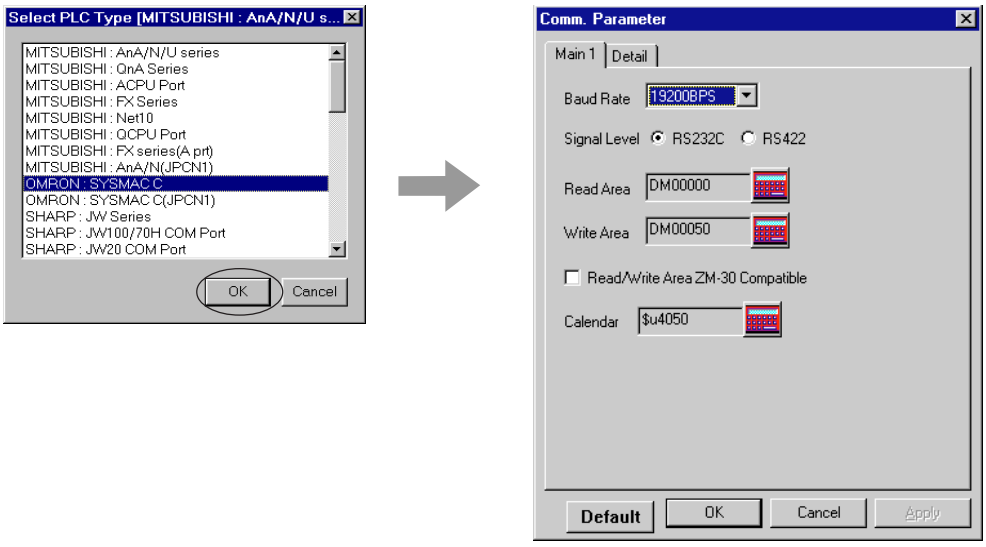
2. [Edit Model] dialog is displayed. Select the model name, then click [OK].



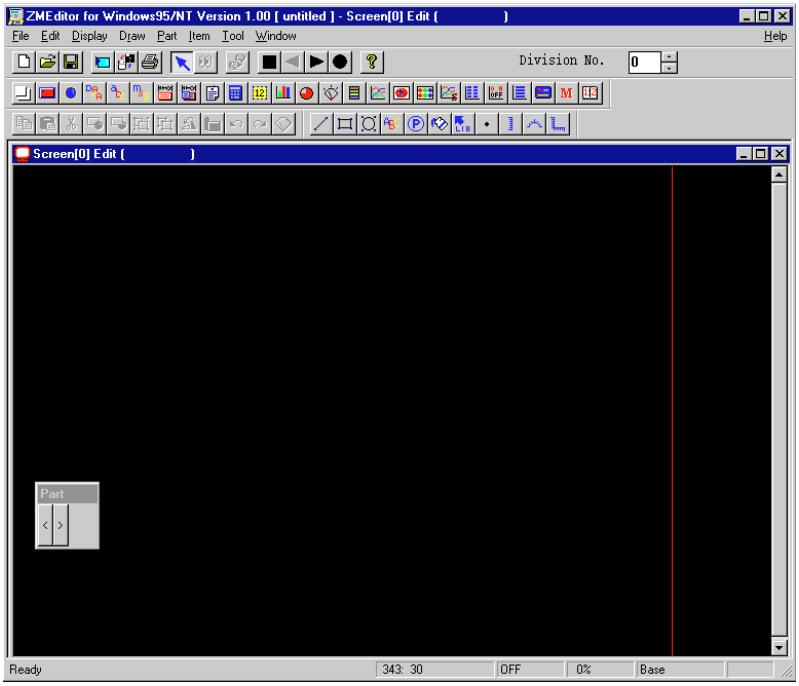
3. The [Select PLC Type] dialog is displayed.
Select as default (SHARP : JW series), then click [OK] to display [Screen [0] Editing] window.



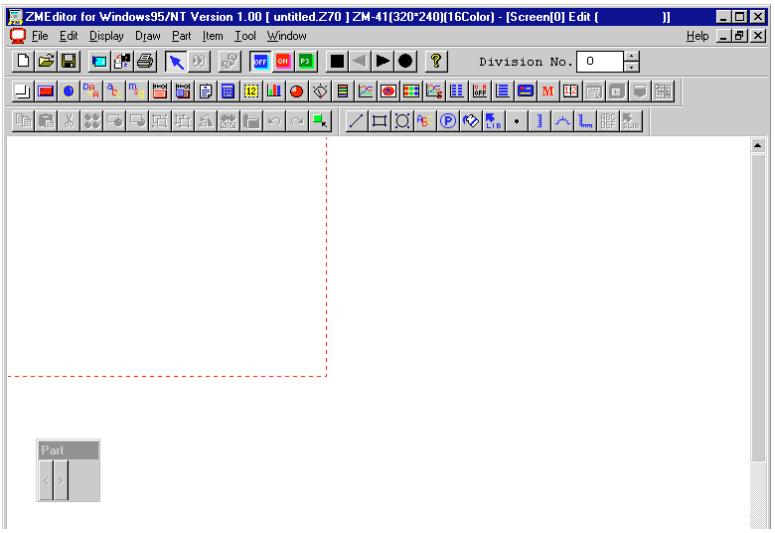
When the type of the PLC was changed, [Communication Parameter] dialog is displayed first, then [Screen [0] Editing] window is displayed.



4. The window can be adjusted to the desired size when necessary.
(Red frame size represents the size of the display of 800 x 600 dots.Red dotted line represents the size of the editing model.)

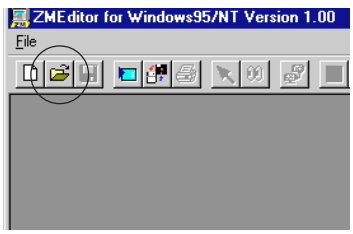


When [Editing Model: ZM-41 (320*240)] is selected, the following window will appear. Screens should be editted within the dotted lines.

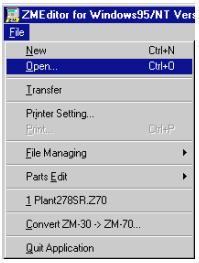


Opening an existing file

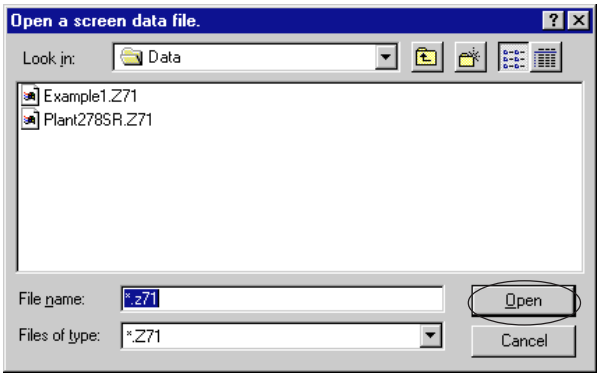
1. Click [Open] icon for [Open(O)] in [File(F)] menu.



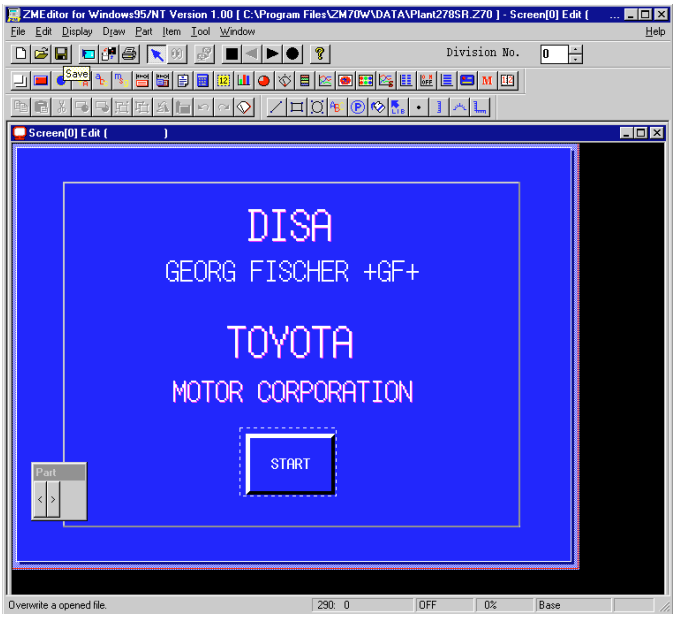
Or...



2. A dialog to select the file will be displayed. Select a screen data file to be editted then click [Open].

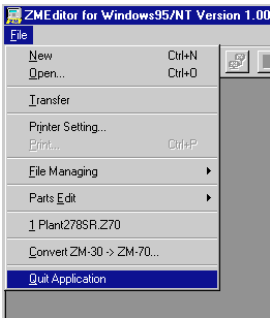


3. Selected screen data file is open.

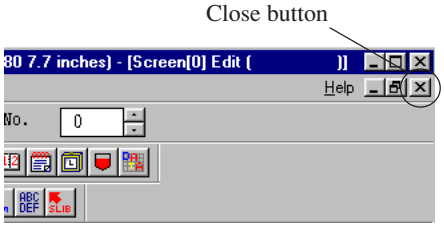


Closing the software

1. Click either [(Quit Application)] in [File(F)] menu or [Close] button.

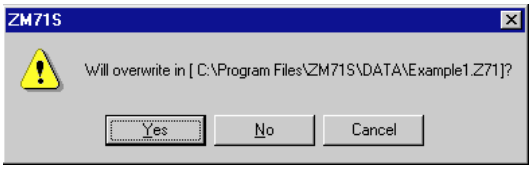


Or...



2. Screen is closed.

If the modified data is not saved, the dialog appears to confirm whether the data will be saved or not. Click either [Yes] or [No] to close the program.



2 Creating a Screen Consisting of Characters and Bitmap Data

You will create the following screen.
This is the initial screen to be displayed at start-up.

Procedure

Operation

Before Creating a Screen

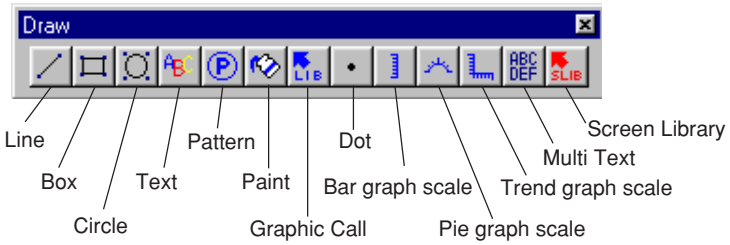
After starting ZM-71SE, follow the procedure below:

For ZM-70

Select "ZM-70 (640*480) (16-Color)" from "Edit Model".

1. Open a new file.
Click the [New] icon. The [Edit Model] dialog and [Select PLC Type] dialog are displayed in sequence. Set up as shown below:
Edit Model: ZM-82 (640*480 10.4 inches)
Select PLC Type: SHARP: JW series
[Screen [0] Edit] window is displayed.

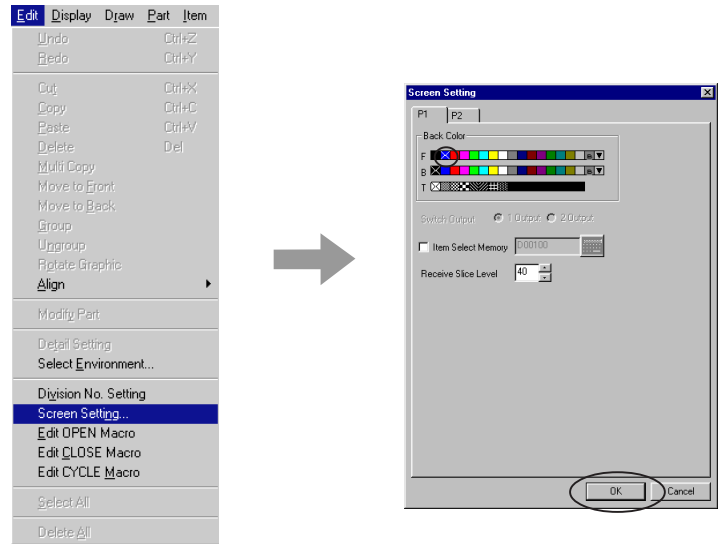
2. The draw tool bar is mainly used in this chapter. Check the meaning of each icon.



Screen Color Change

At start-up, the screen color is black. The color can be changed with the following steps:

1. Click [Edit] menu. The following pull-down menu is displayed.Click [Screen Setting]. The [Screen Setting] dialog is displayed.



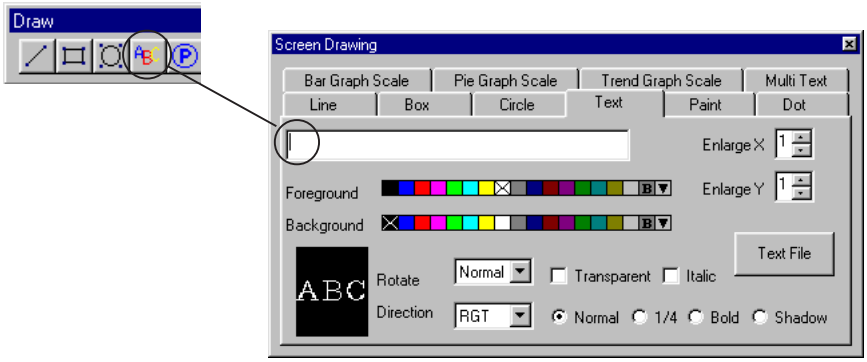
2. In [Back Color], check blue for [F (foreground)]. Click [OK].

3. The screen color is changed to blue.

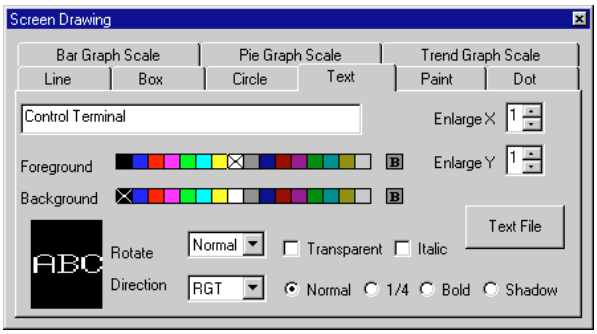
Creating a Screen Title

Character Entry

1. Click [Text] icon in the draw tool bar.
The following [Screen Drawing] dialog is displayed.
The cursor blinks in the box.



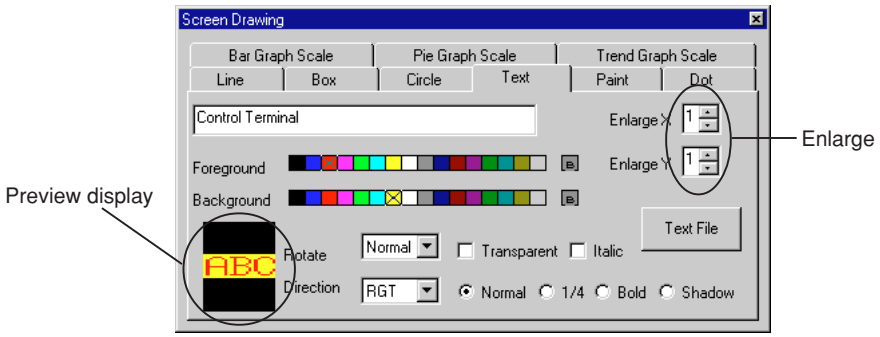
2. Key in "Control Terminal".



Property Setting

1. Set up properties for "Control Terminal".
In the [Screen Drawing] dialog, check red for [Foreground] and yellow for [Background].
The text image appears in the preview display.

2. Enter "3" for [Enlarge X] and [Enlarge Y].



3. Set up the other options as follows:

Rotate: Normal ☐Transparent ☐Italic

Direction: RGT ○Normal ○1/4 ○Bold ◉Shadow

A variety of character types can be selected.

Transparent unchecked: Control Terminal (Background color)

checked: Control Terminal

Italic unchecked: Control Terminal

checked: *Control Terminal*

Normal: Control Terminal

1/4(Invalid for 2-byte characters): Control Terminal

Bold: **Control Terminal**

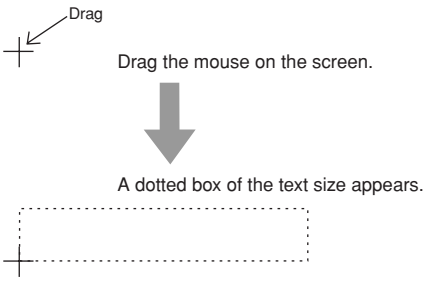
Shadow: Control Terminal

* "Bold" is valid when Enlarge is X : 1 and Y : 1.

(Enlarged) C — Foreground Color / Background Color

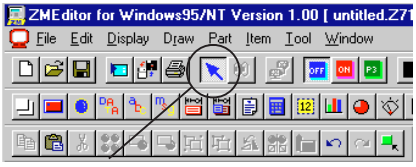
Placing the Text

1. Place the text on the screen.
Drag the mouse on the screen.
A dotted box of the text size is displayed and moved with the mouse.

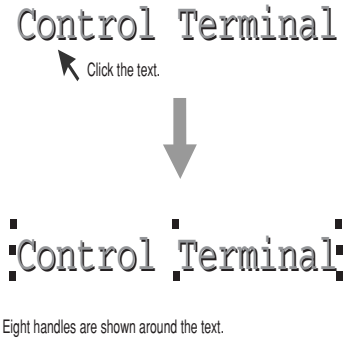


2. Upon releasing the mouse button, the text appears on the screen.

3. To adjust the text position, click the [Select] icon. The mouse cursor changes from a cross to an arrow.
Click the text. Handles are shown around the text.



[Select] icon



Eight handles are shown around the text.

4. Drag the text to the upper center of the screen.

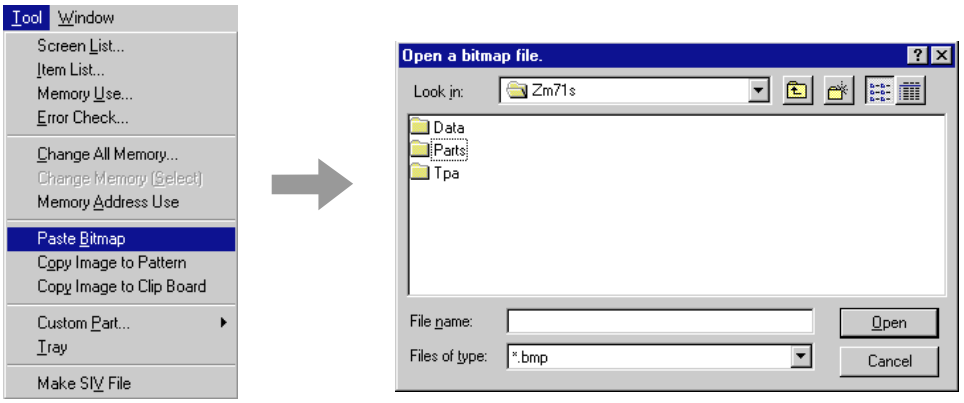
To modify text properties (color or character type), click the [Detail/Prop. Change] icon in step 3 (while handles are shown around the text) , or double-click the text.

Bitmap File Import

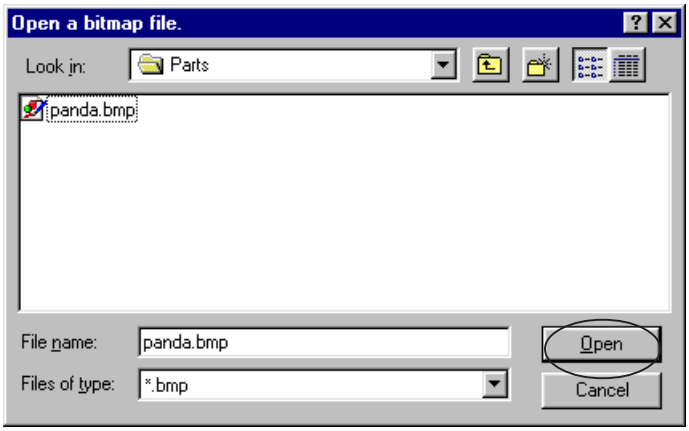
With ZM-71SE, it is possible to import a bitmap file (extension: [.bmp]) to the screen easily. Using this function, company logotype or graphics can be imported with ease.

Import the following bitmap data.
When ZM-71SE is installed, the bitmap data is also automatically installed into the [\Zm-71s\Parts] folder under the file name of "panda.bmp".

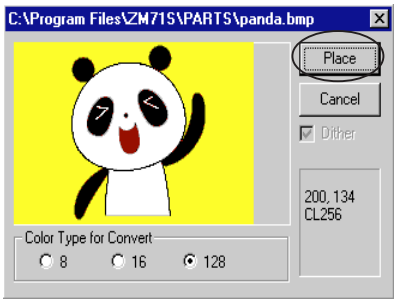
1. When the [Screen [0] Edit] window is displayed, select [Paste Bitmap] from the [Tool] menu.
   The [Open a bitmap file] dialog is displayed.



2. Select [panda.bmp] from the "Parts" folder and click [Open].



3. The dialog showing the bitmap is displayed. When it is O.K., click the [Place] button.



4. The above dialog disappears. The cross cursor appears on the screen. Drag the cursor to the center of the screen. A dotted box of the bitmap size also appears with the cursor.

5. When the mouse is dragged to the center, release the mouse button. The bitmap is placed.

Drag the bitmap and release the mouse button.

The bitmap is placed in the position.

If the cross cursor is clicked without dragging after the [Place] button is clicked, the bitmap is placed in the cursor position. The bitmap is placed on each click of the cursor. To quit placing the bitmap, click the [Select] icon and cancel the cross cursor.

Once a bitmap is placed on the screen, it is saved in the pattern edit file automatically. Therefore, the bitmap is retained even if it is deleted from the screen.
By clicking the [Pattern] icon in the draw tool bar, bitmap data registered as patterns can be checked.

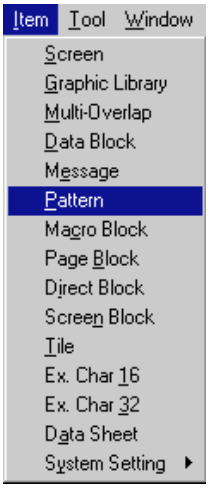
Creating Logotype

Characters in the desired font and size can be created and imported to the screen easily. Such characters are created in the units of dots and saved in pattern edit file.

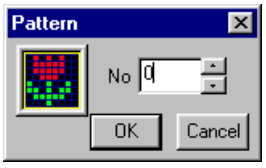
Create the logotype as shown below.

Entering the Dot Editing Area

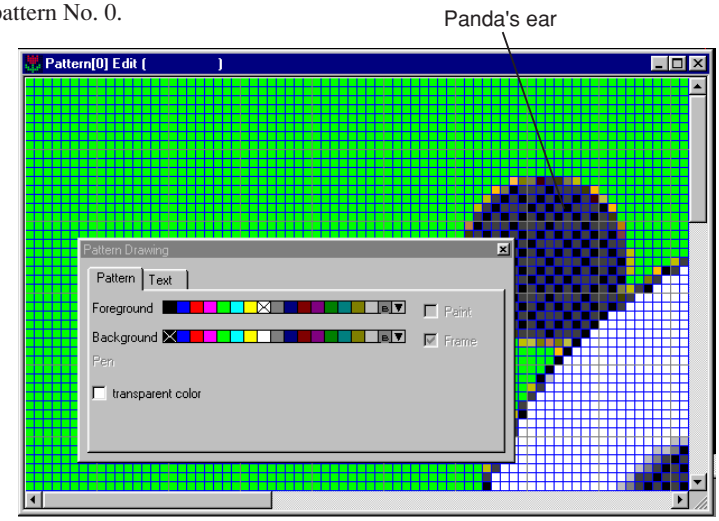
1. Click the [Item] menu. The following pull-down menu appears. Click [Pattern].



2. The [Pattern] dialog for entering a pattern No. is displayed. Check that "0" is entered and click [OK].

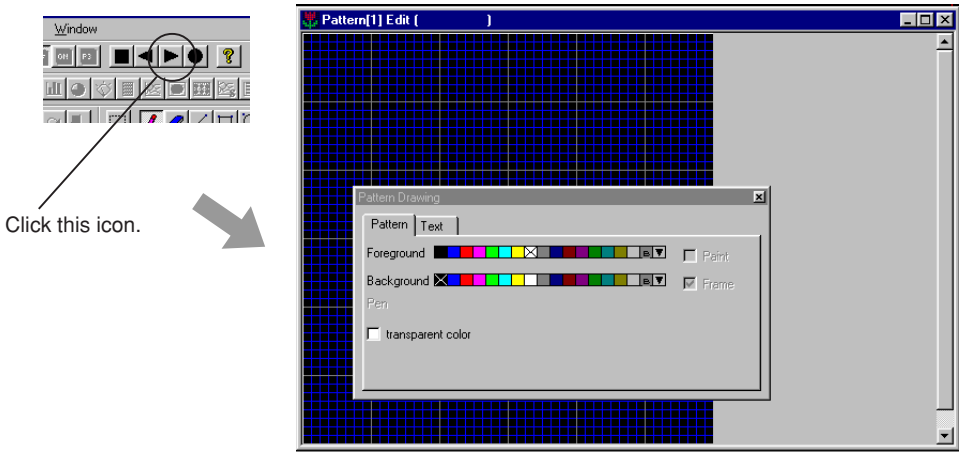


3. The [Pattern [0] edit] window is opened.
Check that the bitmap previously imported using [Paste bitmap] is registered as pattern No. 0.



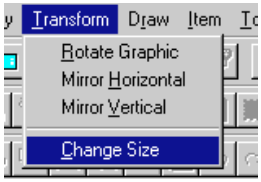
To delete the stored pattern (bitmap), open the window of the pattern number and select [All delete] from the [Edit] menu.
Only the pattern in the opened window is cleared.

4. Store the logotype in pattern No. 1. Click the [Next] icon in the tool bar to open the [Pattern [1] Edit] window.

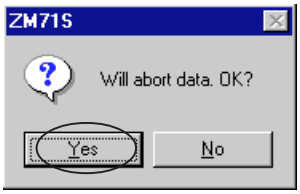


Modifying the Dot Editing and Display Size

1. Adjust the editing area size to the text.
Select [Change Size] from the [Transform] menu.



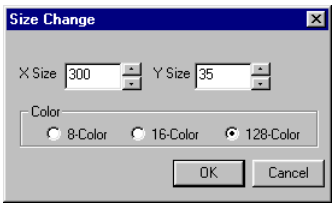
2. The following message appears. Click [Yes].



3. The [Size Change] dialog is displayed. Enter the desired values in dots as shown below. Click [OK].

X Size: 300

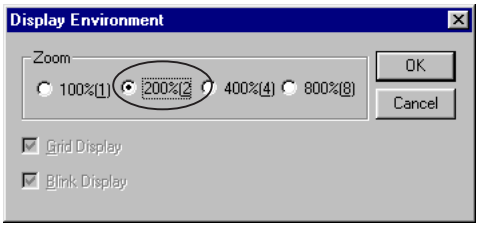
Y Size: 35 Color: 128-color



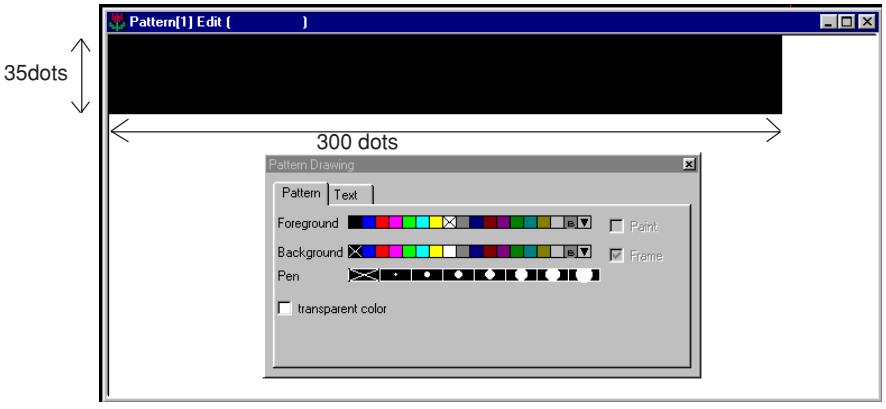
4. Decrease the [Zoom] value for convenient editing.

Select [Display Environment] from the [Display] menu.

The [Display Environment] dialog is displayed. Select [200 %] and click [OK].

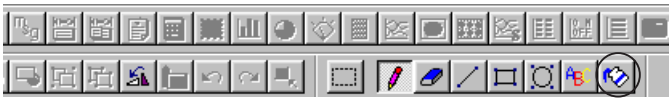


The window is decreased.

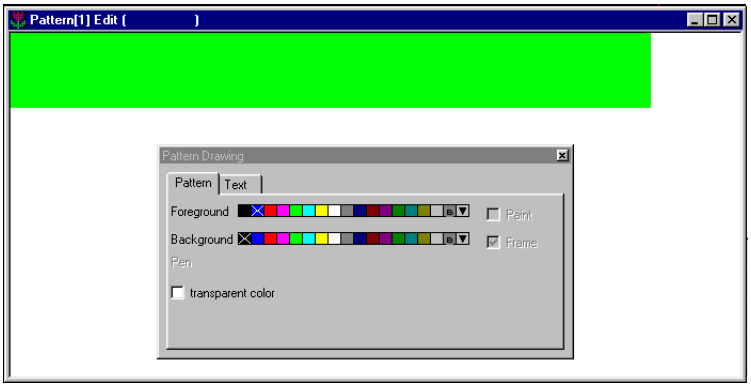


Matching the Area Color with the Screen Color

1. Click the [Paint] icon in the draw tool bar for pattern edit.



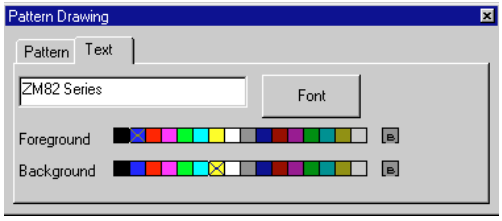
2. Because the screen color is blue, check blue for [Foreground] and click anywhere on the dot editing area. The area color is changed to blue.



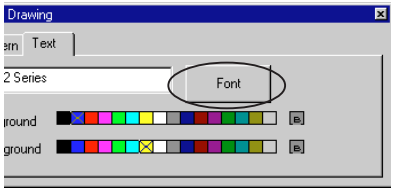
Entering Text and Setting Text Properties

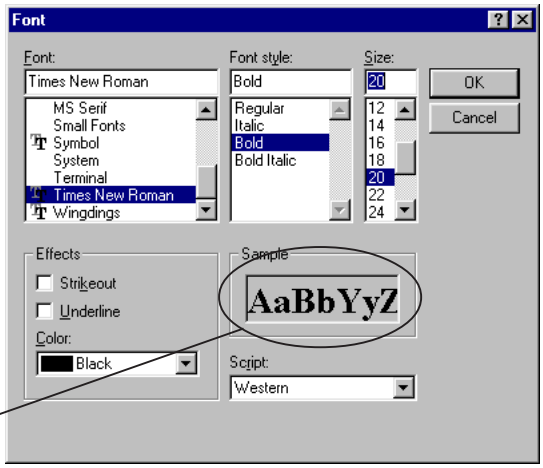
1. Click the [Text] icon. The [Pattern Drawing] dialog is displayed.

2. As done is the [Screen Drawing] dialog (Page 2-3), key in "ZM82 Series".



3. Set up text properties,such as font and size.Click [Font]. The following [font] dialog is displayed.





Specified font image is displayed.

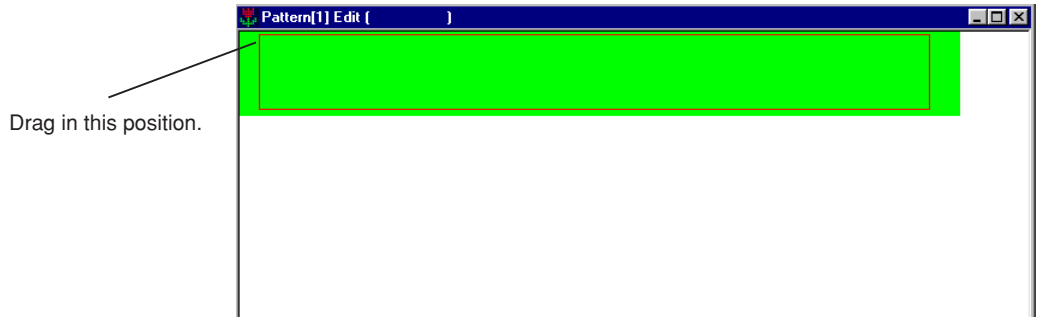
In this example, set up as shown below:

Font: Times New Roman Style: Bold Size: 20

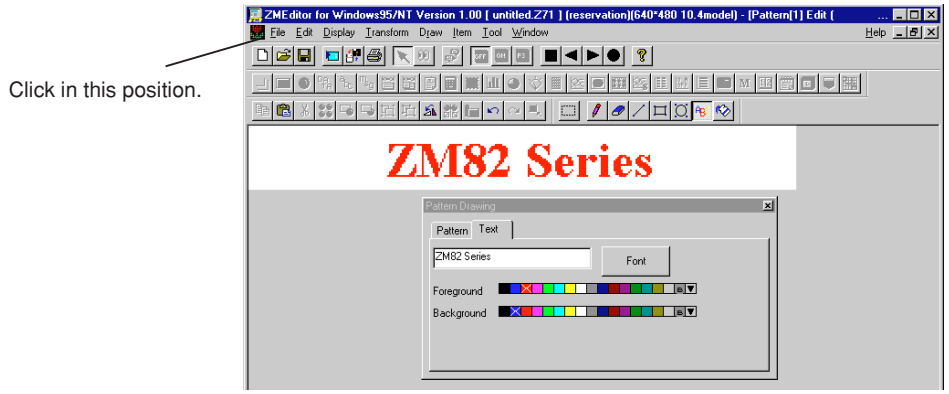
4. By clicking [OK], the [Pattern [1] Edit] window is displayed.
Select the desired colors.

Foreground: Red Background: Blue

5. Drag the mouse over the dot editing area. The box of the text size is displayed.

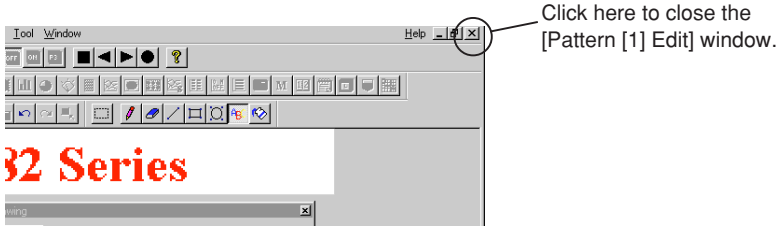


6. Locate the mouse cursor in the center of the dot editing area, and click the mouse button. The text is displayed. Now the text is registered as pattern No. 1.



Placing the Text on the Screen.

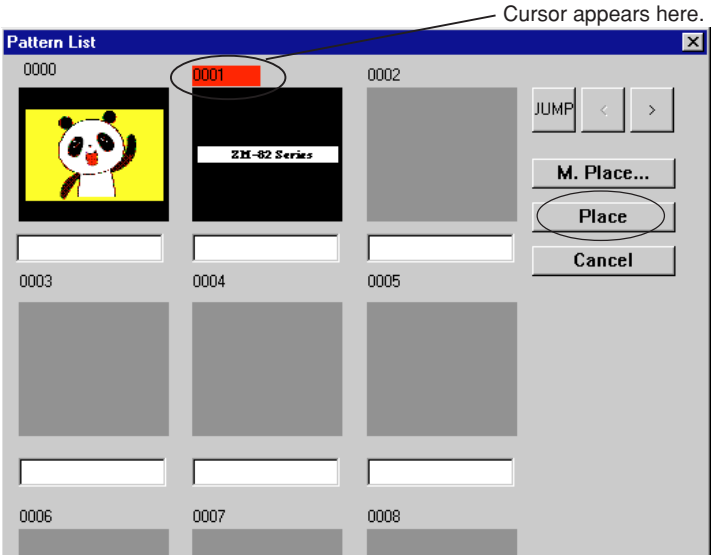
1. Click the "x" (close) button in the [Pattern [1] Edit] window. The window is closed and the [Screen [0] Edit] window is displayed.



By selecting [Screen] from the [Item] menu, the [Screen [0] Edit] window is displayed While the [Pattern [1] Edit] window is opened.

2. Click the [Pattern] icon in the draw tool bar.

3. The [Pattern List] window is displayed.
Select [0001]. The read cursor appears over [0001].



4. Click the [Place] button. The [Screen [0] Edit] window is displayed.
By dragging the mouse, the dotted box of the pattern size is displayed with cross cursor.

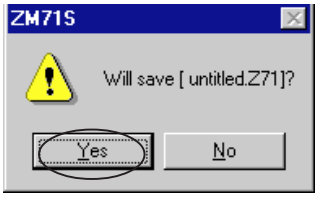
5. Move the cursor to the position as shown below and release the mouse button.
The text is displayed.

Saving the screen data

Save the created file.

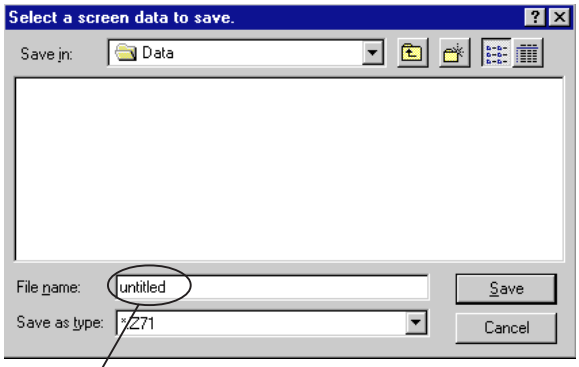
1. Click the [Save] icon in the tool bar, or select [Save] from the [File] menu.

2. The following inquiry dialog appears. Click [Yes].



3. The [Select a screen data to save] dialog is displayed.
Enter "Example1" in the text field and click the [Save] button.

For ZM-70
Extension is [.Z71] when a screen data is saved.



Now this screen file is saved under the file name of "Example1.Z71".

3 Screen Data Transference

We will transfer the screen data (file name: "Example1.Z71") created in Chapter 2 to ZM-70.
The process is different between ZM-70 and ZM-80. See P3-8 for the details.

Procedure

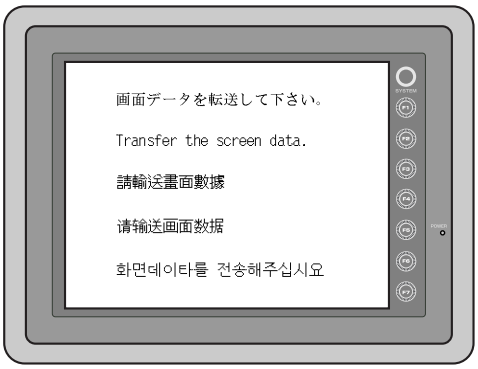
Operation

Before Data Transference

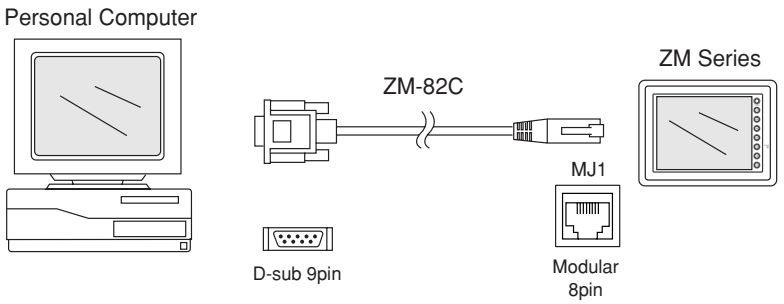
Start up ZM-70.

1. When the ZM-70 is turned on first (after being unpacked), the following screen is displayed.

* The following screen is not displayed if screen data has already been transferred to ZM-70.



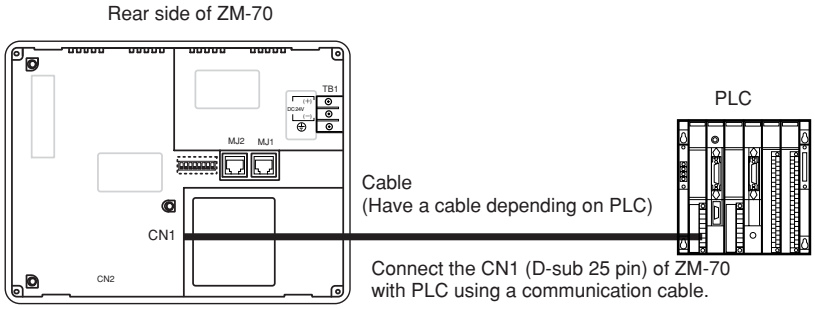
2. Connect ZM-70 to the computer with a data transfer cable "ZM-82C". Screen data transfer port on the ZM-80 side is "MJ1".



Adaptors are included in V6-CP set.
These adaptors are not necessary when DOS/V computer is used.

3. Connect ZM-70 and a PLC in advance.
Match parameters such as baudrate or parity on the PLC side with [Communication Parameter] on ZM-70 side.

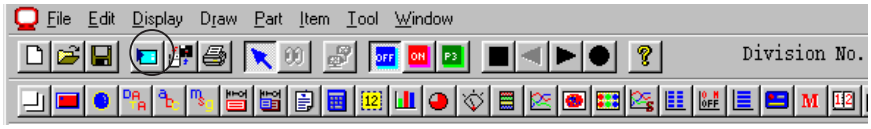
4. Link ZM-70 to the PLC with a communication cable.
Communication connector on ZM-70 side is CN1 (D-sub 25 pin).



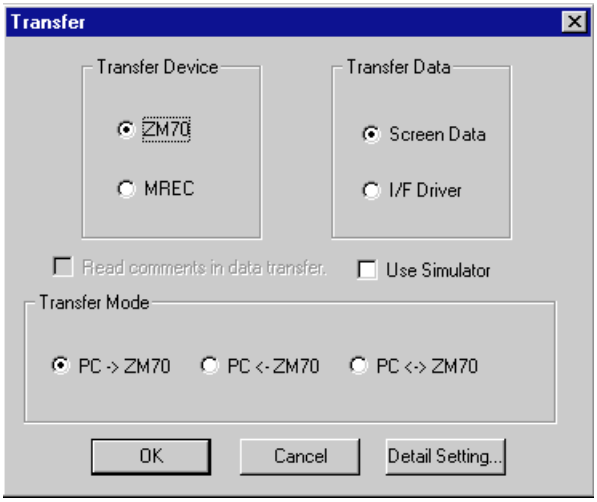
Have a proper communication cable for your PLC.
For the connecting instruction, refer to "Hardware Specifications" provided with ZM-80.

Transferring the Screen Data

1. On the ZM-71SE screen (on the computer), click the [Transfer] icon or select [Transfer] from the [File] menu.

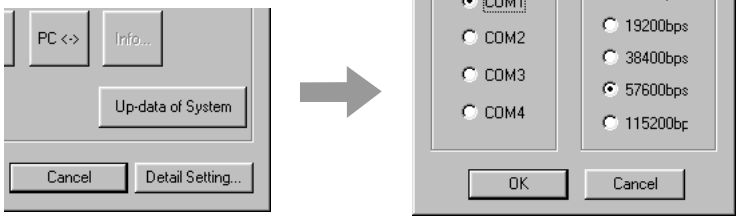


2. The [Transfer] dialog is displayed.



3. [Detail Setting ...] should be opened first.
Set as below :
[Serial port : (Select one to be used.)]
[Baud Rate : 57600 bps]

> Maximum of the baudrate varies according to the model of PC.

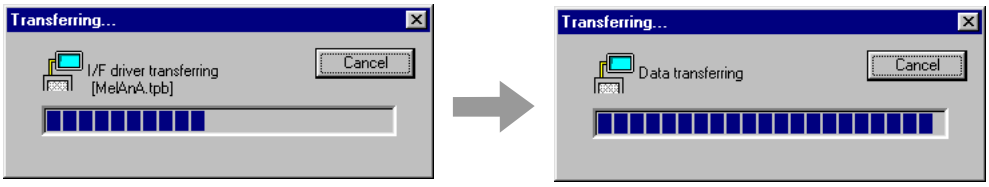


4. Click [OK] to return to the [Transfer] dialog.

5. Set up as shown below:

Transfer device : ZM-70
Transfer Data : Screen Data
☐ Use Simulator
☐ Read comments in data transfer

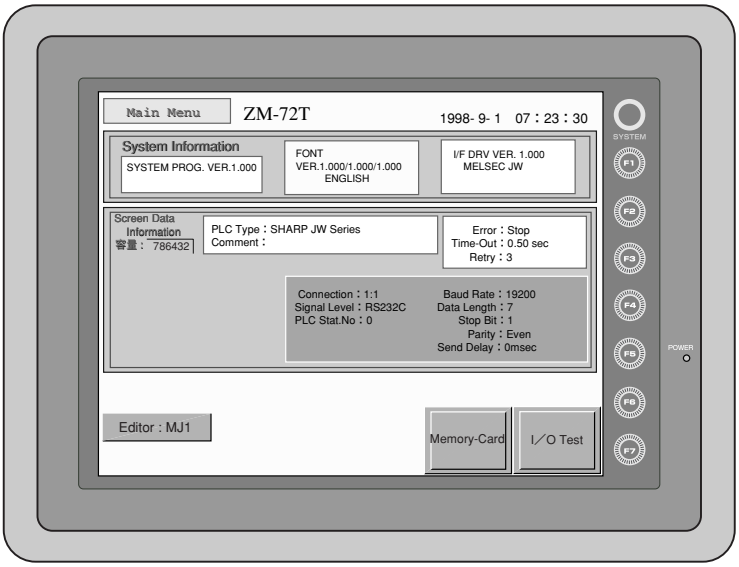
6. Click [PC->]. The [Transferring] dialog is displayed on the computer.
After the I/F driver data is transferred, the screen data is transferred.



The [Transferring] dialog on the computer.

After the I/F drive data is transferred, the screen data is transferred.

7. "Main Menu" screen appears upon the completion of the data transfer.



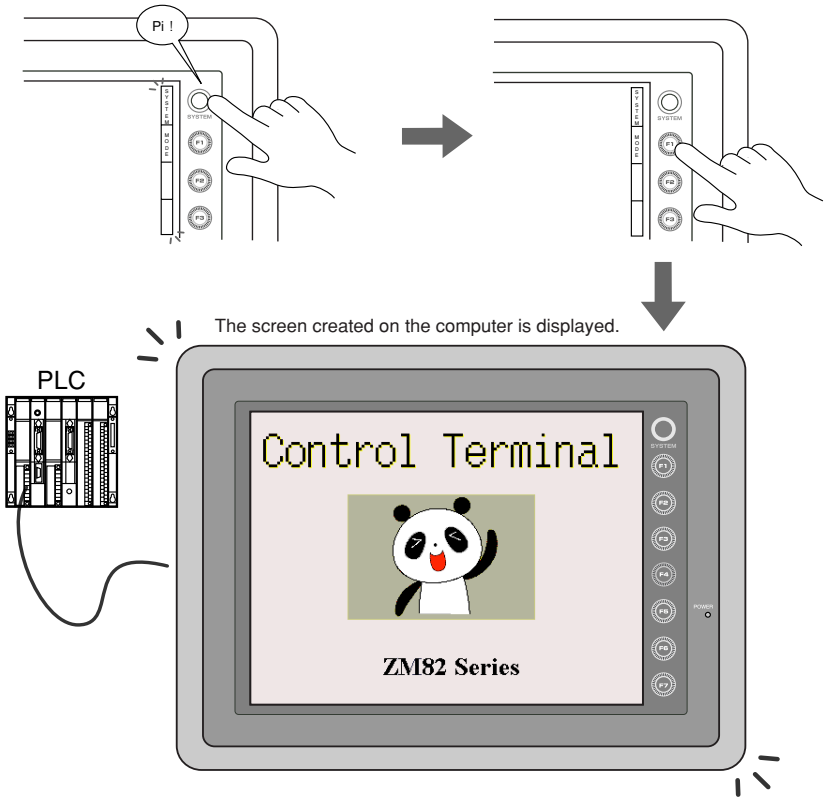
Keyword

I/F driver

This is a protocol file necessary for communication between ZM-70 and PLC or ZM-70 and a general-purpose computer. If the I/F driver does not conform to PLC connected to ZM-70, communication will not be executed correctly.

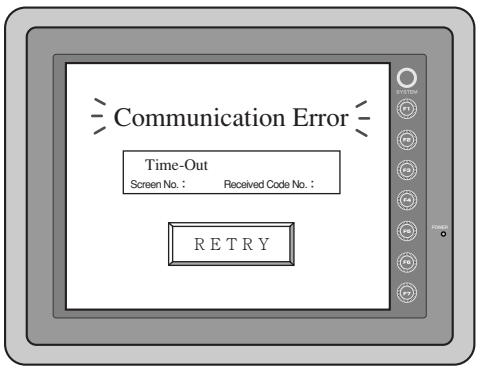
ZM-80 Operation Check

1. Make sure whether ZM-70 is connected to the PLC. Press [SYSTEM] key. The screen created on the PC appears.



If Communication between ZM-70 & PLC Is Not Successful:

If "Communication Error" Appears on the ZM-70 :



The possible causes are as follows:

• An incorrect PLC type is selected.

Check if a correct PLC type is selected in the [Select PLC Type] dialog when a new screen is opened.

• The cable is connected incorrectly.

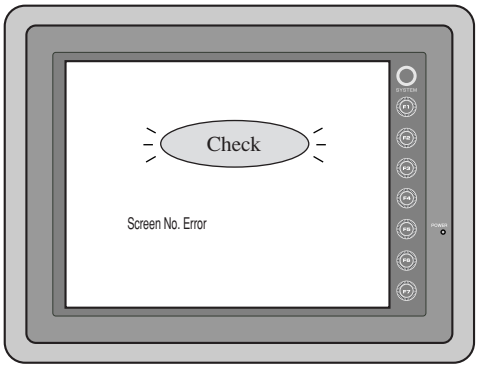
Check if the cable is connected to the correct pins.

Check the cable for breakage.

• The communication parameters set up for PLC and ZM-80 are not in conformity.

Check the parameter contents.

If "Screen No. Error" Appears on the ZM-70 Screen:

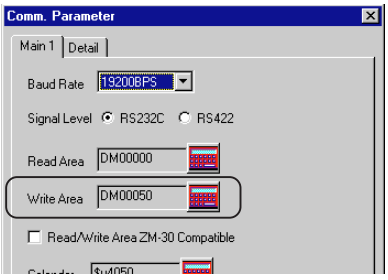


Check if a screen number which does not exist is entered for the memory address "n+2" of the read area.

Keyword

Read area

[Read Area] is set up in the [Comm. Parameter] dialog. To bring up the dialog, select [System Setting] from the [Item] menu and click [Comm. Parameter].



The read area is for transferring mainly screen display commands from an external device (PLC, etc.) to ZM-70.

Three consecutive words are assigned to the read area.

(When [Buffering Area Setting] is used, more words are necessary.)

The contents are:

Address	Name	Contents
n	RCVDAT	Sub command
n + 1	SCRN_COM	Screen status command
n + 2	SCRN_No	External screen number command

When communication starts between PLC and ZM-70, the screen of the number stored in the read area "n+2" is opened first.
If the screen number does not exist, the "Screen No. Error" message is given.

<Ex.>
D00000 is entered for [Read Area] for the file "Example1.Z71".
Therefore:

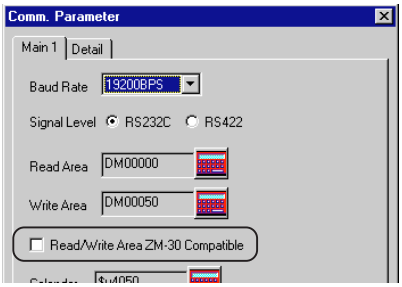
D00002 = 0 Screen No. 0 is indicated.
D00002 = 10 "Screen No. Error" is given.
(Because screen No. 10 is not included in the "Example1.Z71" file.)

The screen number displayed on the ZM-70 screen is written to the Write Area "n+2".

Keyword

Write Area

[Write Area] is set up in the [Comm. Parameter] dialog. To bring up the dialog, select [System Setting] from the [Item] menu and click [Comm. Parameter].
The write area is for writing mainly screen status data from ZM-80 to an external device (PLC, etc.).



Similar to the Read Area, three consecutive words are assigned to the Write Area.
The contents are:

Address	Name	Contents
n	CFMDAT	Same as those in the read area "n"
n + 1	SCRN_COM	Screen status
n + 2	SCRN_No	Display screen number

The contents of the three words and those of the write area are mostly in pairs.
The screen number to be displayed is commanded from the "n+2" Read Area to ZM-70, and the screen number displayed on ZM-70 is written to the "n+2" Write Area.

ZM-70 Procedure

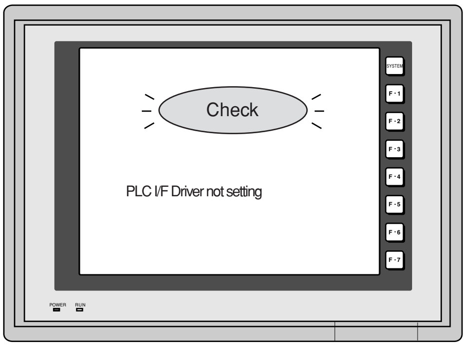
1) ZM-70 setup • P3-8
   Bring up the "Main Menu" screen on ZM-70 and set in a stop.
2) Screen data transference • P3-10
   Transfer the screen data from the computer to ZM-70.
3) Connecting ZM-70 to PLC • P3-12
   Connect ZM-70 to PLC after transferring the screen data to ZM-70.
4) Communication start between ZM-70 and PLC. • • • • • • • • • • • • • • • • • P3-12
   Press the [SYSTEM] key and [F 1] key of ZM-70 so that it start to run.

ZM-70 Operation

Before Data Transference

Start up ZM-70

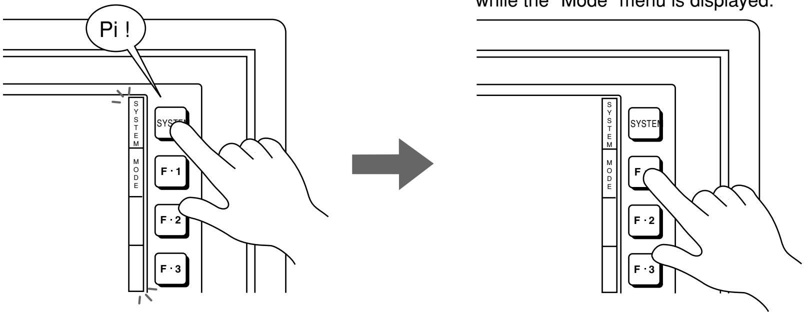
1. When the ZM-70 is turned on first (after being unpacked), the following screen is displayed.



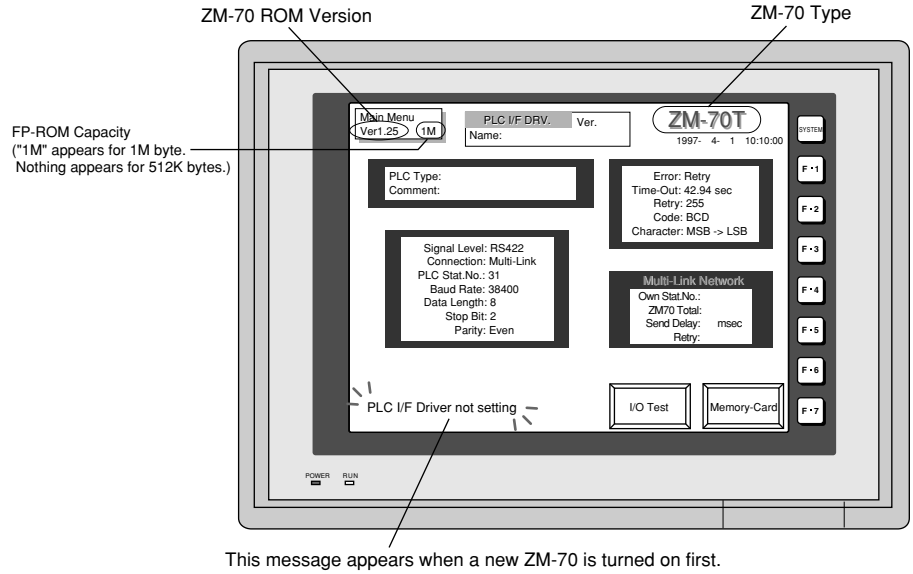
2. Press the [SYSTEM] key and then the [F1] key on ZM-70.

Press the SYSTEM key to call up the menu.

Press the F1 key while the "Mode" menu is displayed.

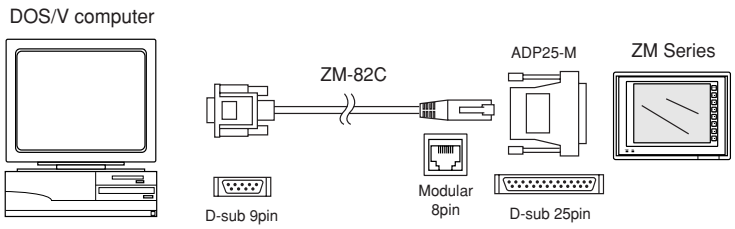


3. The "Main Menu" screen is displayed on ZM-70.
The following message appears in the left corner of the screen.
The message may be ignored because it means that ZM-70 is new and stores no screen data yet.

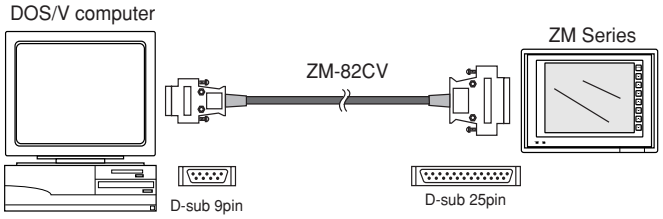


4. Connect ZM-70 to the computer used for screen editing using the screen data transfer cable. For a DOS/V computer, use our cable ZM-82CV.

*[ZM-82C]



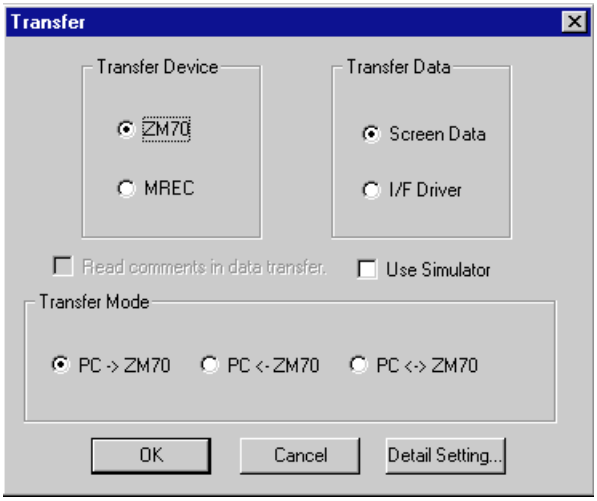
*[ZM-82CV]



Transferring the Screen Data

1. On the ZM-71SE screen (on the computer), click the [Transfer] icon or select [Transfer] from the [File] menu.

2. The [Transfer] dialog is displayed.



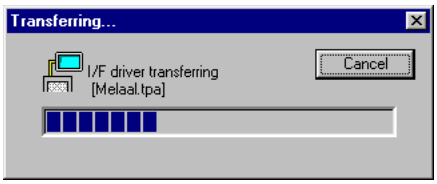
Set up as shown below:

Transfer Device : ZM-70
Transfer Data : Screen Data
☐ Use Simulator
☐ Read comments in data transfer

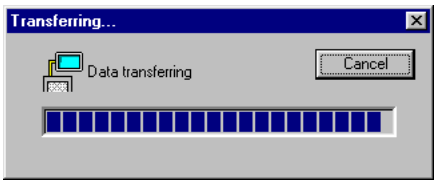
Click [PC ->].

When the screen data is transferred first, the I/F driver data is also transferred automatically.

3. The [Transferring] dialog is displayed on the computer. After the I/F driver data is transferred, the screen data is transferred.
The ZM-70 screen also brings up the [Transferring] dialog.

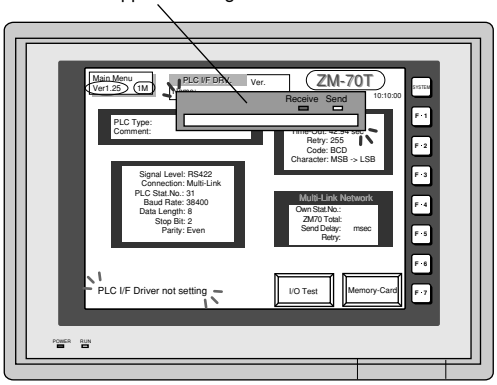


The [Transferring] dialog on the computer.

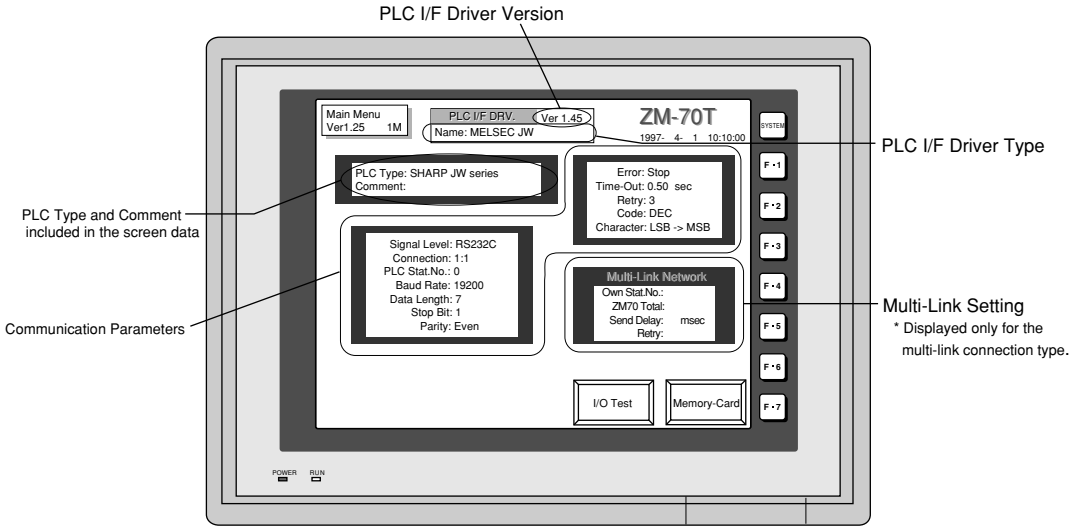


After the I/F drive data is transferred, the screen data is transferred.

This window appears during transference.



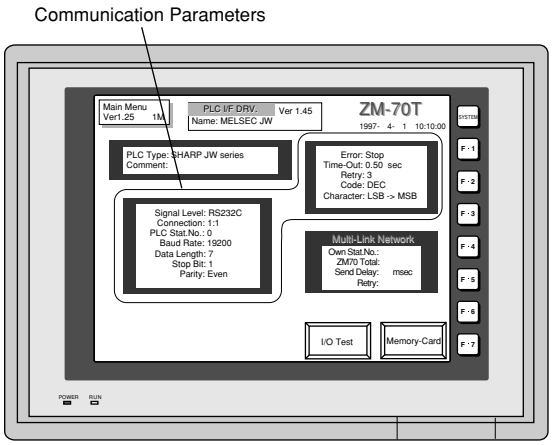
4. Upon completion of transference, the dialogs disappear.
On the ZM-70 screen, the PLC type selected when creating the screen on the computer is displayed. This means that the I/F driver data has been transferred normally.



ZM-70 Operation Check

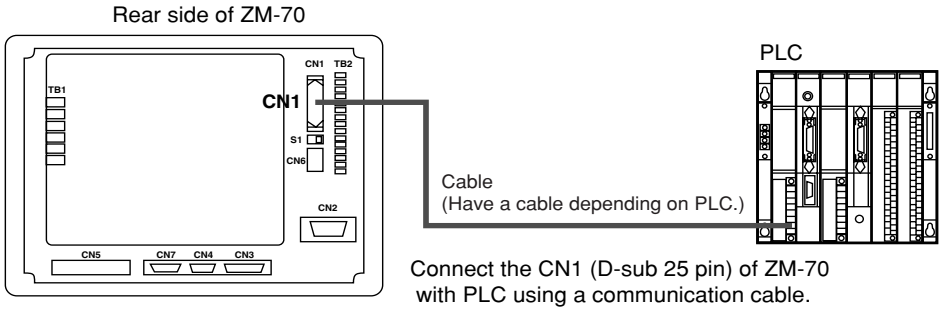
Connection and Communication with PLC

1. Set up the same communication parameters such as baud rate and parity for ZM-70 and PLC.
For ZM-70, check the "Main Menu" screen data.
For PLC, set up the data while referring to the PLC manual.



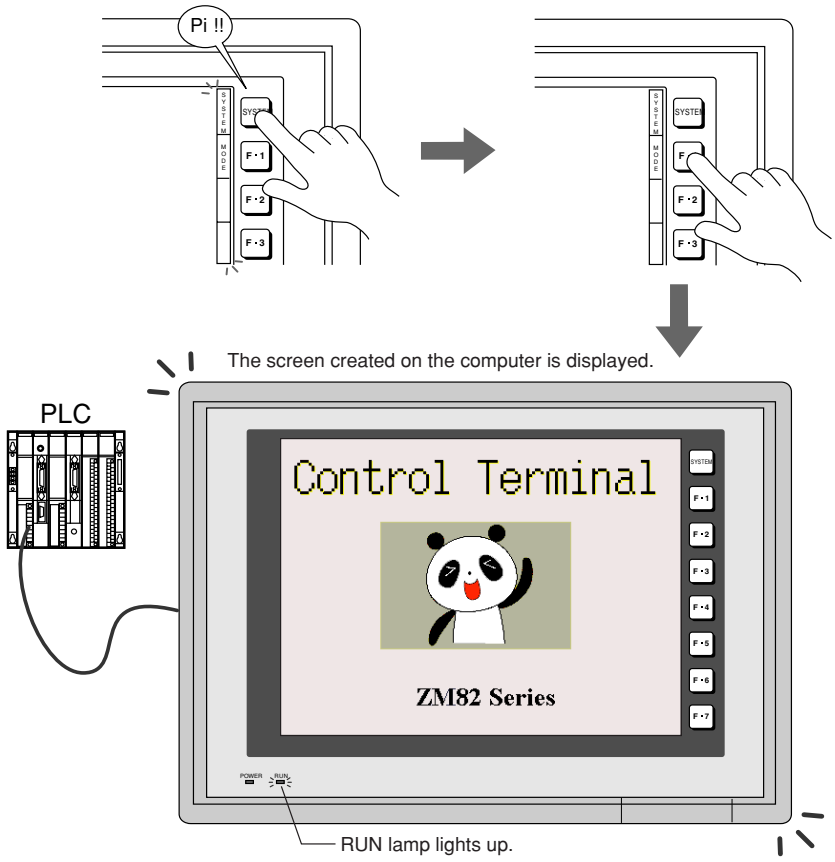
2. Disconnect the cable (ZM-82CV) between the computer and ZM-70.
Connect ZM-70 and the PLC with a communication cable.
(Use the CN1 connector used for screen data transference.)

For ZM-41, use the CN2 connector.



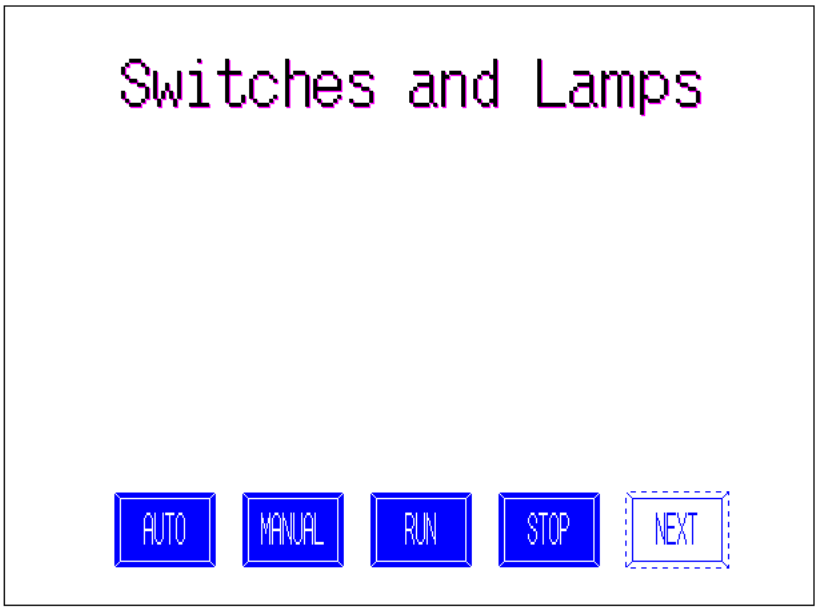
Have a proper communication cable for your PLC.
For the connecting instructions, refer to "Hardware Specifications" provided with ZM-70.

3. Press the [SYSTEM] key and the [F 1] key. The screen created on the computer is displayed on the ZM-70 screen. The "RUN" lamp in the lower left corner lights up, indicating that ZM-70 and PLC are communicating normally.



4 Creating Switches

You will place a standard switch which sets/resets the specified bit in the PLC memory when it is pressed/released, and will place four copy switches.
Also, you will create a screen change switch on the previous screen.

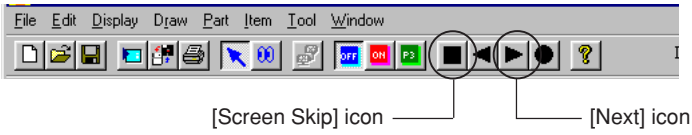


Procedure

Operation

Creating a New Screen

Click the [Next] icon to open a new screen.

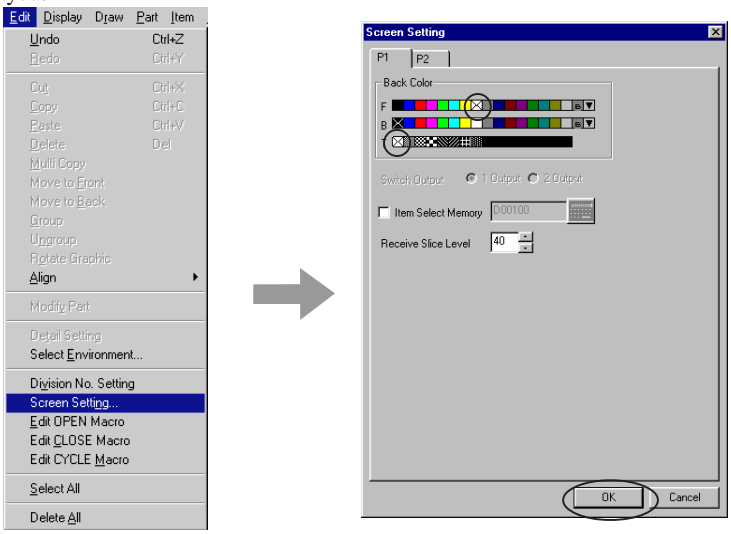


When the [Screen Skip] icon is selected, a new screen cannot be opened by clicking the [Next] icon.

Screen Color

Select the desired screen color.

1. Select [Screen Setting] from the [Edit] menu. The [Screen Setting] dialog is displayed.



2. Check white for [F (foreground)].

3. Click the [OK] button to quit the [Screen Setting] dialog.
Now the screen color is changed to white.

When a new screen is opened, it has the data of [Screen Setting] (except [Item Select Memory]) set up for the previous screen.

Creating a Screen Title

Create the screen title "Switches and Lamps".

1. Click the [Text] icon in the draw tool bar. The [Screen Drawing] dialog is displayed.

2. Key in "Switches and Lamps". Set up text properties and place the title in the upper center of the screen.

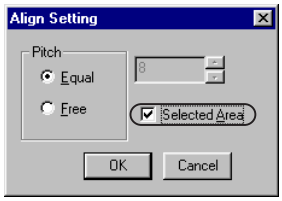
Foreground	: Black	Background	: Purple	
Enlarge X	: 3	Enlarge Y	: 3	
Rotate	: Normal	Direction	: RGT	◉Shadow

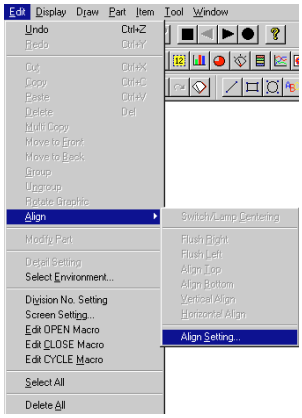
[Select] icon

3. Click the [Select] icon to close the [Screen Drawing] dialog.

To place the title in the center:

1) Select [Align] from the [Edit] menu and click [Align Setting]. The [Align Setting] dialog is displayed.
2) Check that [◉Equal] is chosen for [Pitch]. Check the [Selected Area] box(☑) and click the [OK] button.



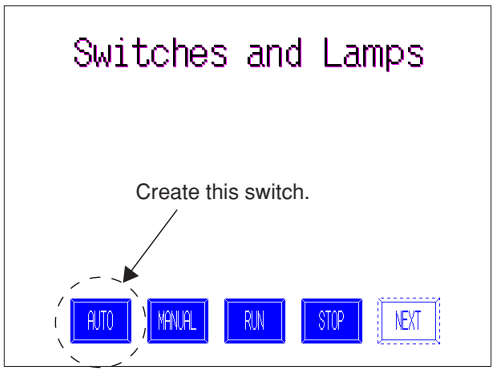


3) Enclose the title using the mouse. The coordinates are as shown below. A dotted box appears.

4) Select [Align] from the [Edit] menu and click [Vertical Align] or [Horizontal Align].
5) The title is placed in the center of the dotted box.
6) To prevent the box from appearing again in the next operation, uncheck the [☑Selected Area] box in the [Align Setting] dialog and click the [OK] button.

Selecting a Switch Part

Create a switch as follows.



For ZM-70

Basic parts are registered in "Std.zmp". Also our "Parts_e.z7p" is provided.

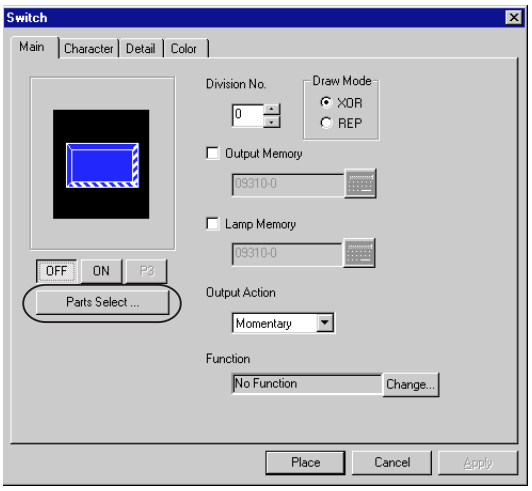
ZM-70 screen components, such as switches, lamps, numerical data display areas, and overlap display areas, are registered as parts.
The basic parts are stored in the "Std.z7p" file.
(The file is stored in the "Parts" directory when the software is installed.)
The "Parts_e.z7p" file is also provided.

There are two types of the switch parts: standard and non-standard.
Part types No. 0 to 3 in the "Parts_e.z7p" file are the standard.
The methods of changing switch color and part shape differ between the standard and the non-standard parts. Choose the standard type in this example.

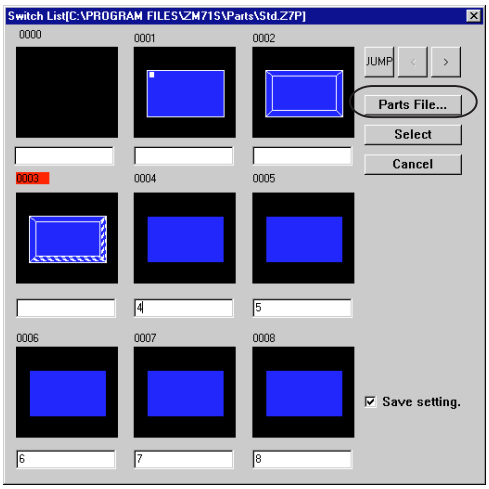
Under total available memory capacity for one screen, a maximum of 500 switches can be created.

1. Click the [Switch] icon in the tool bar. The [Switch] dialog is displayed.

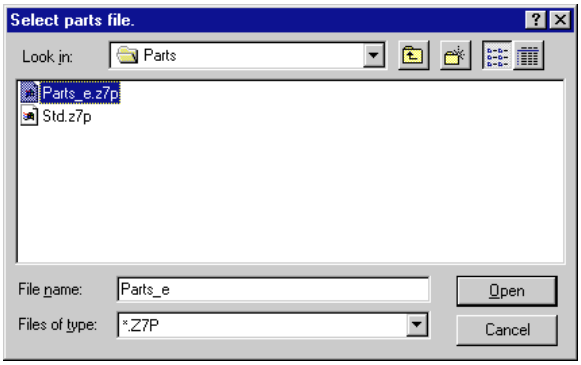
[Switch] icon



2. Click the [Parts Select] button. [Switch List (Std.z7p)] is displayed.

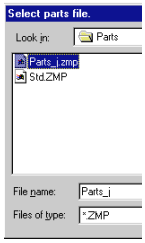


3. Click [Parts File] and open the "Parts_e.z7p" file.



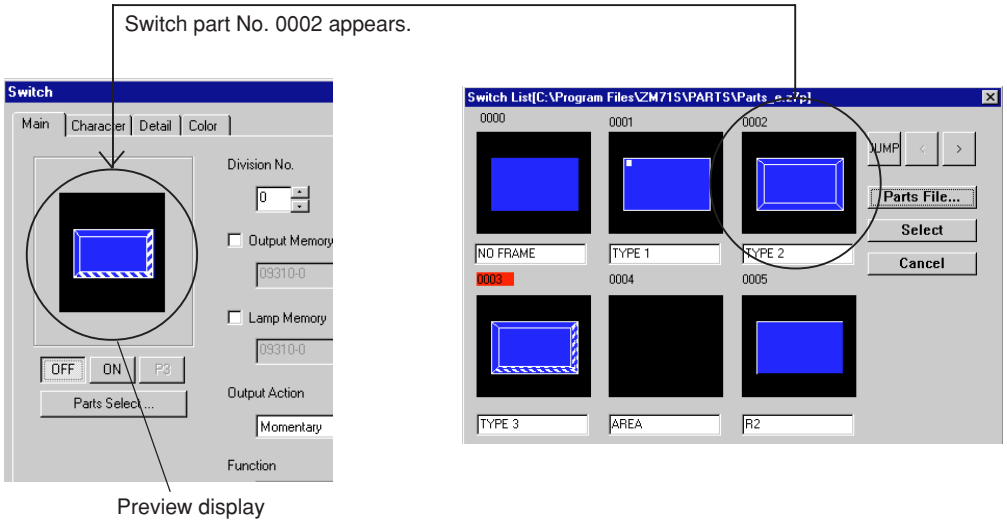
For ZM-70

Change [Files of type] to [*.z7p] to select ZM-70 parts file.
Select "Parts_e.z7p", then click [Open].



4. Select [0002] from [Switch List], and click the [Select] button.

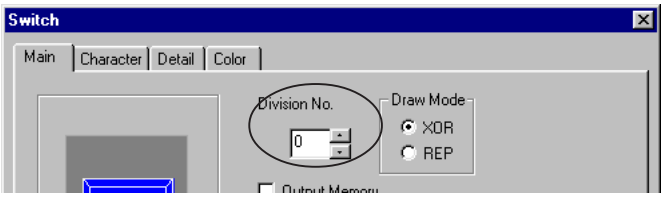
5. The selected part appears in the preview display.



Placing the Switch

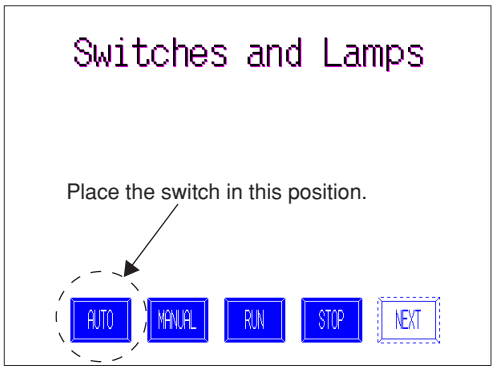
Place the selected switch part on the screen.

1. Check that "0" is entered for [Division No.].



2. Click the [Place] button in the [Switch] dialog.

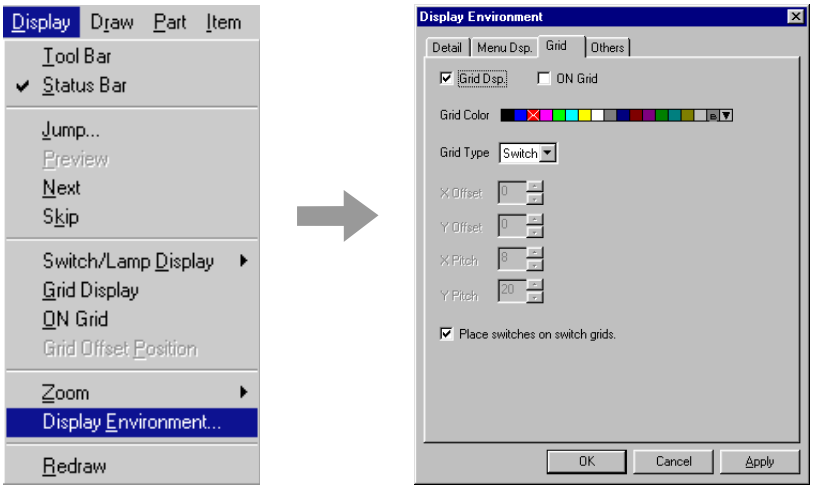
3. The switch area as shown on the right appears. Move it to the lower left corner of the screen and click the mouse. The switch is placed as shown below:



When the switch area is dragged, it is moved along the switch grids.

To bring up the switch grids:

1) Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.



2) Click [Grid]. The [Grid] tab window is displayed.

3) Set up as shown below:
   ☑Grid Dsp.
   Grid Color: Red
   Grid Type: Switch
   * ☑Place switches on switch grids.

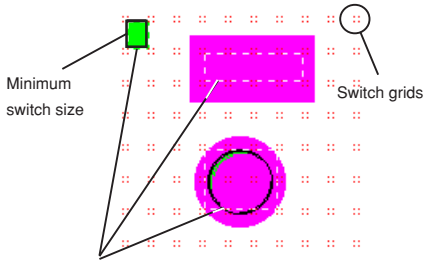
4) Click the [OK] button and close the [Display Environment] dialog.

5) The switch grids are displayed on the screen. Refer to <Fig. 1> below.

* The [☑Place switches on switch grid.] box is checked as default.
Placing, moving, and enlarging a switch area is carried out along switch grids.
When the [Place switches on switch grid.] box is not checked, these operations are carried out in the unit of dots.(1)

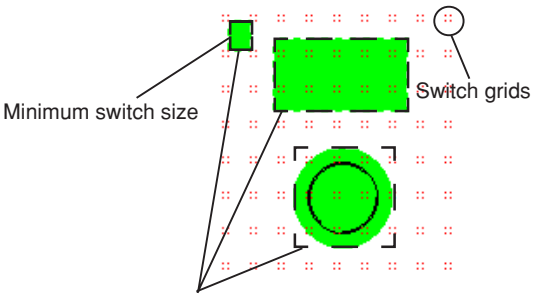
For ZM-70

(1)
When the [Place switches on switch grids.] box is not checked, these operations are carried out in the unit of dots.
However, the switch operating area is always based on the switch grids, and the switch becomes invalid in the non-active area. Refer to the following explanation for the switch operating area.



The dotted boxes show switch operating areas.

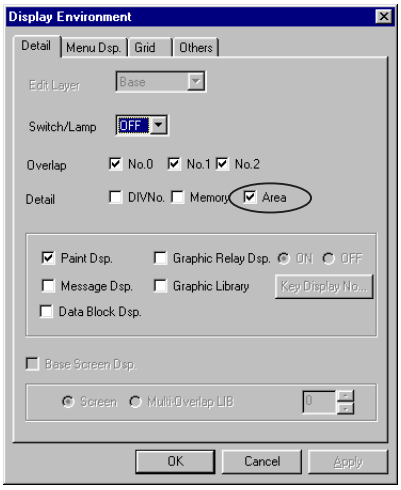
<Fig. 1>



The dotted boxes show switch operating areas.

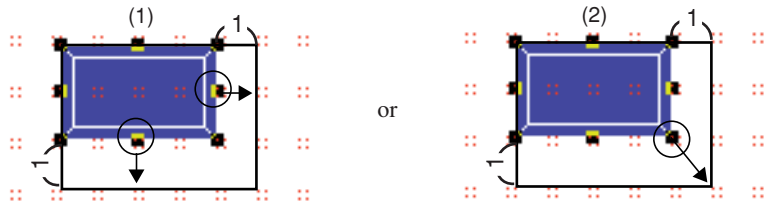
About switch operating area
A switch can be activated only when it is pressed within the operating area.

To bring up the switch operating area:
1) Select [Display Environment] from the [Display] menu.
   The [Display Environment] dialog is displayed.
2) Check the [Area] box for [Detail].
3) Click the [OK] button to quit the dialog.
4) A dotted box is displayed on the screen.
   Refer to <Fig. 1>.



Enlarging and Reducing the Switch

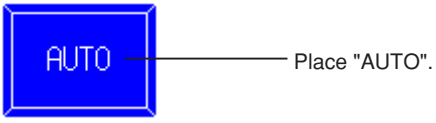
Enlarge the switch by one size along the grids in the X- and Y-axis directions.



To enlarge the switch, drag a handle using the mouse as above (1) or (2).

Text in Switch

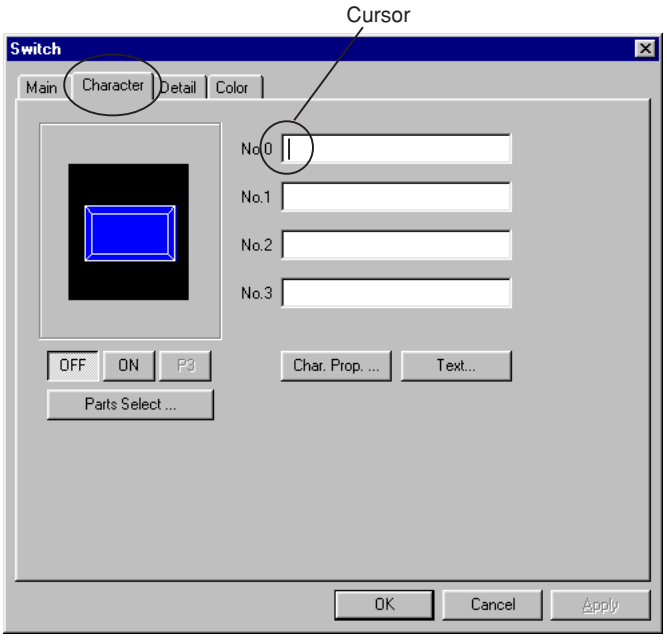
Enter text to be placed in the switch.



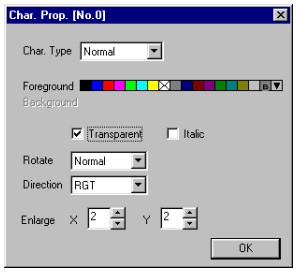
[Detail/Prop. Change] icon

1. Double-clicking the switch or selecting the switch (handles are shown) and clicking the [Detail/Prop. Change] icon brings up the [Switch] dialog.

2. Click [Character]. The [Character] tab window is displayed.



3. While the cursor is placed in text field No. 0, click [Char. Prop.].
The [Char. Prop. [No. 0]] dialog is displayed. Set up as shown below:



Char. Type : Normal
Foreground : White
☑Transparent
☐ Italic
Rotate : Normal
Direction : RGT
Enlarge X : 2 Y : 2

The [Char. Prop.] dialog can be set up for text in each text field.

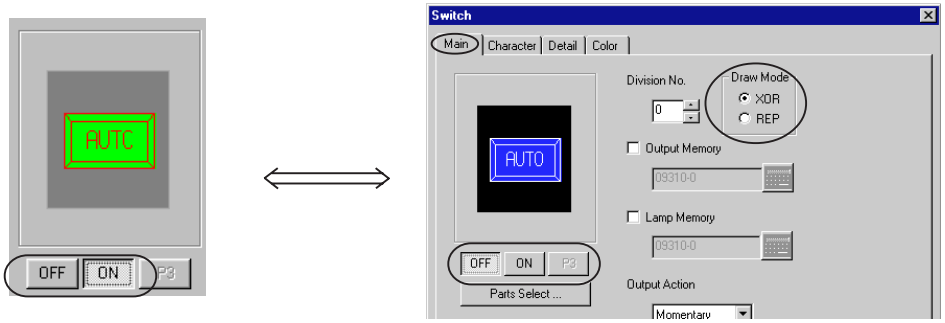
4. Key in "AUTO" in text field No. 0.

A maximum number of characters in a line depends on switch size and character size.

5. Click the [OK] button. The text is displayed in the preview display in the [Switch] dialog.

Checking the Switch Colors in the [Switch] Dialog

1. Click [Main] in the [Switch] dialog. The [Main] tab window is displayed.



2. By clicking the [ON] or [OFF] button, the switch ON color and OFF color can be checked.

3. Check that [XOR] is chosen for [Draw Mode].

4. When the [ON] or [OFF] button is clicked, the switch colors are changed as follows:

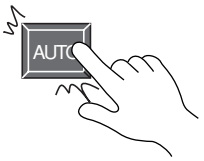
OFF color	Blue	ON color	Red
OFF frame color	White	ON frame color	Green
OFF character color	White	ON character color	Green

About XOR and REP
For a standard switch part
XOR: Switch frame and character colors are XORed with the selected colors.
For XOR, refer to "Chapter 17 Graphic Display: Graphic Colors" in the Reference Manual.
REP: They are drawn in the selected colors.

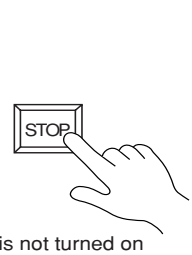
Lamps in Switches (ON/OFF)

Choose whether the lamp of the switch lights up (in ON color)/goes off (in OFF color) in internal process when it is pressed/released ([Lamp Memory] box unchecked) or the lamp lights up/goes off with external commands from PLC ([Lamp Memory] box checked).

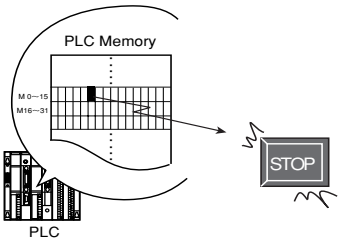
In this example uncheck the [Lamp Memory] box.



To turn on/off the lamp of the switch with external commands from PLC, check the [Lamp Memory] box.
When the lamp memory bit in the PLC memory is set, the lamp lights up (in ON color).
When the bit is reset, the lamp goes off (in OFF color).



The lamp is not turned on even when the switch is pressed.



The lamp is turned on when the lamp memory bit in the PLC memory is set.

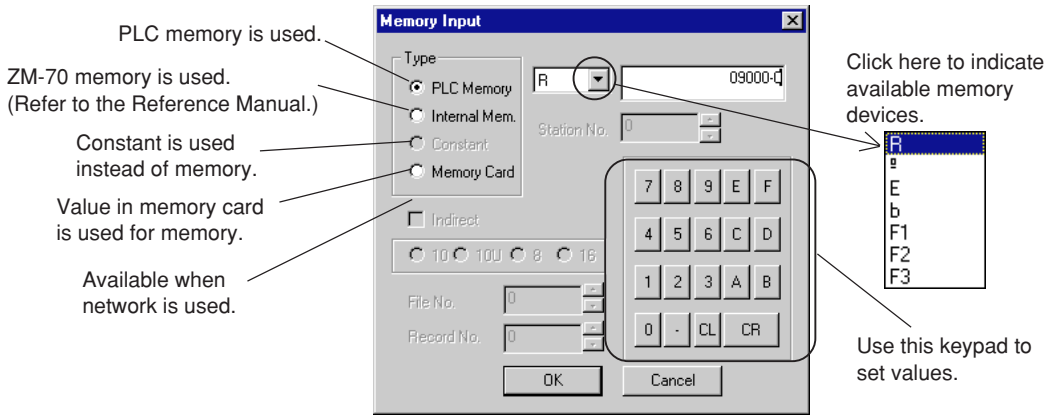
When the [Lamp Memory] box is checked and when 3-notch part is selected, it is possible for one lamp to use three patterns of OFF, ON, and P3. The lamp memory uses 2 bits in this case.

Switch Output and Output Action

Set the switch output action so that when it is pressed/released, the specified PLC memory bit is set/reset.

1. Check the [Output Memory] box (☑).

2. Click  . The [Memory Input] dialog is displayed.



3. Set up as shown below:

Type : ◉PLC memory
Memory : 09000-0

Click [OK] and return to the [Switch] dialog.

4. Select the desired option for [Output Action] so that the output to PLC is executed when the switch is pressed.
To set/reset 09000-0 when the switch is pressed/released in this example, select [Momentary] for [Output Action].
"R" memory is bit-writable.

[Momentary], [Set], [Reset], [Alternate] or [Momentary W] can be selected for [Output Action].

Switch Action	Action output processing
Set	When the switch is pressed, the specified bit is set (ON).
Reset	When the switch is pressed, the specified bit is reset (OFF).
*Momentary (Momentary W)	When the switch is held down, the specified bit is set (ON), and when it is released, it is reset (OFF).
Alternate	Each time the switch is pressed, the specified bit is alternately set (ON) and reset (OFF).

* If the non-bit-writable memory is specified for [Output Memory], it is recommended to select [Momentary W]. In this case, results are directly written in the one-word area of the specified memory.

Switch Function

Set the function of the switch to be executed when it is pressed.

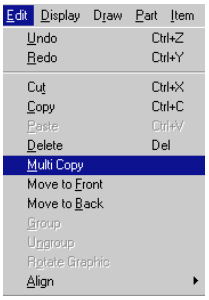
1. In this example, the switch should just set/reset the specified PLC memory bit when it is pressed/released. Therefore, no special function is required. Check that [No Function] is selected for [Function].

To select a different option for [Function], click the [Change] button to bring up the [Switch Function] dialog. Select the desired one from the dialog.

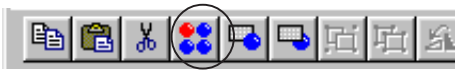
2. Click [OK] to quit the [Switch] dialog. The AUTO switch has been completed.

Copying the Switch

Make four copies of the switch (AUTO) and complete them one by one.

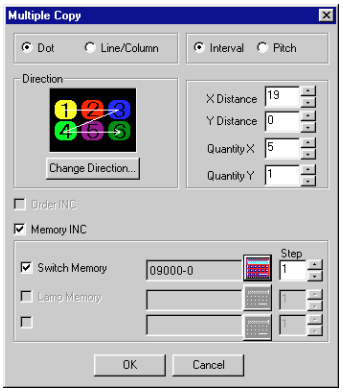


1. Click the AUTO switch (handles are shown). Click [Multi Copy] icon in the parts bar.



Select [Multi Copy] from the [Edit] menu. The [Multiple Copy] dialog is displayed.

2. Set up as shown below and click the [OK] button.



◉Dot Direction: ①②③ ④⑤⑥

◉Interval
X Distance: 19 Quantity X: 5
Y Distance: 0 Quantity Y: 1
☑Memory INC
☑Switch Memory
09000-0 Step: 1

3. Five switches (the master switch inclusive) are displayed.

1st 2nd 3rd 4th 5th

4. Complete the MANUAL, RUN, and STOP switches.

(1) Double-click the 2nd switch. The [Switch] dialog is displayed.
Open the [Main] tab window. Set up as shown below:

Division No. : 0
Output memory : ☑checked 09000-1
Lamp Memory : ☐unchecked
Output Action : Momentary
Function : No function

(2) Click [Character] in the [Switch] dialog. The [Character] tab window is displayed.

(3) "AUTO" is highlighted in the switch. Key in "MANUAL".

(4) Click the [OK] button. The switch is completed.

(5) For the 3rd switch, follow the same steps.
Bring up the [Main] tab window and set up as shown below:

Division No. : 0
Output memory : ☑checked 09000-2
Lamp Memory : ☐unchecked
Output Action : Momentary
Function : No function

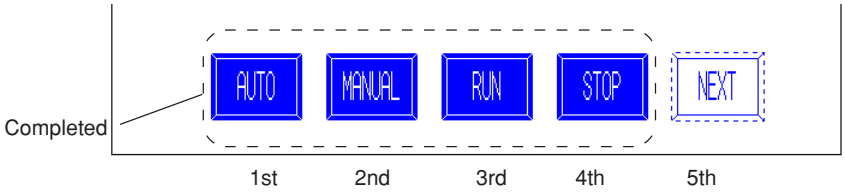
Bring up the [Character] tab window and key in "RUN".

(6) For the 4th switch, follow the same steps.
Bring up the [Main] tab window and set up as shown below:
As this switch is turned on/off with external commands from PLC, check the [Lamp Memory] box.

Division No. : 0
Output memory : ☑checked 09000-3
Lamp Memory : 09000-5
Output Action : Momentary
Function : No function

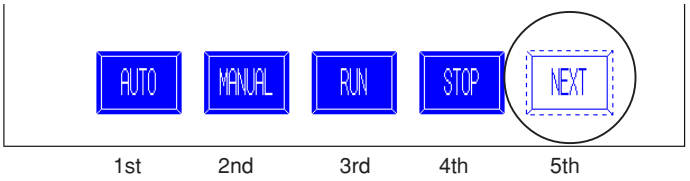
Bring up [Character] tab window and key in "STOP".

The MANUAL, RUN, and STOP switches have been completed.



Creating a Screen Change Switch and Modifying Color and Part

Create a screen change switch "NEXT".



1. Double-click the 5th switch. The [Switch] dialog is displayed.

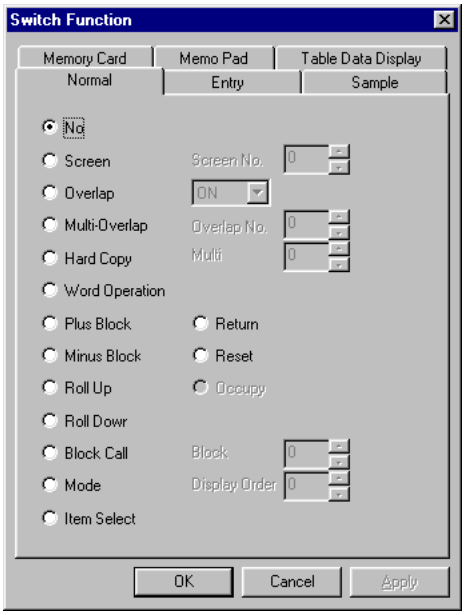
2. Set up the [Switch] dialog.
Division No.: 0

3. Although the [Output Memory] box is checked and "09000-4" is entered, uncheck it. Output is not made when the NEXT switch is pressed.
☐ Output Memory: unchecked

4. Lamp Memory: unchecked

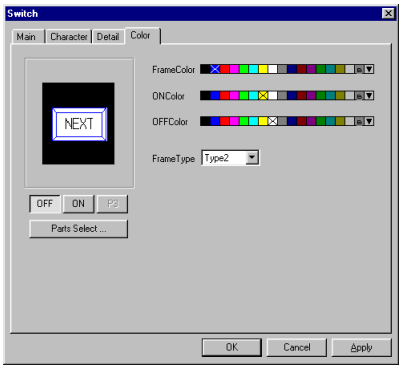
5. When the [Output Memory] box is not checked, [Output Action] is ignored.

6. Click the [Change] button for [Function].
The [Switch Function] dialog is displayed.



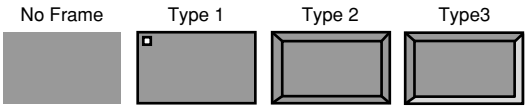
Click [Screen]. Enter "2" for [Screen No.]. Click the [OK] button.
The [Main] tab window is displayed. [Screen: 2] is entered for [Function].

7. Change the switch color.
Click [Color] in the [Switch] dialog. The [Color] tab window is displayed.



8. Set up as shown below:
Frame Color : Blue
ON Color : Yellow
OFF Color : White

9. Choose the desired type from the following standard switch parts.

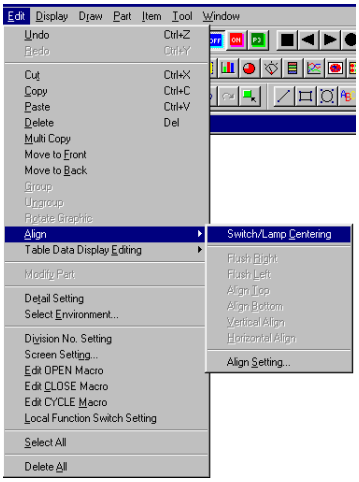


Select [Type 3] for [Frame Type] in this example.

10. Change the switch text.
1) Click [Character] in the [Switch] dialog. The [Character] tab window is displayed.
2) To change character color, click [Char. Prop.] to display the [Char. Prop.] dialog.
3) Check blue for [Foreground], and set enlargement to X:1, Y:2, then click the [OK] button.
4) Key in "NEXT" in text field No.0.

11. Click the [OK] button.

12. For centering the characters on the switch, select [NEXT] switch then select [Switch/Lamp Centering] from [Edit] menu.



The NEXT switch has been completed.

Placing the Screen Change Switch on the Previous Screen

Place the screen change switch on screen No. 0.

1. Click the [Previous] icon to bring up the previous screen No. 0.

[Switch] icon

2. Click the [Switch] icon in the tool bar. The [Switch] dialog is displayed.

3. Bring up the [Main] tab window. Set up as shown below:

Parts Select : No. 0002 in [Switch List Parts_e.z7p]
Division No. : 0
Output memory : ☐ unchecked
Lamp Memory : ☐ unchecked
Output Action : Momentary (to be ignored)
Function : Screen: 1

For ZM-70

Select No.0002 from "Parts_e.z7p"

4. Bring up the [Character] tab window. Key in "NEXT".
Set up properties as shown below:

Char. Type : Normal
Foreground : White
☑Transparent: checked ☐ Italic : unchecked
Rotate : Normal
Direction : RGT
Enlarge X : 1 Y : 2

5. Bring up the [Color] tab window. Set up as shown below:

Frame Color : White
ON Color : Red
OFF Color : Blue

[Save] icon

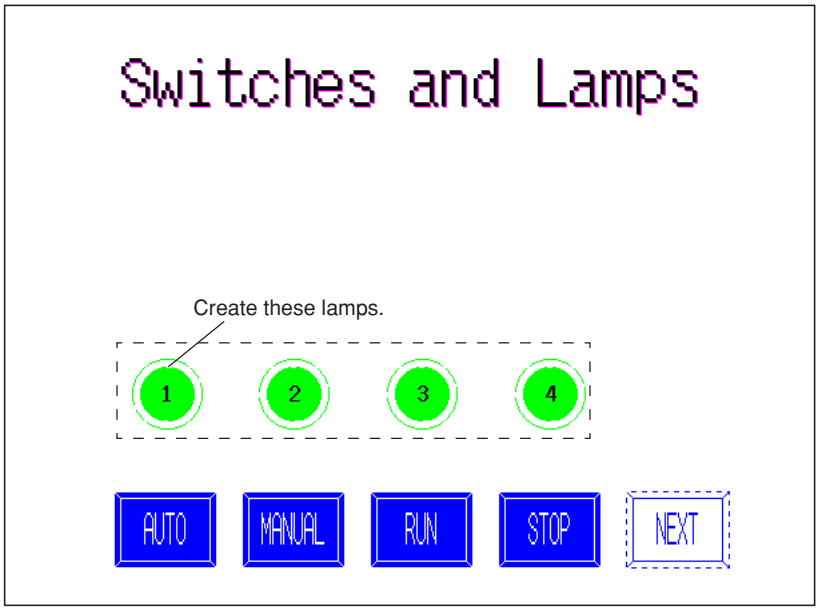
6. Click the [Place] button in the [Switch] dialog. This step completes the NEXT switch.

7. Click the [Save] icon to save the created screen.

Switch operation check is explained in Chapter 5.

5 Creating Lamps

On the screen created in Chapter 4, we will add lamps as shown below.

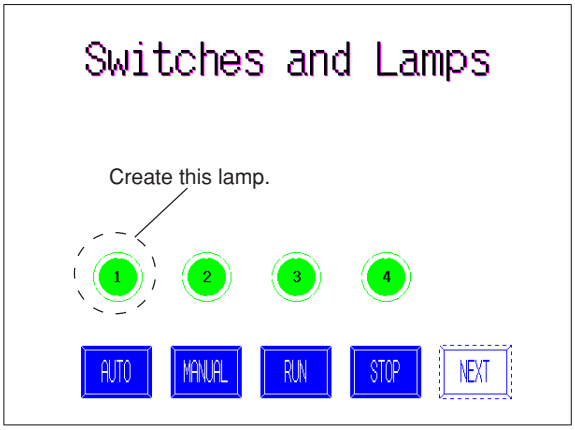


Procedure

Operation

Selecting a Lamp Part

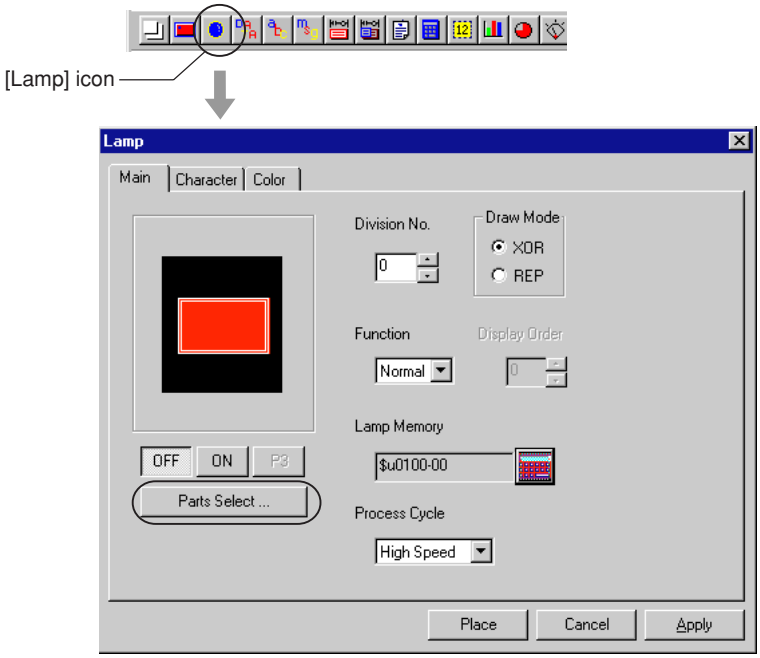
Create lamp ① as shown below.



Similar to the switch parts, the lamp parts consists of two types: standard and non-standard.
Part types No. 0 to 3 in the "Parts_e.z7p" file are the standard.
The methods of modifying lamp color and part shape differ between the standard and the non-standard. Choose the non-standard type in this example.

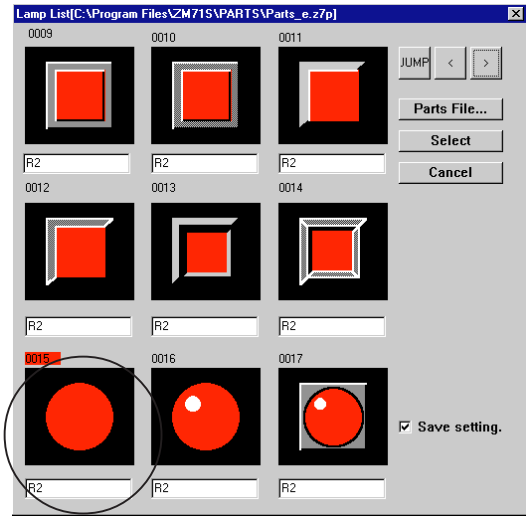
1. Click the [Next] icon and open screen No. 1.

2. Click the [Lamp] icon in the tool bar. The [Lamp] dialog is displayed.



3. Click the [Parts Select] button. [Lamp List Parts_e.z7p] is displayed.

4. Select [0015] and click the [Select] button.



5. The part appears in the preview display in the [Lamp] dialog.

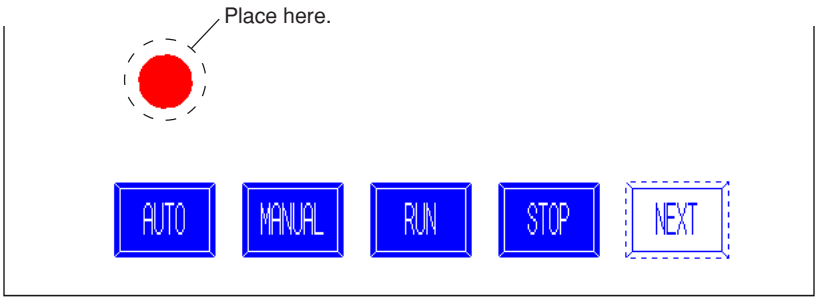
Placing the Lamp

Place the lamp part on the screen.

1. Check that "0" is entered for [Division No.].

2. Click the [Place] button in the [Lamp] dialog.

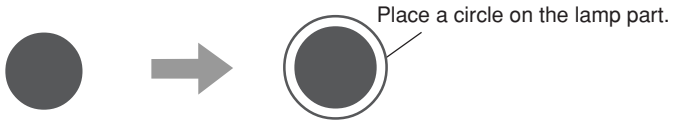
3. The lamp area is shown. Place it above the switch on the extreme left.



Under the total available memory capacity for one screen, a maximum of 500 lamps can be created.

Part Modification

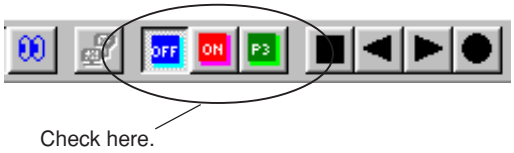
Modify the lamp part as shown below:



The lamp part shape is modified in the [Modify Part] window.
When modifying the lamp which is off, check that [OFF] is chosen for [Switch/Lamp Display]. When modifying the lamp which is on, check that [ON] is chosen for [Switch/Lamp Display].

Lamp Modification for "OFF"

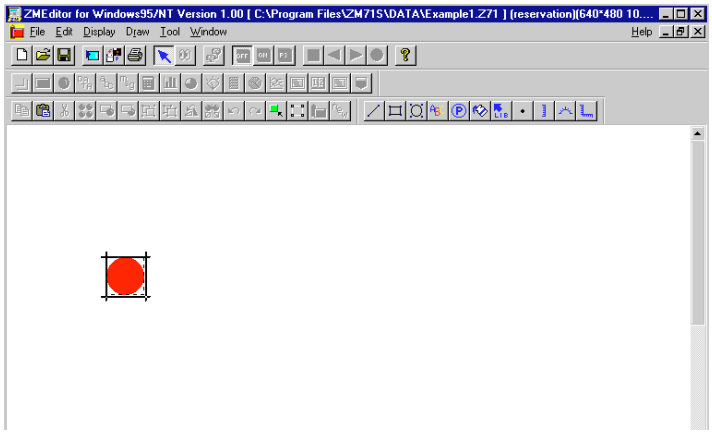
1. Check that the lamp displayed on the screen is off ([OFF] is displayed at the bottom of the screen).

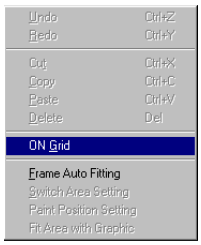


If not, select [Switch/Lamp Display] from the [Display] menu and choose [OFF].

2. Click the lamp part (handles are shown). Click the [Change the setting of a part placed.] in the tool bar.

3. The [Modify Part] window is displayed.

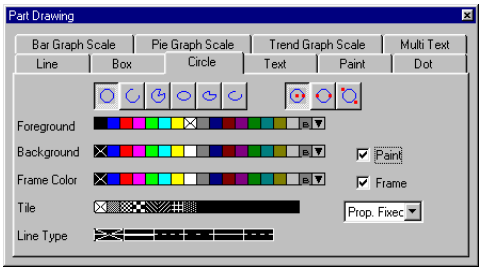




4. Right-click the mouse. The pop-up menu is displayed. Uncheck [ON Grid].

5. Place a green circle on the lamp part.

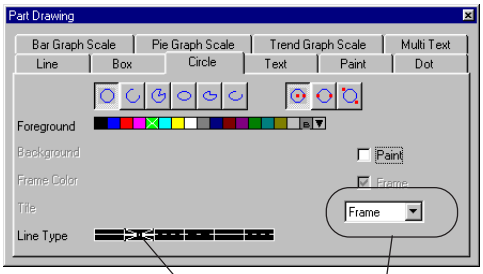
1) Click the [Circle] icon in the draw tool bar. The [Part Drawing] dialog is displayed.



2) Uncheck the [Paint] box. Set up as shown below:

Foreground : Green
Line Type : No. 1

Select the desired option from the [Frame] drop-down menu.

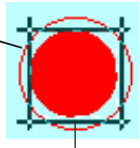


Whether part color can be changed in the [Lamp] dialog is determined by an option selection from [Frame Prop.].

* [Prop. Fixed] : Color cannot be changed in the [Lamp] dialog.
* [Frame] : Color can be changed by setting [Frame ON/OFF Color] in the [Color] tab window opened in the [Lamp] dialog.
* [Area] : Color can be changed by setting [ON/OFF Color] in the [Color] tab window opened in the [Lamp] dialog.

These options are also provided for the switch parts.

6. Draw a circle and place it as shown on the right.



About enlarging the placed part

- The placed part can be enlarged by right-dragging the mouse while holding down the CTRL key.

400 % zoom:
Drag as shown above.

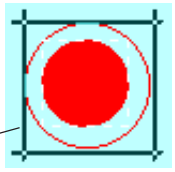
200 % zoom:
Drag as shown above.

- By pressing the [HOME CLR] key, the initial window display is restored (the screen zero point: the top left corner; zoom: 100 %).

- Select [Zoom] from the [Display] menu. Select the desired option: 400 %, 200 %, 100 %, or 75 %.

7. Click the [Frame Auto Fit] icon.

[Frame Auto Fit] icon



Frame

Keyword

Frame

This shows the part area.

[Frame Auto Fit] icon

When this icon is clicked, the part including the drawn figure is enclosed in the frame.

The circle is enclosed in the frame.
The OFF lamp has been completed.

8. Proceed to creating the ON lamp.
Select the lamp entirely by dragging the mouse. While holding down the CTRL key, press "C". Or, select [Copy] from the [Edit] menu, or click the [Copy] icon.
The lamp is copied.

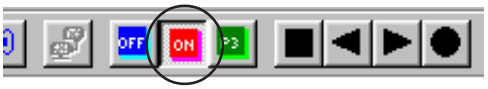
[Copy] icon

9. Select [Quit Part Modifying] from the [File] menu. The window is closed and the screen is displayed.

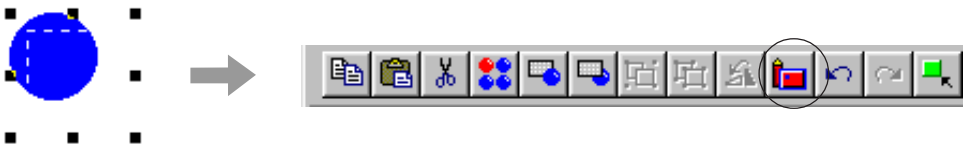
Lamp Modification for "ON"

Modify the lamp when it is on.

10. Select [Switch/Lamp Display] from the [Display] menu and choose [ON].

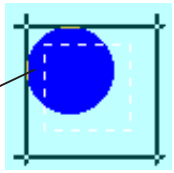


11. Select the lamp (handles are shown) for modification. Click the [Change the setting of a part placed.] icon.



12. The [Modify Part] window is displayed.

13. Select the painted circle and delete it.

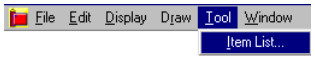


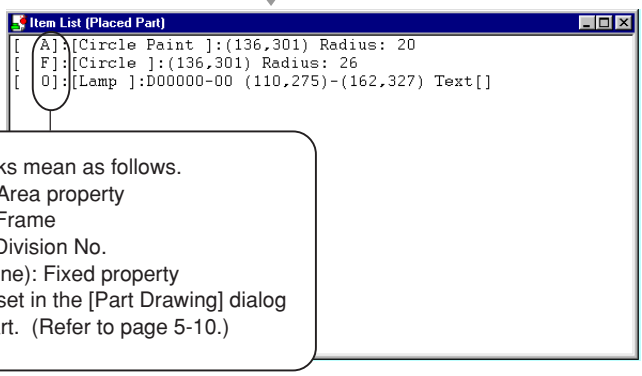
14. While holding down the CTRL key, press "V". Or, select [Paste] from the [Edit] menu, or click the [Paste] icon. The lamp copied in step 8 is pasted.

[Paste] icon

When the list of placed parts should be referred to or when the desired part cannot be clicked:

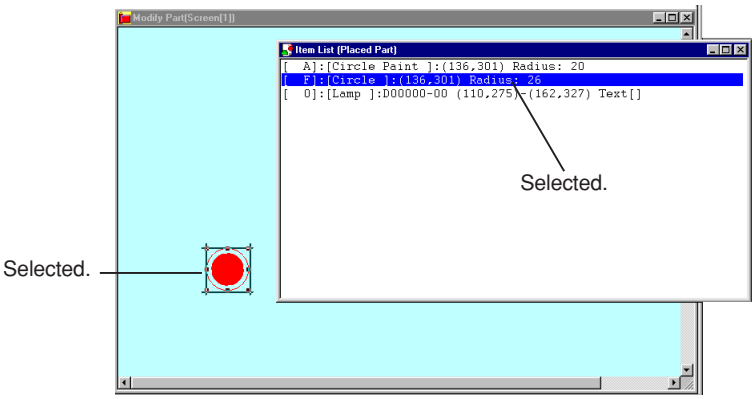
1 Select [Item List] from the [Tool] menu. The [Item List] window is displayed.





These marks mean as follows.
A: Area property
F: Frame
0: Division No.
(none): Fixed property
These are set in the [Part Drawing] dialog for each part. (Refer to page 5-10.)

2 When the part for modification is selected, the part in the [Modify Part] window is also selected.



3 Select [Detail Setting] from the [Edit] menu. The dialog for the details of the part is displayed. Modify the part as desired.
Modification of the [Lamp] dialog is not possible in the [Modify Part] window.
Return to the screen and make a modification.

4 Select [Quit Item List] from the [File] menu.

15. When [Quit Part Modifying] is selected from the [File] menu, the screen is restored.

16. Select [Switch/Lamp Display] from the [Display] menu. Select [OFF] so that [OFF] appears at the bottom of the screen.

[Lamp] Dialog

Set up the [Lamp] dialog for the lamp.

[Detail/Prop. Change] icon

1. Double-clicking the lamp or selecting the lamp (handles are shown) and clicking the [Detail/Prop. Change] icon brings up the [Lamp] dialog.

2. Check that "0" is entered for [Division No.].

3. Select [Normal] for [Function].

4. Enter "09000-00" for [Lamp Memory].

5. Check that [REP] is selected for [Draw Mode].

6. Choose [High Speed] for [Process Cycle].

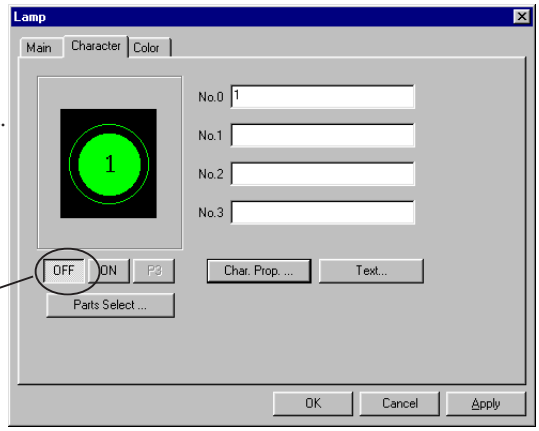
Text in Lamp

Enter text to be placed in lamp.

1. Click [Character] in the [Lamp] dialog. The [Character] drop-down menu is displayed.

2. Check that [OFF] is indicated as shown on the right.

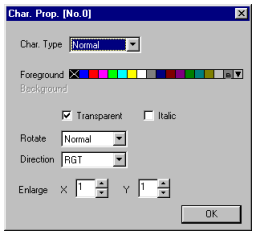
3. Enter "1" for text field No. 0.



Select [OFF].

4. While the cursor is placed in text field No. 0, click [Char. Prop.]. The [Char Prop.[No. 0]] dialog is displayed. Set up as shown below and click [OK].

Char. Type : Bold
Foreground : Black
☑Transparent
☐ Italic
Rotate : Normal
Direction : RGT
Enlarge X : 1 Y : 1

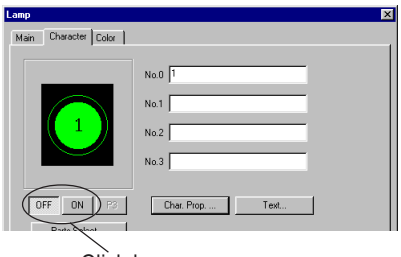


When [REP] is chosen for [Draw Mode], refer to the following.

Text for designating the lamp function
<When [REP] is chosen for [Draw Mode]>

1) Texts to be displayed when the lamp is on and off can be entered separately. For the text for OFF, check that [OFF] is chosen and enter the desired text. For the text for ON, click [ON] and enter the desired text.

2) Although [REP] is chosen for [Draw Mode] in this example, the same text is used when the lamp is on and off. Therefore, after the text for OFF is entered, entering the text for ON is not necessary.
It is recommended that the lamp color and text color when the lamp is on are not the same.



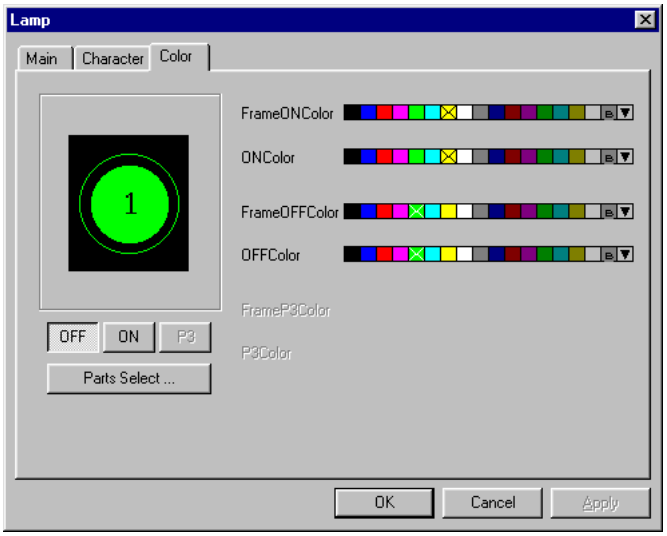
Click here.

<When [XOR] is selected for [Draw Mode]>
The same text is used when the lamp is on and off. Enter the desired text for OFF.
The text for ON is displayed in a color determined by XOR operation.

Lamp Color Change

Change the color of the lamp.

1. Click [Color] in the [Lamp] dialog. The [Color] tab window is displayed.



2. Set up as shown below:

ON Frame Color	: Yellow	OFF Frame Color	: Green
ON Color	: Yellow	OFF Color	: Green

3. Click the [OK] button to quit the [Lamp] dialog.

About lamp color
Although lamp color is changed in the [Lamp] dialog, changing may not be possible in certain cases. Then bring up the [Modified Part] window and change color.
(Refer to page 5-7.)

Copying the Lamp

Make four copies of lamp ① and complete them one by one.

1. Click lamp ① (handles are shown).

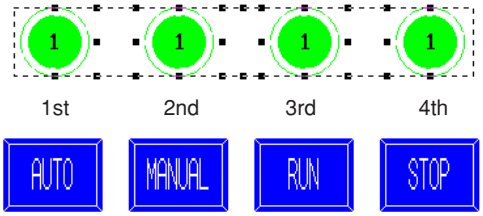
Click [Multi Copy] icon in the tool bar. The [Multiple Copy] dialog is displayed.

2. Set up as shown below and click [OK].

◉Line/Column
◉Interval

Direction: ①②③ ④⑤⑥

X Distance: 5 Quantity X: 4
Y Distance: 0 Quantity Y: 1
☑Memory INC
☑Lamp Memory 09000-00 Step: 1



3. Four lamps (the master lamp inclusive) are displayed.

4. Complete the 2nd, 3rd, and 4th lamps.

(1) Double-click the 2nd lamp. The [Lamp] dialog is displayed.
Open the [Main] tab window. Set up as shown below:

Division No. : 0
Function : Normal
Lamp Memory : 09000-01
Draw Mode : ◉REP
Process cycle : High Speed

(2) Click [Character] in the [Lamp] dialog. The [Character] tab window is displayed.

(3) "1" is highlighted in the lamp. Key in "2".

(4) Click the [OK] button.

(5) For the 3rd and 4th lamps, follow the same steps.
Open the [Main] tab window and set up as shown below:

Division No. : 0
Function : Normal
Lamp Memory : 09000-02 (3rd) 09000-03 (4th)
Draw Mode : ⦿REP
Process cycle : High Speed

Open the [Character] tab window and key in "3" for the 3rd lamp and "4" for the 4th lamp.

Now screen No. 1 has been completed.

ZM-70 Operation Check

Save the created screen.
While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-70 and check that ZM-70 operates correctly.

Used memory

<Switch>

No.	Output memory	Lamp memory	OFF color	ON color
1	M00000	None	Blue	Red
2	M00001	None	Blue	Red
3	M00002	None	Blue	Red
4	M00003	M00005	Blue	Red
5	None	None	White	Yellow

<Lamp>

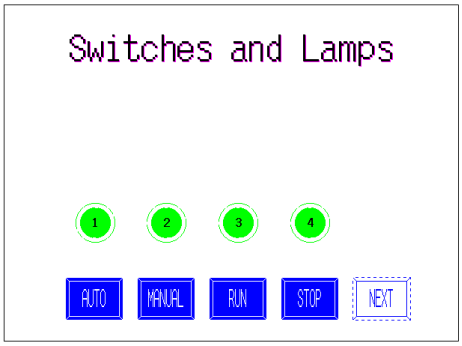
No.	Lamp memory	OFF color	ON color
1	M00000	Green	Yellow
2	M00001	Green	Yellow
3	M00002	Green	Yellow
4	M00003	Green	Yellow

Screen Change Check

Screen No. 0 is displayed first.
Pressing the NEXT switch brings up screen No. 1.

Screen No. 0

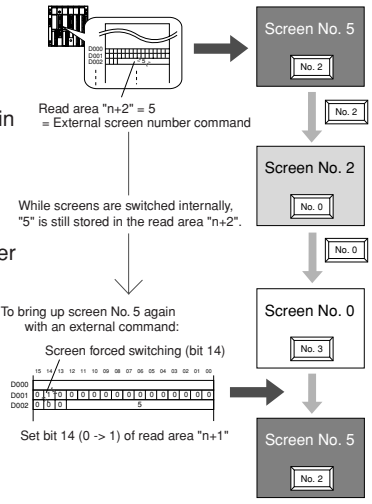
Screen No. 1



- Changing the screen with an external command from PLC
  Enter the desired screen number for the Read Area "n+2" (external screen number command). The Read Area is set up for [Read Area] in the [Comm. Parameter] dialog (displayed by selecting [System Setting] from the [Item] menu.)

- Checking the screen currently being displayed in PLC
  The Write Area "n+2" set up for [Write Area] in the [Comm. Parameter] dialog stores the screen number currently being displayed.

- Notes on changing the screen by using both switch and PLC
  Change the screen with an external screen number command from PLC first.
  Afterwards, the screen change switch is used to change screens.
  When the first screen should be displayed again with a command from PLC, the command is invalid because the read area "n+2" (external screen number command) still stores the first screen number. In such a case, when bit 14 of "n+1" is set (0 -> 1), the screen of the number stored in the read area "n+2" is displayed.

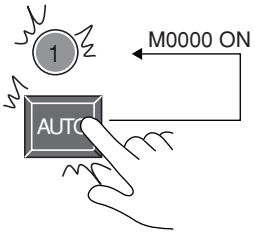


Checking Lamp Turning ON

1. Press the AUTO switch.

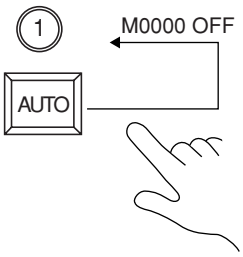
The switch lamp lights up.

Lamp ① lights up at the same time (M0000 is set).



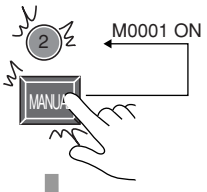
When the AUTO switch is released,
the lamp goes off automatically.

Lamp ① goes off at the same time (M0000 is reset).



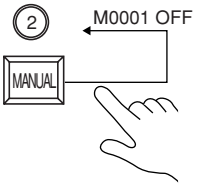
2. Press the MANUAL switch.
The switch lamp lights up.

Lamp ② lights up at the same time (M0001 is set).



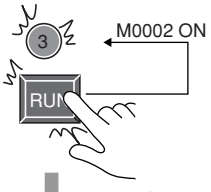
When the MANUAL switch is released,
the lamp goes off automatically.

Lamp ② goes off the same time (M0001 is reset).



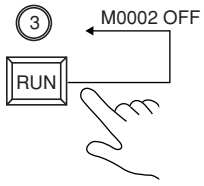
3. Press the RUN switch.
The switch lamp lights up.

Lamp ③ lights up at the same time (M0002 is set).



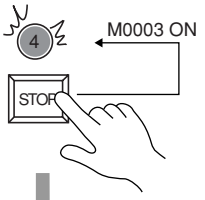
When the RUN switch is released,
the lamp goes off automatically.

Lamp ③ goes off at the same time (M0002 is reset).



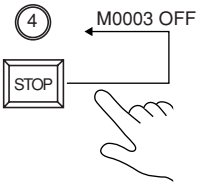
4. Press the STOP switch.

Lamp ④ lights up (M0003 is set).



When the STOP switch is released,

lamp ④ goes off (M0003 is reset).

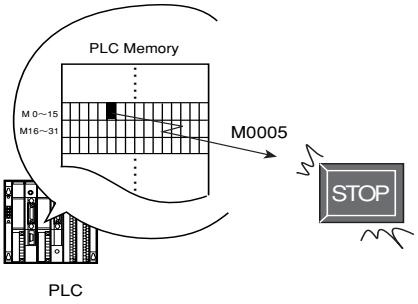


5. Turn on the STOP switch lamp.

Set M0005 with a command from PLC.

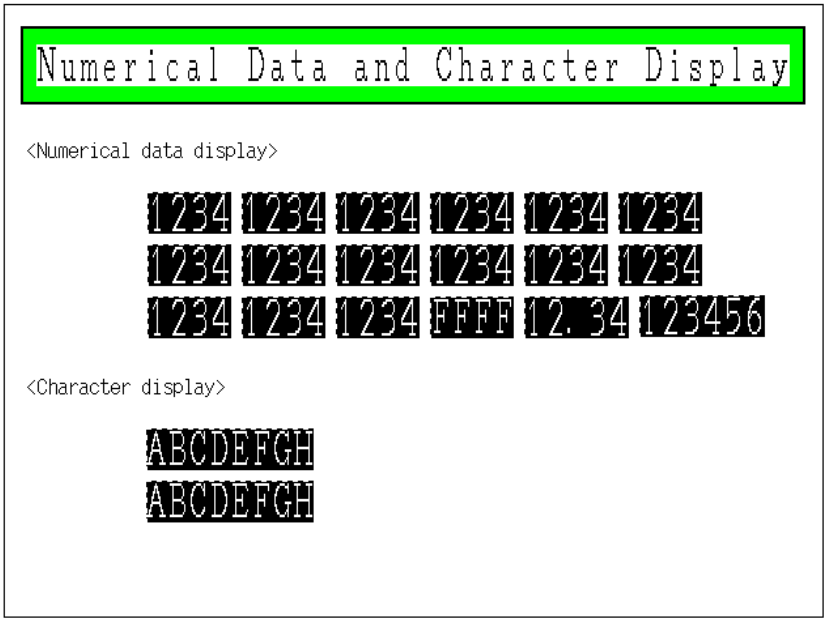
The switch lamp lights up.

(Refer to "(6)" on page 4-13.)



6 Creating PLC Numerical Data and Character Display Parts

You will create the following screen including PLC numerical data and character display parts.



Procedure

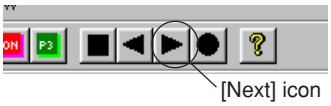
Operation

Creating a New Screen

Open a new screen and place fixed texts.

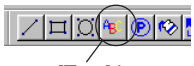
1. Click the [Next] icon to open a new screen.

Create screen No. 2.



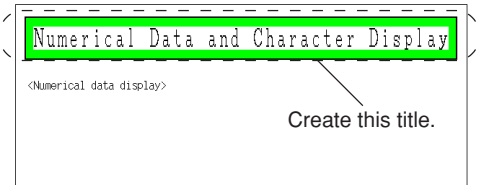
2. Select [Screen Setting] from the [Edit] menu. The [Screen Setting] dialog is displayed.
Check white for [F (foreground)] and click [OK].

3. Click the [Text] icon in the draw tool bar.



4. Key in "Numerical Data and Character Display". Set up text properties as shown below and place it in the upper center of the screen.

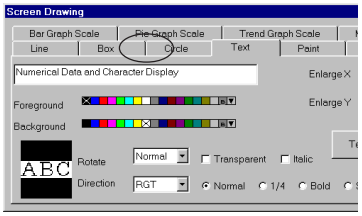
Enlarge X: 2 Y: 2
Foreground : Black
Background : White
Rotate : Normal
Direction : RGT
☐ Transparent
☐ Italic
◉ Normal

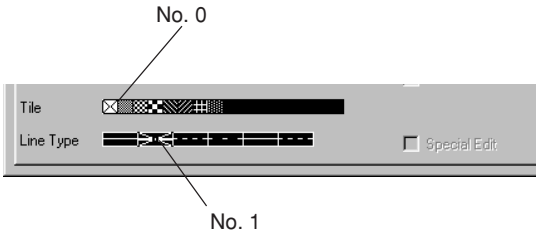


5. Click [Box] in the [Screen Drawing] dialog. Set up as shown below:

Foreground : Yellow
Background : Black
Frame Color : Black
Tile : No. 0
Line Type : No. 1

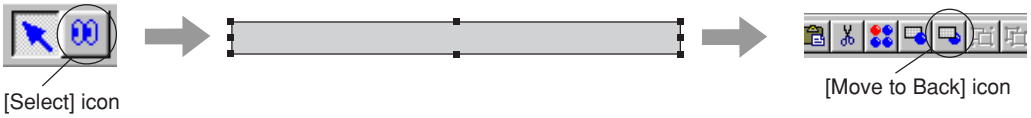
☑Paint
☑Frame





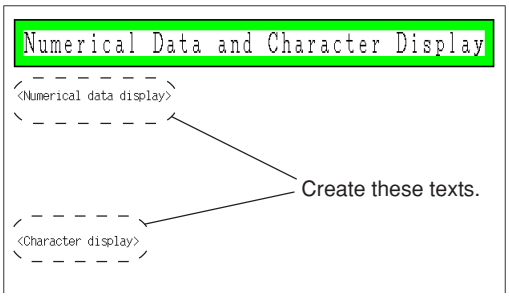
6. Enclose "Numerical Data and Character Display" in a box.

7. Move the box to the back of the title.
Click the [Select] icon and select the box (handles are shown). Click the [Move to Back] icon.



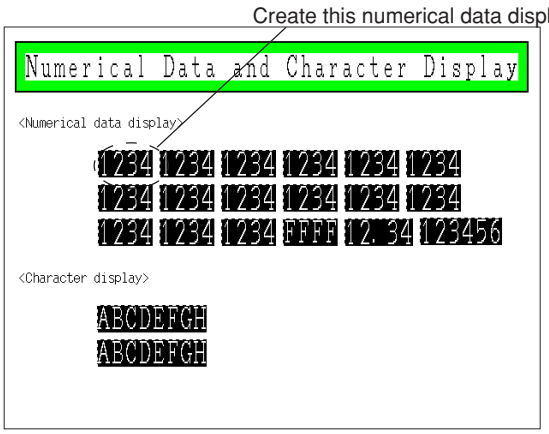
8. Key in "<Numerical data display>" and "<Character display>". Place them on the left. Set up properties as shown below:

Enlarge X: 1 Y: 1
Foreground : Black
Rotate : Normal
Direction : RGT
☑Transparent
☐ Italic
◉Normal



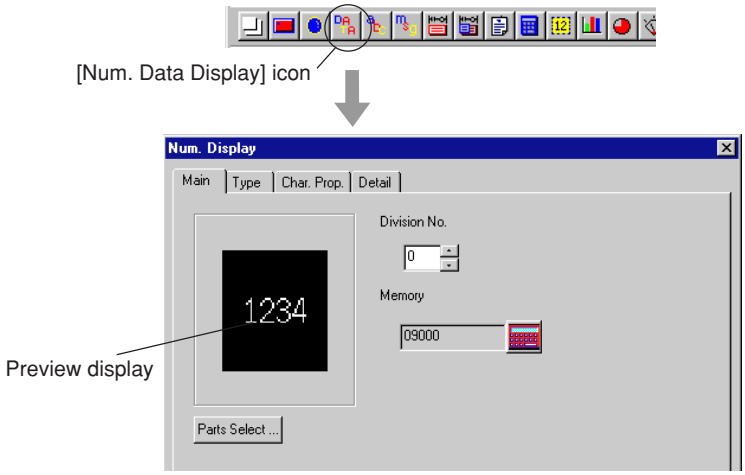
Creating Numerical Data Display Parts

Create the following numerical data display part.



[Num. Display] Dialog

1. Click [Num. Data Display] icon in the tool bar. The [Num. Display] dialog is displayed.



2. Click the [Parts Select] button. [Num. Display List Parts_i.zmp] is displayed.

3. Select [0007] and click the [Select] button.
Part No. 0007 appears in the preview display in the [Num. Display] dialog.

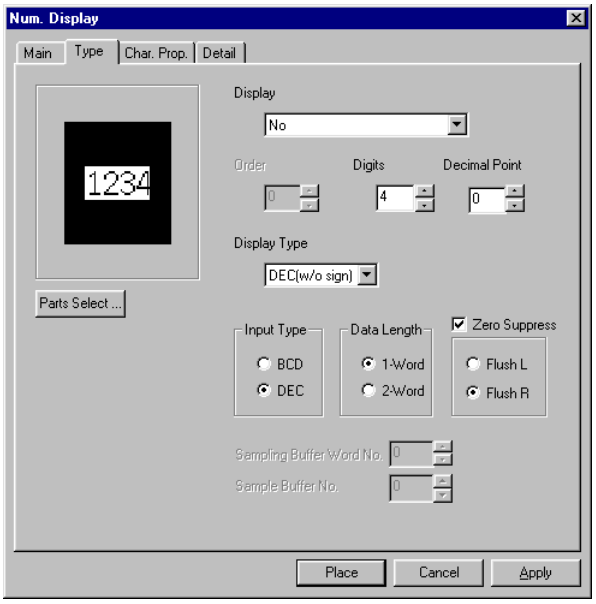
[Main] Tab Window

1. In the [Num. Display] dialog, open the [Main] tab window. Check that "0" is entered for [Division No.].

2. The data stored in the assigned [Memory] is displayed on ZM-80. Enter "D00200" in this example.

[Type] Tab Window

1. Click [Type] in the [Num Display] dialog. The [Type] tab window is displayed.



2. Select [No] for [Display Function].
"09200" entered for [Memory] in the previous step is displayed on the display part on the screen.

3. Enter "4" for [Digits] and enter "0" for [Decimal Point].

Depending on the [Display Type] selection, the available data range varies as shown on the right.

Type	Digits	Decimal point
DEC	1 ~ 10	0 ~ 9
HEX	1 ~ 8	——
OCT	1 ~ 11	——
BIN	1 ~ 32	——

4. Select the code for displaying data that is read in the code specified by [Input Type]. The available codes are: [DEC (w/o sign)], [DEC (w/- sign)], [DEC (w/+ sign)], [HEX], [OCT] and [BIN]. In this example, select [DEC (w/o sign)] for [Display Type].

5. Choose either [BCD] or [DEC] for the code in the PLC memory. Because SHARP PLC is used in this example, select [DEC] for [Input Type].

PLC in BCD format :OMRON C series; MITSUBISHI AnA/N series; FUJI H series, KOYO SU/SG
PLC in BIN format : Models except the above

6. Set up as shown below for other options:

Data Length ◉1-Word
☑Zero Suppress ◉Flush R

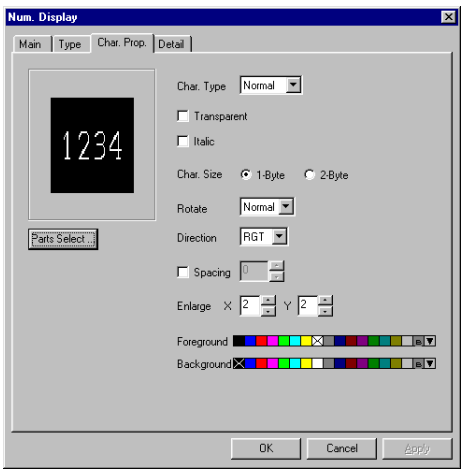
- One numerical data display part can occupy two words at maximum. The number of digits that can be displayed from one- or two-word memory depends on the code selected.

Code format	1-word range	2-word range
DEC (w/o sign)	0~65535	0~4294967295
DEC (w/- sign)	-32768~32767	-2147483648~2147483647
DEC (w/+ sign)	-32768~+32767	-2147483648~+2147483647
HEX	0~FFFF	0~FFFFFFFF
OCT	0~177777	0~37777777777
BIN	0~1111111111111111	0~11111111111111111111111111111111

- If the entered number of digits exceeds the specified range, extra digits from the right are omitted.
<Ex.>
Data length: 1-Word No. of digits: 3
1234 ---> 123
└─This figure is not displayed.

[Char. Prop] Tab Window

1. Click [Char. Prop.] in the [Num Display] dialog. The [Char. Prop.] tab window is displayed.



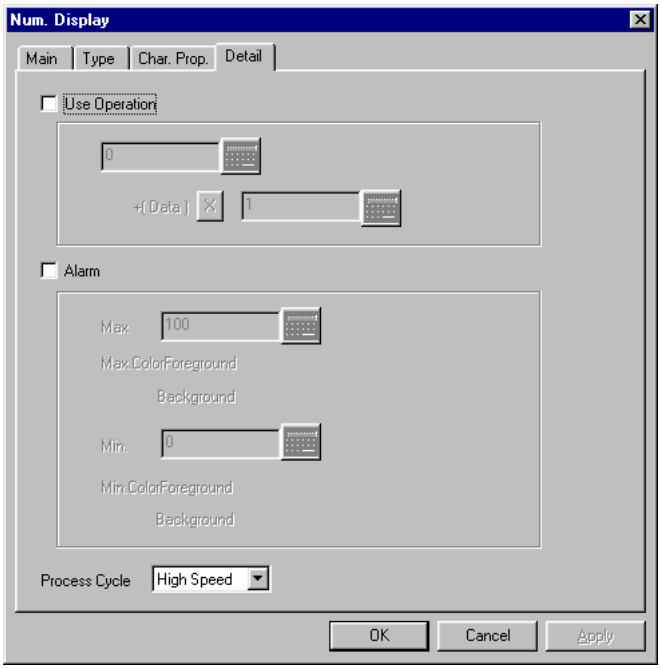
2. Set up as shown below:

Char. Type : Normal
☐ Transparent
☐ Italic
Char. Size : 1-Byte
Rotate : Normal
Direction : RGT
☐ Spacing
Enlarge X: 2 Y: 2
Foreground : White
Background : Black

[Detail] Tab Window

1. Click [Detail] in the [Num. Display] dialog. The [Detail] tab window is displayed.

2. Uncheck the [Use Operation] and [Alarm] boxes.



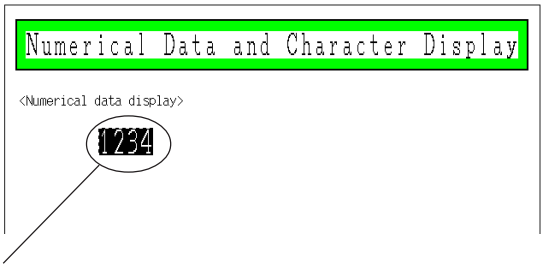
3. Select [High Speed] for [Process Cycle].

Placing the Numerical Data Display Part

Place the numerical data display part.

Click the [Place] button in the [Num. Display] dialog. A dotted box for numerical data display area is displayed. Drag the box to the desired position and click the mouse. (Refer to the following figure.)

The numerical data display part has been completed.

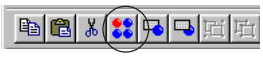


The part has been completed.

Copying the Numerical Data Display Part

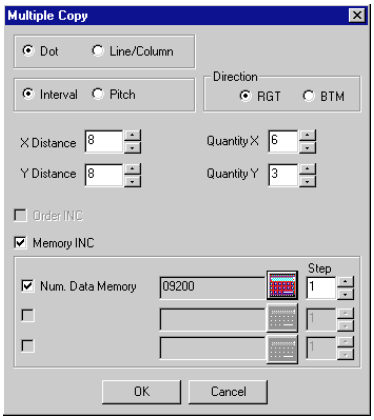
Make seventeen copies of the numerical data display part. In this example, consecutive memory addresses are set up for the copies.

1. Click the placed numerical data display part (handles are shown).
Select [Multi Copy] from the [Edit] menu.
The [Multiple Copy] dialog is displayed.

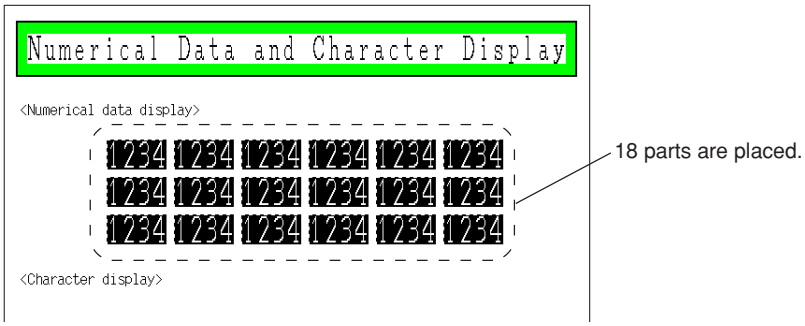


2. Set up as shown below and click the [OK] button.

◉Dot Direction ①②③ ④⑤⑥
◉Interval
X Distance: 8 Quantity X: 6
Y Distance: 8 Quantity Y: 3
☑Memory INC
☑Num. Data Memory
09200 Step: 1



3. Eighteen numerical data display parts (the master inclusive) are placed.



4. Check that the [Num. Display] dialog is set up as shown below for each copy. Double-clicking each part brings up the dialog.

<[Main] tab window>
Division No.: 0
Memory: 09200 ~ 09242

In the [Multiple Copy] dialog, [①②③ / ④⑤⑥] is selected for [Direction]. Therefore, memory addresses are allocated consecutively to the display parts in the direction from left to right.

Fig. 1

<Numerical data display>

<[Type] tab window>

Display Function : No
Digits : 4
Decimal Point : 0
Display Type : DEC (w/o sign)
Input Type : DEC
Data Length : 1-Word
☑Zero Suppress ◉Flush R

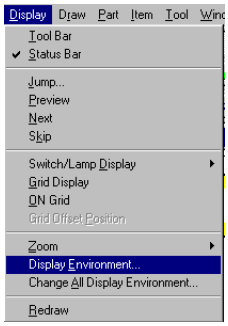
<[Detail] tab window>

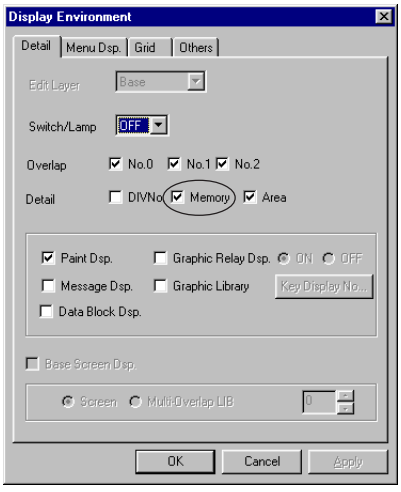
☐ Use Operation
☐ Alarm
Process Cycle : High Speed

<[Char. Prop] tab window>

Char. Type : Normal
☐ Transparent
☐ Italic
Char. Size : 1-Byte
Rotate : Normal
Direction : RGT
☐ Spacing
Enlarge X: 2 Y: 2
Foreground : White
Background : Black

Memory data can be displayed on a computer screen as shown in Fig. 1.
Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.
Open the [Detail] tab window. Select [Memory] for [Detail] and click [OK].



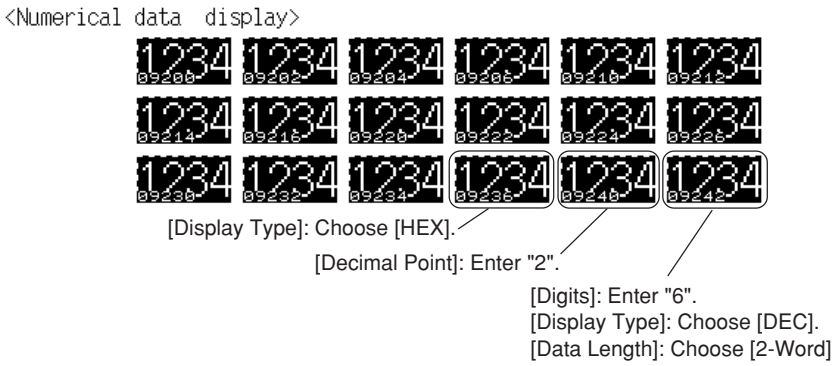


Memory data is displayed on the computer screen.

It is not necessary to allocate memory consecutively. However, some PLC models can handle data more quickly when the numbers are consecutive.

Modifying Copied Numerical Data Parts

Modify the following numerical data parts.



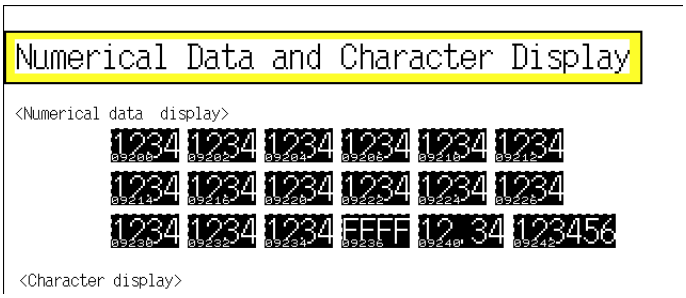
1. Double-click the numerical data display part for modification.

2. The corresponding [Num. Display] dialog is displayed.
For the part allocated with 09236, choose [HEX] for [Display Type].

3. For the part allocated with 09240, enter "2" for [Decimal Point].

4. For the part allocated with 09242, enter "6" for [Digits], and consequently, choose [2-Word] for [Data Length].

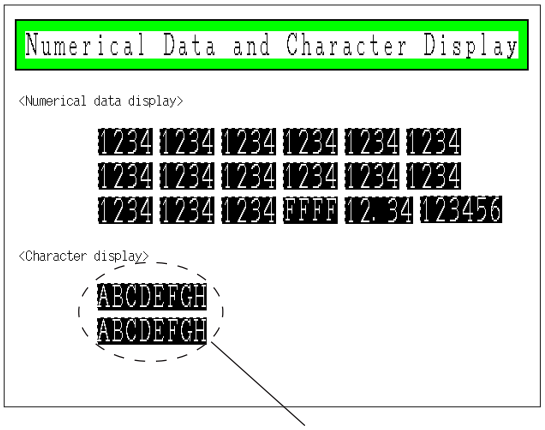
5. Because the last part assigned with 09242 overlaps with the adjacent part assigned with 09240, drag the last part as shown below:



Modification has been completed.

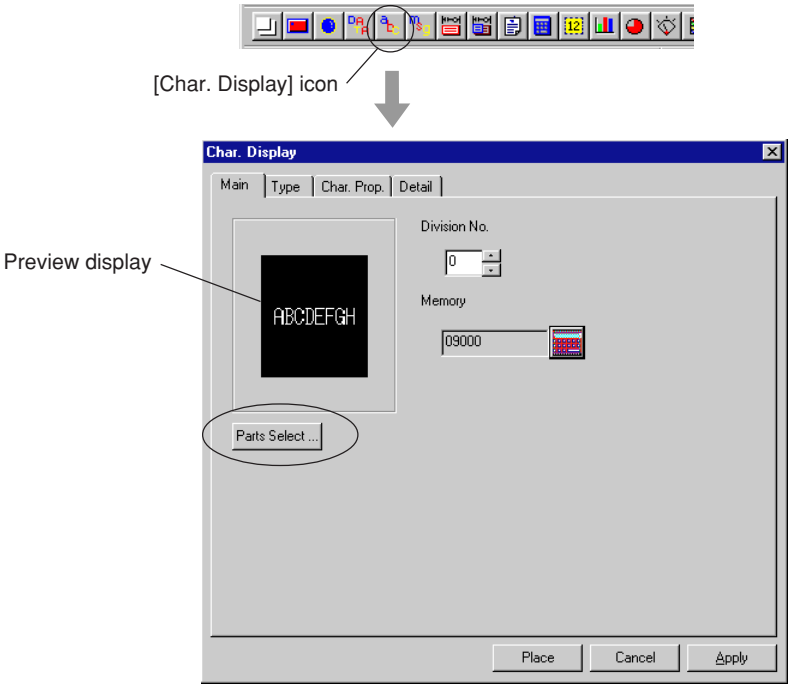
Character Display

Create the following character display parts.



[Char. Display] Dialog

1. Click [Char. Display] icon in the tool bar. The [Char. Display] dialog is displayed.



2. Click the [Parts Select] button. [Char. Display List Parts_i.zmp] is displayed.

3. Select [0007] and click the [Select] button.
Part No. 0007 appears in the preview display in the [Char. Display] dialog.

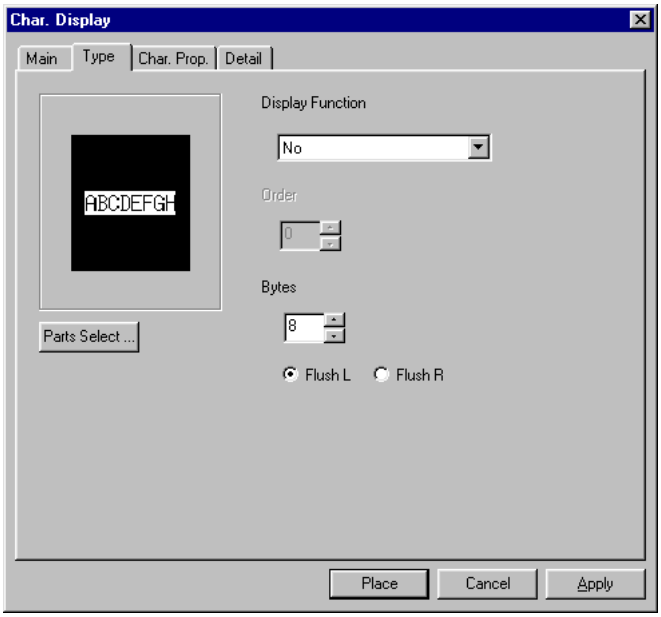
[Main] Tab Window

1. Check that "0" is entered for [Division No.].

2. The data stored in the assigned [Memory] is displayed on ZM-80. Enter "09250" in this example.

[Type] Tab Window

1. Click [Type] in the [Char. Display] dialog. The [Type] tab window is displayed.



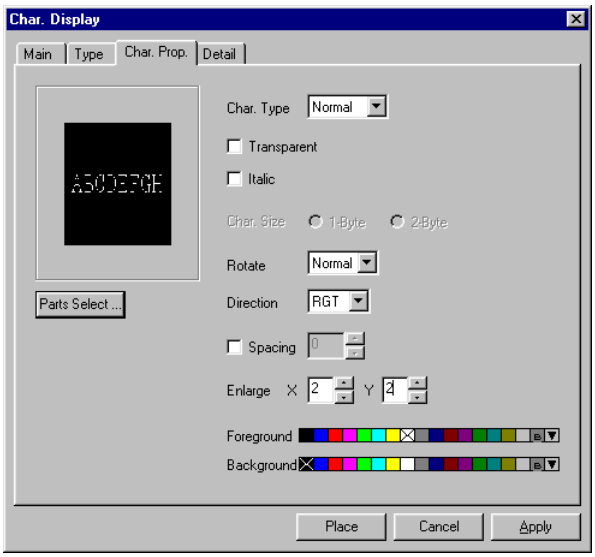
2. Select [No] for [Display Function].
Only character display becomes valid.

3. Enter "8" (4-word) for [Bytes].

4. Choose [◉Flush L].

[Char. Prop] Tab Window

1. Click [Char. Prop.] in the [Char. Display] dialog. The [Char. Prop.] tab window is displayed.



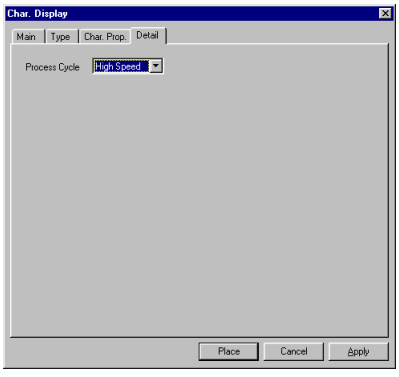
2. Set up as shown below:

Char. Type : Normal
☐ Transparent
☐ Italic
Rotate : Normal
Direction : RGT
☐ Spacing
Enlarge X: 2 Y: 2
Foreground : White Background : Black

[Detail] Tab Window

Click [Detail] in the [Char. Display] dialog. The [Detail] tab window is displayed.

Select [High Speed] for [Process Cycle].

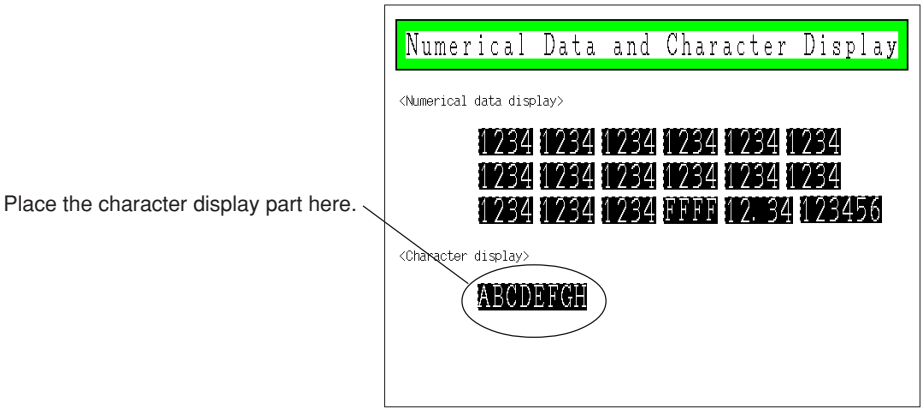


The character display part has been completed.

Placing a Character Display Part

Place a character display part.

Click the [Place] button in the [Char. Display] dialog. A dotted box for character display area is displayed. Drag the box to the desired position and click the mouse.

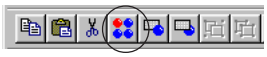


The character display part has been placed.

Copying the Character Display Part

Make a copy of the character display part.

1. Click the character display part (handles are shown).
Select [Multi Copy] icon. The [Multiple Copy] dialog is displayed.

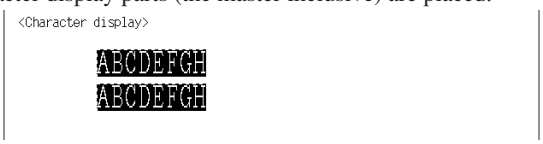


2. Set up as shown below and click [OK].

◉Dot Direction ①②③ ④⑤⑥
◉Interval
X Distance: 0 Quantity X: 1
Y Distance: 8 Quantity Y: 2
☑Memory INC
☑Char. Data Memory
09250 Step: 4

1 step = 1 word
8 bytes = 4 words

3. Two character display parts (the master inclusive) are placed.



4. Check that the [Char. Display] dialog is set up as shown below for the copy.

<[Main] tab window>
Division No. : 0
Memory : 09260

<[Type] tab window>
Display Function : No
Bytes : 8
◉Flush L

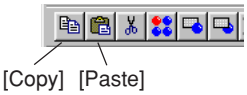
<[Detail] tab window>
Process Cycle : High Speed

<[Char. Prop] tab window>
Char. Type : Normal
☐ Transparent
☐ Italic
Rotate : Normal
Direction : RGT
☐ Spacing
Enlarge X: 2 Y: 2
Foreground : White
Background : Black

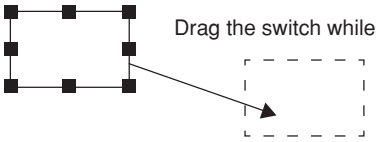
Screen No. 2 has been completed.

The following copy methods are available.

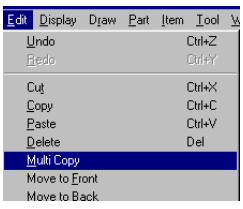
◎ Copy by icons
Use the [Copy] and [Paste] icons in the edit tool bar.



◎ Copy by [CTRL]+dragging
Click the part/figure. While holding down the [CTRL] key, drag the part/figure to the desired position and release the mouse. The copy is placed in the position.



◎ To place copies at equal intervals
Select [Multi Copy] icon in the tool bar.or select [Multi Copy] from the [Edit] menu.
The [Multiple Copy] dialog is displayed.
Set up the dialog for the desired number of copies and their spacing.
(Refer to page 6-7.)



ZM-70 Operation Check

Save the created screen.

While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-70 and check that ZM-70 operates correctly.

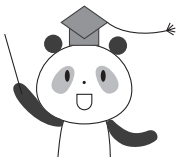
Used memory

<Numerical data display>

No.	Memory	Code format	Digits	Decimal point
1	09200	DEC (w/o sign)	4	0
2	09202	DEC (w/o sign)	4	0
3	09204	DEC (w/o sign)	4	0
4	09206	DEC (w/o sign)	4	0
5	09210	DEC (w/o sign)	4	0
6	09212	DEC (w/o sign)	4	0
7	09214	DEC (w/o sign)	4	0
8	09216	DEC (w/o sign)	4	0
9	09220	DEC (w/o sign)	4	0
10	09222	DEC (w/o sign)	4	0
11	09224	DEC (w/o sign)	4	0
12	09226	DEC (w/o sign)	4	0
13	09230	DEC (w/o sign)	4	0
14	09232	DEC (w/o sign)	4	0
15	09234	DEC (w/o sign)	4	0
16	09236	HEX	4	0
17	09240	DEC (w/o sign)	4	2
18	09242	DEC (w/o sign)	6	0

<Character display>

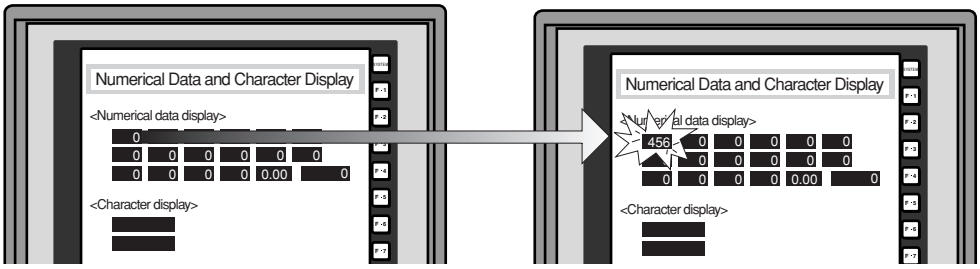
No.	Memory	Bytes
1	09220	8
2	09222	8



Writing Numerical Data from PLC

Open screen No. 2 "Numerical Data and Character Display" and check with the following steps.

1. By entering "0456" for "9200", "456" is displayed immediately.



2. By entering "1234" for "9202", "1234" is displayed immediately.

3. By entering "9999" for "9204", "9999" is displayed immediately.

4. By entering "4EA0" for "9236", "4EA0" is displayed immediately.

5. By entering "1289" for "9240", "12.89" is displayed immediately.

6. By entering "0" for "9242" or "1" for "9244", "65536" is displayed immediately.

Writing Characters from PLC

When data is to be displayed in characters, it may be easier to illustrate memory allocation by bytes.

Memory "n"	1st character	LSB (0~7)	A
	2nd character	MSB (8~15)	B
Memory "n+1"	3rd character		C
	4th character		D
Memory "n+2"	5th character		E
	6th character		F
Memory "n+3"	7th character		G
	8th character		H

	B (42)	A (41)
Memory "n"	2nd character	1st character
	D (44)	C (43)
Memory "n+1"	2nd character	1st character
	F (46)	E (45)
Memory "n+2"	2nd character	1st character
	H (48)	G (47)
Memory "n+3"	2nd character	1st character

By entering "H4241" for "9220", "H4443" for "9222", "H4645" for "9224", and "H4847" for "9226", "ABCDEFGH" is displayed immediately.

Placing Multiple Numerical Data

When displaying a greater amount of screen data, the display speed gets slower. In such a case, the following methods should be effective.

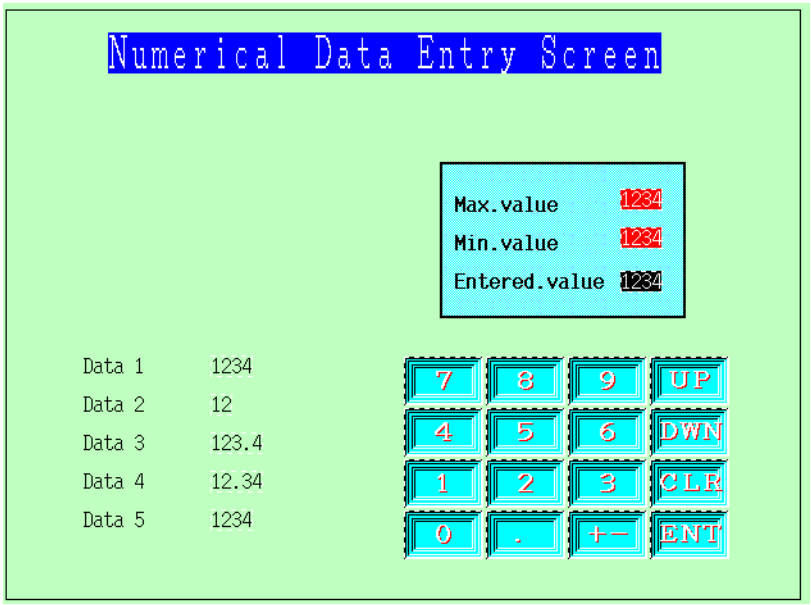
1. To increase the display speed for all data:
Allocate memory in consecutive number.

2. To increase the display speed for the specified data:
For data which may be viewed slower when changed, choose [Low Speed] for [Process Cycle]. Only for data which should be viewed in real time, choose [High Speed] for [Process Cycle].

For details, refer to "Chapter 5 Screens" in the Reference Manual.

7 Changing the PLC Memory Data through Keypad

You will create the following screen.
The desired values can be entered through the keypad to change the data in the PLC memory.



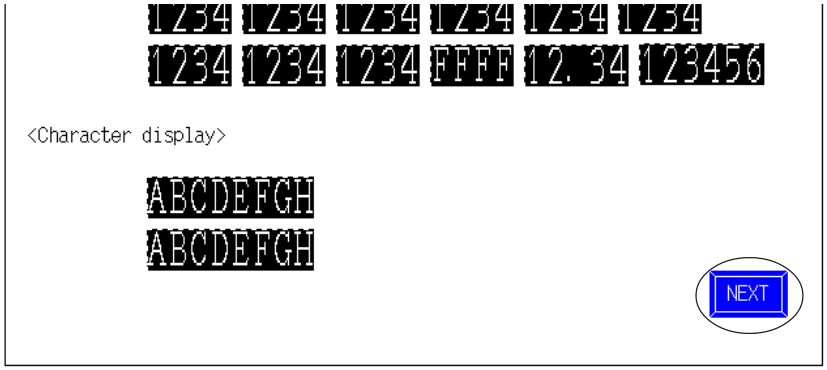
Procedure

Operation

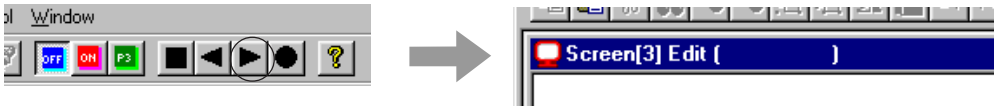
Creating a Screen Change Switch

On the previous screen No. 2, create a screen change switch to bring up the next screen.

1. Place a switch part as shown below. Enter [Screen: 3] for [Function] in the [Switch] dialog.

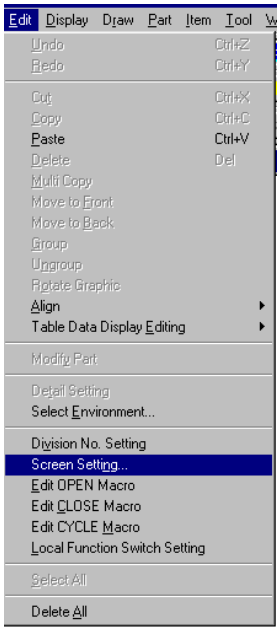


2. Click the [Next] icon to open the [Screen [3] Edit] window.

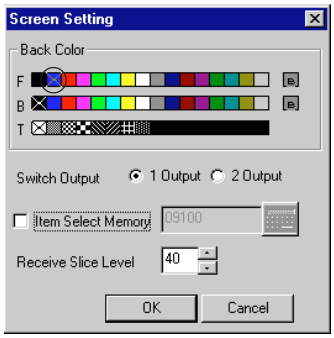


Screen Color Change

1. Select [Screen Setting] from the [Edit] menu.



2. Check blue for [F] in [Back Color] and Click [OK].
The screen color is changed to blue.

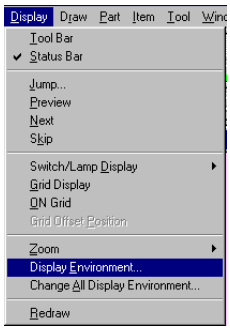


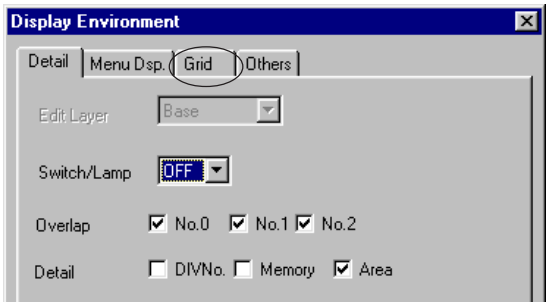
Setting Up Display Environment

Set up the [Grid] tab window so that screen parts can be placed with ease.

Keyword
Grids
Grids are small dots placed at regular intervals on the screen for facilitating drawing or aligning. [1-Byte (for character)], [Switch (for switch)], [Mode (for overlap)] or [Free] can be selected for [Grid Type].

1. Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.





2. Open the [Grid] tab window and set up as shown below:

☑Grid Dsp. ☑ON Grid
Grid Color : White
Grid Type : Free
X Offset : 0 Y Offset: 0
X Pitch : 10 Y Pitch : 10
☑Place switches on switch grids.

Keyword
ON Grid
When this option is selected, a part/figure placed on the screen is snapped to the nearest grid.
However, an overlap part is moved by selecting [Mode] for [Grid Type] and a switch part is moved by selecting [Switch] for [Grid Type], irrespective of the selection of [ON Grid].
(A switch part can be moved by selecting any other option for [Grid Type], but switch grids may be deviated. It is recommended to select [Switch] to move switches.)
[ON grid] can be selected also from the pop-up menu which appears by right-clicking the mouse.

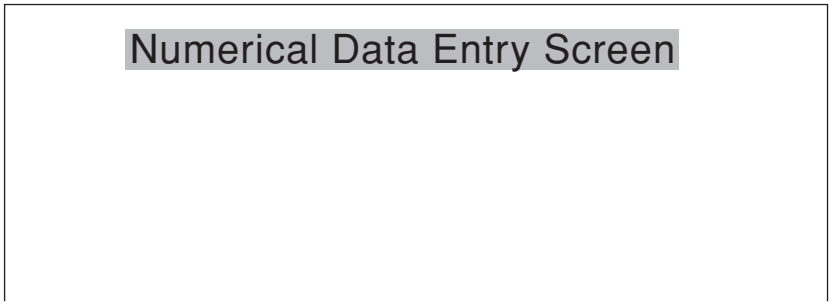
3. Click [OK]. Grids are displayed on the screen.

Creating a Screen Title

1. Click the [Text] icon in the draw tool bar. Key in "Numerical Data Entry Screen".

2. Set up text properties and place the text as shown below:

Foreground : Red Enlarge X: 2
Background : Light blue Enlarge Y: 2
Rotate : Normal ☐Transparent ☐Italic
Direction : RGT ◉Normal



Placing a Keypad

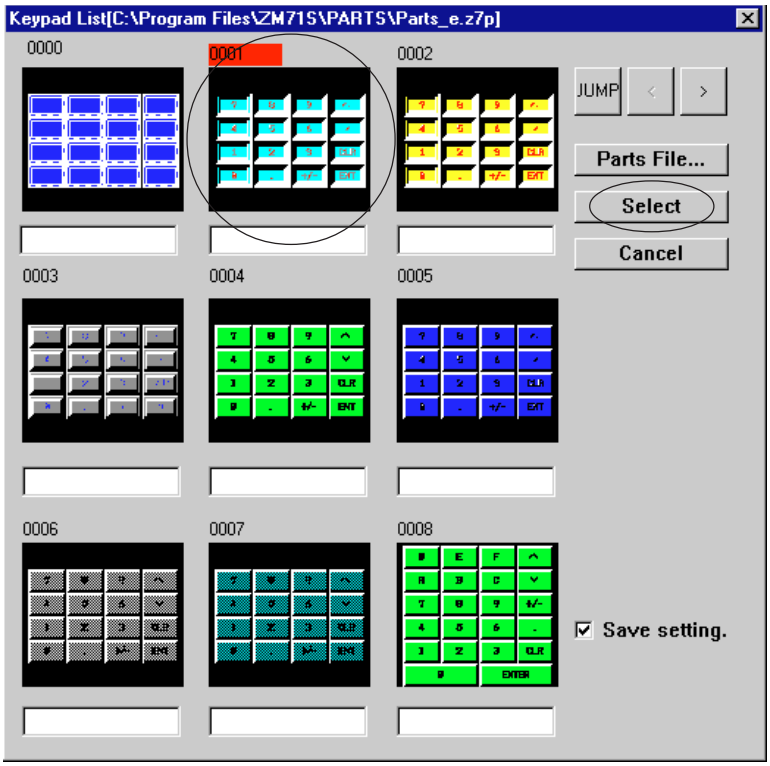
1. Check that "0" is entered for [Division No.] at the top right of the screen.

When the above [Division No.] is set first, the same division number is automatically set for the parts to be placed afterwards.
For information on the division number, refer to page 7-17.

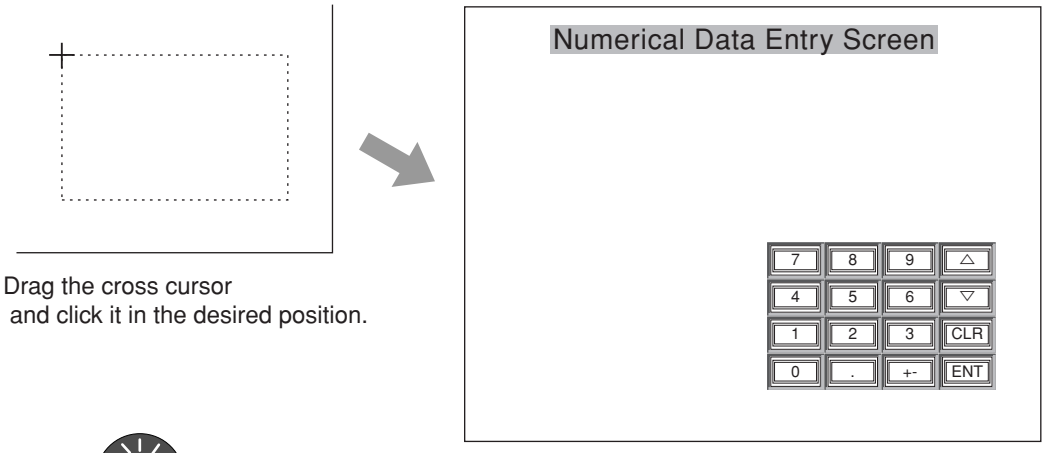
2. Click the [Entry Mode] icon in the tool bar.

3. The entry mode parts tool bar is displayed on the right of the draw tool bar. Click the [Keypad] icon on the extreme left.

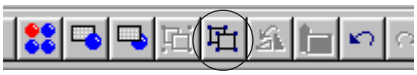
4. [Keypad List Parts_e.z7p] is displayed. Click [0001] and [Select].



5. A keypad-size dotted box with cross cursor is displayed on the screen. Drag the box and click the mouse in the position as shown below. The keypad is placed.

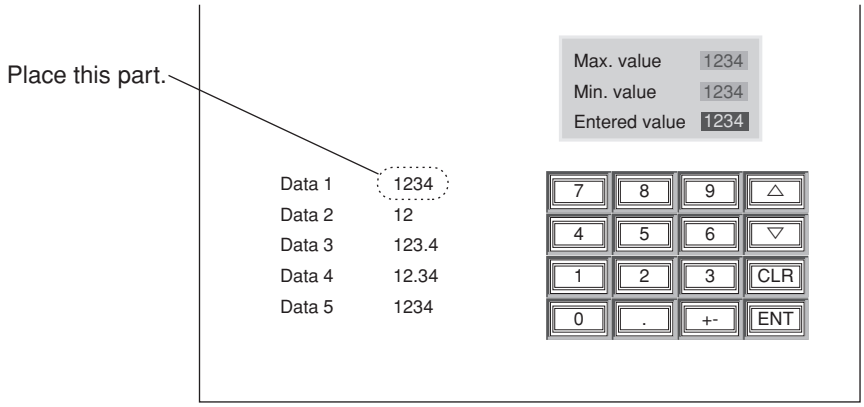


When the keypad has been placed, it is grouped. To modify each switch position or setting, click the keypad (handles are shown), and select [Ungroup] from the [Edit] menu or click the [Ungroup] icon.



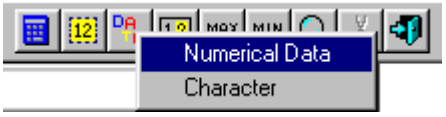
Placing a Numerical Data Display Part (Entry Target)

Place a numerical data display part to which data should be written.

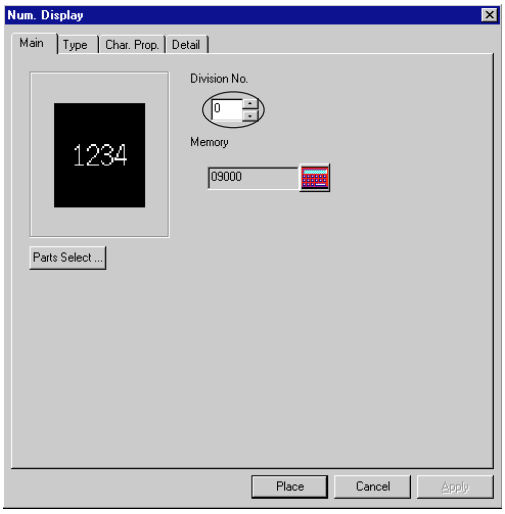


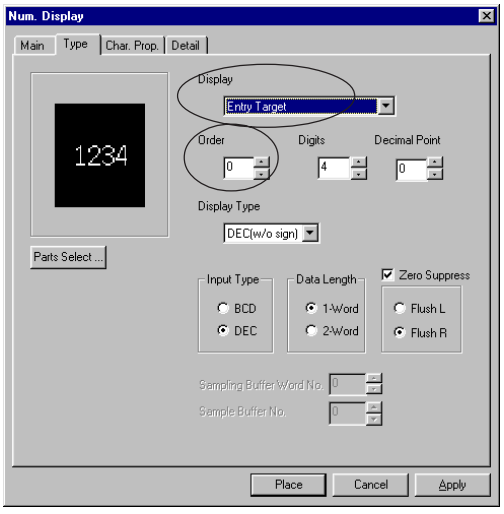
1. Click the [Data Display] icon in the entry mode parts tool bar.

2. The following pull-down menu is displayed. Choose [Numerical Data].



3. The [Num. Display] dialog is displayed.
Open the [Main] tab window. Check that "0" is entered for [Division No.].
Open the [Type] tab window. Check that [Entry Target] is selected for [Display Function], and "0" is entered for [Order].





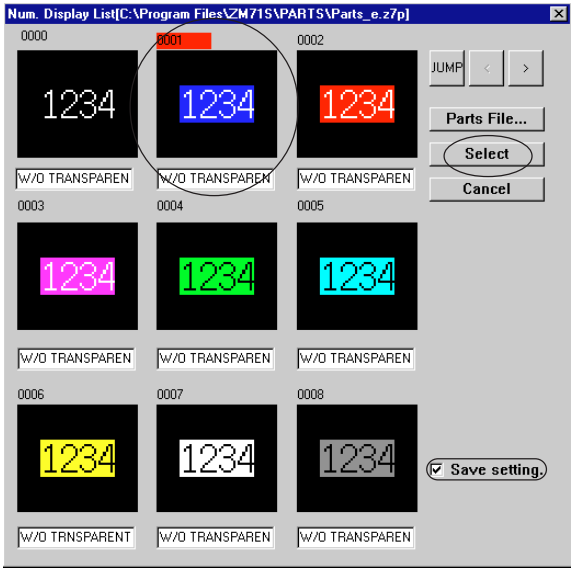
Keyword

Order

This option determines the order of the cursor moving between data display parts.
The cursor appears at the numerical data display part specified with "0" when the screen is opened.

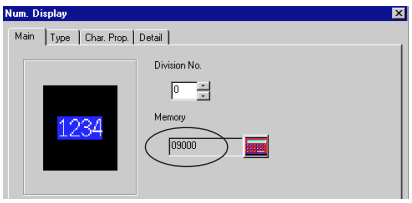
4. Click the [Parts Select] button. [Num. Display List] is displayed.

5. Click [0001] and make sure that the [Save setting] box is checked. Click [Select]. Part No. 0001 is displayed in the [Num. Display] dialog.



When the [Save setting] box is not checked, the previously set data for [Division No.], [Display Function], [Memory], etc. are cleared. This should be noted whenever a part is selected from [Num. Display List].

6 In the [Main] tab window, enter "09000" for [Memory].
Numerical data entered through the keypad is to be written to this address.

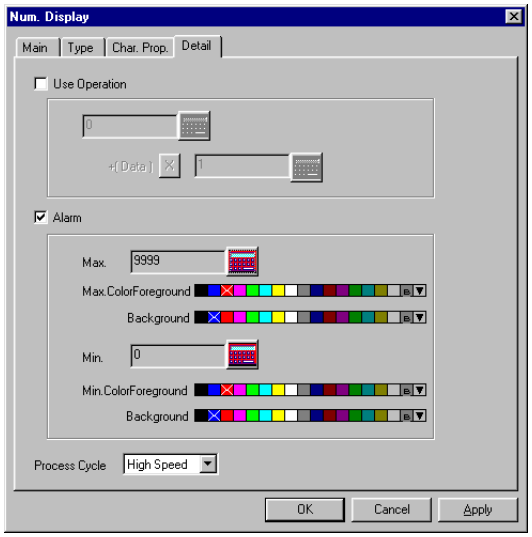


7. Set up the [Char. Prop.] tab window as shown below:

Char. Type : Normal ☐ Transparent ☐ Italic
Char. Size : ◉ 1-Byte
Rotate : Normal Direction: RGT ☐ Spacing
Enlarge X: 1 Y: 1
Foreground : White Background: Blue

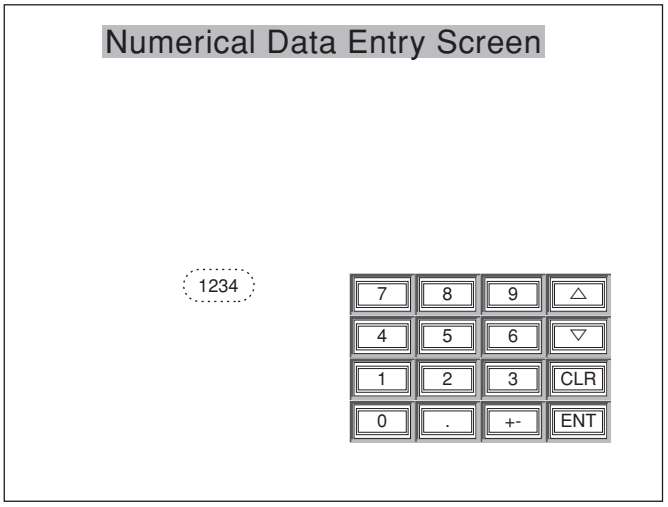
8. Open the [Detail] tab window. Set up the maximum and minimum values. Check the [Alarm] box so that [Max.] and [Min.] setting becomes valid. Set up as shown below:

[Max.: 9999]
Max. Color Foreground: Red Background: Blue
[Min.: 0]
Min. Color Foreground: Red Background: Blue



If an entered value is not in the range from specified min. value to max. value, the value is shown in the color selected for [Max. Color] or [Min. Color]. This function is valid only when such a value is entered from PLC. When a value not within the range is entered through the keypad, the entry is rejected.

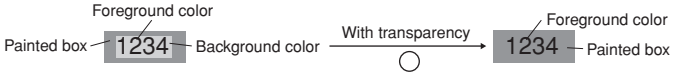
9. Place the numerical data display part as shown below by clicking the [Place] button.



About transparency

For a numerical data or character display part, note the setting of [Transparent].

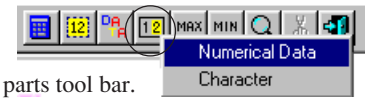
When a painted box is placed behind a part, the [Transparent] box must be checked.



When a part consists of only foreground and background colors without a painted box (for example, part No. 0001 in [Num. Display List Parts_i.zmp]), the [Transparent] box must be unchecked.

Placing a Numerical Display Part (Entry Display)

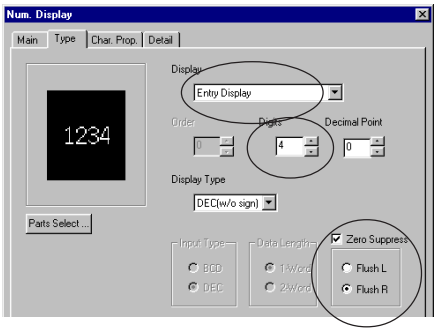
Place a part for displaying the data keyed in through the keypad (before being written to the memory).



1. Click [Entry Display] icon in the entry mode parts tool bar.

2. Choose [Numerical Data]. The [Num. Display] dialog is displayed.
Open the [Main] tab window. Check that "0" is entered for [Division No.].
Open the [Type] tab window. Set up as shown below:

Display Function : Entry Display
Digits: 4
☑Zero Suppress
◉Flush R

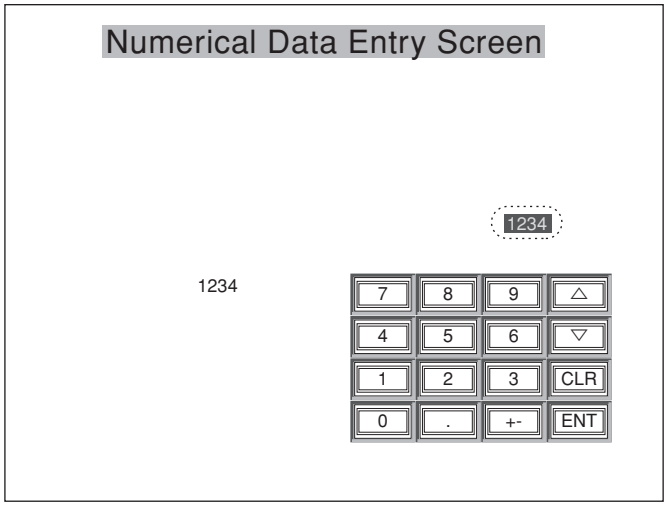


Specify the maximum number of digits for the placed entry target parts. In this example, enter "4" for [Digits].

3. Open the [Char. Prop.] tab window. Set up as shown below:

Char. Type : Normal ☐Transparent ☐Italic
Char. Size : ◉1-Byte
Rotate : Normal Direction: RGT ☐Spacing
Enlarge X: 1 Y: 1
Foreground : White Background: Black

4. Place as shown below by clicking the [Place] button.



Placing Max. and Min. Value Display Parts

Place max. and min. value display parts.

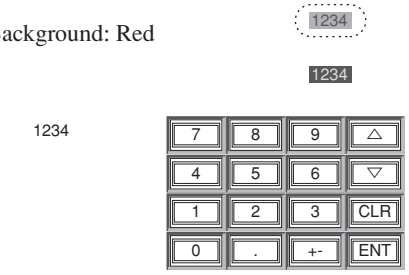
1. Place a max. value display part.
Click the [Max. Display] icon in the entry mode parts tool bar.

2. The [Num. Display] dialog is displayed. Set up as shown below:
[Main] tab window Division No.: 0
[Type] tab window Display Function: Max. Display
Digits: 4 Decimal Point: 0

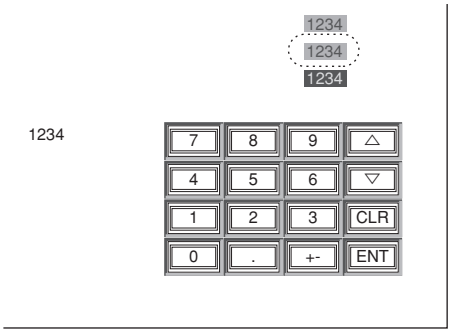
Specify the maximum number of digits for the placed entry target parts. In this example, enter "4" for [Digits].

3. Set up the [Char. Prop.] tab window as shown below:
Char. Type : Normal ☐ Transparent ☐ Italic
Char. Size : ◉ 1-Byte
Rotate : Normal Direction: RGT ☐ Spacing
Enlarge X: 1 Y: 1
Foreground : Yellow Background: Red

4. Place the part as shown on the right by clicking the [Place] button.



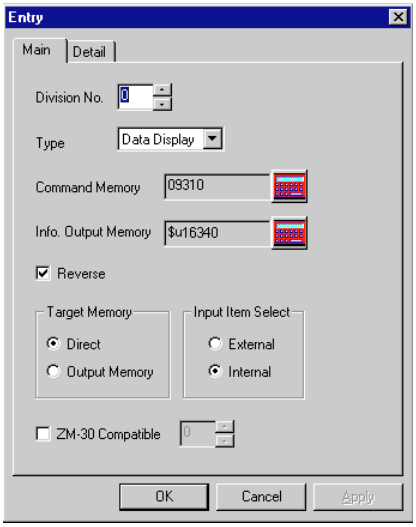
5. Place a min. value display part. Click [Min. Display] icon.
Set up the [Num. Display] dialog and place the part as shown below:
[Main] tab window Division No.: 0
[Type] tab window Display function: Min. Display
[Char. Prop] tab window As same as the setting for the max. value display part



Setting Up Entry Mode

Set up entry mode for controlling the screen.

1. Click [Detail] in the entry mode parts tool bar.
The [Entry] dialog is displayed.



2. Set up as shown below:

[Main] tab window

Division No. : 0
Type : Data Display
Command Memory : 09310
Info. Output Memory: $u16340
☑Reverse
Target Memory ◉Direct
Input Item Select ◉Internal
☐ZM-30 Compatible

[Detail] tab window

☐Use Graphic
☐Default to 0
Process Cycle : Low Speed

Type: Data Display --- Data display parts for entry targets are placed on the base screen.
Command Memory: 09310 -------This is used as a control memory for releasing the keypad interlock, etc.
Info. Output Memory: $u16340 ---The selection order of the numerical data display part currently selected by the cursor is written. (When it is not necessary, select [Internal Mem.].)
☑Reverse = This option determines whether to highlight the data display area (in reverse video) currently selected as the entry target.
Target Memory: Direct = Data in the selected data display area is written directly to the specified memory address.
Input Item Select: Internal = Up/Down switches on the screen are used to move the cursor.

Bit 15 of the command memory (Writing enabled/disabled)
Writing is disabled by default for the keypad in the entry mode (any keys other than UP and DOWN do not work) because bit 15 of the command memory is off.
To use the keypad, set bit 15 (= H8000) of the memory.

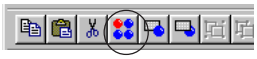
3. Click [OK].
The [Entry] dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen. This step completes setting up entry mode.

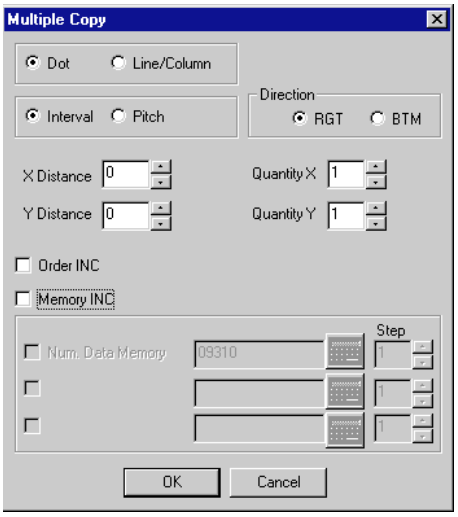
Copying the Numerical Display Part (Entry Target)

Make four copies of the numerical data display part to which data should be written.

1. Click the numerical data display part (for which [Entry Target] is selected for [Display Function]). Handles are shown around it.

2. Select [Multi Copy] icon in the tool bar. The [Multiple Copy] dialog is displayed.





3. Set up as shown below:

◉Dot Direction ①②③④⑤⑥

◉Interval

X Distance : 0 Quantity X : 1

Y Distance : 14 Quantity Y : 5

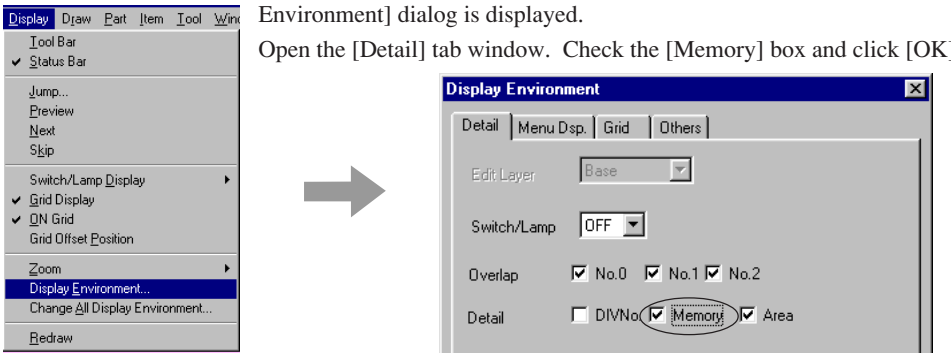
☑Order INC

☑Memory INC

☑Num. Data Memory 09310 Step: 1

4. Click [OK]. Four copies are placed under the top part vertically.

5. Check the memory addresses allocated to the display parts.
Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.
Open the [Detail] tab window. Check the [Memory] box and click [OK].



6. Check that 09310 ~ 09320 are entered for the five parts respectively.

Changing the Display Format for Entry Targets

Open the [Main] tab window for each part and set up as shown below:

	Display Type	Digits	Decimal Point
1st part	DEC (w/o sign)	4	0
2nd part	DEC (w/o sign)	2	0
3rd part	DEC (w/o sign)	4	1
4th part	DEC (w/o sign)	4	2
5th part	DEC (w/o sign)	4	0

Changing the Max. and Min. Values for Entry Targets

1. In the [Detail] tab window for each part, the [Alarm] box is checked, "9999" is entered for [Max.], and "0" is entered for [Min.].

2. Change the data for [Max.] and [Min.] in each window.

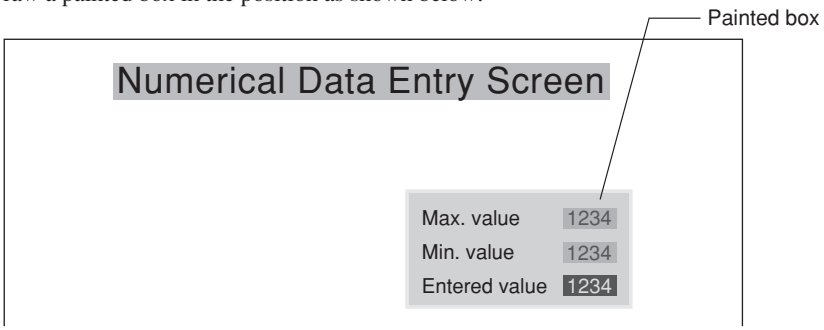
	[Max.]	[Min.]
1st part	9999	0
2nd part	99	22
3rd part	5555(=555.5)	1111(=111.1)
4th part	7777(=77.77)	3333(=33.33)
5th part	9999	0

When the [Alarm] box is not checked in the [Detail] tab window, [Max.] and [Min.] are not set up. However, the max. number of digits for the numerical data display part is set up for [Digits].

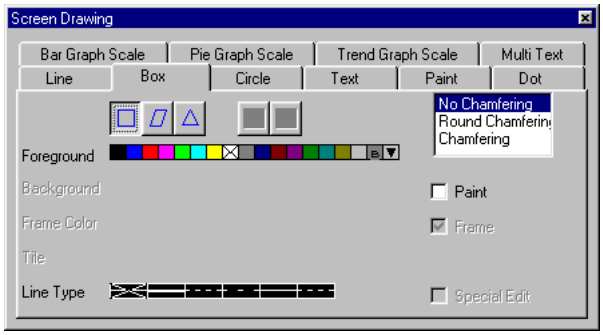
Placing a Painted Box Behind the Parts

Drawing a Painted Box

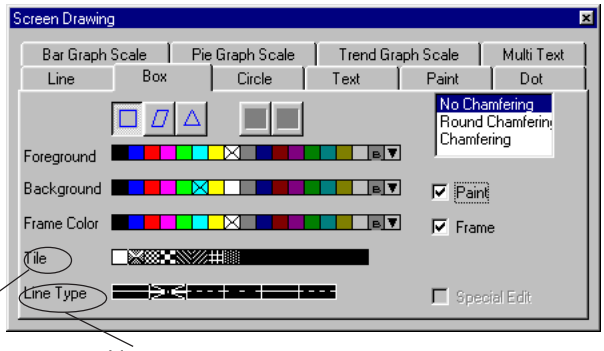
Draw a painted box in the position as shown below:



1. Click the [box] icon in the draw tool bar. The [Screen Drawing] dialog is displayed.



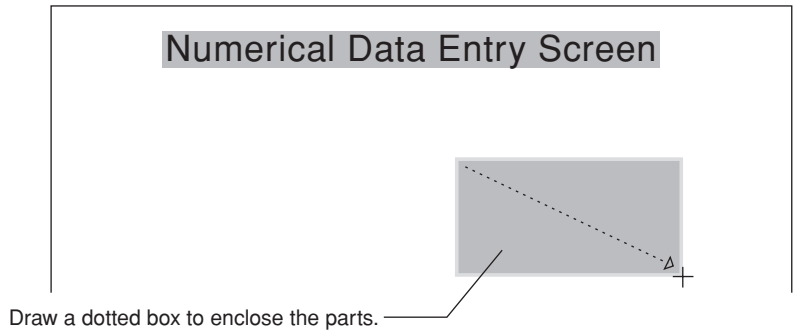
2. For drawing a painted box in this example, open the [Box] tab window and check the [Paint] box. The following options appear in the window.



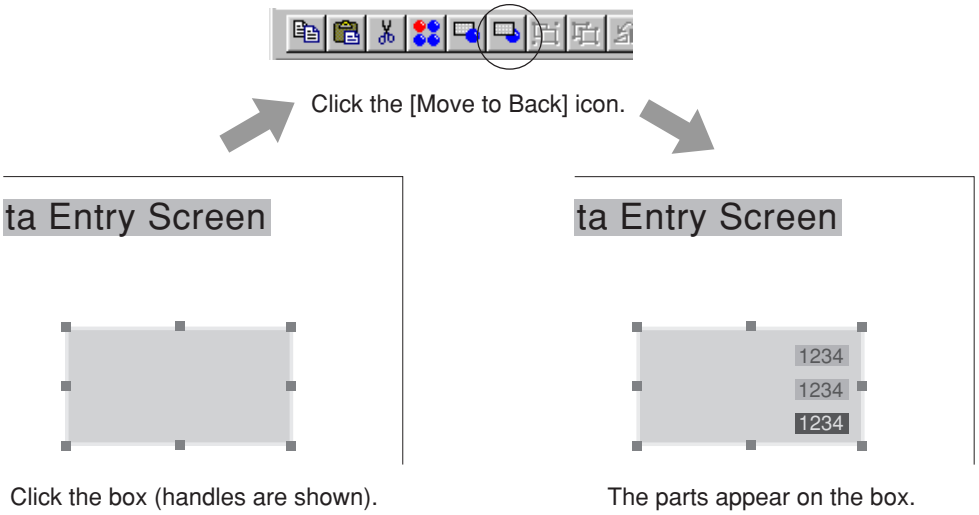
3. Set up as shown below:

Foreground : White
Background : Light blue
Frame Color : White
Tile : No. 1 (2nd from the extreme left)
Line Type : No. 1 (thick line: 2nd from the extreme left)

4. Drag the cross cursor and draw a dotted box to enclose the placed parts on the screen. A painted box is drawn as shown below:

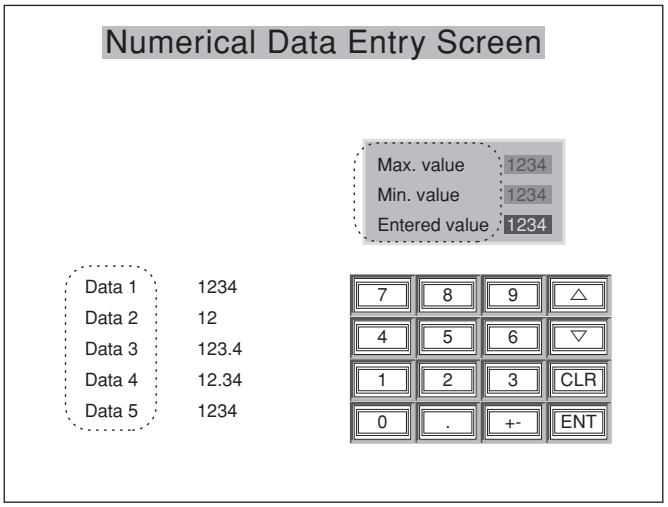


5. The parts are placed behind the painted box.
Click the [Select] icon and click the box (handles are shown). Click the [Move to Back] icon. Now the parts appear on the painted box.



Creating Texts

Create the following texts.



1. Click the [Text] icon in the draw tool bar. The dialog for text entry is displayed.

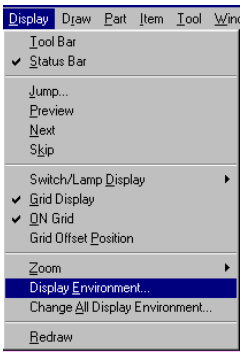
2. Set up as shown below and place the texts as shown in the above figure.

Prop. \ Text	"Max. value"	"Min. value"	"Entered value"	"Data 1 (~5)"
Foreground	Red	Red	Blue	White
Enlarge X	1	1	1	1
Enlarge Y	1	1	1	1
Rotate	Normal	Normal	Normal	Normal
Direction	RGT	RGT	RGT	RGT
Transparent	checked	checked	checked	checked
Italic	unchecked	unchecked	unchecked	unchecked
Char. Type	Bold	Bold	Bold	Normal

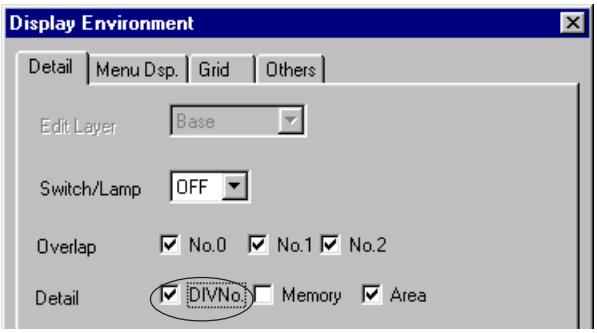
Division Number Check

Check that the division number is set up correctly.

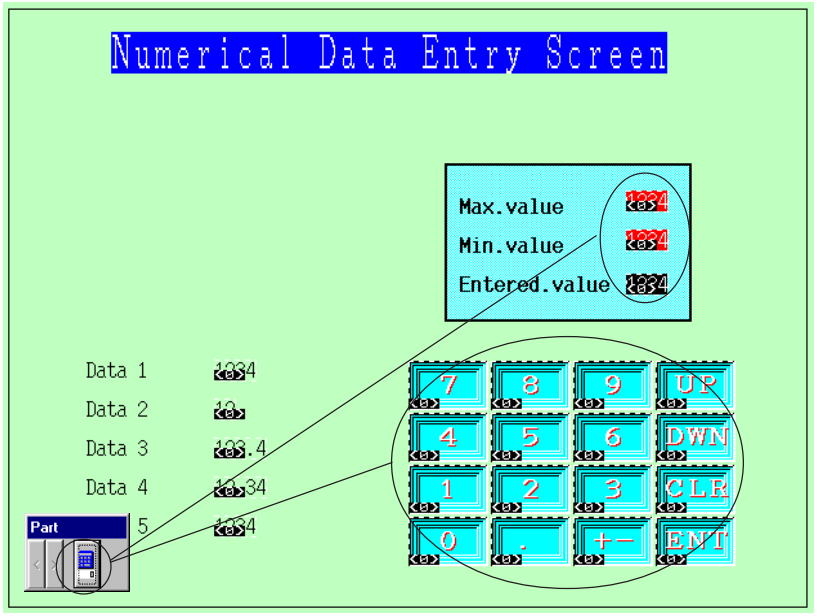
1. Select [Display Environment] from the [Display] menu.



2. The [Detail] tab window is displayed in the [Display Environment] dialog. Check the [Div No.] box and click [OK].



3. The division number is entered for each part on the screen.
Check that all parts on the screen and the icon in the [Part] auxiliary tool box have the same division No. 0.
If not, correct data setting so that all division numbers are set to "0".



Set all division numbers to "0".

Keyword

Division number

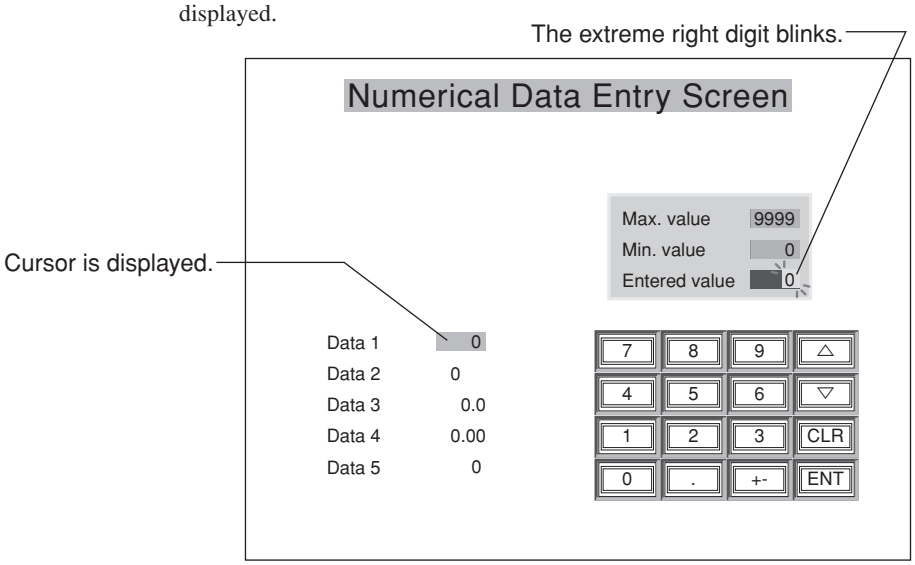
A maximum of 256 divisions(No. 0 to 255) can be set up for the base screen and each overlap respectively. You can imagine that 256 transparent sheets are laid on top of each other.
When several parts (switch, numerical data display, display area) are combined to establish a function, such as an entry mode, relay mode, and sampling mode, the parts must be set to the same division number.
Because the same division number is entered for the placed parts (keypad, max. value display part, etc.) in the above example, they are linked with the entry mode and can function correctly.

The "Numerical Data Entry Screen" has been completed. Save the file and transfer the screen data to ZM-70.

Opening Screen No. 3

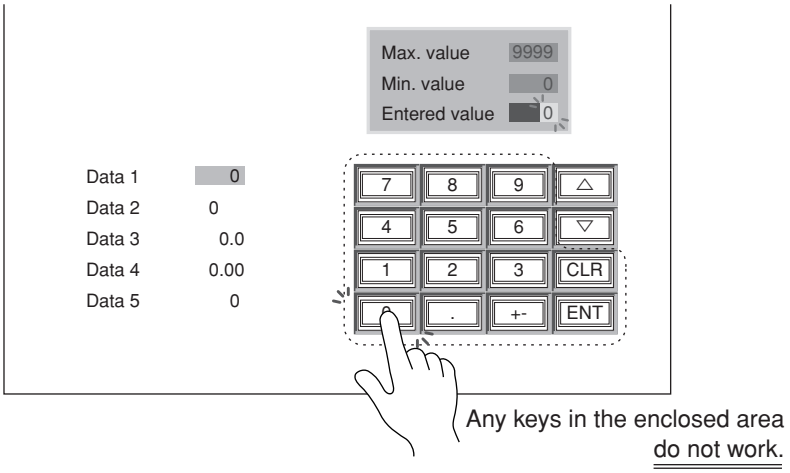
1. Connect ZM-70 to PLC, and start communication. Screen No. 0 including the bit map data is displayed.

2. Press the NEXT switch. Screen No. 1 is displayed. Press the NEXT switch on the screen. Repeat these steps until screen No. 3 "Numerical Data Entry Screen" is displayed.

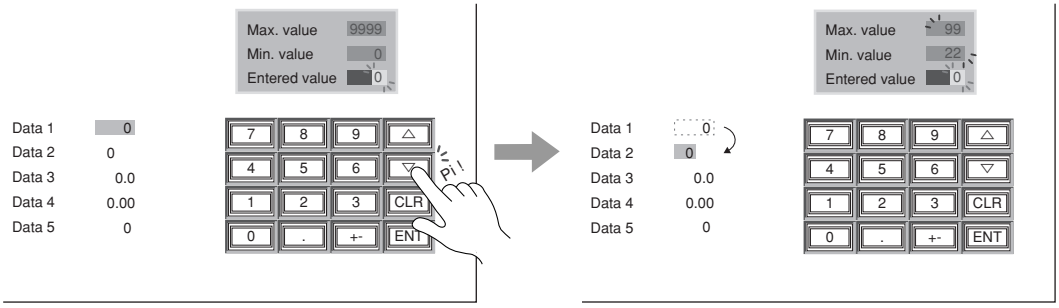


Releasing the Keypad Interlock

When the keypad interlock is on, the keys make an error sound (beep) when pressed and do not work.



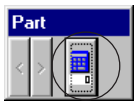
However, the upward and downward cursor keys are valid to move up/down the cursor. By moving the cursor along the "Data" parts using the cursor keys, the max. and min. values entered for each part are indicated.



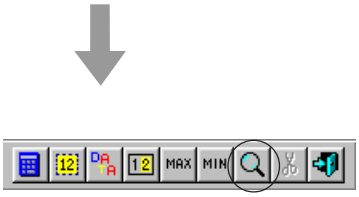
Pressing the ▽ key moves down the cursor.

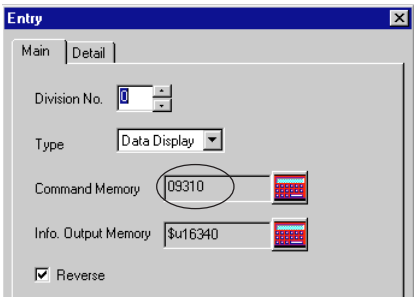
The max. and min. values for the selected part are indicated.

To release the keypad interlock, follow these steps:



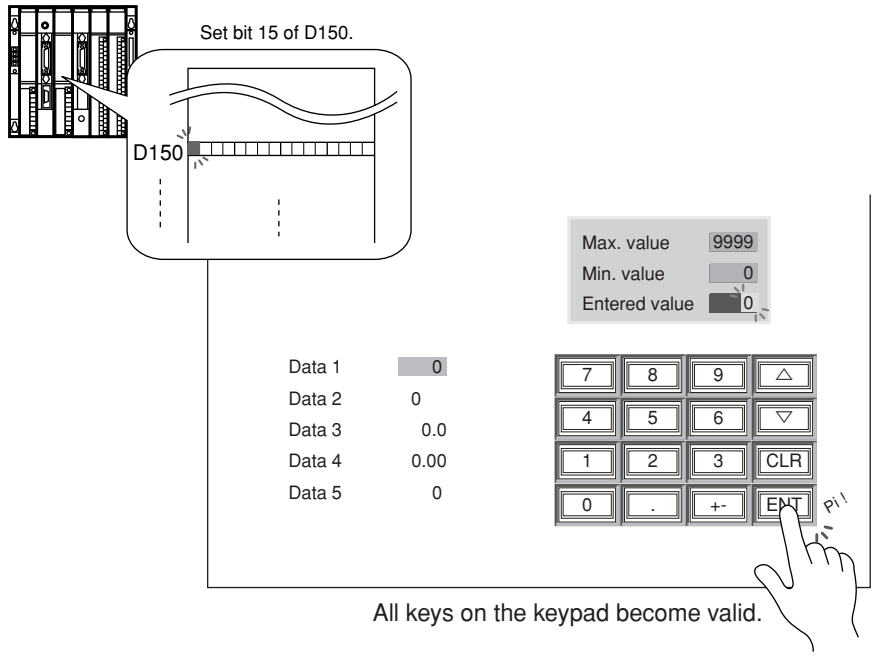
1. Check that in the [Main] tab window of the [Entry] dialog, "D150" is entered for [Command Memory]. Click the [Entry] icon in the [Part] auxiliary tool box and click the [Detail] icon in the entry mode parts tool bar. The [Entry] dialog is displayed. Check the [Command Memory].



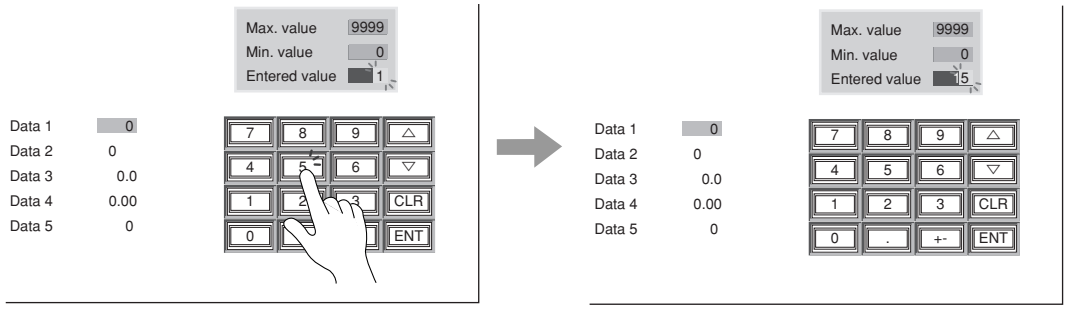


09310 is used to release the keypad interlock.

2. Bit 15 of the memory D150 is the writing enabled/disabled bit. Set bit 15 (D150 = H8000). Now the numerical keys and ENT keys of the keypad work.

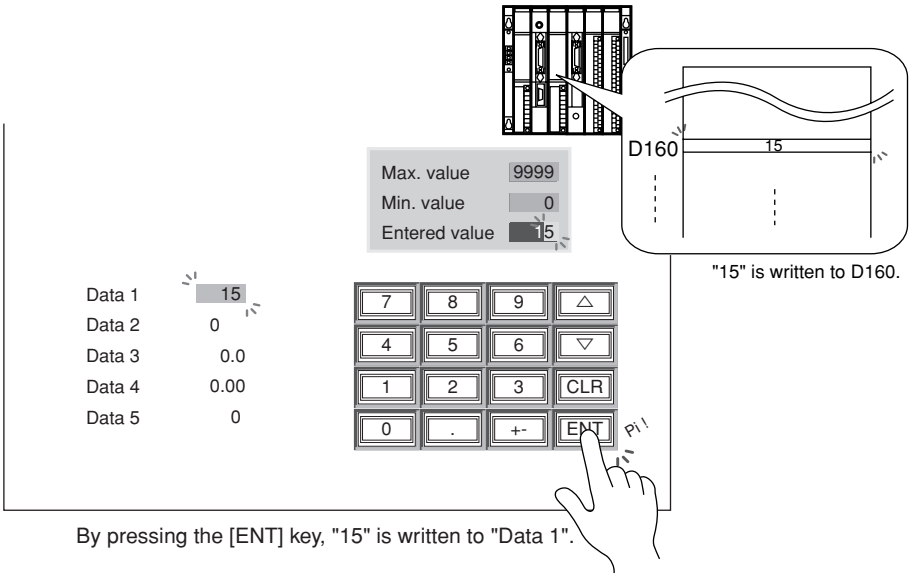


3. Locate the cursor on the "Data 1" part. Press "1" on the keypad. "1" is entered for "Entered value".
Press "5". "15" is entered for "Entered value".



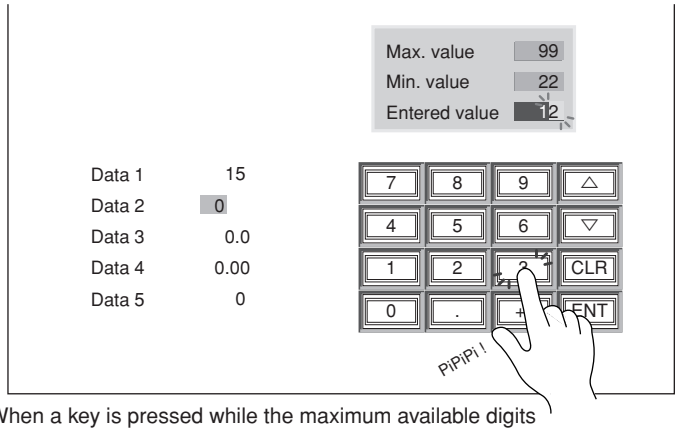
By pressing "5", "15" is entered for "Entered value".

4. Press the ENT key. "15" is written to "Data 1". Check that "15" is written to D160 (at [Memory] in the [Num. Display] dialog set up for "Data 1")



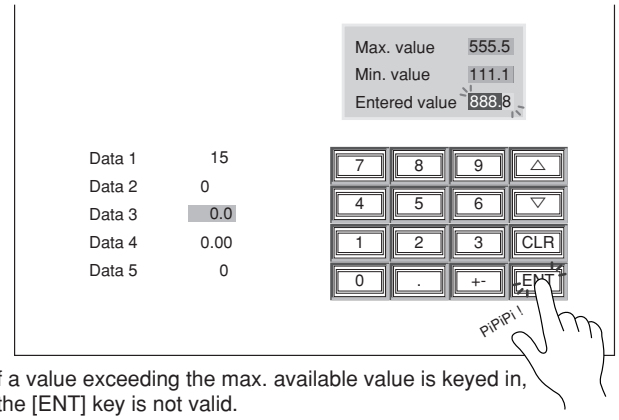
By pressing the [ENT] key, "15" is written to "Data 1".

5. Locate the cursor on the "Data 2" part. "Max. value" indicates "99" and "Min. value" indicates "22".
Press "12" on the keypad. "12" is entered for "Entered value".
When one more key ("3" for example) is pressed, the key makes an error sound (beep) and does not work because the maximum available digits have already been entered.

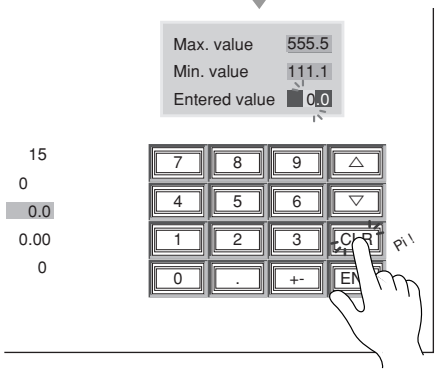


When a key is pressed while the maximum available digits have already been entered, the key does not work.

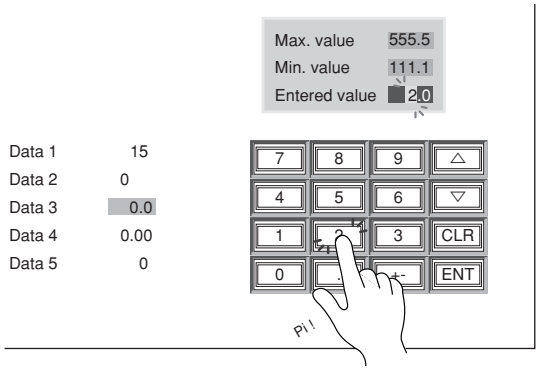
6. If the cursor is moved to the "Data 3" part before the [ENT] key is pressed, "Data 2" still indicates "0".
When "888.8" is keyed in and the [ENT] key is pressed while the cursor is located on the "Data 3" part, the key makes an error sound (beep) and the entry is not valid. Any value exceeding the maximum available value cannot be entered.
Press [CLR] key to reset "Entered value" and key in a value within the allowable range.



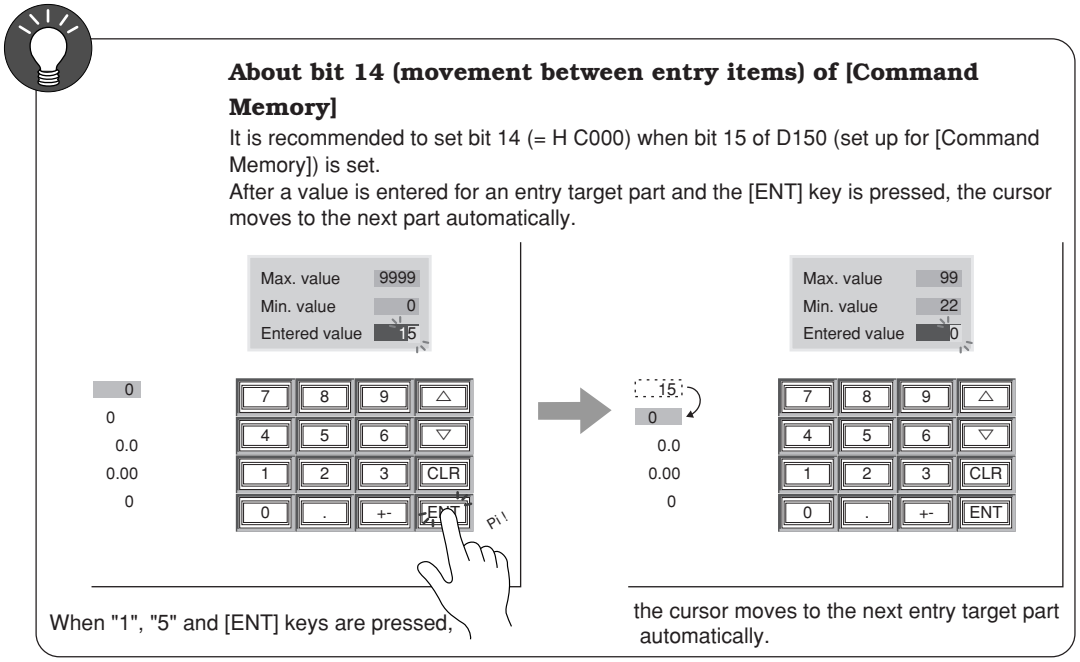
If a value exceeding the max. available value is keyed in, the [ENT] key is not valid.



Press [CLR] key to reset "Entered value".



Key in a proper value.



About bit 14 (movement between entry items) of [Command Memory]

It is recommended to set bit 14 (= H C000) when bit 15 of D150 (set up for [Command Memory]) is set.

After a value is entered for an entry target part and the [ENT] key is pressed, the cursor moves to the next part automatically.

When "1", "5" and [ENT] keys are pressed,

the cursor moves to the next entry target part automatically.

Memory for Entry Mode

The screen uses the following memory addresses:

Option	Address	Contents	Direction	Set in:
[Command Memory]	D150	Control memory for releasing the keypad interlock, etc.	PLC -> ZM-70	[Entry] dialog
[Memory]	D160 ⟆ D164	Memory to which values entered through the keypad are written	ZM-70 -> PLC	[Num. Display] dialog

Questions and Answers

The following describes possible keypad problems and measures.

◎None of the keys on the keypad work.

--> The same division number may not be entered for the keys and the [Division No.] in the [Entry] dialog. The same division number must be set up.
(Refer to page 7-16.)

◎Although the up/down cursor keys work, the numerical and [ENT] keys do not work.

--> Bit 15 (writing enabled/disabled bit) of [Command Memory] in the [Entry Dialog] may not be set.
Setting bit 15 should release the keypad interlock.

◎The cursor does not appear on the screen.

--> A memory address may be entered for [Item Select Memory] in the [Screen Setting] dialog for the screen.
When a memory address is entered for [Item Select Memory], the cursor is displayed only for the corresponding part. Delete the address entry.

Keyword

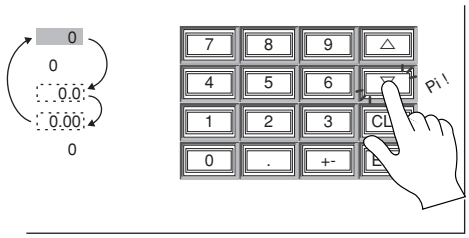
[Item Select Memory] (in [Screen Setting] dialog)

When the entry mode is used, whether entry target parts on the base screen are valid is controlled by [Item Select Memory].
Bits from 0 of the memory address "n" respectively correspond to the numbers entered for [Order] (in the [Num. Display] dialog) for entry target parts. By setting a bit, the entry target part of the corresponding [Order] number becomes valid for data entry and the cursor is displayed.
Any entry target part having an [Order] number which corresponds to a reset bit becomes invalid and the cursor is not displayed.

When bits of the [Item Select Memory] address "n" are set as follows:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1

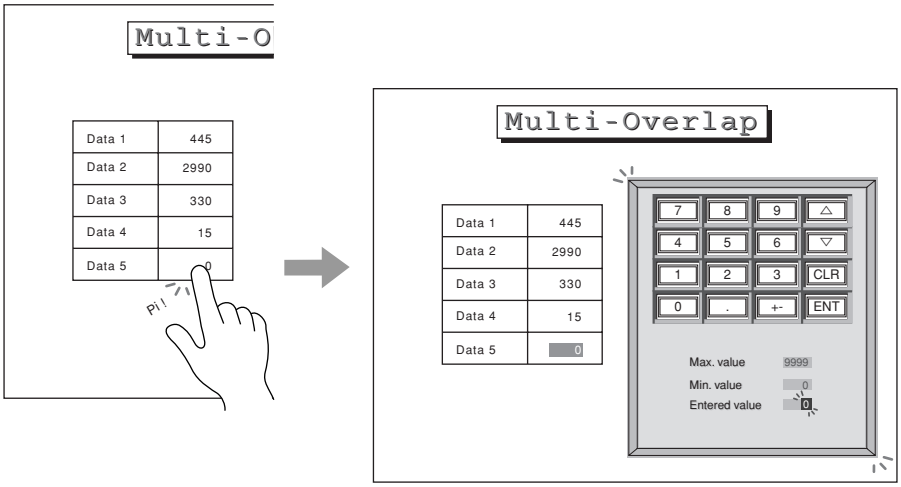
Ignored — Corresponding to [Order] numbers



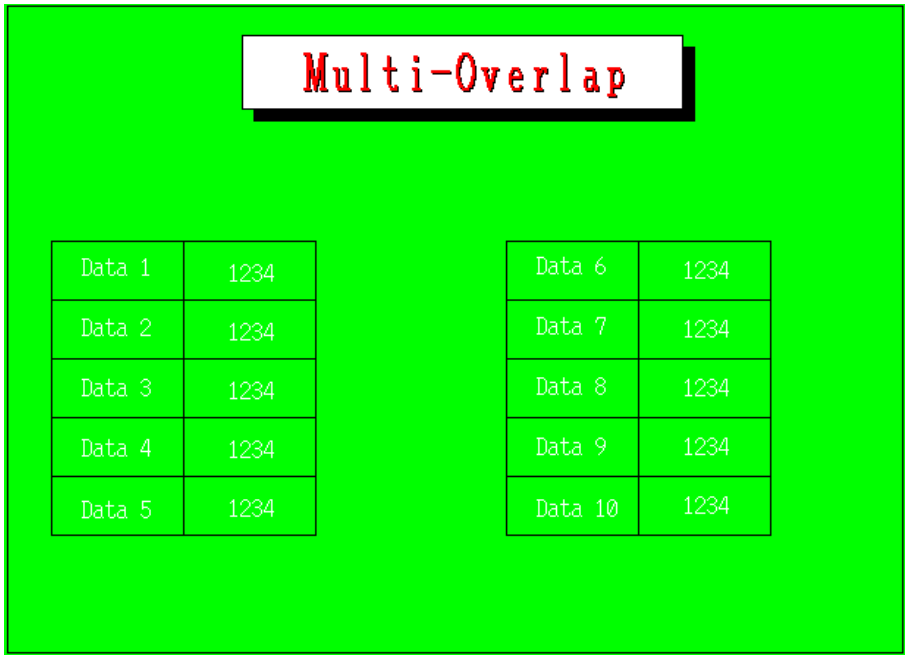
The cursor moves between the entry target parts as indicated by the arrows.

8 Displaying the Keypad Only When Necessary (Multi-Overlap)

It is possible to display the keypad on the screen only when necessary.



You will create the following screen.
By pressing a numerical data display part, the hidden switch is activated to display the keypad.



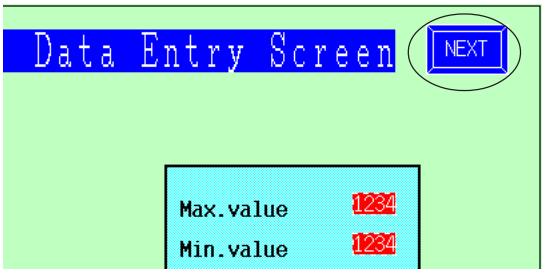
Procedure

Operation

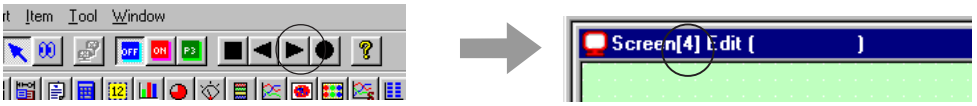
Creating a Screen Change Switch

Create the following screen change switch.

1. Place the switch part as shown below. Enter [Screen: 4] for [Function] in the [Switch] dialog.



2. Click the [Next] icon to open the [Screen [4] Edit] window.



Screen Color and Display Environment Setting

1. Select [Screen Setting] from the [Edit] menu. Check green for [F] in [Back Color] and Click [OK].
The screen color is changed to green.

2. Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.

3. Open the [Grid] tab window. Set up as shown below and click [OK].

☑Grid Dsp.		☑ON Grid	
Grid Color	: Purple		
Grid Type	: Free		
X Offset	: 0	Y Offset	: 0
X Pitch	: 5	Y Pitch	: 5

☑Place switches on switch grids.

The purple grids are displayed on the screen.

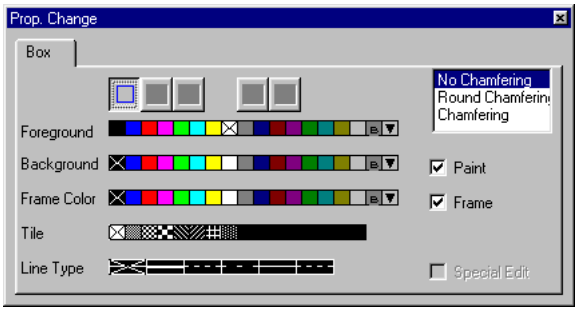
Creating a Screen Title

1. Click [Text] icon in the draw tool bar. Key in "Multi-Overlap".

2. Set up text properties as shown below:

Foreground	: Red	Enlarge X	:2
Background	: Black	Enlarge Y	:2
Rotate	: Normal	☐ Italic	
Direction	: RGT	◉Shadow	

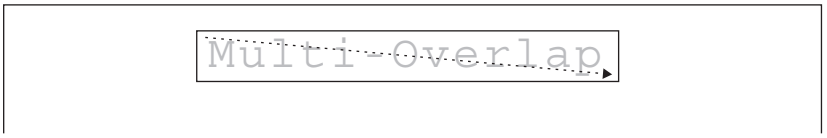
3. Draw a box to be placed behind the title.
Click the [Box] icon in the draw tool bar. The following dialog is displayed.



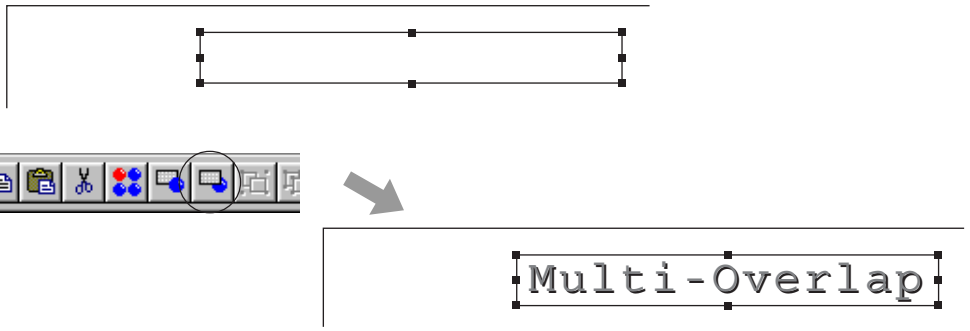
4. Set up properties as shown below:

Foreground : White
Background : Black ☑Paint
Frame Color : Black ☑Frame
Tile : No. 0 (extreme left)
Line Type : No. 0 (extreme left: solid line)

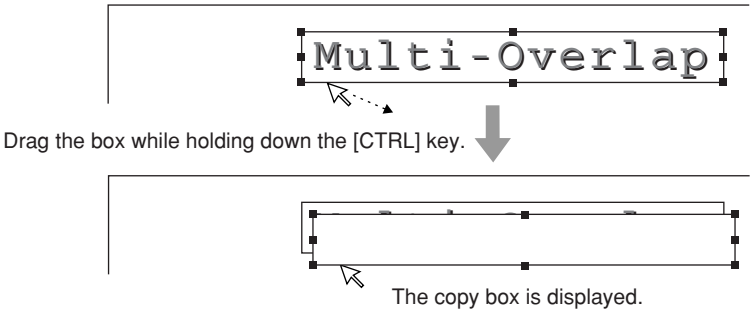
5. Draw a painted box and cover the title.



6. Click the [Select] icon and click the box (handles are shown).
Click the [Move to Back] icon. The title appears on the box.

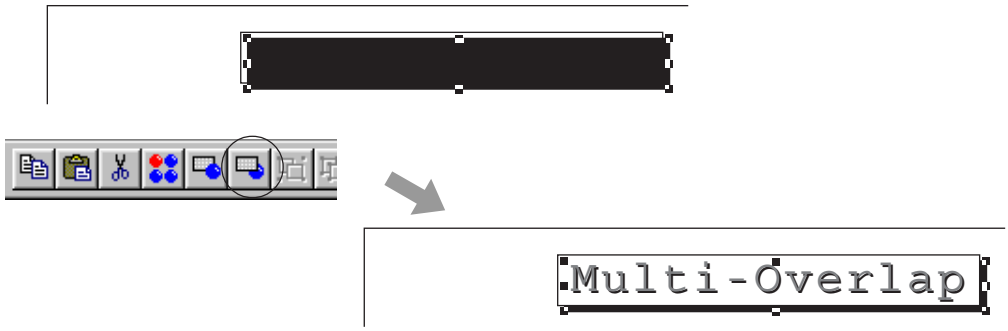


7. Copy the box.
Click the box (handles are shown). While holding down the [CTRL] key, drag the box. The copy box is displayed in the dragged position.



8. Double-click the copy box or click it (handles are shown). Click the [Detail/Prop. Change] icon. The [Prop. Change] dialog is displayed.
Check black for [Foreground].

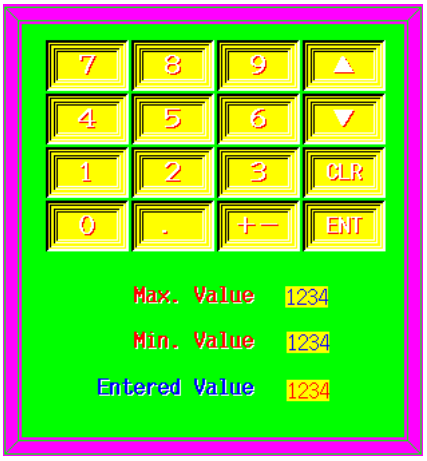
9. While handles are shown around the box, click the [Move to Back] icon. Place the box as shown below. The copy box is placed like a shadow of the original box.



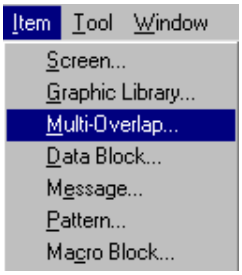
This step completes drawing the screen title.

Creating an Overlap

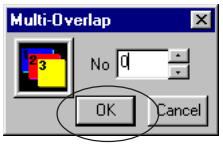
Create an overlap to be called up.



1. Select [Multi-Overlap] from the [Item] menu.

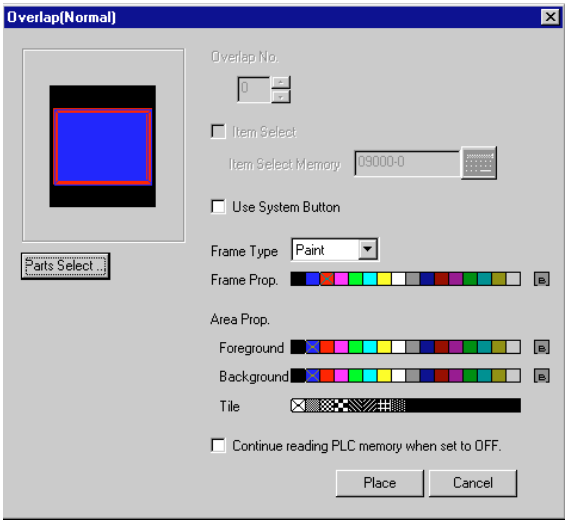


2. The [Multi-Overlap] dialog is displayed. Check that "0" is entered and click the [OK].



3. The [Multi Overlap [0] Edit] window is opened. Click the [Overlap] icon in the tool bar.

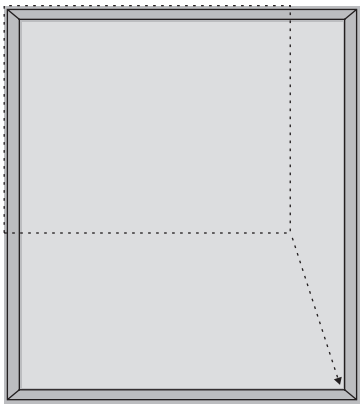
4. The [Overlap (Normal)] dialog is displayed. Click the [Parts Select] button and select the [0002] part.



5. Set up as shown below:

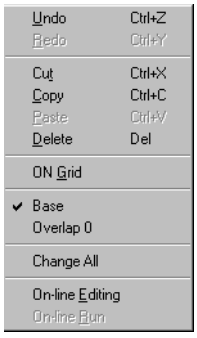
☑Use System Button
Frame Type : Paint
Frame Prop. : Yellow
Area Prop. Foreground : Green
Background : White
Tile : No. 1 (2nd from the left)
☐ Continue reading PLC memory when set to OFF

6. Click [Place]. A dotted box with cross cursor is displayed. Place the box on the screen by clicking it. Adjust it to the keypad size.

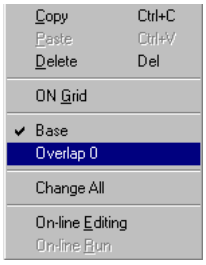


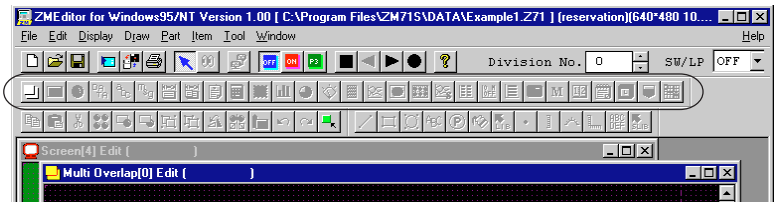
Placing a Keypad

1. In the [Multi Overlap [0] Edit] window, in which the overlap part is placed, right-click the mouse.
The following pop-up menu is displayed.

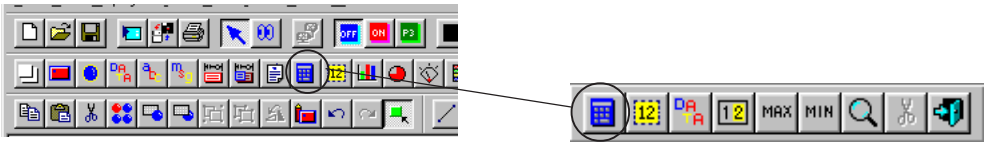


2. Select [Overlap 0]. Now the editing layer is limited within the overlap part and parts placement or drawing is allowed only on the part. The tool bar as enclosed below becomes valid.





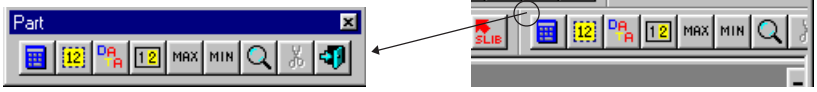
3. Check that "0" is entered for [Division No.] at the top right of the screen. Click the [Entry Mode] icon. Click the [Keypad] icon in the entry mode parts tool bar.



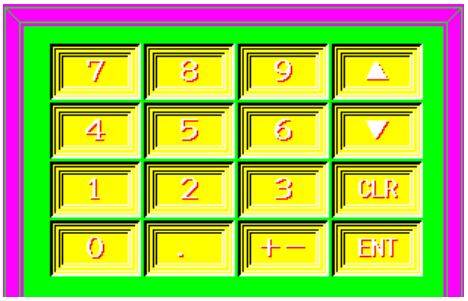
If the entry mode parts tool bar is not displayed entirely, click the outside of any icon and drag the tool bar to the desired position on the screen.

If entry mode parts tool bar is hidden, click the outside of any icon and drag.

The entry mode parts tool bar is displayed independently.



4. Click [0002] and place the keypad as shown below:



Placing Numerical Data Display Parts (Entry Display)

Place the numerical data display parts for entered value, max. value, and min. value on the overlap.

1. Click [Entry Display] icon in the entry mode parts tool bar.
Select [Numerical Data]. The [Num. Display] dialog is displayed. Select the [0001] part. Set up properties as shown below and place it on the screen.

[Main] tab window — Division No.: 0

[Type] tab window — Display function: Entry Display — Digits: 4

[Char. Prop] tab window — Char. Type: Normal

☐ Transparent ☐ Italic

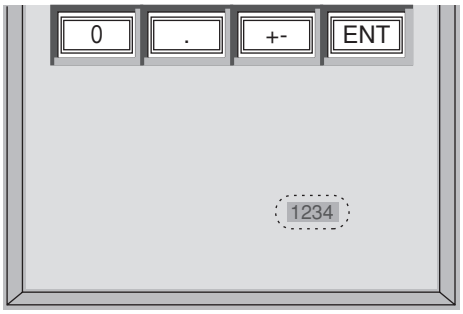
Char. Size ◉ 1-Byte

Rotate: Normal — Direction: RGT

☐ Spacing

Enlarge X: 1 Y: 1

Foreground: Blue — Background: Yellow

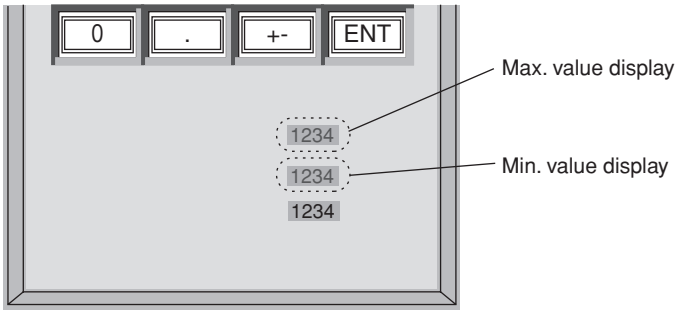


2. Also place the max. value and min. value display parts following the same steps. Click the [Max. Display] icon and [Min. Display] icon in the entry mode parts tool bar respectively and set up as shown below:

[Main] tab window — Division No.: 0

[Type] tab window — Display function: Max. or Min. Display
Digits: 4 Decimal Point: 0
Display Type: DEC (w/o sign)

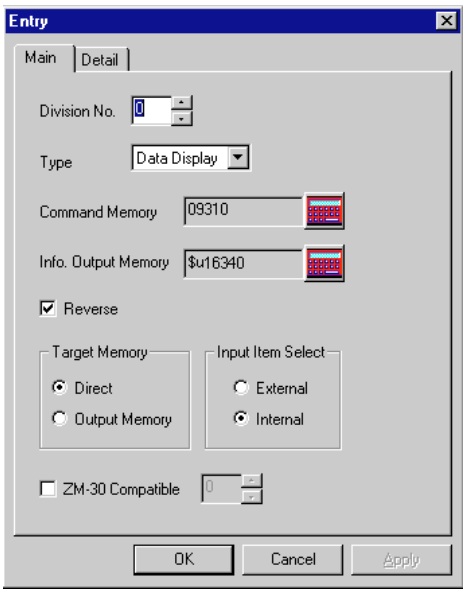
[Char. Prop] tab window — Char. Type: Normal
☐ Transparent ☐ Italic
Char. Size ◉ 1-Byte
Rotate: Normal Direction: RGT
☐ Spacing: unchecked
Enlarge X: 1 Y: 1
Foreground: Purple Background: Yellow



Setting Up Entry Mode

Set up the control data for the keypad placed on the overlap.

1. Click the [Detail] icon in the entry mode parts tool bar. The [Entry] dialog is displayed.



2. Set up as shown below:

[Main] tab window

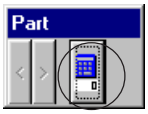
Division No.: 0
Type: Data Display
Command Memory: 09310
Info. Output Memory: $u16340
☑Reverse
Target Memory ◉Direct
Input Item Select ◉Internal
☐ZM-30 Compatible

[Detail] tab window

☐Use Graphic
☐Default to 0
Process Cycle: Low Speed

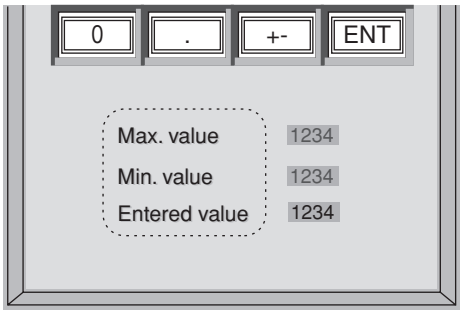
3. Click [OK].

The [Entry] icon is stored in the [Part] auxiliary tool box in the lower left corner.



Placing Texts on the Overlap

Place the following texts on the overlap.



1. Click the [Text] in the draw tool bar.

The dialog for text entry is displayed.

2. Key in the texts and set up properties as shown below:

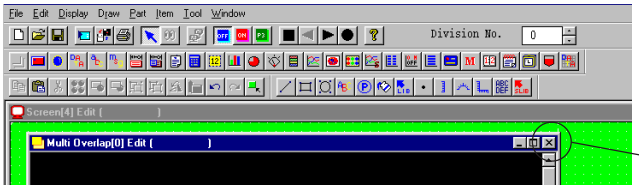
Prop. \ Text	"Max. value"	"Min. value"	"Entered value"
Foreground	Red	Red	Green
Background	White	White	Blue
Enlarge X	1	1	1
Enlarge Y	1	1	1
Rotate	Normal	Normal	Normal
Direction	RGT	RGT	RGT
Italic	unchecked	unchecked	unchecked
Char. Type	Shadow	Shadow	Shadow

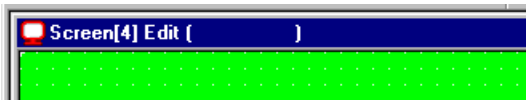
Place the texts on the overlap as shown in the above figure.

[Overlap Setting] Dialog

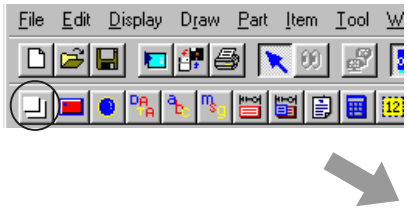
Return to the [Screen Edit] window and set up the [Overlap Setting] dialog for calling up the overlap.

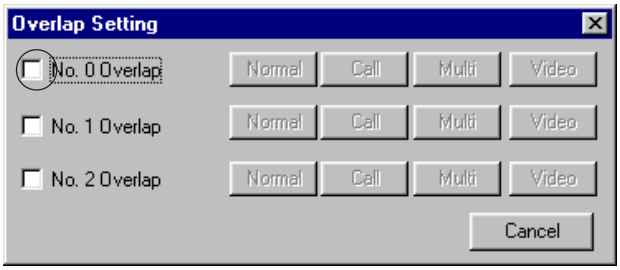
1. Click the "x" (close) button in the [Multi Overlap [0] Edit] window. The [Screen [4] Edit] window is displayed.



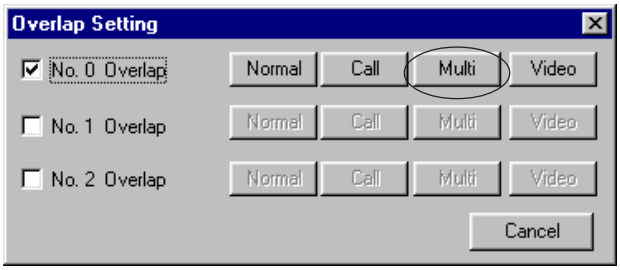


2. Click the [Overlap] icon in the tool bar. The [Overlap Setting] dialog is displayed.

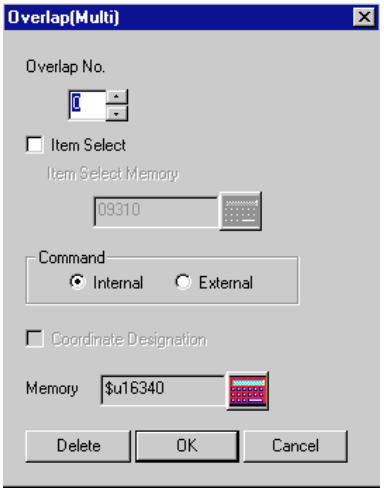




3. Click the [No. 0 Overlap] box. The following options are displayed. Click [Multi].

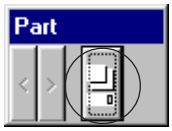


4. The [Overlap (Multi)] dialog is displayed.



5. Set up as shown below:
Overlap No.: 0
☐ Item Select
Command ◉Internal
Memory: $u16340

6. Click [OK].

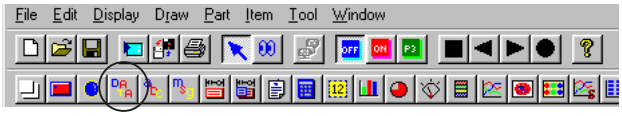


The [Overlap] icon is stored in the [Part] auxiliary tool box in the lower left corner of the screen.
The setting to call up the overlap on the screen has been completed.

Placing a Numerical Data Display Part (Entry Target)

Place a numerical data display part to which data entered through the keypad should be written.

1. Click the [Num. Data Display] icon in the tool bar.



2. The [Num. Display] dialog is displayed. Click [Part Select]. Select [0001] from the list.

3. Set up as shown below:
[Main] Memory: D180
[Type] Display Function: Entry Target
Order: 0 Digits: 4 Decimal Point: 0
Display Type: DEC (w/o sign)
Entry Type: DEC Data Length: 1-Word
☑Zero Suppress : Flush R
[Char. Prop] Char. Type: Normal
☐ Transparent ☐ Italic Char. Size ◉1-Byte
Rotate: Normal Direction: RGT Enlarge X: 1 Y:1
Foreground: White Background: Green

[Detail] ☑Alarm

Max.: 9999	Max. Color	Foreground	: Red
		Background	: Green
Min.: 0	Min. Color	Foreground	: Red
		Background	: Green

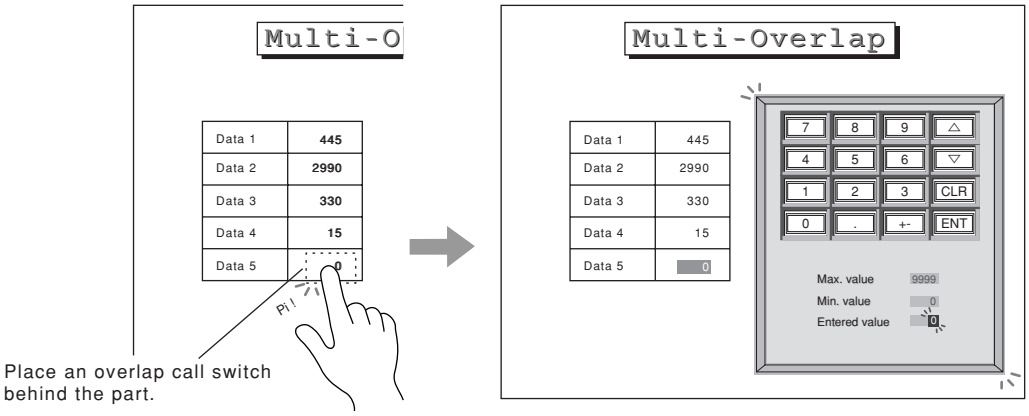
Process Cycle: High Speed

For checking/ unchecking the [Alarm] box, refer to page 7-13.

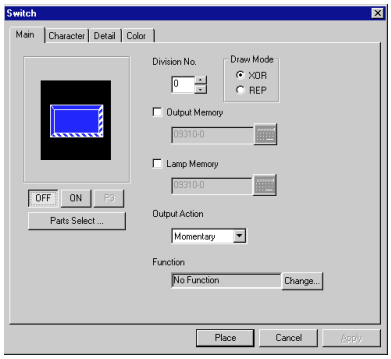
4. Click [Place]. A dotted box with cross cursor is displayed on the screen. Place it as shown below.

Placing an Overlap Call (Hidden) Switch

To bring up the keypad when any numerical data display part is pressed, place an overlap call switch behind each part. Place one switch with the following steps.

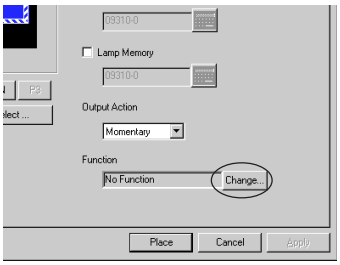


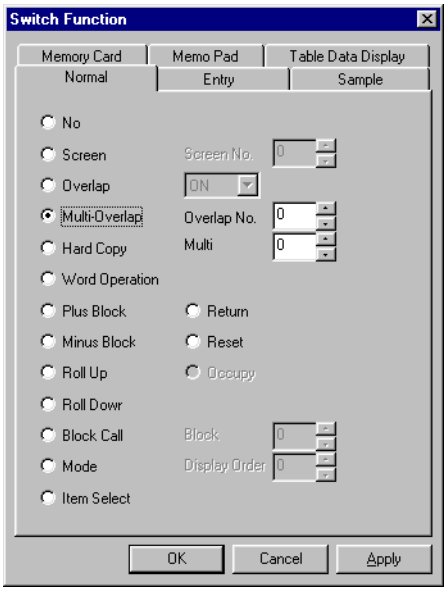
1. Click the [Switch] icon in the tool bar. The [Switch] dialog is displayed.



2. Click the [Parts Select] button and select [0000]. The [Switch] dialog is displayed again.

3. Click the [Change] button at [Function] in the [Main] tab window. The [Switch Function] dialog is displayed.
Select [Multi-Overlap] and enter "0" for [Overlap No.] and [Multi-Overlap No.].
Click [OK].

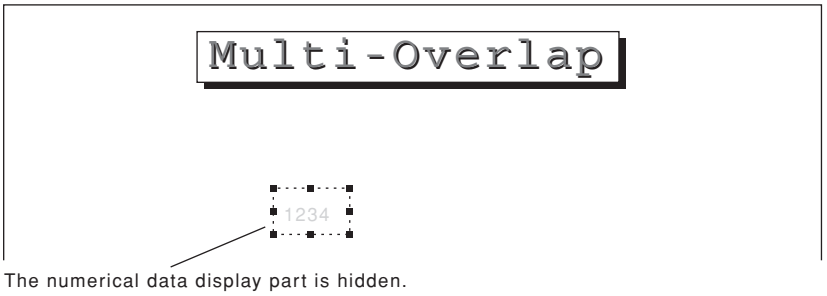




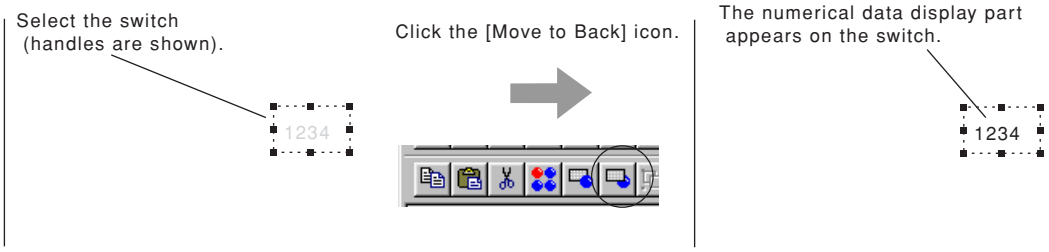
4. Open the [Color] tab window and set up as shown below:

ON Color : Purple
OFF Color : Green
Frame Type : No Frame

5. Click [Place] and place the switch over the top numerical data display part.
The numerical data display part is under the switch.



6. Click the switch (handles are shown). Click the [Move to Back] icon to display the part on the switch.

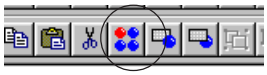


Copying the Numerical Data Display Part and the Overlap Call Switch

Make nine copies of both the numerical data display part and the overlap call switch.

1. Copy the numerical data display part.
Click the numerical data display part. Select [Multi Copy] from the [Edit] menu.
The [Multiple Copy] dialog is displayed.

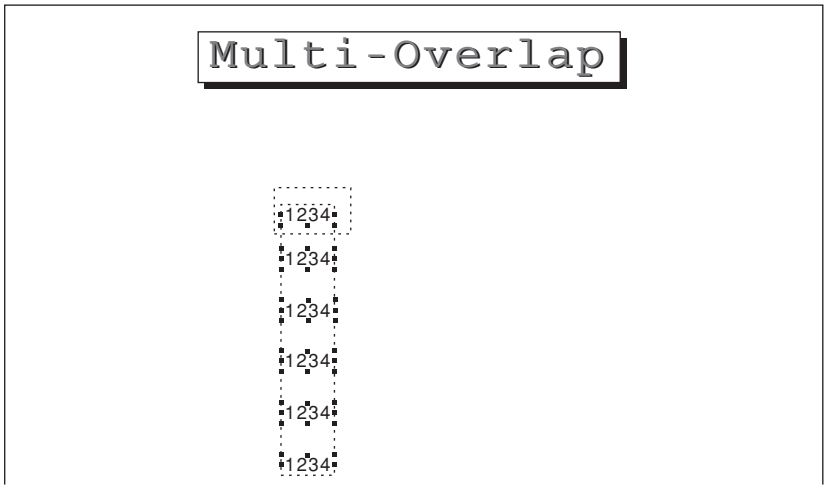
2. Set up as shown below:



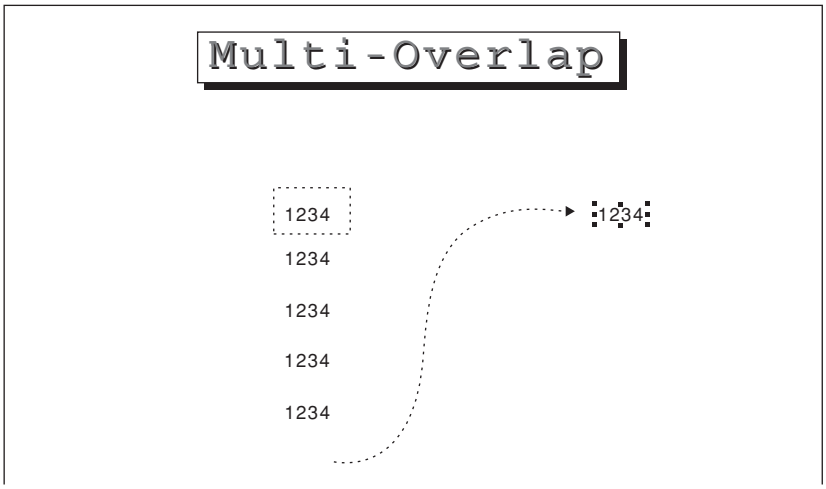
◉Dot
◉Interval
X Distance : 0
Y Distance : 24
☑Order INC
☑Memory INC
☑Num. Data Memory: D180

Direction ①②③ ④⑤⑥
Quantity X : 1
Quantity Y : 6
Step: 1

3. Click [OK]. The copy parts are displayed on the screen.



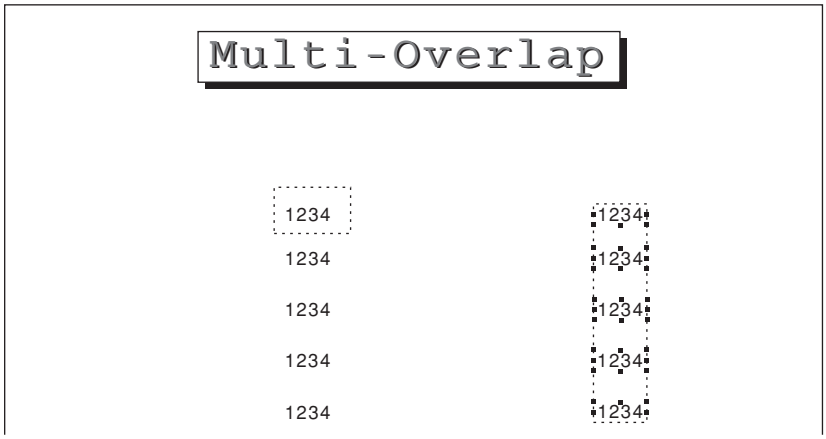
4. Click the bottom part and move it as shown below:



5. Click the moved part (handles are shown). Select [Multi Copy] icon in the tool bar. The [Multiple Copy] dialog is displayed. Set up as shown below:

◉Dot	Direction	①②③ ④⑤⑥
◉Interval		
X Distance : 0	Quantity X	: 1
Y Distance : 24	Quantity Y	: 5
☑Order INC		
☑Memory INC		
☑Num. Data Memory: D185	Step: 1	

6. Click [OK].
The copies are displayed as shown below:



7. Make nine copies of the overlap call switch.
Click the switch (handles are shown) and open the [Multiple Copy] dialog.

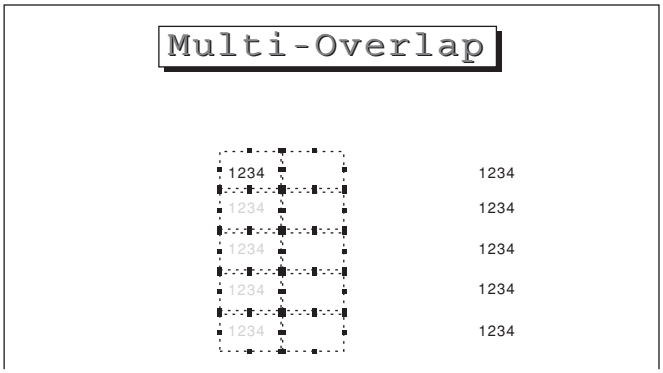
8. Set up as below and click [OK].

◉Dot
◉Interval

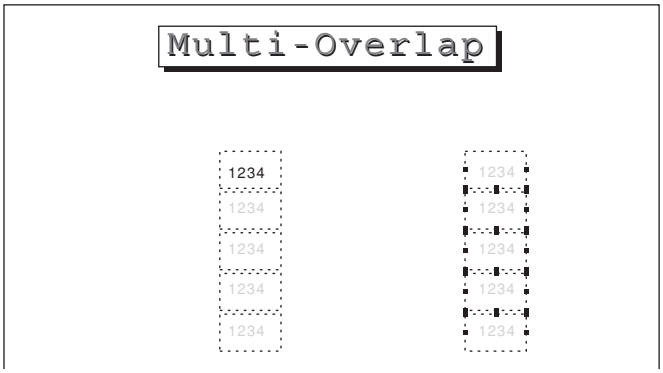
Direction ①②③ ④⑤⑥

X Distance : 3
Y Distance : 3

Quantity X : 2
Quantity Y : 5



9. Place five copy switches over the respective numerical data display parts on the right.

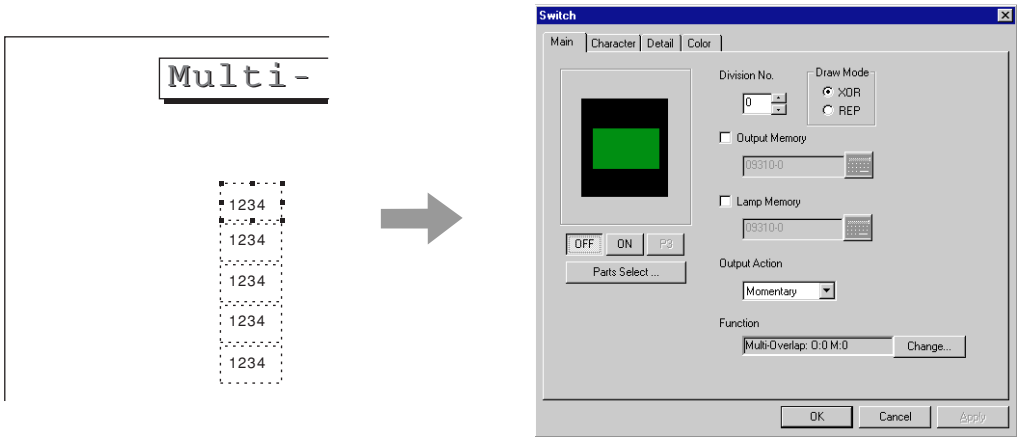


10. Move each switch behind the part using the [Move to Back] icon.

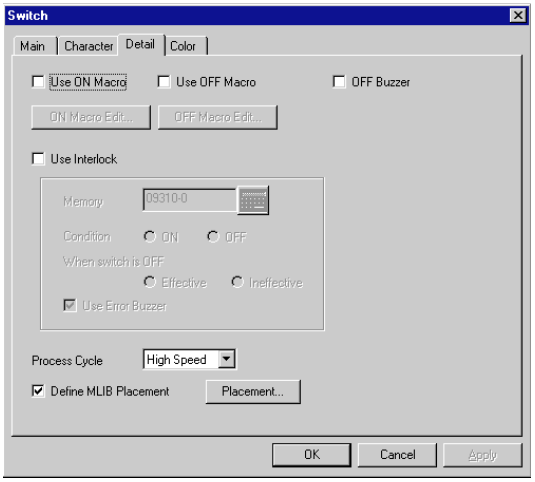
Placing the Overlap

It is possible to specify the position of the overlap, which is displayed by pressing an overlap call switch.

1. Click the top switch on the left and click the [Detail/Prop. Setting] icon (or, double-click the switch). The [Switch] dialog is displayed.

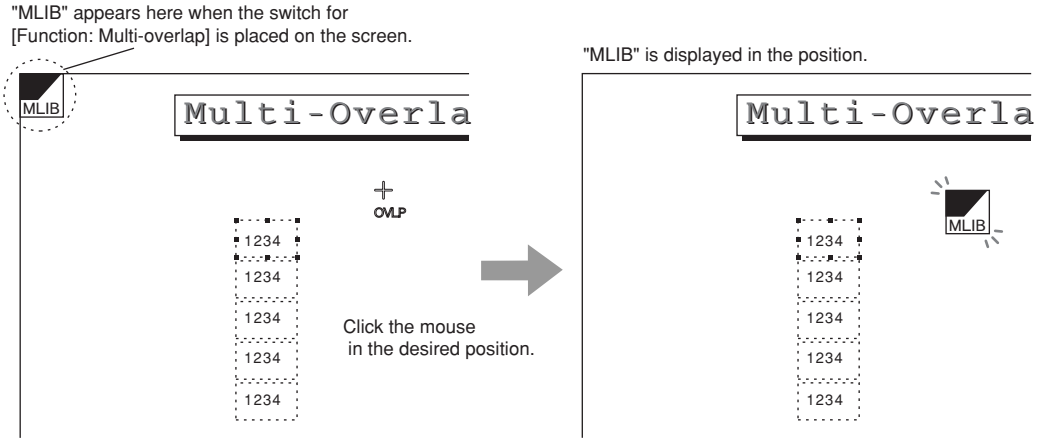


2. Check that "Multi-Overlap: O:0 M:0" is entered for [Function] in the [Main] tab window. Open the [Detail] tab window.



3. The [Define MLIB Placement] box is checked. Click the [Placement] button. The [Switch] dialog disappears, and the "OVLP" cursor appears on the screen.

4. Click the "OVLP" cursor in the desired position, in which the top left corner of the overlap part is located. "MLIB" appears in the position, and the [Switch] dialog is displayed.

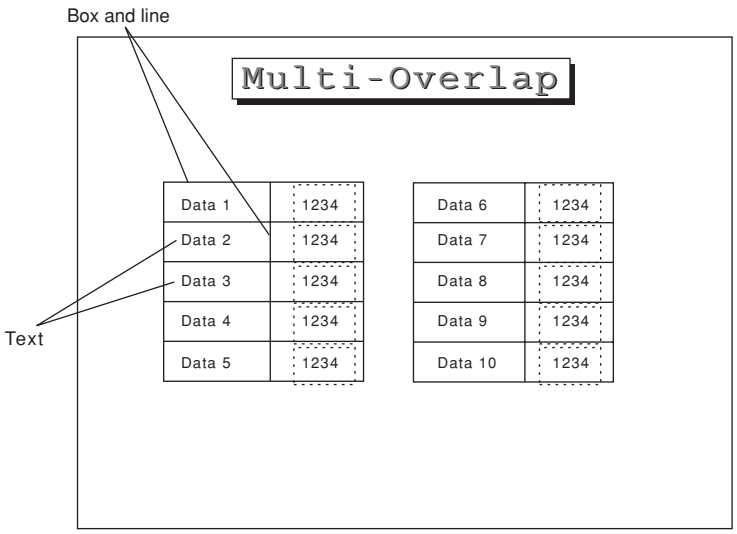


5. Click [OK].

6. Specify the overlap positions for the remaining nine switches with the same steps using the [Placement] button in the [Detail] tab window.

Drawing on the Screen

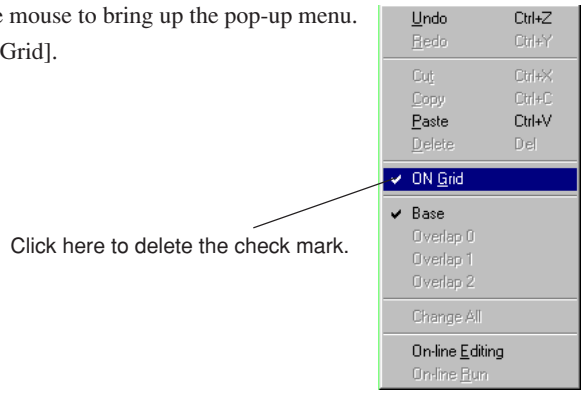
Draw texts, boxes, and lines on the screen as shown below:



1. Click the [Text] icon in the draw tool bar. Enter the desired texts and place them. Set up properties as shown below:

Prop. \ Text	"Data 1 (~ 10)"
Foreground	White
Enlarge X	1
Enlarge Y	1
Rotate	Normal
Direction	RGT
Transparent	checked
Italic	unchecked
Char. Type	Normal

2. Right-click the mouse to bring up the pop-up menu. Uncheck [ON Grid].

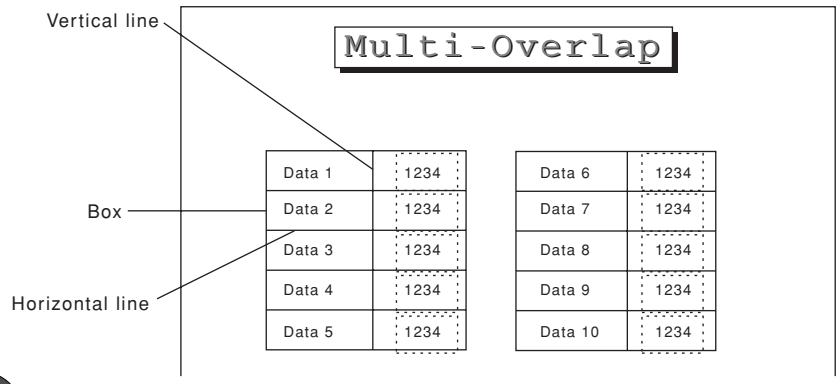


3. Draw the following table using the [Line] and [Box] icons in the draw tool bar. Set up properties as shown below:

Vertical line
- Color : White
- Line Type : No. 1 (thick line)

Horizontal line
- Color : White
- Line Type : No. 0 (solid line)

Box
- Foreground : White
- Line Type : No. 0 (solid line)
- ☐Paint

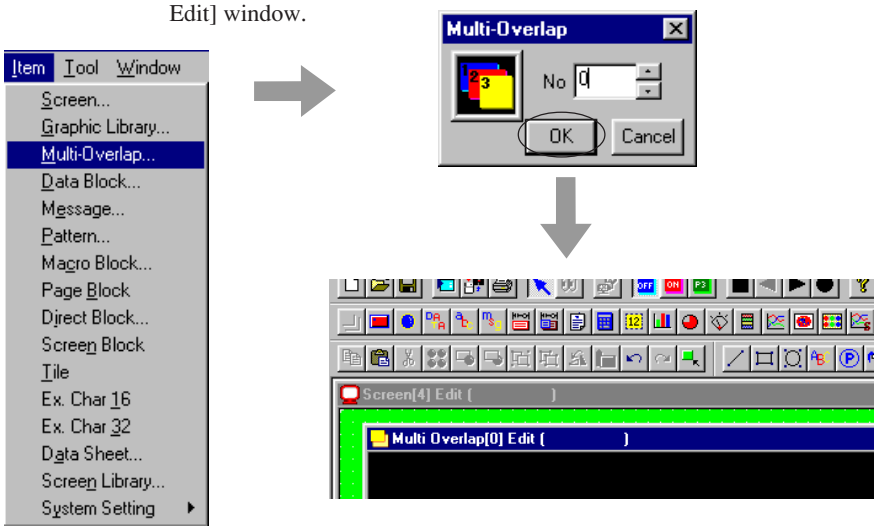


When drawing vertical or horizontal lines, drag the mouse while holding down the [SHIFT] key. Lines can be drawn straight.

Division Number Check

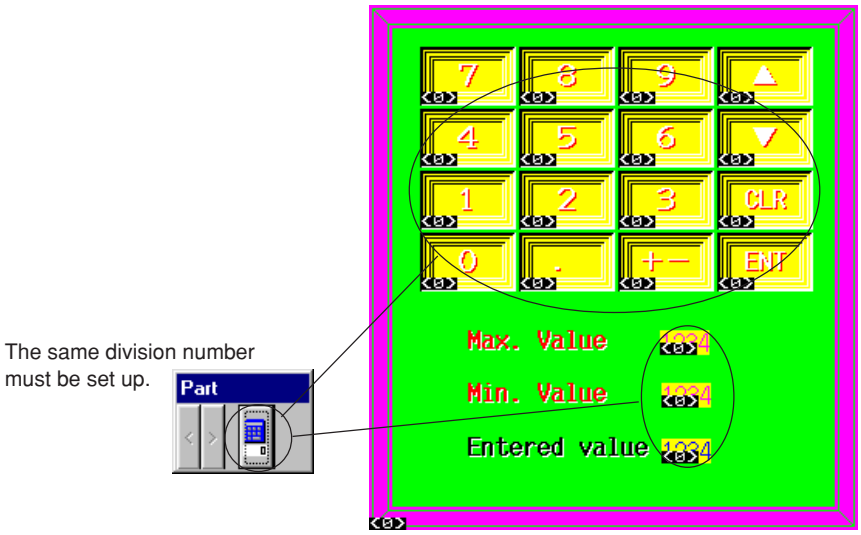
Check that the division number is set up correctly.

1. Select [Multi-Overlap] from the [Item] menu and open the [Multi Overlap [0] Edit] window.



2. Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed. Check the [Div No.] box for [Detail] and click [OK].

3. The division number (<0>) is entered for each part on the overlap.
Check that all parts and the icon in the [Part] auxiliary tool box have the same division No. 0.

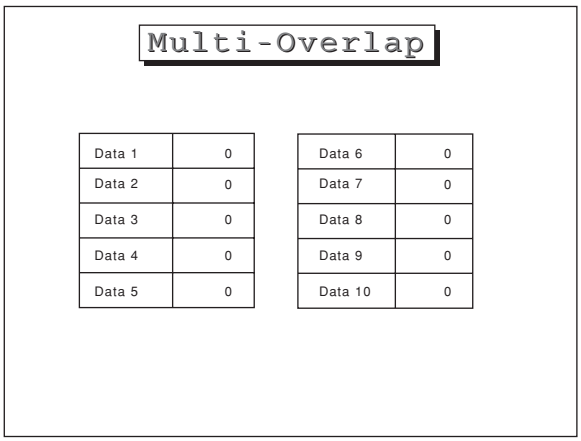


The overlap has been completed.
Save the file and transfer the data to ZM-80.

Opening Screen No. 4

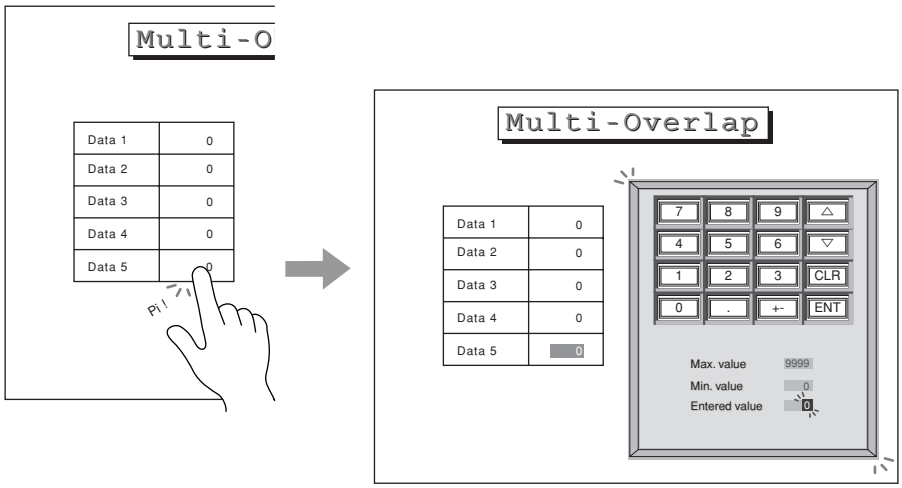
1. Connect ZM-70 and PLC, and start communication. Screen No. 0 including the bit map data is displayed.

2. Press the NEXT switch. Screen No. 1 is displayed. Press the NEXT switch on the screen. Repeat this procedure until screen No. 4 "Multi-Overlap Screen" is displayed.

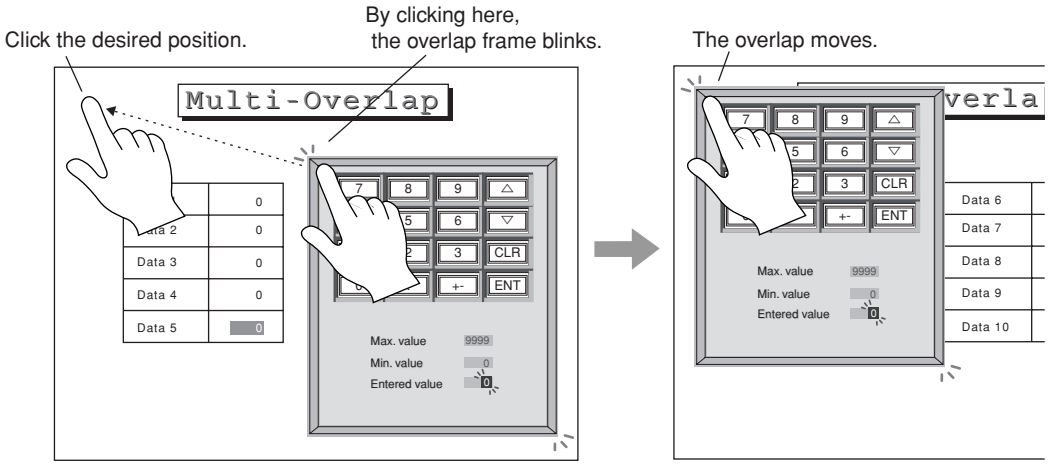


Calling Up the Overlap

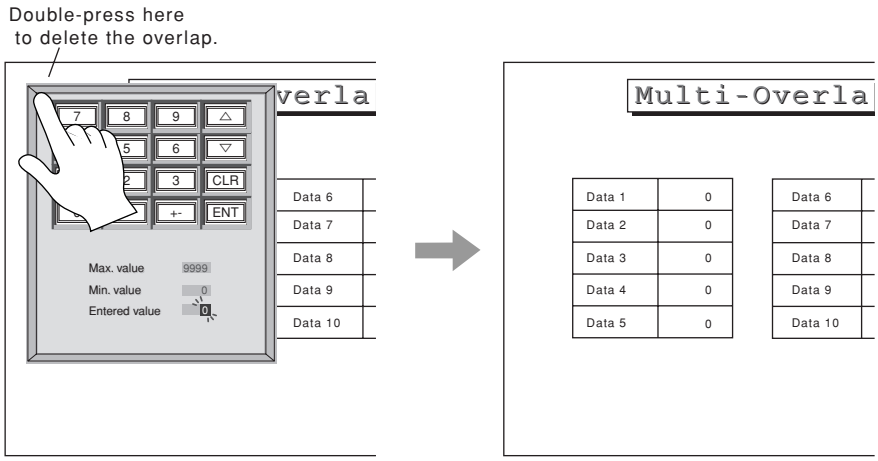
1. Press any numerical data display part. The overlap is displayed and the cursor is placed on the pressed part.



2. Press the top left corner of the overlap. The overlap frame blinks. By pressing a different position on the screen, the overlap is moved into position.

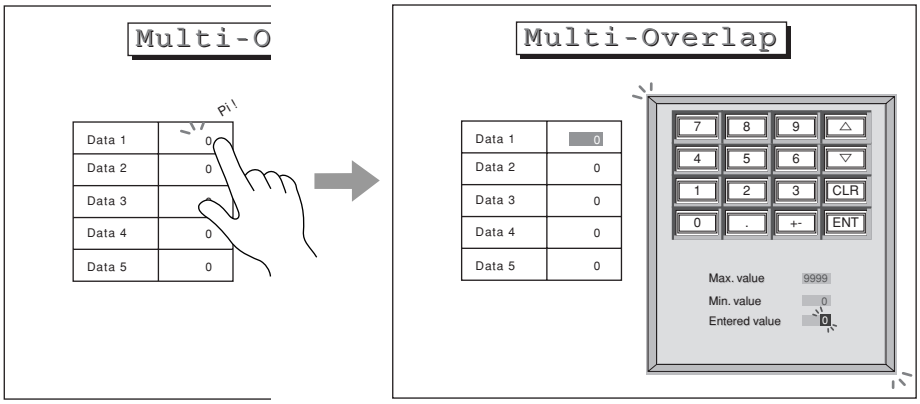


3. To delete the overlap, double-press the top left corner of the overlap (because the system button is activated).

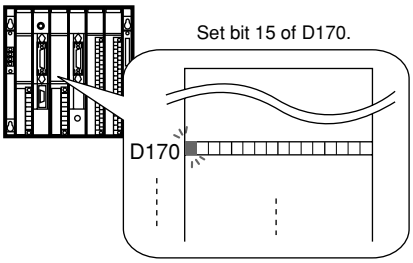


Releasing the Keypad Interlock

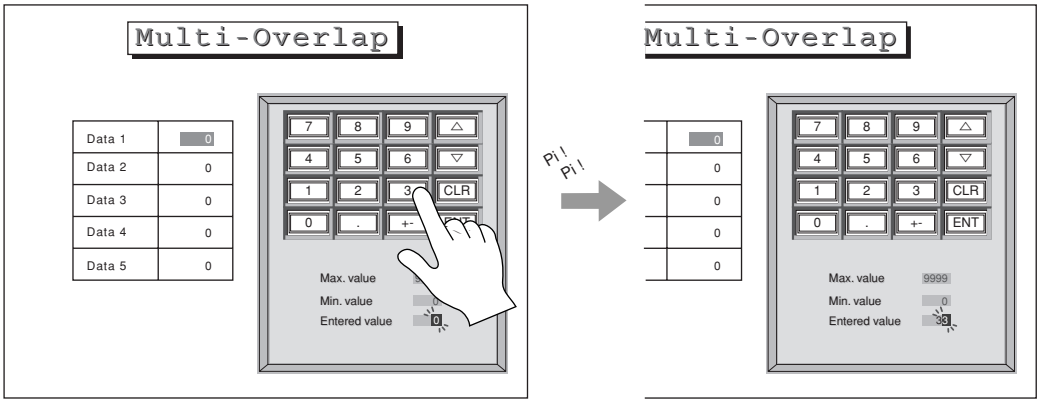
1. When the numerical data display part of "Data 1" is pressed, the overlap appears on the right and the cursor is displayed on the part.



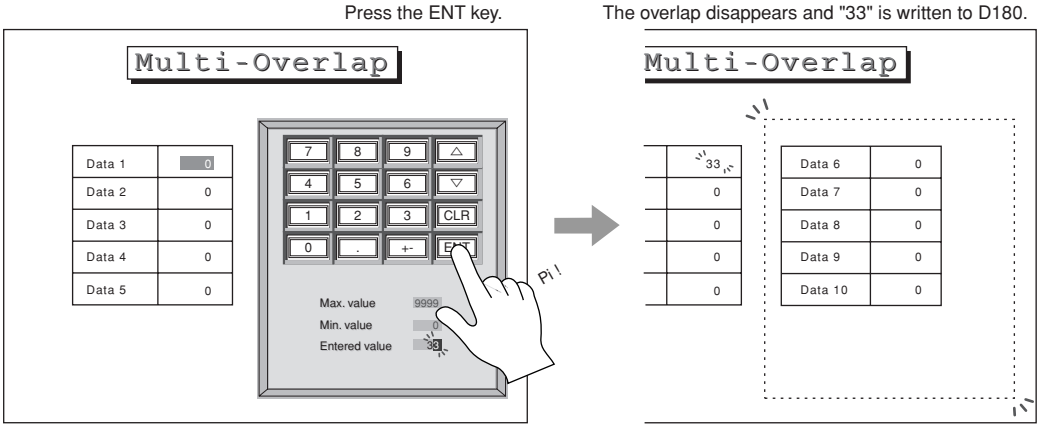
2. When any numerical key or the ENT key is pressed, the key makes an error sound (beep) and does not work because the keypad interlock is on.
For the overlap, "D170" is entered for [Command Memory] in the [Entry] dialog.
Set bit 15 of D170 (= H8000). Now the keypad interlock is released.



3. Press "33" on the keypad. "33" is indicated at "Entered value".



4. Press the ENT key. The overlap disappears and "33" is written to "Data 1". Check that "33" is written to D180 (the address set for [Memory] in the [Num. Display] dialog for Data 1) in the PLC memory.



Values can be written to the other data display parts with the same steps.

Memory for Entry Mode

The screen uses the following memory addresses:

Option	Address	Contents	Direction	Set in:
[Command Memory]	D170	Control memory for releasing the keypad interlock, etc.	PLC -> ZM-70	[Entry] dialog (in overlap editing)
[Memory]	D180 ∫ D189	Memory to which values entered through the keypad are written	ZM-70 -> PLC	[Num. Display] dialog (in screen editing)

Questions and Answers

The following describes possible keypad problems on the overlap and measures.

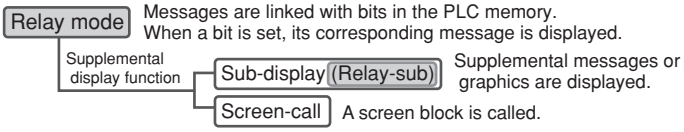
◎ The cursor is displayed even though the overlap is not called.

--> [Entry] dialog should be set up only for the overlap, but it may have been set also in the screen edit window.
If the [Entry] icon is stored in the auxiliary tool box also on the screen, the [Entry] dialog has been set up. Delete it.

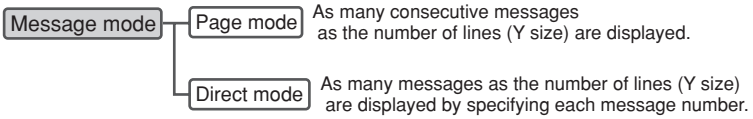
9 Displaying Messages by Setting/ Resetting Bits (Relay Mode)

The following ways are available to display messages on the screen.

- Messages are displayed or erased by setting or resetting of bits.

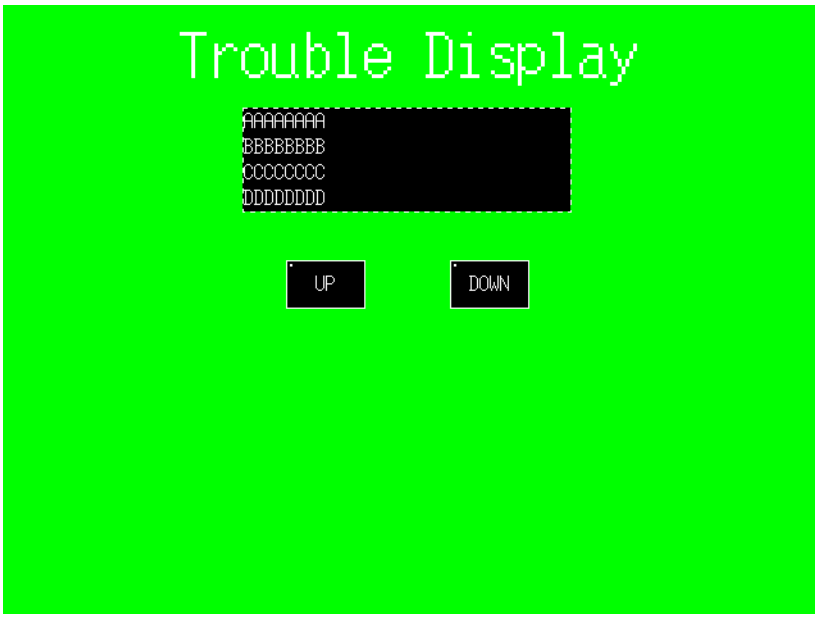


- Messages are displayed by specifying the numbers.



The messages to be displayed are set up in the message edit window.

In this chapter, you will create the following screen in relay mode.



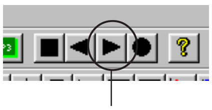
Procedure

Operation

Creating a New Screen

Create and place the NEXT switch to bring up the next screen on screen No. 4. Open a new screen and place the fixed text.

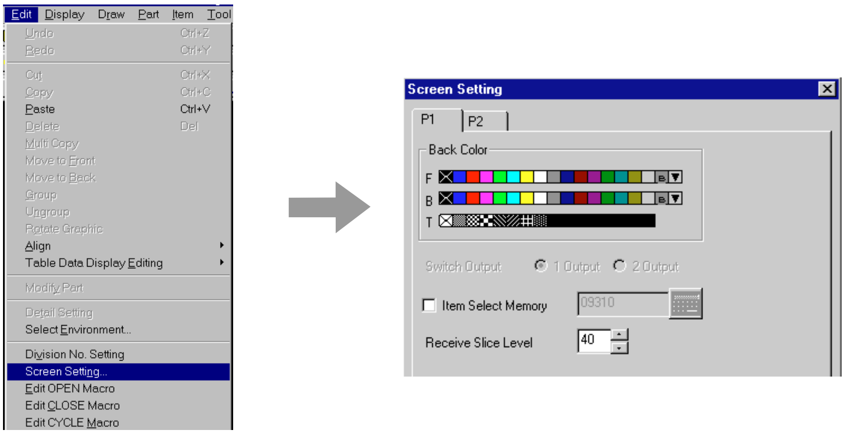
1. Place a switch part on screen No. 4 as shown below. In the [Switch] dialog, enter [Screen: 5] for [Function].



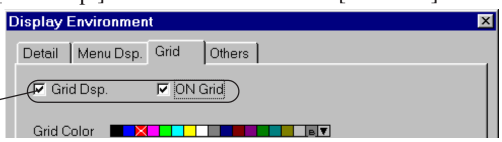
[Next] icon

2. Click the [Next] icon to open the new screen No. 5.

3. Select [Screen Setting] from the [Edit] menu. In the [Screen Setting] dialog, check black for [F (foreground)]. Click [OK].

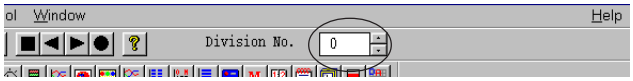


4. Select [Display Environment] from the [Display] menu. Open the [Grid] tab window and uncheck the [Grid Dsp.] box. Also uncheck the [ON Grid] box if it is checked. Click [OK].

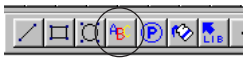


Uncheck this check box.

5. Check that "0" is entered for [Division No.] at the top right of the screen.



6. Key in "Trouble Display". Set up properties as shown below and place the title in the center of the screen.

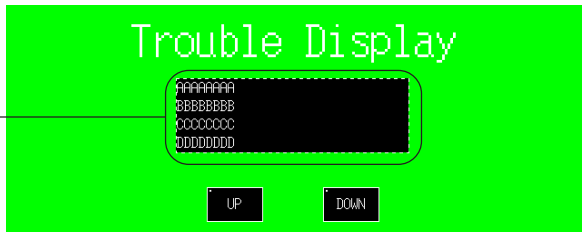


Foreground: White
Enlarge X: 3
Enlarge Y: 3
Rotate: Normal
Direction: RGT
☑Transparent

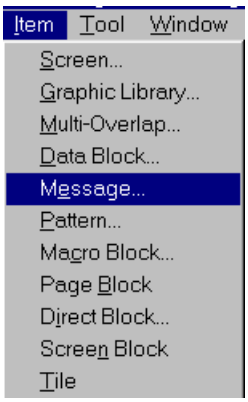
Message Registration

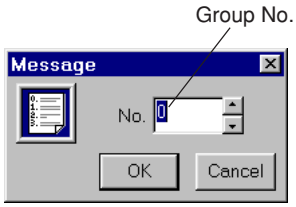
It is necessary to register the messages to be displayed on the screen. Open the [Message Edit] window.

Set up messages to be displayed in this area.



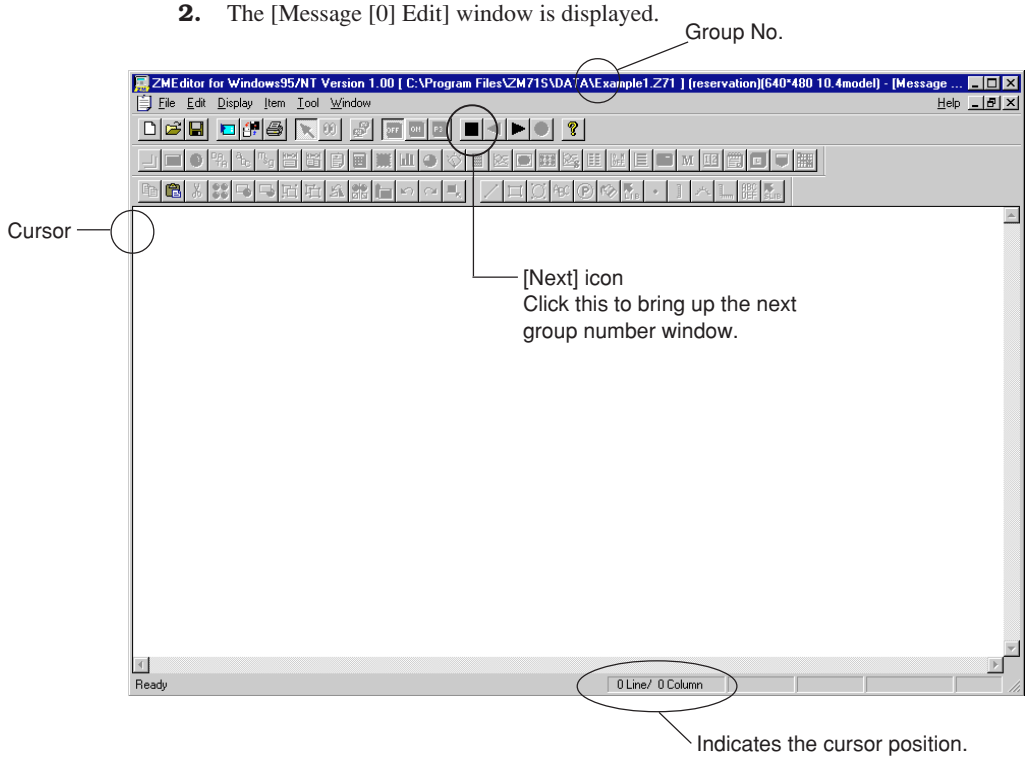
1. Select [Message] from the [Item] menu. The [Message] dialog is displayed. Enter "0" (group number) and click the [OK] button.





The message editing area is divided into 24 groups, each of which can contain a maximum of 256 message lines (maximum available lines: 6144 lines). In message editing, a maximum of 80 one-byte characters or 40 two-byte characters can be registered per line.

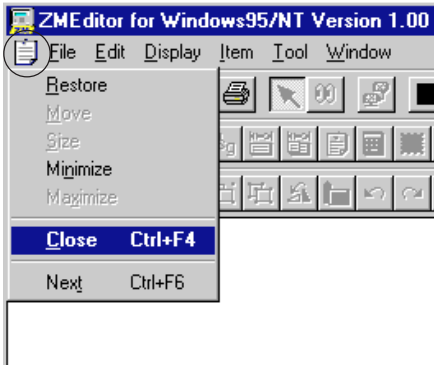
2. The [Message [0] Edit] window is displayed.

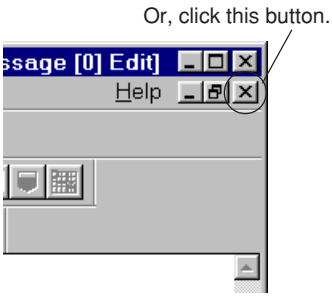


3. Enter messages using alphabets in this example. Start to enter them from line No. 0. Registration is made upon entry. Press the return key to move the cursor to the next line.

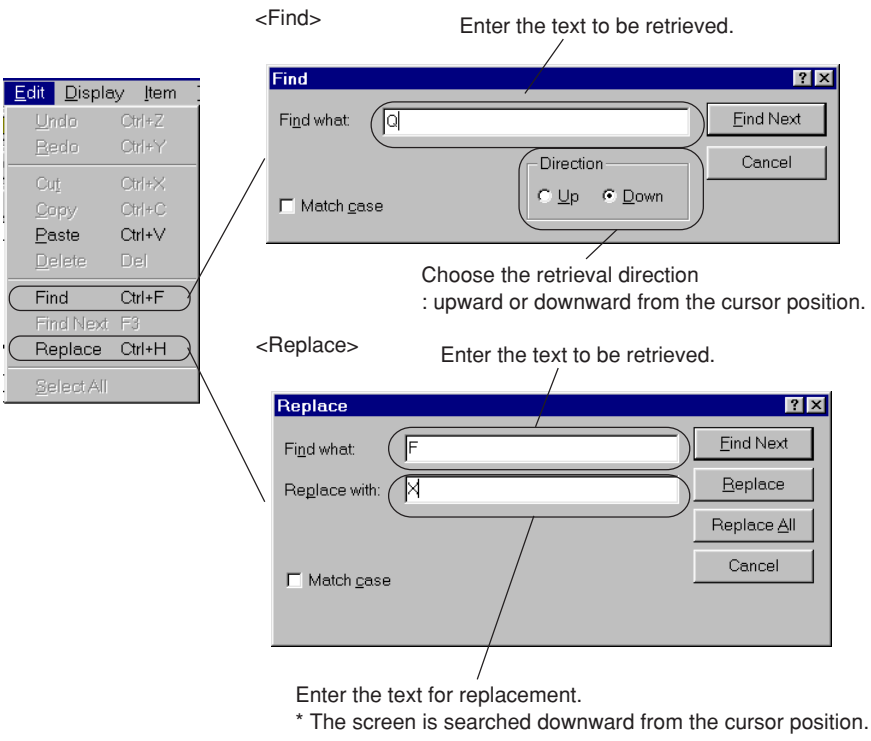
Line No.	Message
0	AAAAAAAA
1	BBBBBBBB
2	CCCCCCCC
3	DDDDDDDD
4	EEEEEEEE
5	FFFFFFFF
6	GGGGGGGG
7	HHHHHHHH

4. To close the [Message [0] Edit] window, click [X](close) or select [Close] from [File] the pull-down menu.



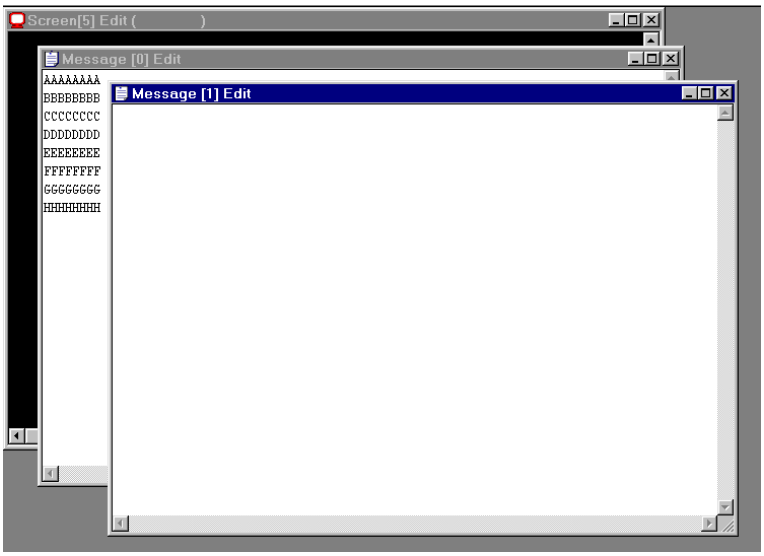


The [Message Edit] window has the retrieval and replacement functions, and they are valid within the same message group.



Data created by other softwares (Microsoft Word, etc.) can be copied and pasted.

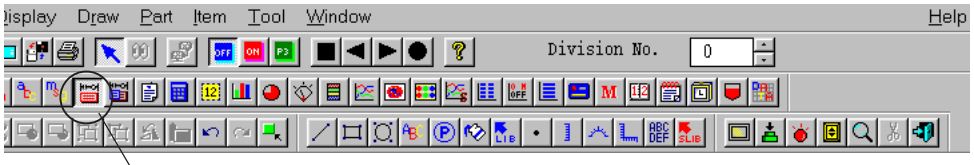
The next [Message Edit] window can be opened for executing edit. (Select [Message] from the [Item] menu.)



Relay Mode Selection

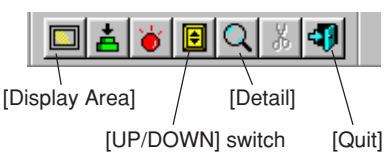
Select relay mode.

1. Click [Relay Mode] icon in the tool bar. The following relay mode parts tool bar is displayed.



2. This tool bar is used for setting up relay mode, display areas, and switches.

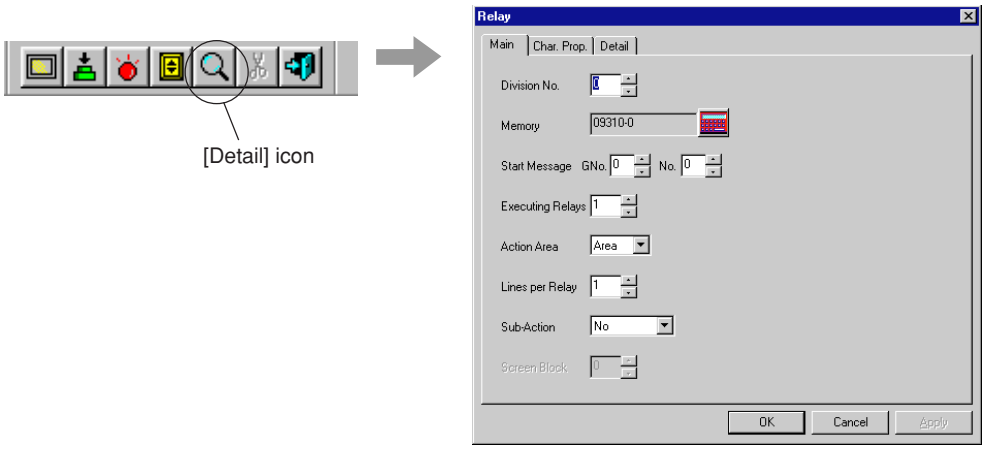
Relay mode parts tool bar



[Relay] Dialog

Set up the [Relay] dialog.

Click the [Detail] icon in the relay mode parts tool bar. The [Relay] dialog is displayed.



[Main] Tab Window

1. Open the [Main] tab window. Check that "0" is entered for [Division No.].

2. Specify the top bit address for allocating the PLC memory to the registered messages.
The total number of bits is to be entered for [Executing Relays] with the following step.
In this example, enter "09310-0" for [Memory].

3. Specify the message group number and the top line (message) number, which are registered in message editing. Enter "0" for [G No.] and [No.].

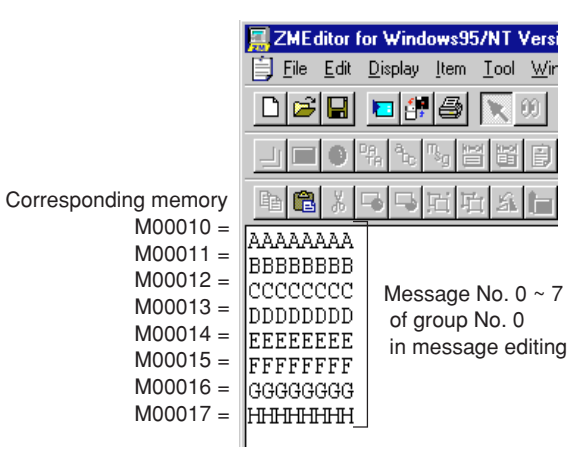
4. Specify the number of bits to be allocated to the messages (range: 1 to 512).
In this example, enter "8" for [Executing Relays].

5. Select [Area], [Switch], or [Lamp] for specifying the place where the message should be displayed on the screen.
In this example, choose [Area] for [Action Area].

6. Specify the number of lines (of messages) to be linked with one bit.
In this example, enter "1" for [Lines per Relay].

7. Choose [No] for [Sub-Action] when using relay mode only.

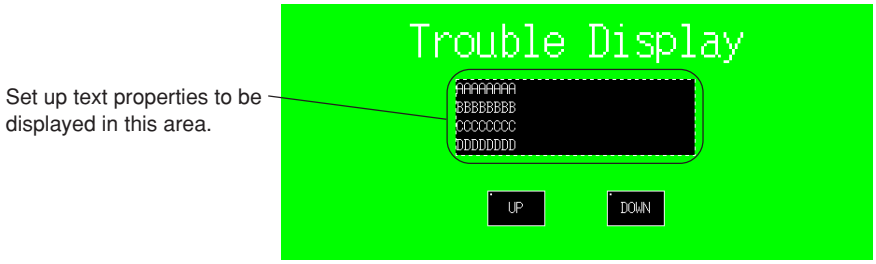
Now the messages from No. 0 to No. 7 (equivalent to the value entered for [Executing Relays]) can be displayed when the corresponding bit is set.



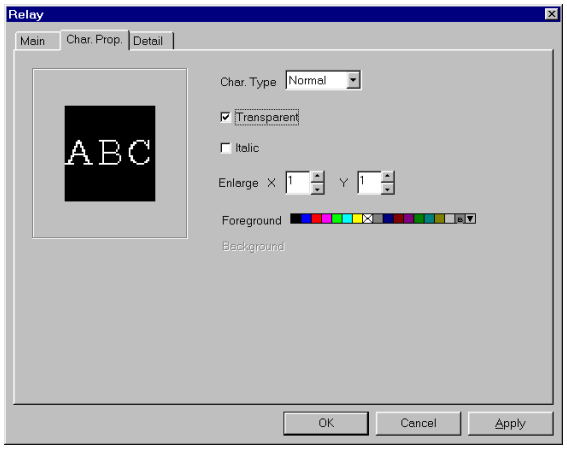
Based on the top bit address entered for [Memory], as many bits as the number entered for [Executing Relays] are used. Messages starting from the line (message) of the group as specified for [Start Message] are allocated to the bits automatically.
When the number of bits specified for [Executing Relays] is greater than the maximum available number for a group, the next message group is also used.
<Ex.> When "258" is entered for [Executing Relays], and [G No.. 0] and [No. 0] are entered for [Start Message]:
Messages from message No. 0 of group No. 0 to message No. 1 of group No. 1 (258 lines) correspond to the bits respectively.

[Char. Prop] tab window

Set up the [Char. Prop.] tab window as shown below:



Set up as shown below:

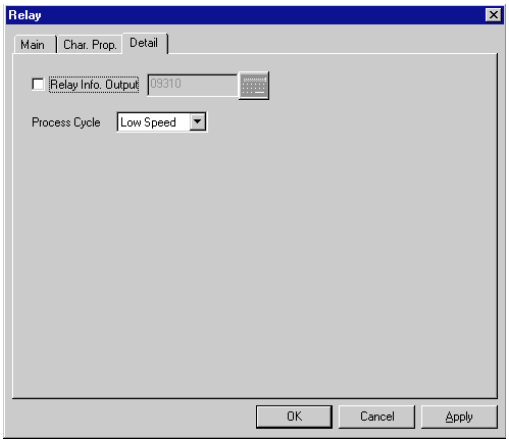


Char. Type : Normal
☑Transparent
☐Italic
Enlarge X: 1 Y: 1
Foreground : White

[Detail] Tab Window

1. Choose whether data of the message displayed or selected on the screen in relay mode should be output to PLC. If you want to output data, check the box and specify the desired top memory address. For specifying the memory address (3-word required), refer to the "Instruction Manual". The box is not checked in this example.

2. Choose [Low Speed] for [Process Cycle].

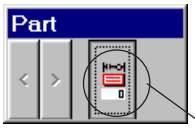


Quitting the [Relay] Dialog

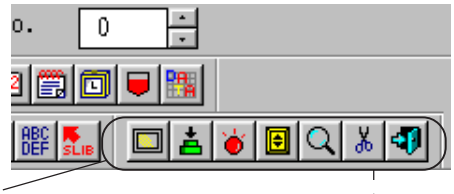
When quitting the [Relay] dialog, click [OK]. The dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen.

Modifying or deleting the [Relay] dialog

1) When modifying or deleting the [Relay] dialog, click the icon in the [Part] auxiliary tool box appearing in the lower left corner of the screen.



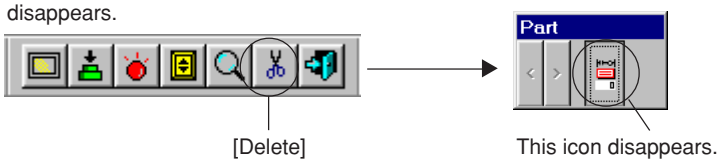
2) The relay mode parts tool bar is displayed.



3) The [Detail] icon retains the data of the [Relay] dialog previously set. Click the [Detail] icon. The [Relay] dialog is displayed.

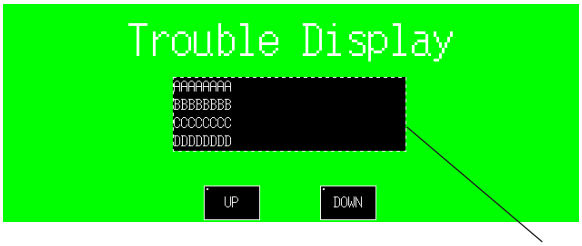
4) Modify the data of the dialog.

5) To delete the dialog, click the [Delete] icon. The icon in the [Part] auxiliary tool box disappears.

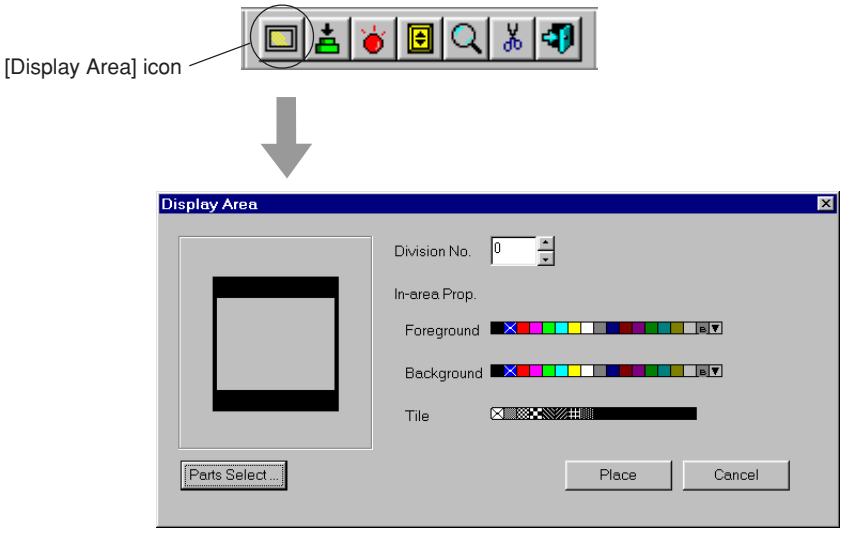


Creating a Message Display Area

Create a message display area on the screen.



1. Click the [Display Area] icon in the relay mode parts tool bar. The [Display Area] dialog is displayed.



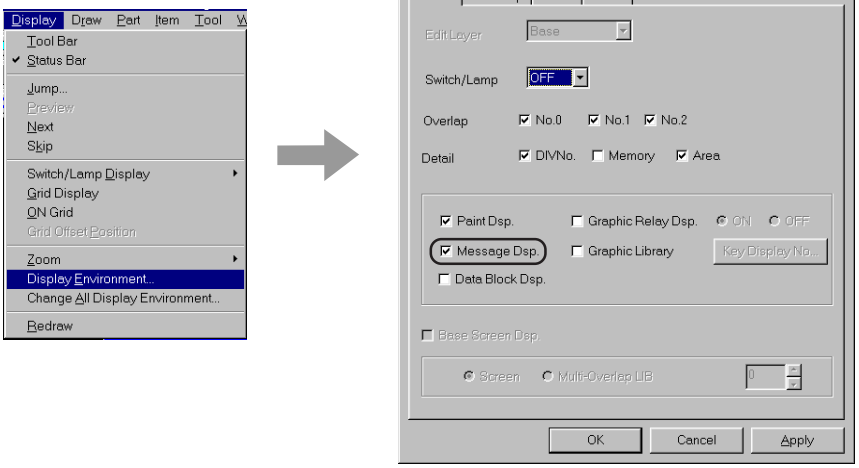
2. Set up as shown below:

Division No. : 0
Foreground : Blue
Background : Blue
Tile : No. 0

3. Click the [Place] button and place the display area in the desired position (as shown on the previous page).

4. Reduce the area to the size of 4 lines.

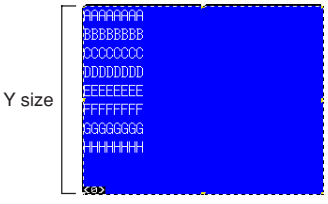
1) Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.

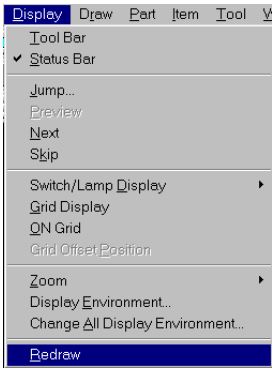


2) Check the [Message Dsp.] box.

3) Click the [OK] button to quit the dialog.

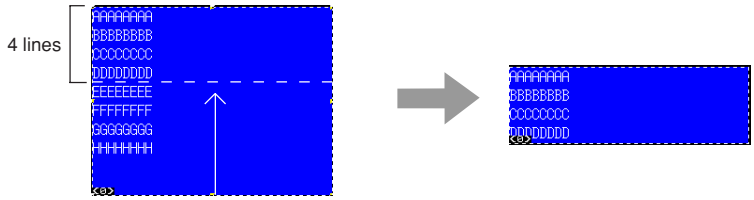
4) The message display image is shown on the screen.





5) If the image is not shown, select [Redraw] from the [Display] menu.

6) Click the message display area (handles are shown). Drag the handle until the area is reduced to the size of four lines (Y size).

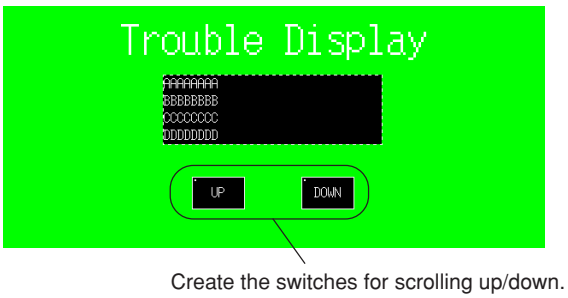


The message display area has been set up.

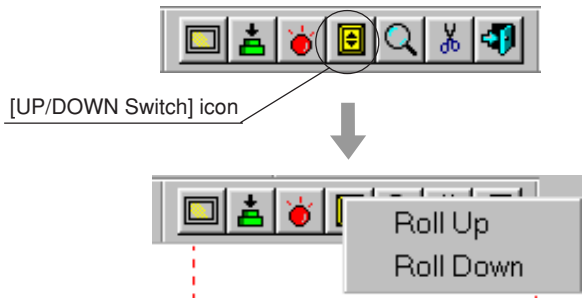
The message area must be able to contain the lines specified for [Lines per Relays] in the [Relay] dialog. If the area is too small, an error will arise.

Creating Roll Up and Roll Down Switches

When the called messages cannot be held in the specified area, it is necessary to scroll up or down. For this purpose, create the switches for scrolling up/down.

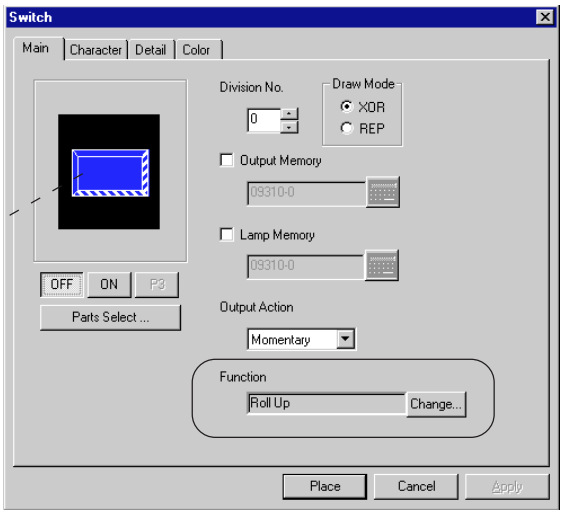


1. Click the [UP/DOWN Switch] icon in the relay mode parts tool bar. The following pull-down menu is displayed.



2. When [Roll Up] is chosen, the [Switch] window for the Roll Up switch is displayed. When [Roll Down] is chosen, the window for the Roll Down switch is displayed.

3. Choose [Roll Up]. The [Switch] dialog is displayed. [Roll up] is chosen for [Function].



Preview display

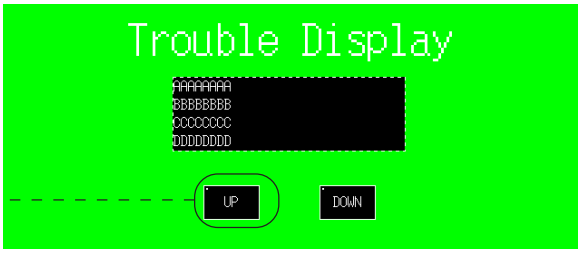
4. The switch part shown in the preview display should be modified. Click [Parts Select]. [Switch List Parts_e.z7p] is displayed. Select [0001] and click [Select]. Check the [Save Setting] box if it is not checked.

5. Click [Character] in the [Switch] dialog. The [Character] tab window is displayed.

6. Enter "UP" for text field No. 0. Set up text properties as shown below:

Char. Type	: Normal	Foreground	: White
☑Transparent		Rotate	: Normal
Direction	: RGT	Enlarge	X:1 Y:1

7. Click the [Place] button and place the switch part on the screen as shown below:



Place in this position.

8. Create a Roll Down switch following the same steps.
Choose [Roll Down] from the pull-down menu appearing by clicking the [UP/DOWN Switch] icon. Enter "DOWN" in the [Character] tab window and set up text properties as those for the Roll Up switch.

Quitting Relay Mode

1. Relay mode has been set up.

2. Click the [Quit] icon in the relay mode parts tool bar. The tool bar disappears.

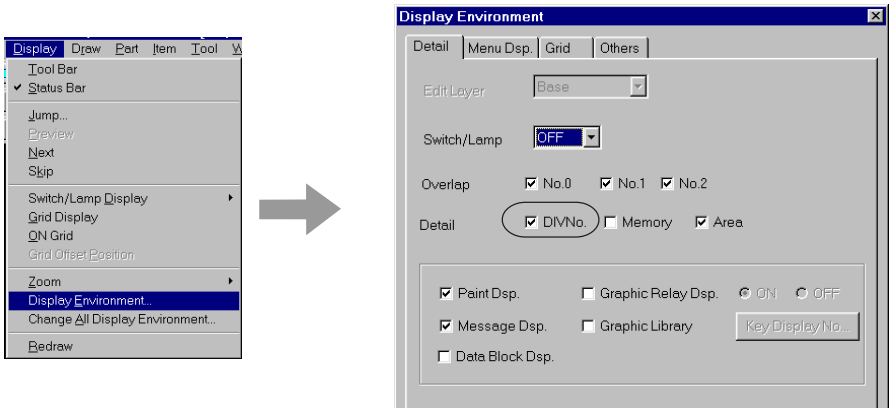
Or, the bar disappears automatically by clicking an icon in a different tool bar.

Division Number Check

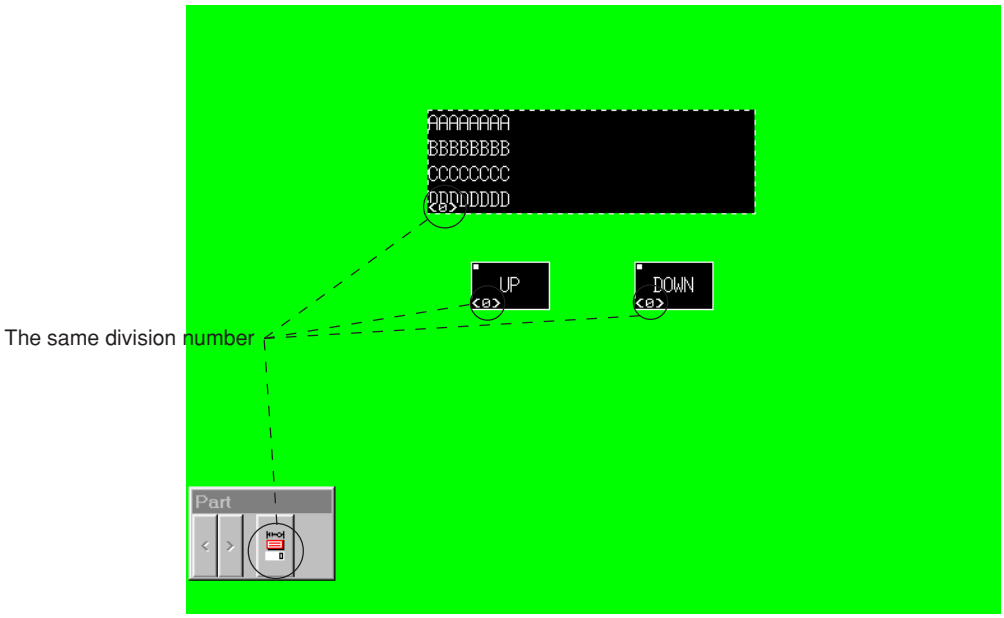
The same division number must be entered for the message display area, Roll Up and Down switches, and the [Relay] dialog icon in the [Part] auxiliary tool box so that they are linked with each other.

1. Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.

2. Open the [Detail] tab window. Check the [DIV No.] box and click [OK].



3. On the screen, check that the division No. 0 is entered as shown below:



ZM-70 Operation Check

Save the created screen.

While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-70 and check that ZM-70 operates correctly.

Used memory and Registered Messages

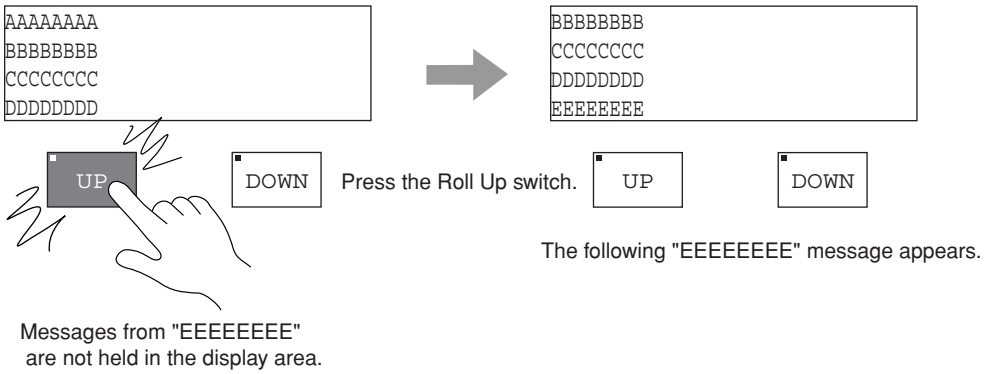
<Relay> No.	Address	<Message group No.> Line No.	
1	M00010	0	AAAAAAAA
2	M00011	1	BBBBBBBB
3	M00012	2	CCCCCCCC
4	M00013	3	DDDDDDDD
5	M00014	4	EEEEEEEE
6	M00015	5	FFFFFFFF
7	M00016	6	GGGGGGGG
8	M00017	7	HHHHHHHH

Relay Mode Check

1. Set M00010 to M00017 in sequence.

2. Messages from "AAAAAAAA" to "DDDDDDDD" can be displayed, but the remaining messages cannot be held in the specified area.

3. Press the Roll Up switch "UP" so that the area is scrolled to display the following message.



Relay Mode Interrupt Test

Priority is given in displaying messages in relay mode. This is based on message numbers that are registered in message editing. The small numbers have higher priority.

1. Reset M0010 to M0017.

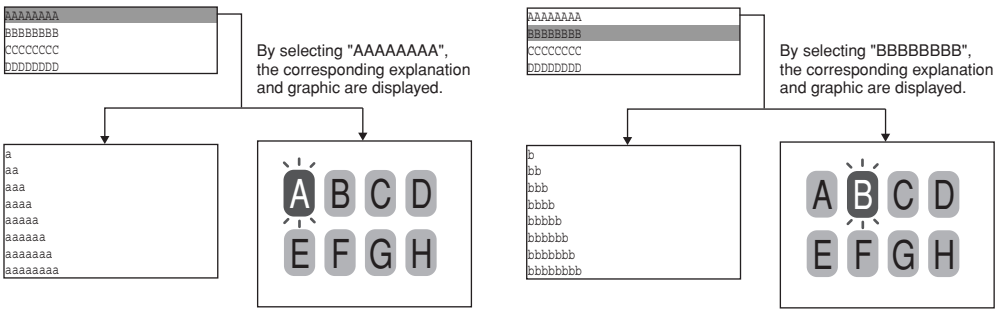
2. Set M0010 and M0013. "AAAAAAAA" and "DDDDDDDD" messages are displayed.

3. Set M0012. "CCCCCCCC" is inserted.

4. Set M0011. "BBBBBBBB" is inserted.

10 Displaying Supplemental Explanation or Graphics to Messages (Relay-Sub Mode)

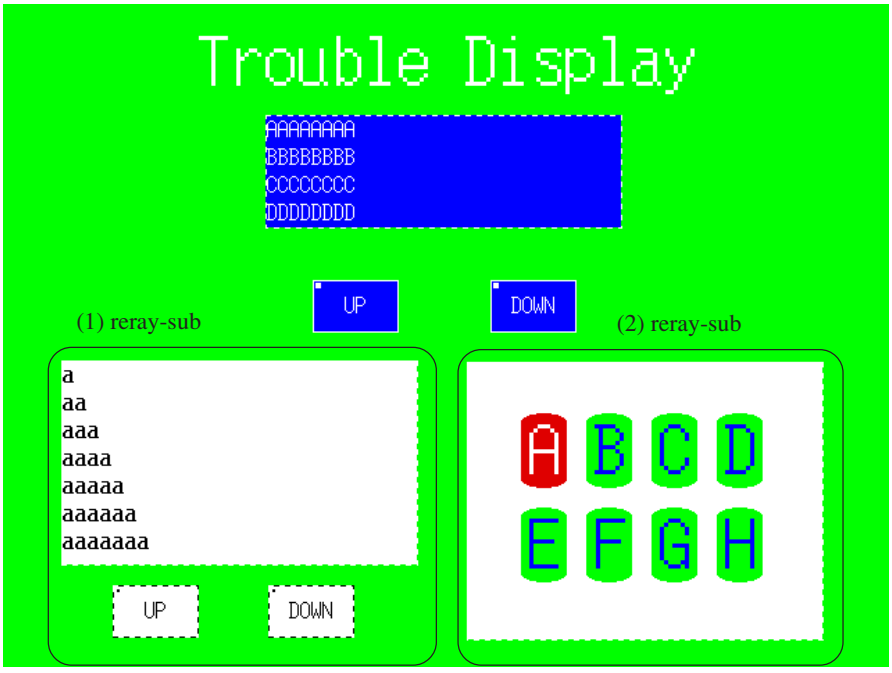
It is possible to link relay messages that are displayed by setting bits with supplemental explanation or graphics using the relay-sub function.



In this chapter, place two sub-display areas on the screen using the relay-sub function as shown below:

(1) Message sub-display area

(2) Graphic sub-display area

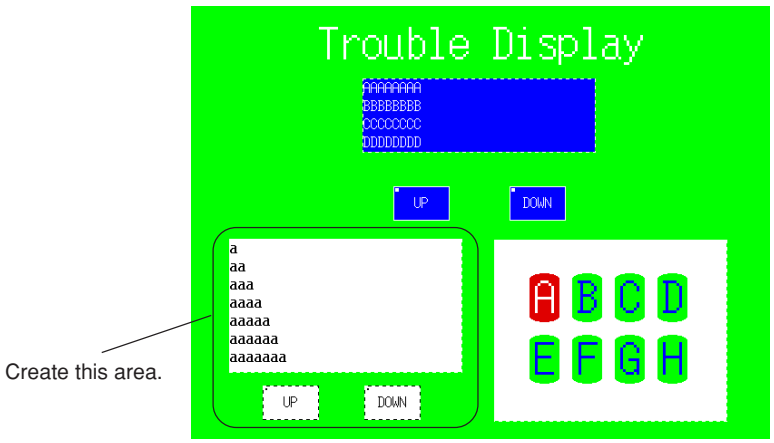


Procedure

Operation

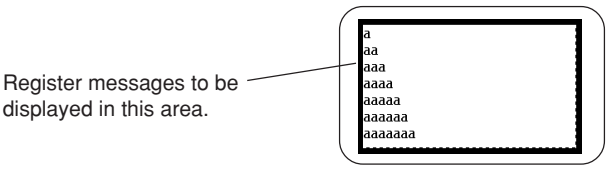
(1) Message Sub-Display Area

Create the following message sub-display area.

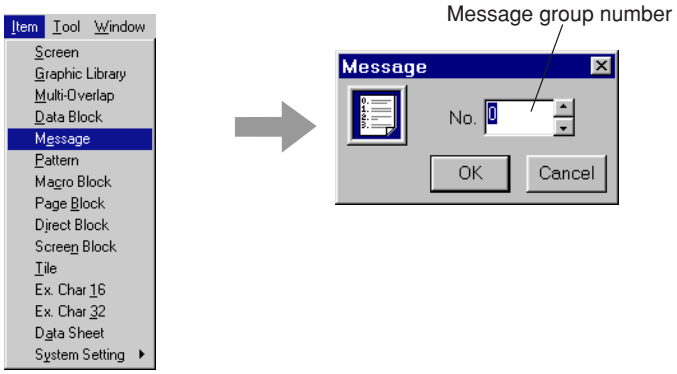


Registering Messages for Sub-Display

Register messages to be used for sub-display in message editing.

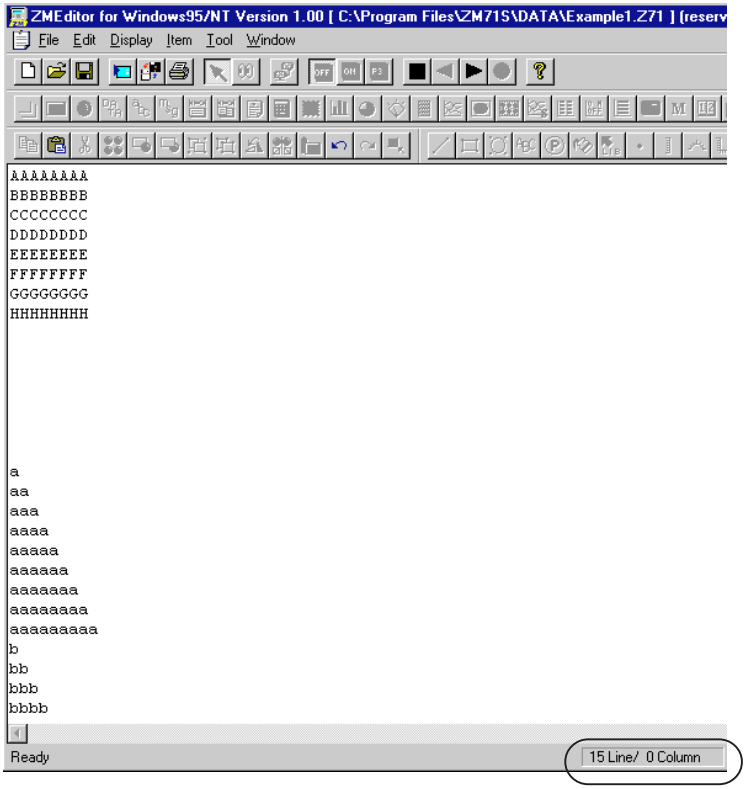


1. Select [Message] from the [Item] menu. The [Message Edit] dialog is displayed. Enter "0" for [No.] and click [OK].



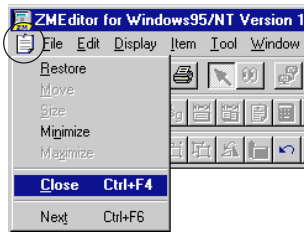
2. The previously registered messages are displayed.
Press the [RETURN] key and place the cursor in the 15th line.
(Leave a space from the 8th line to the 14th line for entering additional messages when necessary.)

Line No.	Message
15	a
16	aa
17	aaa
18	aaaa
19	aaaaa
20	aaaaaa
21	aaaaaaa
22	aaaaaaaa
23	b
24	bb
25	bbb
26	bbbb
27	bbbbb
28	bbbbbb
29	bbbbbbb
30	bbbbbbbb
31	c
32	cc
33	ccc
34	cccc
⋮	⋮
69	ggggggg
70	gggggggg
71	h
72	hh
73	hhh
74	hhhh
75	hhhhh
76	hhhhhh
77	hhhhhhh
78	hhhhhhhh



3. Key in the messages from the 15th line on the screen as shown on the left.

4. To quit entering messages, click the icon shown right. The pull-down menu is displayed. Select [Close] to close the [Message Edit] window.



Registering the Created Messages as "Page Blocks"

To bring up the messages in the sub-display area, register them as a "page block" or a "direct block".

- Page block
  A "page block" is a group of messages selected in consecutive numbers from those created in the [Message Edit] window. By specifying the desired block number, the corresponding group of messages can be displayed.

<Ex.>
When messages as shown on the left are registered as "page blocks":

Line No.	Message
15	a
16	aa
17	aaa
18	aaaa
19	aaaaa
20	aaaaaa
21	aaaaaaa
22	aaaaaaaa
23	b
24	bb
25	bbb
26	bbbb
27	bbbbb
28	bbbbbb
29	bbbbbbb
30	bbbbbbbb
31	c
32	cc
33	ccc
34	cccc
35	ccccc
36	cccccc
37	ccccccc
38	cccccccc

Messages from line No. 15 to No. 22 are registered as page block No. 0.
Messages from line No. 23 to No. 30 are registered as page block No. 1.

When page block No. 0 is selected, the following messages are displayed.

```
a
aa
aaa
aaaa
aaaaa
aaaaaa
aaaaaaa
aaaaaaaa
```

When page block No. 1 is selected, the following messages are displayed.

```
b
bb
bbb
bbbb
bbbbb
bbbbbb
bbbbbbb
bbbbbbbb
```

- Direct block
  A "direct block" is a group of messages selected at random ranging over different message groups created in message editing. By specifying the desired block number, the corresponding group of messages can be displayed.

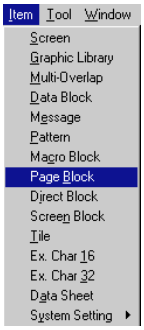
<Ex.>
When messages as shown on the left are registered as "direct blocks":
Messages of line No. 15, 31, 34, 23, 18, and 26 are registered as page block No. 0.
Messages of line No. 38, 30, and 22 are registered as page block No. 1.

When page block No. 0 is selected, the following messages are displayed.

```
a
aaaa
b
bbbb
c
cccc
```

When page block No. 1 is selected, the following messages are displayed.

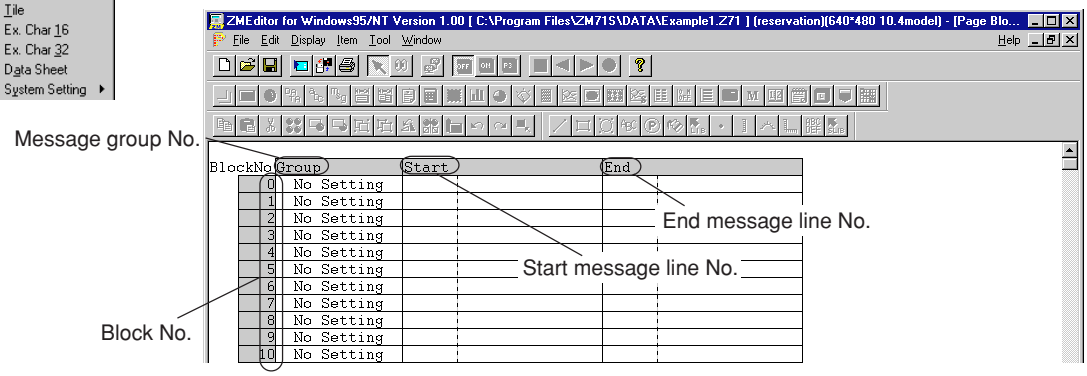
```
aaaaaaaa
bbbbbbbb
cccccccc
```



"Page blocks" are used in this example.

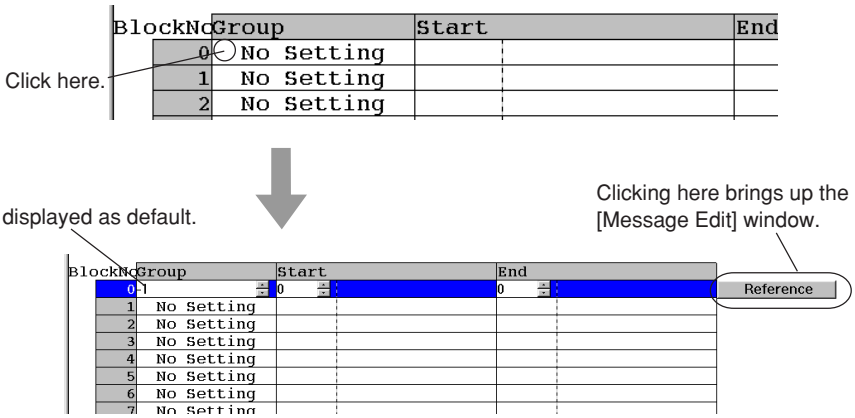
1. Select [Page Block] from the [Item] menu.

2. The [Page Block Edit] window is displayed.



3. Set block numbers.

1) Click the area under [Group] of block No. 0. The display is changed as shown below:



2) Enter "0" for [Group].

4. Enter "15" for [Start]. "a" appears on the right.

5. Enter "22" for [End]. "aaaaaaa" appears on the right.

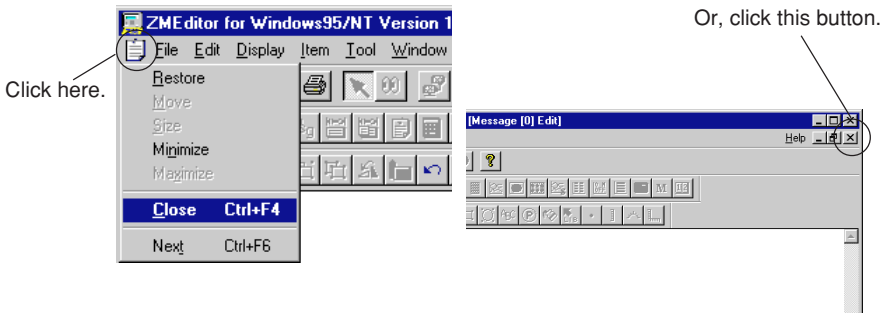
By clicking [Reference], the [Message Edit] window showing the specified group is displayed. To go back to the [Page Block Edit] window, click the "x" (close) button in the [Message Edit] window.

6. Enter the following messages for each block.

Block No.	Group	Start message No.		End message No.	
0	0	15	a	22	aaaaaaaa
1	0	23	b	30	bbbbbbbb
2	0	31	c	38	cccccccc
3	0	39	d	46	dddddddd
4	0	47	e	54	eeeeeeee
5	0	55	f	62	ffffffff
6	0	63	g	70	gggggggg
7	0	71	h	78	hhhhhhhh

To delete the set up data of a block, enter "-1" for [Group] and click the block number. "No setting" is displayed.

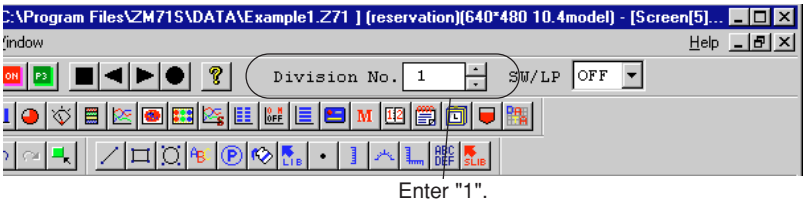
7. Click the icon shown below. Select [close] to close the [Page Block Edit] window.



Relay-Sub Mode Selection

Bring up the relay-sub mode parts tool bar.

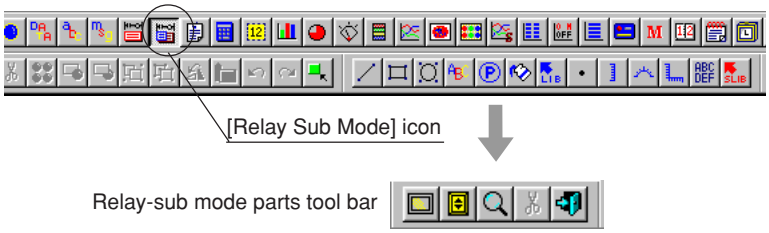
1. Because division No. 0 has been set up for the relay mode on this screen, set up division No. 1 for the relay-sub mode. Enter "1" for [Division No.] at the top right of the screen.



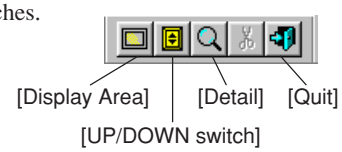
Enter "1".

One mode can be set up for one division.

2. Click the [Relay Sub Mode] icon in the tool bar. The following relay-sub mode parts tool bar is displayed.



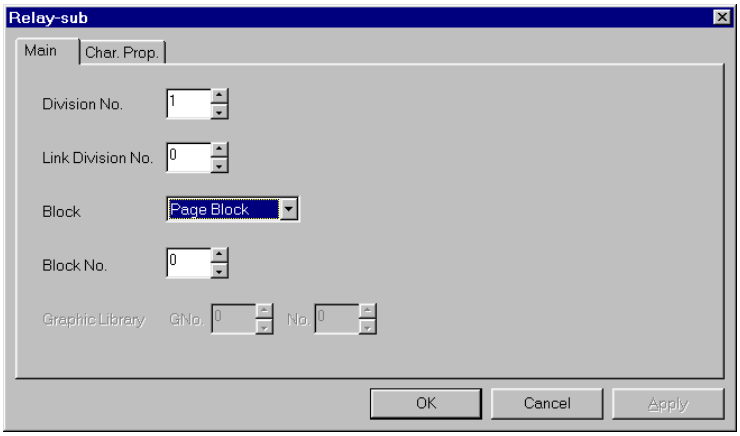
3. The relay-sub mode parts tool bar is used for setting up relay-sub mode, display areas, and switches.



[Relay-Sub] Dialog

Set up details for relay-sub mode.

Click the [Detail] icon in the relay-sub mode parts tool bar. The [Relay-Sub] dialog is displayed.



[Main] Tab Window

1. Check that "1" is entered for [Division No.].

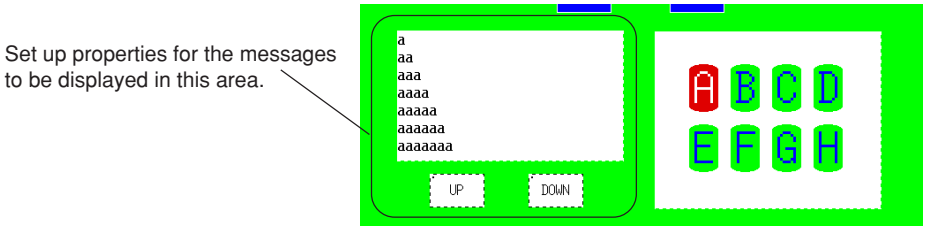
2. Relay-sub mode can only work when it is linked with relay mode. With this option setting, the relay-sub mode is linked with the relay mode.
Set up the same division number as the corresponding relay mode. Enter "0" for [Link Division No.].

3. Choose a form of sub-display from [Block].
Choose [Page Block].

4. Specify the top block number set up in the [Page Block Edit] window.
Enter "0" for [Block No.].

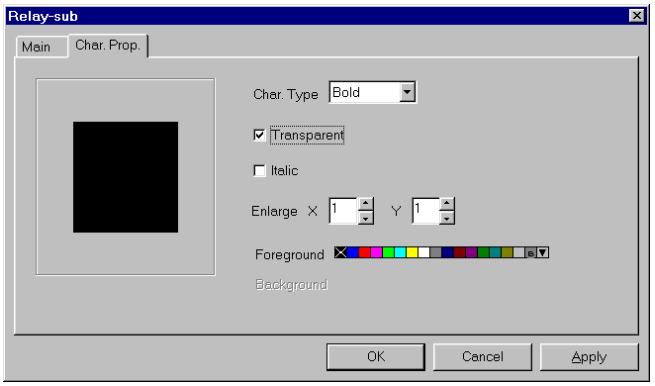
[Char. Prop] Tab Window

Set up text properties for the messages to be displayed in the sub-display area.



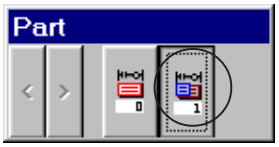
Set up as shown below:

Char. Type : Bold
☑Transparent
☐ Italic
Enlarge X: 1 Y: 1
Foreground : Black



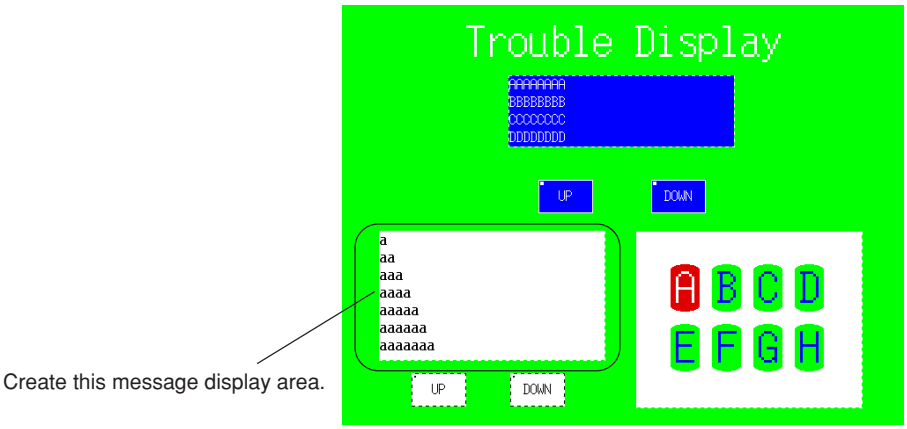
Quitting the [Relay-Sub] Dialog

When quitting the [Relay-Sub] dialog, click the [OK] button. The dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left of the screen.

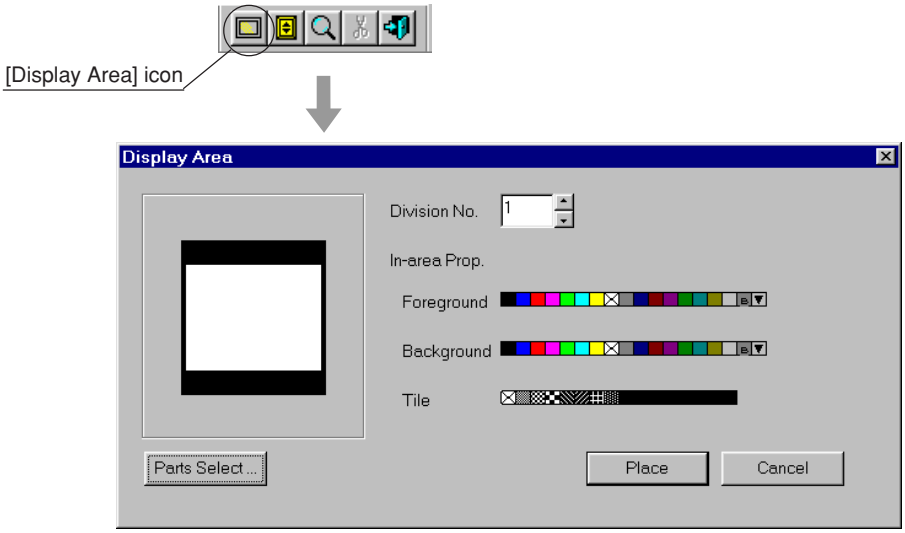


Creating a Display Area for Relay-Sub Mode

Create a message display area in relay-sub mode.



1. Click the [Display Area] icon in the relay-sub mode parts tool bar. The [Display Area] dialog is displayed.

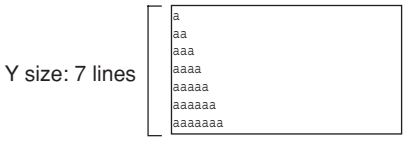


2. Set up as shown below:

Division No.	: 1
Foreground	: White
Background	: White
Tile	: No. 0

3. Click the [Place] button and place the part on the screen as shown above.

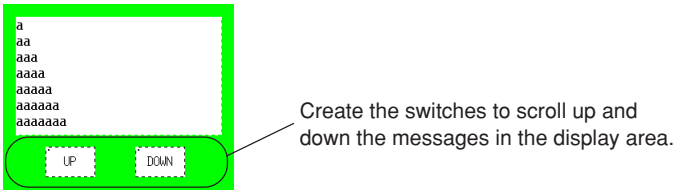
4. Click the placed display area and reduce it to the size of seven lines (Y size).



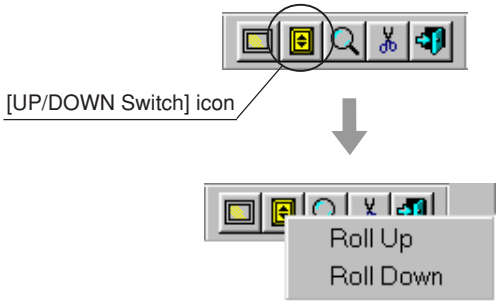
The display area has been completed.

Creating Roll Up and Roll Down Switches

Create the Roll Up and Roll Down switches. When a group of messages cannot be held in the display area, these switches scroll up and down to bring the hidden part into view.



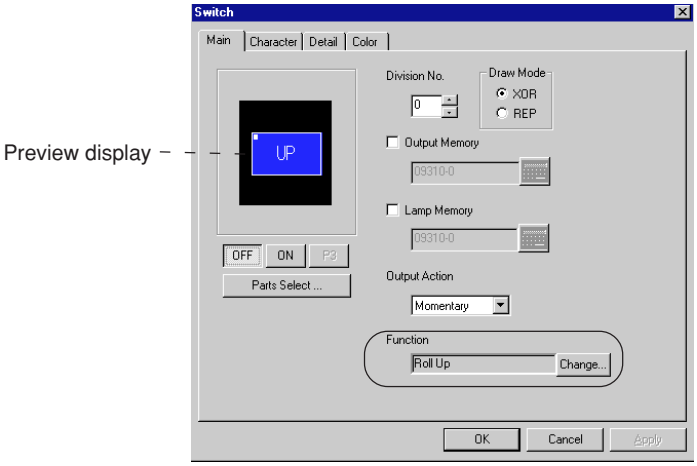
1. Click the [UP/DOWN Switch] icon in the relay-sub mode parts tool bar. The following pull-down menu is displayed.



2. When [Roll Up] is chosen, the [Switch] window for the Roll Up switch is displayed. When [Roll Down] is chosen, the window for the Roll Down switch is displayed.

3. Choose [Roll Up]. The [Switch] dialog is displayed. [Roll up] is chosen for [Function].

4. The switch part shown in the preview display should be modified. Click [Parts Select]. [Switch List Parts_e.z7p] is displayed. Select [0001] and click [Select]. Check the [Save Setting] box if it is not checked.



5. Click [Character] in the [Switch] dialog. The [Character] tab window is displayed.

6. Enter "UP" for text field No. 0. Set up text properties as shown below:

Char. Type	: Normal	Foreground	: Black
Transparent	: checked	Rotate	: Normal
Direction	: RGT	Enlarge	X:1 Y:1

7. Click [Color] in the switch dialog.
The [Color] tab window is displayed.

8. Set up as shown below:

Frame Color : Black
ON Color : Red
OFF Color : White

9. Click the [Place] button and place the switch part on the screen as shown below:

10. Create a Roll Down switch following the same steps.
Click the [UP/DOWN Switch] icon in the relay-sub mode parts tool bar and select [Roll Down] from the pull-down menu.

11. Enter "DOWN" for the switch in the [Character] tab window. Click [Char. Prop] and set up properties as those for the Roll Up switch.

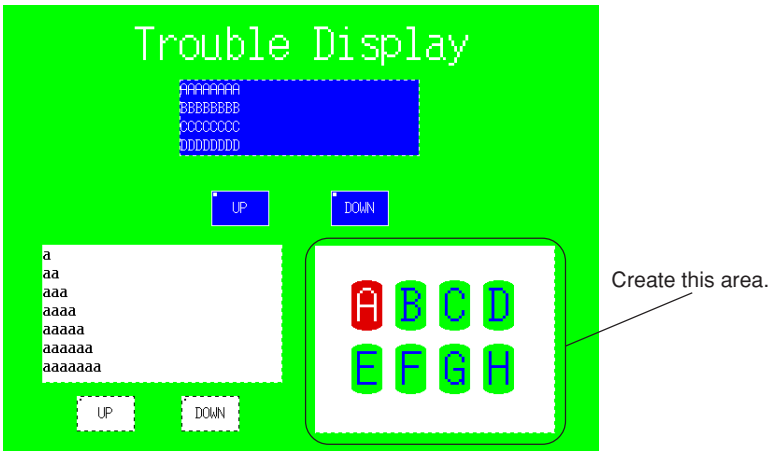
12. Set up the [Color] tab window as shown below:

Frame Color : Black
ON Color : Red
OFF Color : White

13. Place the switch part on the screen.

(2) Graphic Sub-Display Area

Create the following message sub-display area.



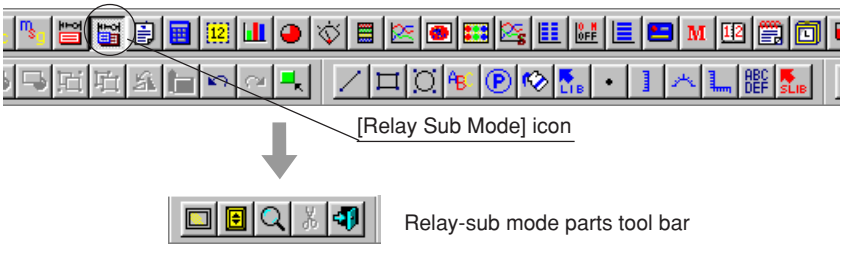
Relay-Sub Mode Selection

Bring up the relay-sub mode parts tool bar.

1. Because division No. 0 for the relay mode and division No. 1 for message sub-display have been set up, set up division No. 2 for graphic sub-display.

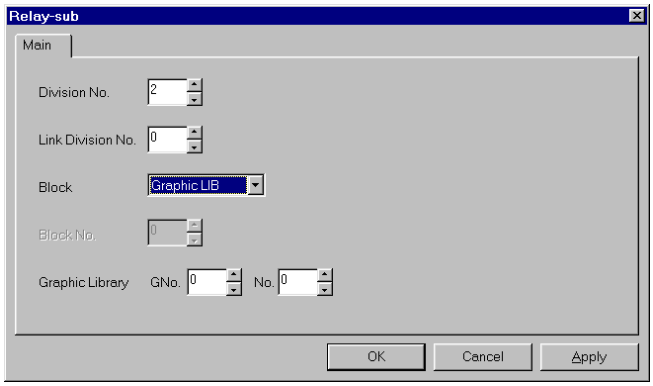
Enter "2" for [Division No.] in the tool bar.

2. Click the [Relay Sub Mode] icon in the tool bar. The following relay-sub mode parts tool bar is displayed.



[Relay-Sub] Dialog

Set up details for relay-sub mode.
Click the [Detail] icon in the relay-sub mode parts tool bar. The [Relay-Sub] dialog is displayed.



[Main] Tab Window

1. Check that "2" is entered for [Division No.].

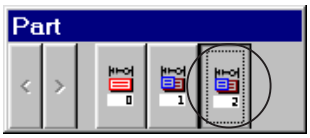
2. Relay-sub mode can only work when it is linked with relay mode. With this option setting, the relay-sub mode is linked with the relay mode.
Set up the same division number as the corresponding relay mode. Enter "0" for [Link Division No.].

3. Choose a form of sub-display from [Block].
Choose [Graphic LIB].

4. Graphics are entered in graphic editing using the following steps. Specify the top group number and the graphic number for the graphics. Enter 0 for [Graphic LIB G No.] and [Graphic LIB No.].

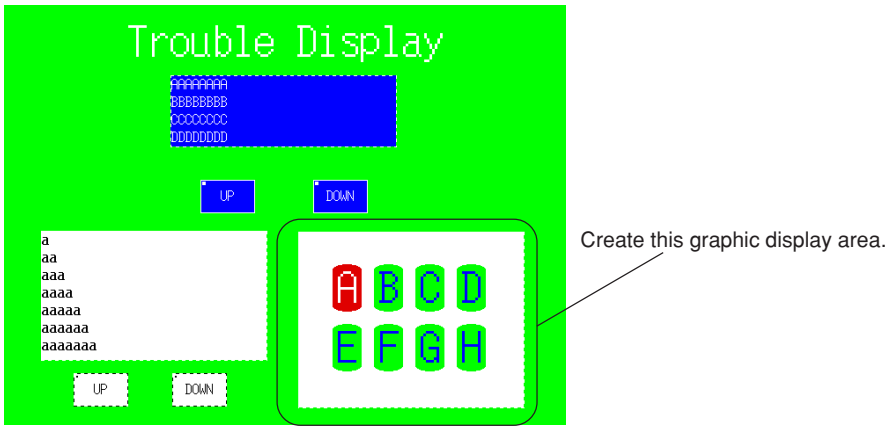
Quitting the [Relay-Sub] Dialog

When quitting the [Relay-Sub] dialog, click the [OK] button. The dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen.

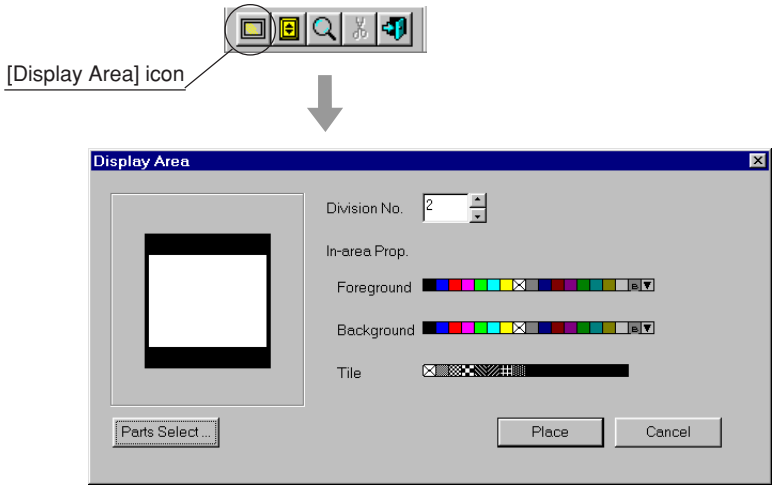


Creating a Display Area for Relay-Sub Mode

Create a display area to display graphics in relay-sub mode.



1. Click the [Display Area] icon in the relay-sub mode parts tool bar. The [Display Area] dialog is displayed.



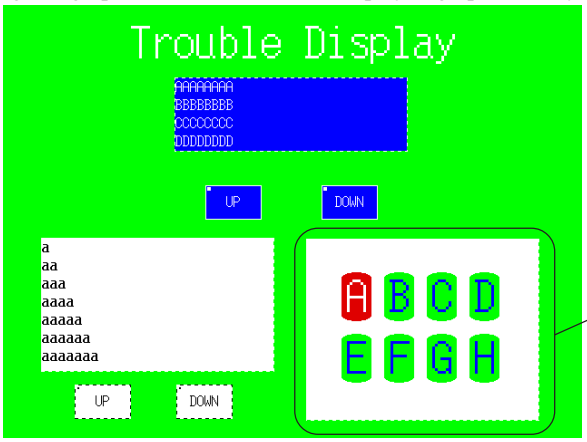
2. Set up as shown below:

Division No.	: 2
Foreground	: White
Background	: White
Tile	: No. 0

3. Click the [Place] button and place the part on the screen as shown above.

Registering Graphics for Sub-Display

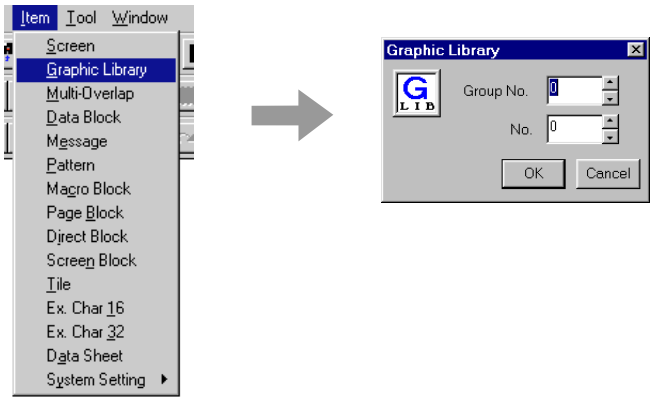
Register graphics to be used for sub-display in graphic library editing.



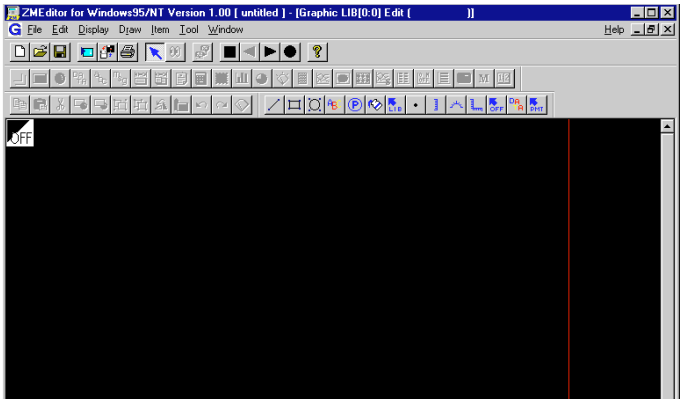
[Graphic LIB Edit] Window

1. Select [Graphic Library] from the [Item] menu. The [Graphic Library] dialog is displayed.

Enter "0" for [Group No.] and [No.] and click the [OK] button.

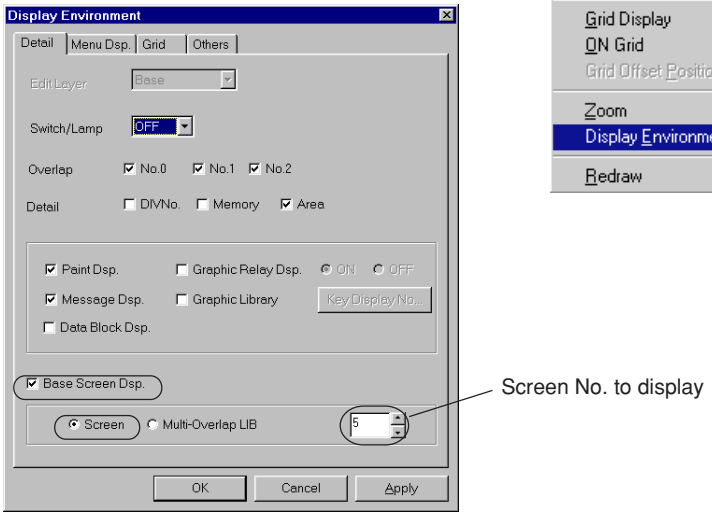


2. The [Graphic LIB [0:0] Edit] window is displayed.



3. Click [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.

4. Check the [Base Screen Dsp.] box. Select [Screen] and enter "5" for the screen number. Click [OK].

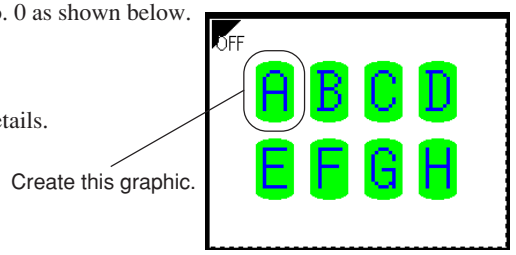


5. Select [Redraw] from the [Display] menu.

6. Screen No. 5 is displayed in the [Graphic LIB [0:0] Edit] window.

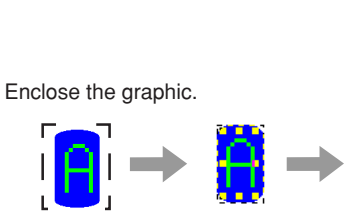
Creating Graphics

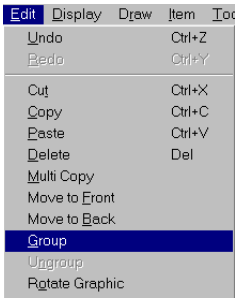
Create graphic No. 0 of group No. 0 as shown below.

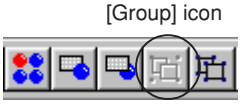


1. Create graphic "A".
Refer to the next page for details.

2. Group the graphic "A".
Enclose the graphic "A" using the mouse (handles are shown). Select [Group] from the [Edit] menu or click the [Group] icon.



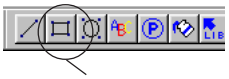




Create the graphic "A" with steps **1** to **3**.

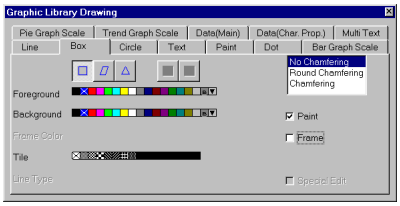
1

Box part

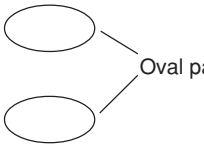


[Box] icon

Foreground : Blue
Background : Blue
Tile : No. 0



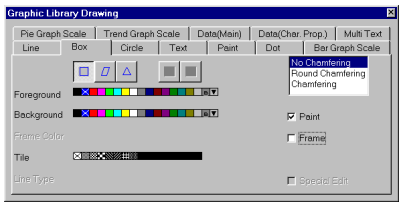
2



Oval parts

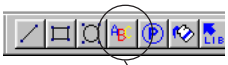
[Circle] icon

Foreground : Blue
Background : Blue
Tile : No. 0



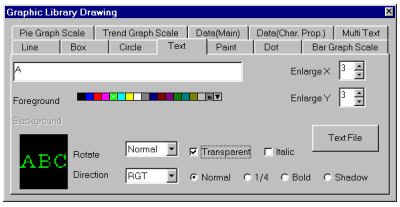
3

A Character part

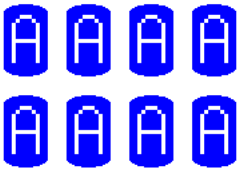


[Text] icon

Foreground : Green
Enlarge X: 3
Enlarge Y: 3
Rotate : Normal
☑Transparent ☐Italic
Direction : RGT
◉Normal

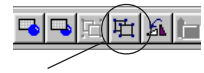


3. Make seven copies of the graphic "A". Select [Multi Copy] icon in the tool bar.



* The [Multiple Copy] dialog is set up as shown below in this example. But adjust [X Distance] and [Y Distance] to your graphics.

◉Dot ◉Interval Direction ①②③④⑤⑥
X Distance: 15 Quantity X: 4
Y Distance: 15 Quantity Y: 2

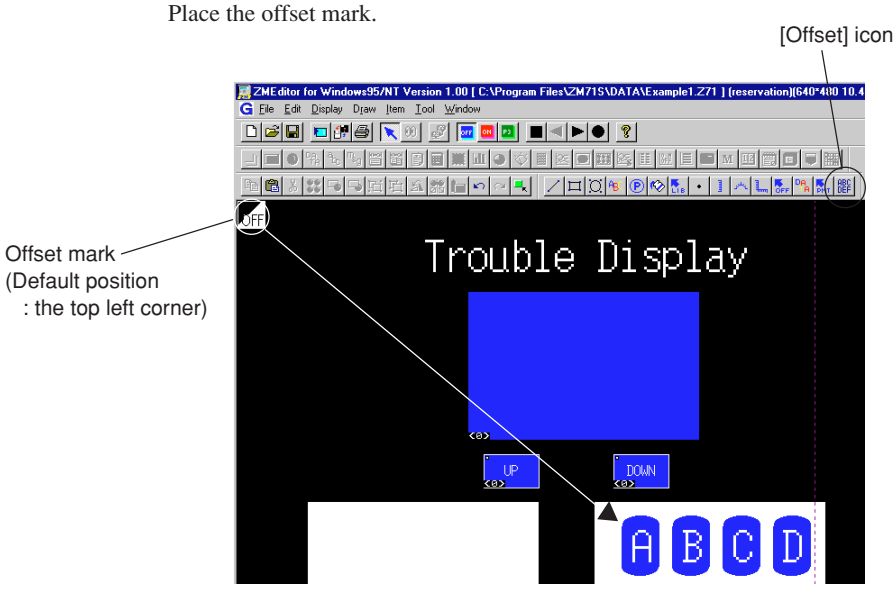

[Ungroup] icon

4. Ungroup the copy graphics using the [Ungroup] icon. Change the character "A" to "B", "C", "D", "E", "F", "G", and "H" for each copy.

When modifying a grouped graphic, ungroup it using the [Ungroup] icon.

Offsetting

Place the offset mark.



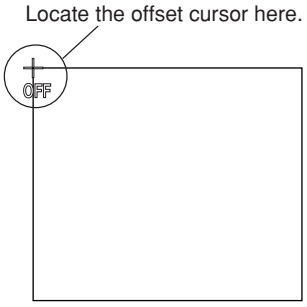
Keyword

Offset

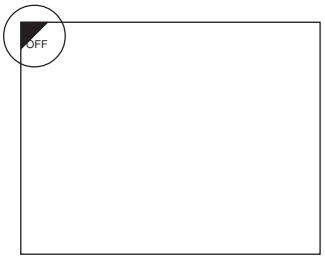
"Offset" is the reference position for calling up the graphics registered in graphic library editing to the screen.

1. Click the [Offset] icon.

2. The offset cursor is displayed.
Move the cursor to the top left corner of the display area part for graphic (division No. 2) and click the mouse.



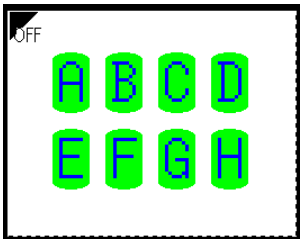
3. The offset mark is located at the top left corner of the display area part.



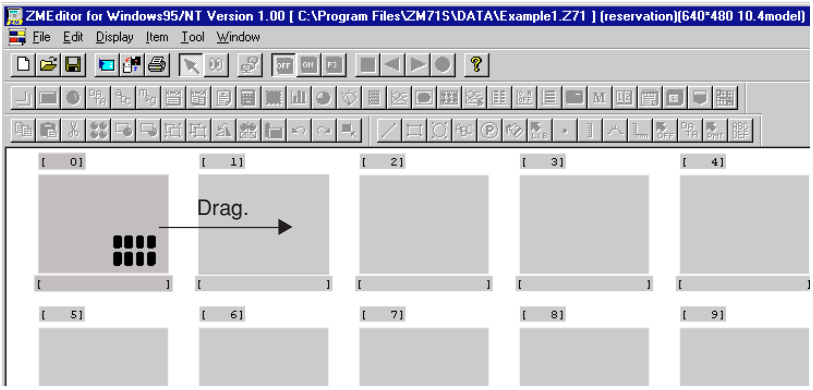
Graphic Copy and Modification

1. Copy this graphic to No. 1 to No. 7 on [Screen List].

1) Click the [Screen List] icon.

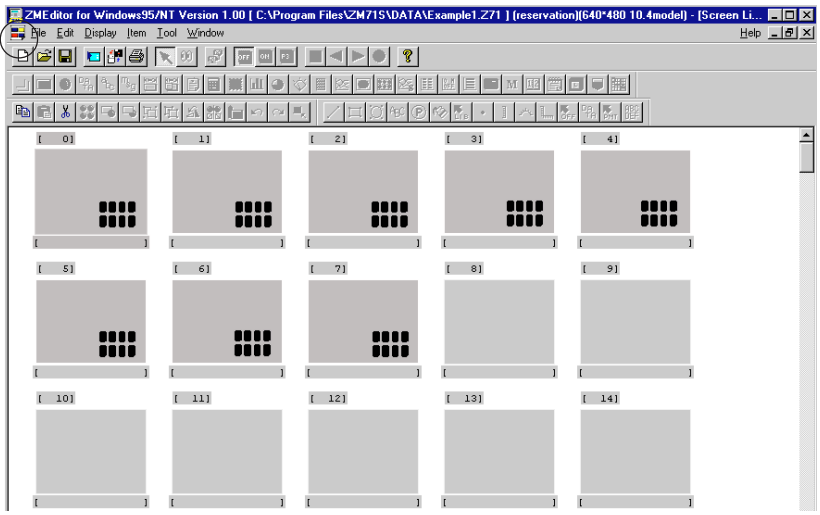


2) [Screen List] is displayed.
Click No. 0 graphic and drag it to area No. 1. The copy is displayed in the area.



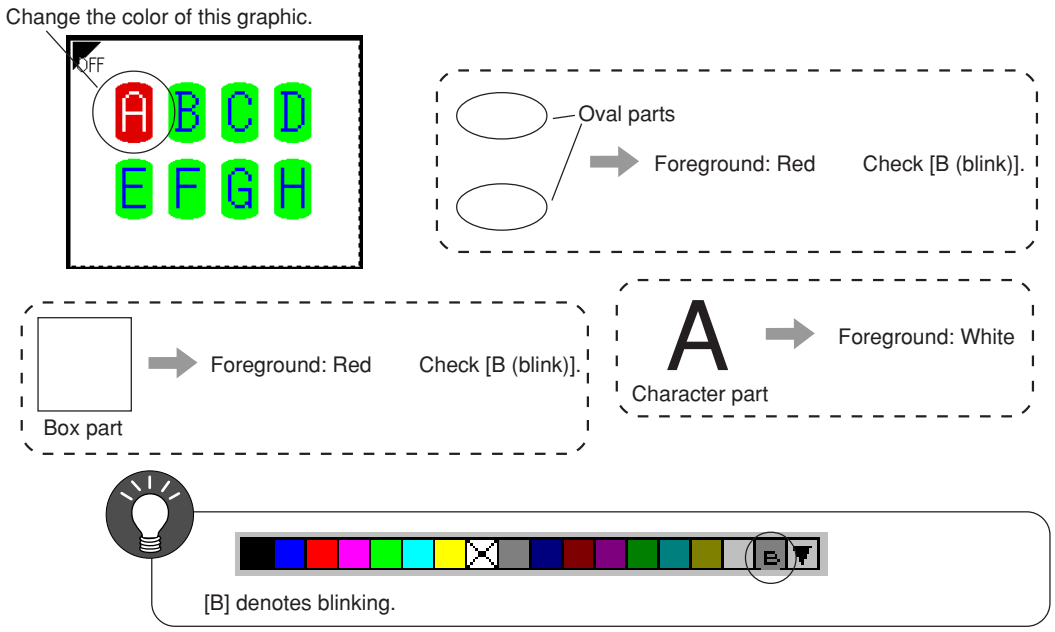
3) Likewise, drag the graphic to areas No. 2 ~ No. 7.

Clicking this icon closes the list.

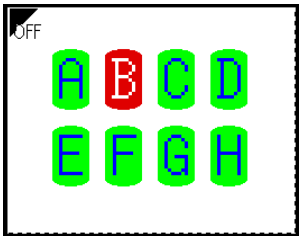


4) Close the list

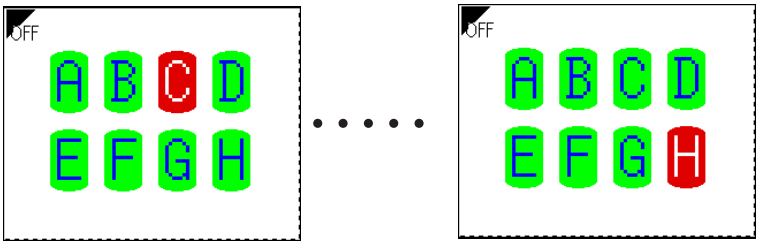
2. Return to graphic editing for graphic No. of group No. 1 (Graphic LIB [0:0]).
Change the color of graphic "A".



3. In graphic editing for graphic No. 1 of group No. 0 (Graphic LIB [0:1]), change the color of the graphic "B". Set up the colors the same as those for graphic "A" (refer to the above figure).



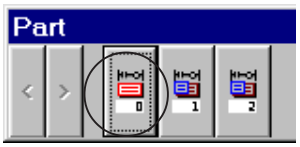
4. Likewise, in graphic editing for graphic No. 2, change the color of graphic "C". Repeat the same steps until the color of graphic No. 7 ("H") is changed (refer to the above figure).



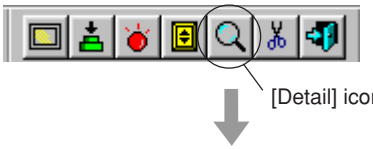
5. Graphic editing has been completed. Click the "x" (close) button and return to the initial screen.

Setting Up the [Relay Dialog] for Linking Relay Mode with Relay-Sub Mode

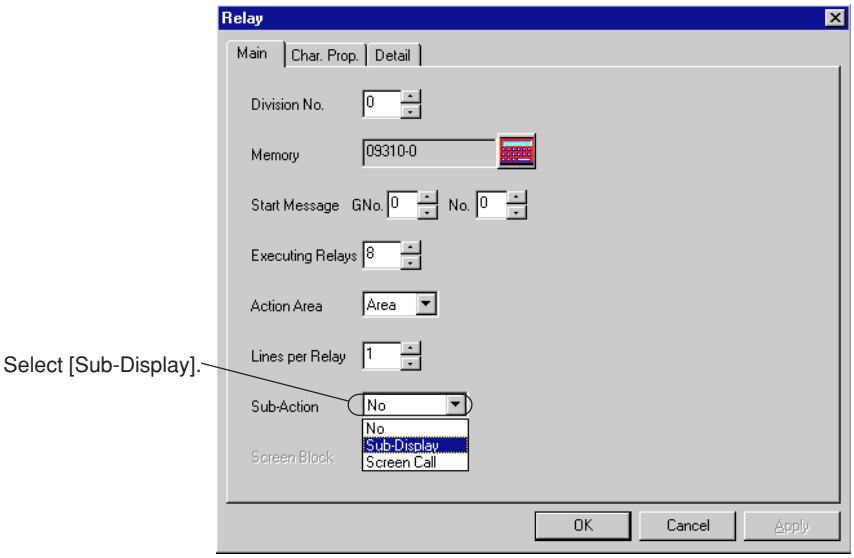
1. Click the [Relay] dialog icon in the [Part] auxiliary tool box. The relay mode parts tool bar is displayed.



2. Click the [Detail] icon.
The [Relay] dialog is displayed.



3. Select [Sub-Display] for [Sub-Action].



4. The [Relay] dialog has been set up.

ZM-70 Operation Check

Save the created screen.
While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-70 and check that ZM-70 operates correctly.

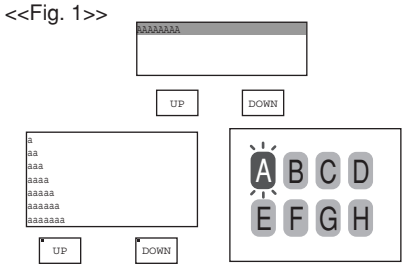
Relay-Sub Function Check

1. Reset the PLC register.

2. Set M00010.

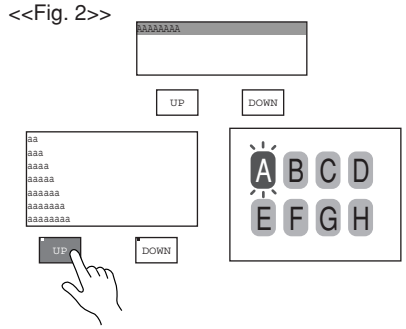
3. "AAAAAAAA" is displayed.
The corresponding messages and highlighted graphic "A" are displayed in the respective sub-display areas.
(Refer to Fig. 1.)

<<Fig. 1>>



4. Press the UP switch to bring up the hidden message. (Refer to Fig. 2.)

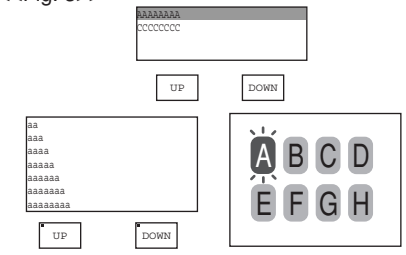
<<Fig. 2>>



5. Set M00012.

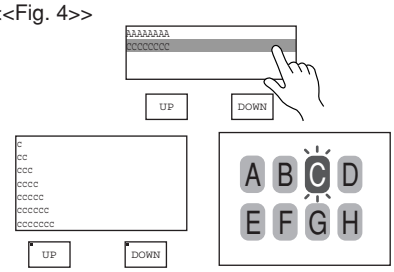
6. "CCCCCCCC" is displayed.
However, the sub-display areas still correspond to "AAAAAAAA" because the message "AAAAAAAA" is chosen.
(Refer to Fig. 3.)

<<Fig. 3>>



7. Touch "CCCCCCCC".
A beep is made and "CCCCCCCC" is chosen. The sub-display areas bring up the corresponding messages and highlighted graphic "C".
(Refer to Fig. 4.)

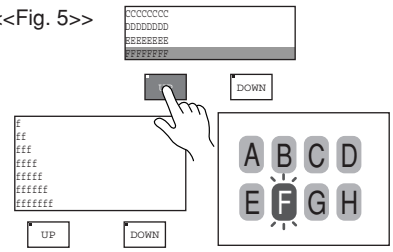
<<Fig. 4>>



8. Set M00011 and M00013 to M00017.

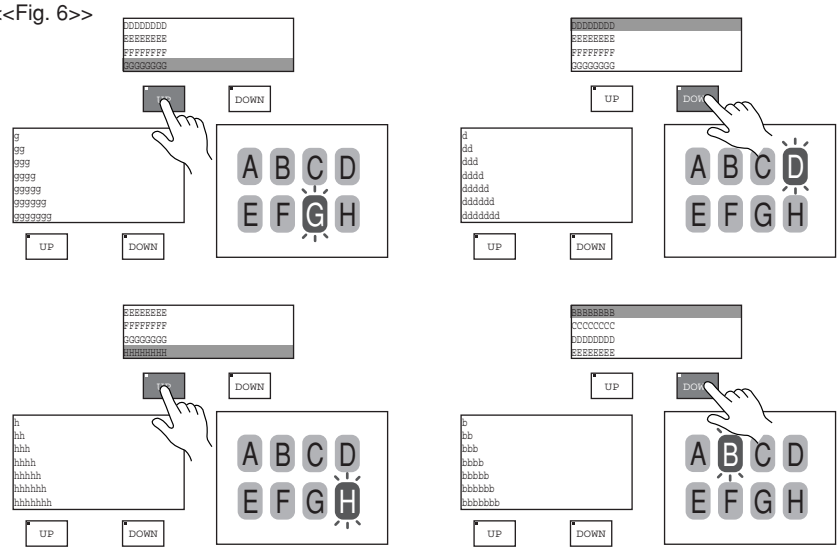
9. Press the UP switch to choose "FFFFFFFF".
The sub-display areas bring up the corresponding messages and highlighted graphic "F".
(Refer to Fig. 5.)

<<Fig. 5>>



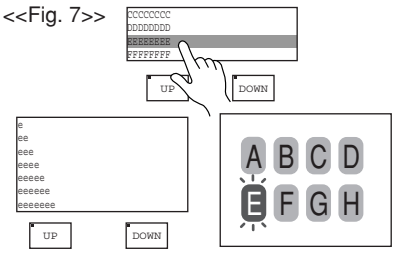
10. Press the UP/DOWN switch and check that the sub-display areas change according to the chosen message.
(Refer to Fig. 6.)

<<Fig. 6>>



11. Touching the desired message directly in the display area will also choose it.
(Refer to Fig. 7.)

<<Fig. 7>>



11 Displaying Error History (Bit Sampling Mode)

Bit sampling mode is used to store the times when errors occurred and were reset (bit ON/OFF times) as well as error contents, and to display the stored data.

Follow the steps below to use the bit sampling mode.

(1) Register error messages to the [Message Edit] window.
(2) Set up the [Buffering Area Setting] dialog for storing error contents.
(3) Set up the [Bit Sampling] dialog for indicating stored error contents.

Keyword

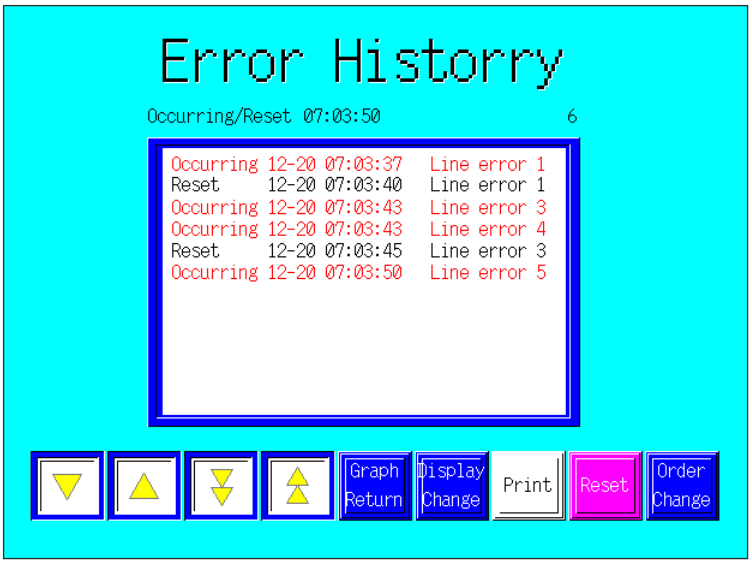
Buffering area

The buffering area stores data sampled. The internal buffer of ZM-80 (ZM-70) or memory cards can be chosen for data storage.
* Memory cards can be used only when ZM-80 (ZM-70) is available with internal or external memory cards (optional).

Data stored in the buffering area can be printed.

Unless the buffering area is cleared, sampled data can be stored and displayed anytime even after screen change.

Create the following screen.



Procedure

Operation

Bring up a new screen for creating a bit sampling screen.
Check silver-color (extreme right) for [F (foreground)].
([Edit] -> [Screen Setting] -> [F (foreground)] -> Silver-color (extreme right))
Place the title "Error History" at the center of the screen. Set up properties as shown below:

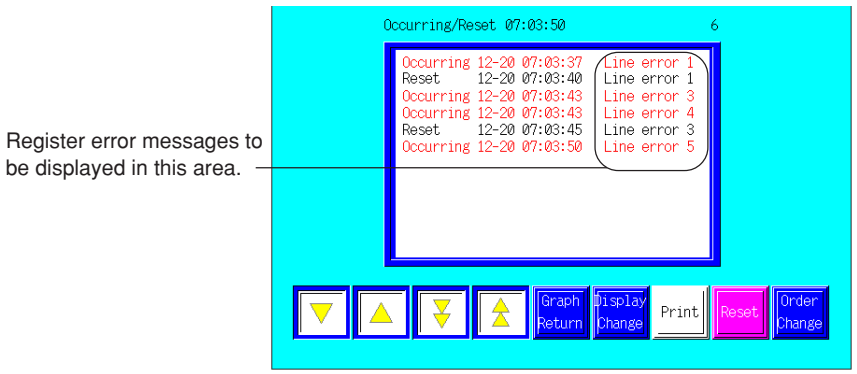
Text: "Error History"

Foreground	Red
Background	Mahogany (No. 6 from the right)
Rotate	Normal
Direction	RGT

Enlarge X	3
Enlarge Y	3
Italic	☐unchecked
◉Shadow	

Error Message Registration for Display

It is necessary to register error messages to be displayed on the screen. Bring up the [Message Edit] window.



1. In "Chapter 9 Displaying Messages by Setting/Resetting Bits (Relay Mode)", group No. 0 has been selected in the [Message Editing] window for registering messages. In this example, select group No. 1 for registering error messages.
Select [Message] from the [Item] menu. The

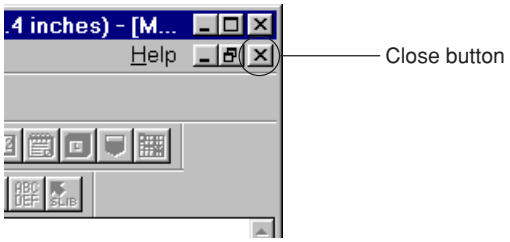
[Message] dialog is displayed. Enter "1" and click the [OK] button.
The [Message [1] Edit] window is displayed.

2. In this example, register fifteen error messages from line No. 0.

Line No.	Message	Line No.	Message
0	Line error 1	8	Line error 9
1	Line error 2	9	Line error 10
2	Line error 3	10	Line error 11
3	Line error 4	11	Line error 12
4	Line error 5	12	Line error 13
5	Line error 6	13	Line error 14
6	Line error 7	14	Line error 15
7	Line error 8		

For the message editing procedure, refer to "Message Registration" in "Real-Time Message Display".

3. When messages have been registered, Click [x] (close button). The [Message [1] Edit] window is closed.



Buffering Area Setting

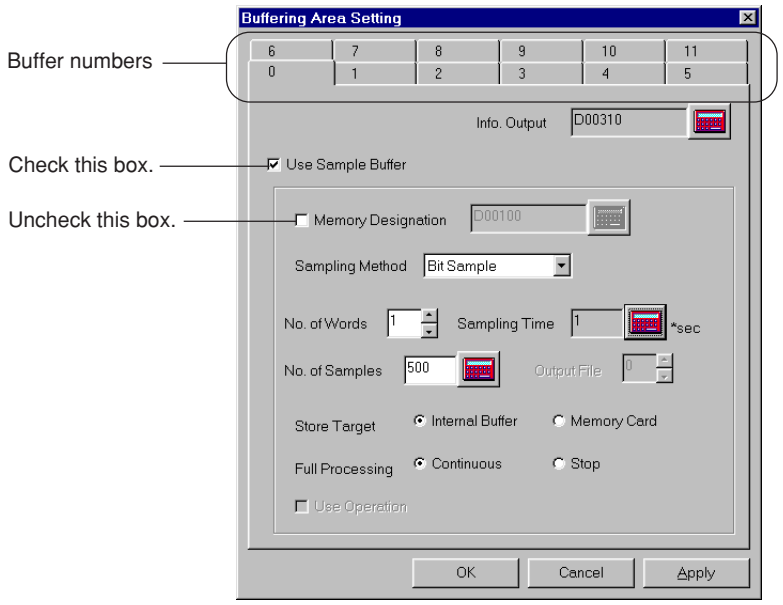
Buffering area is set to store error data.
In the [Buffering Area Setting] dialog, the desired buffer number can be chosen, and sampling mode, the number of sampling times, etc. can be specified for the buffer.

The maximum capacity of the buffering area is 32K words. The buffering area can be divided into 12 sections (buffer No. 0 to 11). Sampling data can be stored in each buffer.

[Buffering Area Setting] Dialog

The buffering area is set in the [Buffering Area Setting] dialog.
Select [System Setting] from the [Item] menu, and click [Buffering Area Setting]. The [Buffering Area Setting] dialog is displayed.

Buffer No. 0 is used in this example.



Buffer No. 0 Setting

1. Buffering area data is written to the memory address selected for [Info. Output] (ZM80 or ZM70 -> PLC).
The selected memory address is used for all buffer Nos. 0 to 11.
Select "D310" for [Info. Output] in this example.
For more information, refer to page 11-17.

2. Check [Use Sample Buffer].
The options for buffer No. 0 are displayed.

3. Uncheck [Memory Designation].
When this item is not checked, sampling data memory addresses are allocated following the read area memory and the sampling control memory.
For more information, refer to page 11-16.

4. Select "Bit Sample" for [Sampling Method].
Data is sampled at the edge of ON/OFF of each bit.

5. Specify the number of words to be sampled for [No. of Words].
One word corresponds to 16 bits.
When "1" is specified, data is sampled at the edge of ON/OFF of 16 bits.
15 errors should be displayed in this example. Specify "1".
Data is thus sampled at the edge of ON/OFF of 16 bits.
[No. of Words] "1"

6. Specify "1" for [Sampling Time]. Sampling is executed at intervals of 1 sec.

When a short time (0 or 1 sec.) is specified for [Sampling Time], the number of PLC data reading times by ZM-70 is increased, and screen process speed will be slow. When [Memory Designation] is checked, the speed will be slower. [Memory Designation] should not be checked in such a case.

7. Specify "500" for [No. of Samples].
The display area in this example shows up to 11 lines. Set the number of sampling times to 11 or more. (Refer to page 11-11.)

Specify [No. of Samples] as a larger number than the Y size of the display area in bit sampling mode. Otherwise, the linked switches (Roll Up, Reset, etc.) will be ineffective.

8. Specify an address for storing sampled data.
[Store Target] "Internal Buffer"

When the ZM-80 (ZM-70) internal buffer is chosen for [Store Target], the sampled data is cleared by turning off the system or by bringing up the main menu on ZM-80 (ZM-70).

Clearing of sampled data as mentioned above can be avoided by choosing a memory card for storage. Sampled data can be saved in the memory card even in the event of a power failure, and the data can be displayed again when the system is turned on.Also, the stored data can be imported to an application software (EXCEL, for example) using our software M-CARD SFT.
ZM-80 (ZM-70) must be available with internal or external memory cards when choosing "Memory Card" for [Store Target].

9. [Full Processing] determines what happens when the specified number of samplings has been exceeded.
Choose "Continuous" in this example.

10. Click [OK]. The [Buffering Area Setting] dialog is closed.

Buffering Area Capacity Calculation

Calculate the capacity as indicated below when "Bit Sample" is chosen for [Sampling Method]:

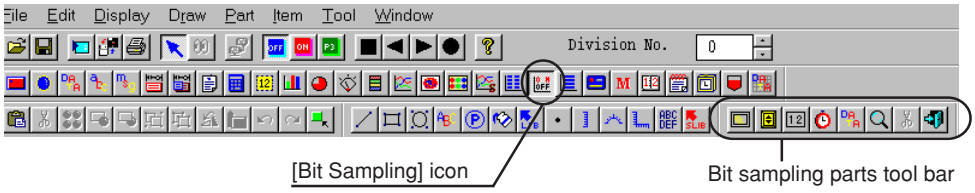
For "Bit Sample"
1 sampling = 3 words
Buffering area size = Number of samples x 1 sampling

The buffering area size in this example corresponds to 1,500 words.
Calculation 500 x 3 = 1500

Bit Sampling Mode Selection

Set up how to indicate data stored in the buffering area.

1. Click the [Bit Sampling] icon in the tool bar.
The bit sampling parts tool bar is displayed.



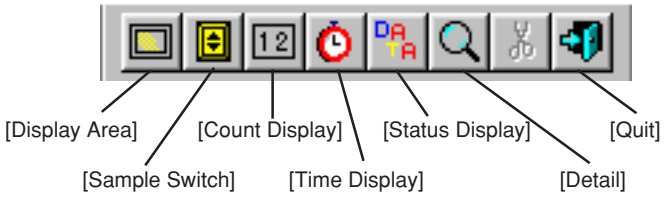
2. The bit sampling parts tool bar contains the parts that are required for setting up bit sampling mode.

<Essential parts>

[Detail] and [Display Area]

<Parts to be used when necessary>

[Sample Switch], [Count Display], [Time Display], and [Status Display]

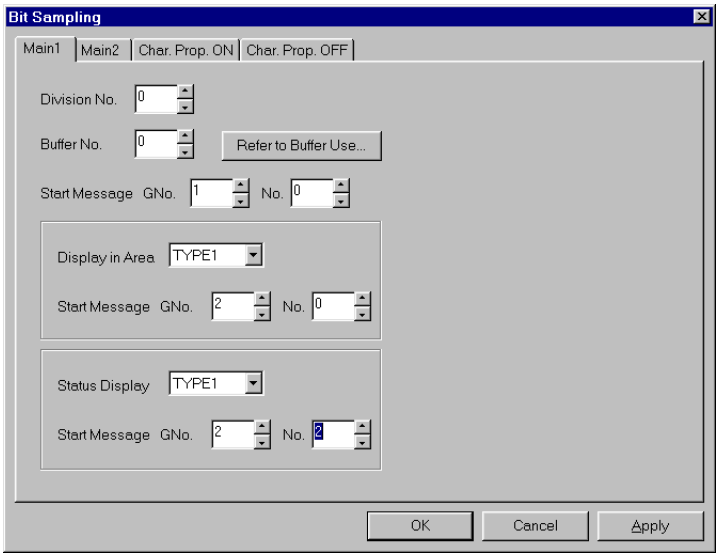


All parts are used in this example.

Note on bit sampling parts setting
Choose the same division number from 0 to 255 for [Detail], [Display Area], [Sample Switch], [Count Display], [Time Display] and [Status Display] so that all these bit sampling parts are linked.

[Bit Sampling] Dialog Setting

Click [Detail] in the bit sampling parts tool bar.
The [Bit Sampling] dialog is displayed.



[Main 1] Tab Window

1. Specify "0" for [Division No.].

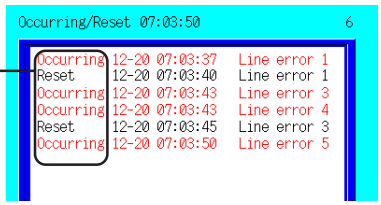
2. Specify the buffer number for execution of bit sampling.
Choose "0" for [Buffer No.] in this example.
When checking the set data of the buffer, click [Refer to Buffer Use].

3. Click [Refer to Buffer Use]. The [Buffering Area Setting] dialog is displayed.
Clicking [OK] after checking the dialog data returns to the [Bit Sampling] dialog.
For more information about the [Buffering Area Setting] dialog, refer to page 11-4.

4. Specify the message group number and the top line number of the registered messages. Refer to page 11-2.
[Start Message GNo.] "1" [No.] "0"

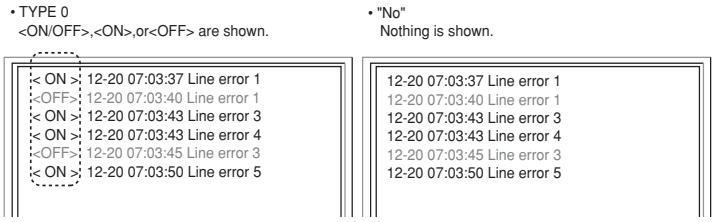
5. Bit activations (ON/OFF) can be indicated at the extreme left of the screen.
Choose the indication method for [Display in Area].
"Occurring" should be indicated when a bit is set (ON), and "Reset" should be indicated when a bit is reset (OFF) in this example. Choose "TYPE 1".

• Display in Area (TYPE 1)
Messages registered in message editing are indicated.



When "TYPE 1" is chosen, two different messages for bit ON and OFF should be registered in message editing. When a bit is set or reset, the corresponding message is indicated.

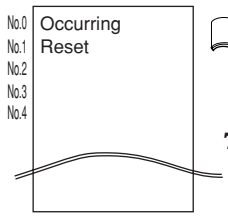
Examples when "No" or "TYPE 0" is chosen for [Display in Area]



6. Register messages "Occurring" and "Reset" in message editing. Use line Nos. 0 and 1 in group No. 2 in this example.

[Start Message GNo.] "2" [No.] "0"

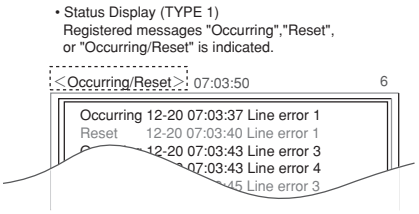
Message group No.2 edit



For the message registration procedure, refer to "Message Registration for [Display in Area] and [Status Display]" on page 11-10.

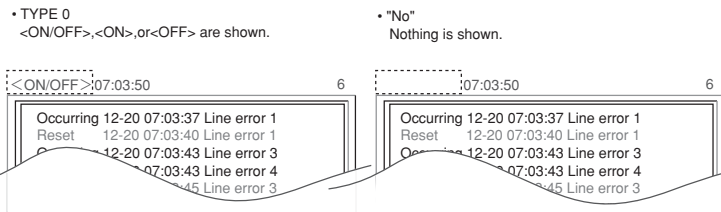
7. The status display indicates which contents are being shown: bit ON, bit OFF, or bit ON/OFF.

"Occurring" should be indicated for bit ON, "Reset" should be indicated for bit OFF, and "Occurring/Reset" should be indicated for bit ON/OFF in this example. Choose "TYPE 1" for [Status Display].

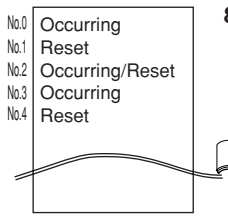


When "TYPE 1" is chosen, messages for bit ON, OFF, and ON/OFF should be registered in message editing. The registered messages are indicated according to bit conditions.

Examples when "No" or "TYPE 0" is chosen for [Status Display]



Message group No.2 edit

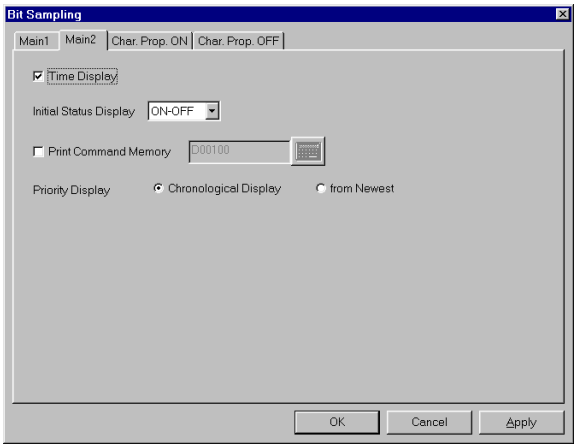


8. Register messages "Occurring", "Reset", "Occurring/Reset" in message editing. Use line Nos. 2, 3, and 4 in group No. 2.

[Start Message GNo.] "2" [No.] "2"

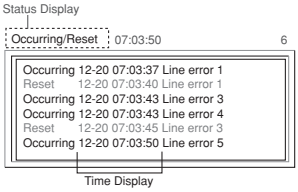
For the message registration procedure, refer to "Message Registration for [Display in Area] and [Status Display]" on page 11-10.

[Main 2] Tab Window



1. When you want to indicate the sampling time, check [Time Display].
It is indicated in the format of [month - day hour : minute : second]. The number of one-byte characters is 15.
Check this box in this example.

2. [Initial Status] determines the status display to be effective when the screen is opened.
Choose "ON-OFF" in this example. ON/OFF of all bits sampled can be indicated.

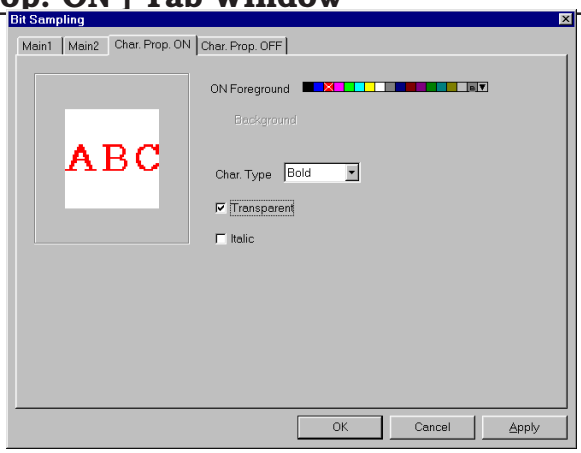


3. When data of all buffers in use (buffer No. 0 in this example) should be printed by a PLC command, check the [Print Command Memory] box.
Printing should be executed using the switch in this example. Uncheck the box.

4. Select the type of the priority by [Priority Display]. In this example, select [Chronological Display].

For ZM-70
The priority of the message cannot be set by the panel editor. Messages are displayed in chronological order.

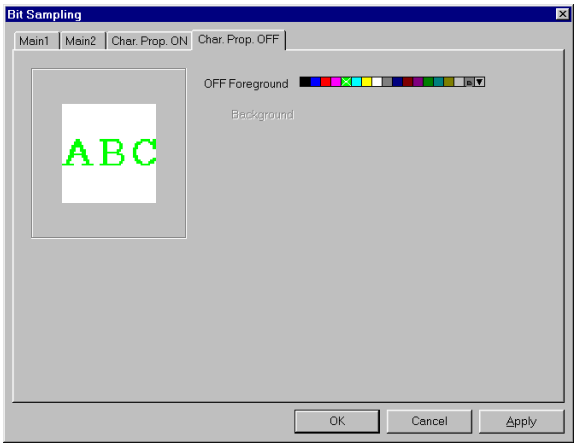
[Char. Prop. ON] Tab Window



1. Specify the ON message color to be displayed in the display area.
   [ON Foreground] "Red"

2. Set up properties for the messages in the display area. The set properties are valid for both ON and OFF messages.
   Char. Type Bold
   Transparent ☑ checked
   Italic ☐ unchecked

[Char. Prop. OFF] Tab Window



1. Specify the OFF message color to be displayed in the display area.
   [OFF Foreground] "Green"

Characters can be sized up to 1 x 1.

Click [OK] to quit the [Bit Sampling] dialog.

Message Registration for [Display in Area] and [Status Display]

Register the messages for [Display in Area] and [Status Display] in message editing. (Refer to page 11-8.)

1. In the section "Error Message Registration for Display", the error messages have been registered in message group No. 1. The messages for [Display in Area] and [Status Display] are thus registered in group No. 2.
   Select [Message] from the [Item] menu. The [Message] dialog is displayed.

2. Select group No. 2 and click [OK].
   The [Message [2] Edit] window is displayed.

Register the messages from line No. 0.

Line No.	Message	
0	Occurring	bit ON
1	Reset	bit OFF
2	Occurring/Reset	Status Display (Refer to page 11-8.)
3	Occurring	bit ON/OFF
4	Reset	bit ON bit OFF

Display in Area (Refer to page 11-7.)

For message edit procedure in the message edit window, refer to "Message Registration" in "Chapter 9 Displaying Messages by Setting/Resetting Bits (Relay Mode)".

3. Click [x] button after registration. The [Screen Edit] window appears.

Display Area Setting

Set up the sampled data display area.

1. Click the [Display Area] icon in the bit sampling parts tool bar.
The [Display Area] dialog is displayed.

2. Set up options as shown below. Place the display area at the center of the screen.

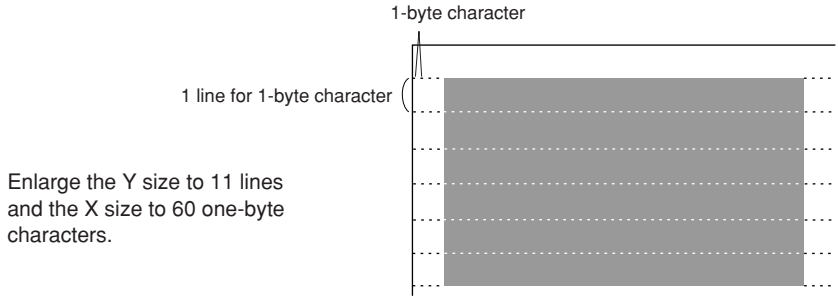
Part selection		No. 15 in file (Parts_e.z7p)
Division No.		0
In-area Prop.	Foreground	Black
	Tile	No. 0

3. Modify the size of the display area.

(1) Bring up grids for reference.
Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed.
Set up the [Grid] tab window as shown below, and click [OK].

Grid Dsp.	checked
Grid Color	Red
Grid Type	1-Byte

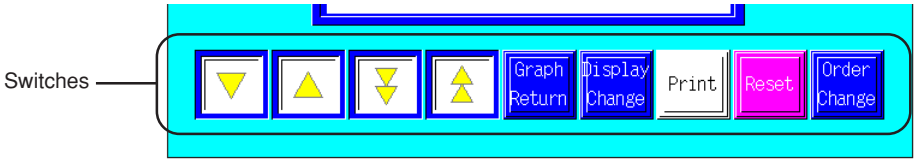
(2) Modify the display area size while referring to the grids shown on the screen.



Switches for Bit Sampling

1. Click the [Sample Switch] icon in the bit sampling parts tool bar. The switches for the bit sampling mode are displayed in the drop-down menu.

2. Set up as shown below:



• Roll Up

Part selection No. 96 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary(ignored)
Function	Roll Up

(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Character) tab window

(No setting)

(Color) tab window

Frame ON Color	Gray
ON Color	Gray
Frame OFF Color	Gray
OFF Color	Silver-color (extreme right)

• Roll Down

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 95 in file (Parts_e.z7p)

(Main) tab window

Function	Roll Down

• Plus Block

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 100 in file (Parts_e.z7p)

(Main) tab window

Function	Plus Block

• Minus Block

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 99 in file (Parts_e.z7p)

(Main) tab window

Function	Minus Block

• Graph Return

Part selection No. 65 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Graph Return

(Character) tab window

No. 0	Graph
No. 1	Return

(Char. Prop.) dialog (for No. 0 and No. 1)

Char. Type	Normal
Foreground	Black
Transparent	☑checked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT

(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

ON Color	Blue
OFF Color	Yellow

• Display Change

Set up the options in the tab windows in the same manner as those for the Graph Return switch, except the following:

(Main) tab window

Function	Display Change

(Character) tab window

No. 0	Display
No. 1	Change

• Print

Set up the options in the tab windows in the same manner as those for the Graph Return switch, except the following:

(Main) tab window

Function	Sample Print

(Character) tab window

No. 0	Print

(Color) tab window

ON Color	Blue
OFF Color	White

• Reset

Set up the options in the tab windows in the same manner as those for the Graph Return switch, except the following:

(Main) tab window

Function	Reset

(Character) tab window

No. 0	Reset

(Color) tab window

ON Color	Blue
OFF Color	Red

For ZM-70
Cannot specify the [Function: Display Order Change] switch.

• Display Order Display

Set up the options in the tab windows in the same manner as those for the Graph Return switch, except the following:

(Main) tab window

Function	Display Order Change

(Character) tab window

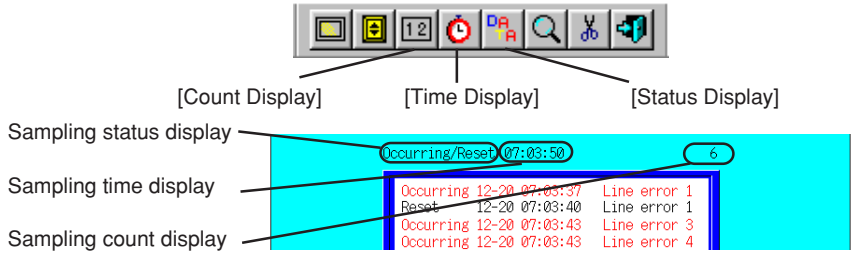
No. 0	Order
No. 1	Change

The following explains the switch functions.

Roll Up	Scrolls by one data element toward the most recent. If it cannot be held in the display area, one data element at a time scrolls into view.
Roll Down	Scrolls by one data element toward the oldest. If it cannot be held in the display area, one data element at a time scrolls into view.
Plus Block	Scrolls by one page toward the most recent.
Minus Block	Scrolls by one page toward the oldest.
Graph Return	Flashes when any of the Roll Up, Roll Down, Plus Block, and Minus Block switches is pressed. When the Graph Return switch is pressed while it is flashing, the display is restored to the most recent bit sampling data. Flashing is canceled as well as the selection.
Display Change	Changes over the sampling status display when it is set to be indicated.
Print	Prints all data stored in the specified buffer numbers.
Reset	Lights up when the switch is pressed once. When it is pressed again within 2 seconds, the buffer in use is cleared, and sampling is restarted immediately. If not pressed within 2 seconds, the switch is turned off, and resetting is nullified.
Display Order Change	Changes the order of the displayed messages when the switch is pressed once. The chronological display is reversed by turns.

Bit Sampling Data Display Parts

1. Set up the [Count Display], [Status Display], and [Time Display] parts for indicating the number of samplings, the status of sampling, and the time recorded when the data was sampled.



2. Set up each display part and place it on the screen.

• Sampling status display

Part selection No. 9 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Sample Status Display
Bytes	10
◉Flush L	

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X: 1 Y: 1
Foreground	Blue
Background	Silver-color

(Detail) tab window

Process Cycle	High Speed

• Sampling time display

Part selection No. 9 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Sample Time Display
Digits	9
Decimal Point	0
Display Type	DEC (w/o sign)
Zero Suppress	☑ checked
◉Flush R	

(Char. Prop.) dialog

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked
Char. Size	◉1-Byte
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X: 1 Y: 1
Foreground	Blue
Background	Silver-color

(Detail) tab window

Process Cycle	High Speed

Depending on the setting for [Digits], the sampling time is indicated in the following format:

8 digits or less
no display

greater than 8 digits and less than 14 digits (both inclusive)
hour : minute : second

15 digits or greater
month - day hour : minute : second

• Sampling count display

Set up the options in the tab windows in the same manner as those for the sampling time display, except the following:

(Type) tab window

Display Function	Sample Count Display
Digits	4

Sampling status display	This display indicates which contents are being shown: bit ON, bit OFF, or bit ON/OFF.
Sampling time display	This display indicates the last sampling time or that of the selected data element.
Sampling count display	This display indicates the total number of data sampled or the ordinal number of the selected data element among those sampled.

Memory Allocation

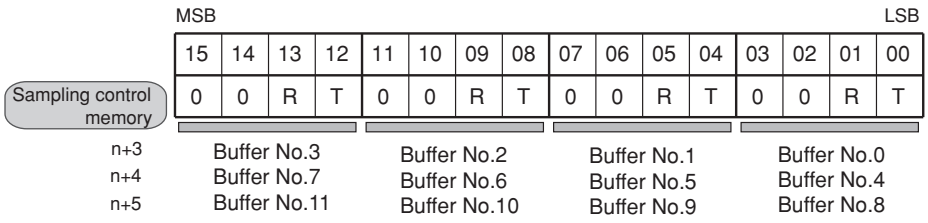
The following memory addresses are used in this example.
Read area memory address: D00000

Memory address	Contents
D00003	Sampling control memory
D00004	Sampling data memory
D00310	Information output memory

Sampling Control Memory

When any setting is made in the [Buffering Area Setting] dialog, sampling control memory addresses are automatically allocated following the read area memory. The number of allocated words and the contents depend on the number of buffers.

Read area memory addresses: n, n + 1, n + 2 (3 words)



R: Reset

When this bit is set (1) , the buffering area is cleared and no sampling occurs.

When this bit is reset (0), sampling is started.

T: Trigger

This is effective only when [Bit Synchronize] is selected for [Sampling Method] in the [Buffering Area Setting] dialog.

Only buffer No. 0 is used in this example. Address D00003 (1 word) is allocated as the sampling control memory.

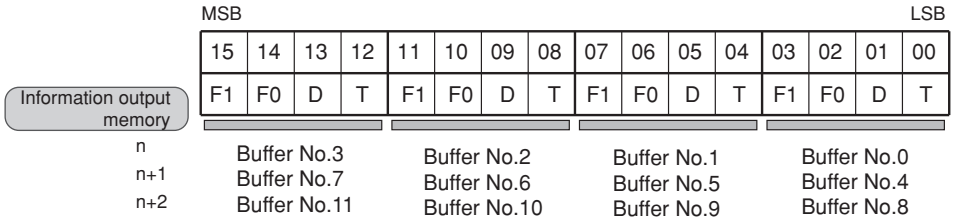
Sampling Data Memory

When [Memory Designation] is not checked in the [Buffering Area Setting] dialog, sampling data memory addresses are allocated following the sampling control memory. Address D00004 (1 word) is allocated as the sampling data memory in this example.

Information Output Memory

Buffering area information is written to the memory address chosen for [Info. Output] (ZM80 -> PLC).

Memory addresses and bits correspond to buffers as shown below:



F1: Specified buffer is full.

F0: Specified buffer is 90 % full.

D : Specified buffer contains data.

T : Status of the input trigger is output.

Only buffer No. 0 is used in this example.

Address D00310 (1 word) is allocated as the information output memory (refer to page 11-4).

Error Messages Corresponding to Bits

The following table indicates error messages corresponding to the sampling data memory bits respectively.

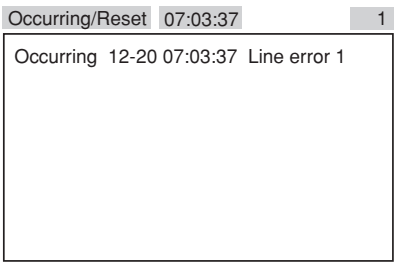
Bit	Message
D00004-00	Line error 1
D00004-01	Line error 2
D00004-02	Line error 3
D00004-03	Line error 4
D00004-04	Line error 5
D00004-05	Line error 6
D00004-06	Line error 7
D00004-07	Line error 8
D00004-08	Line error 9
D00004-09	Line error 10
D00004-10	Line error 11
D00004-11	Line error 12
D00004-12	Line error 13
D00004-13	Line error 14
D00004-14	Line error 15
D00004-15	

Bit Sampling Screen Operation Check

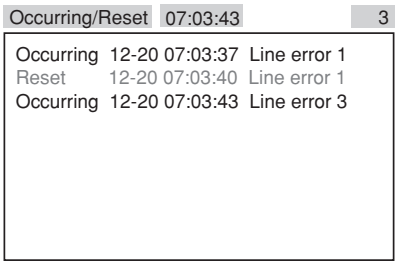
Save the created screen.
While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-80 and check that ZM-80 operates correctly.

1. Specify "H0000" for "D00003". Start sampling.

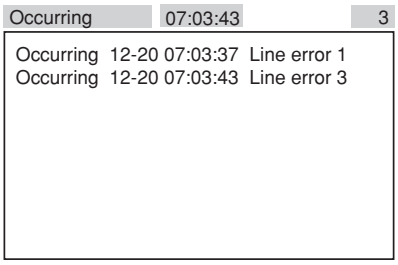
2. Specify "H0001" for "D00004". (Bit 0 is set.)



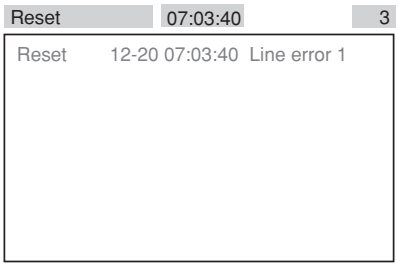
3. Specify "H0002" for "D00004".
(Bit 0 is reset, and bit 1 is set.)



4. Press the [Display Change] switch.
"Occurring/Reset" changes to
"Occurring" in the status display.



5. Press the [Display Change] switch again.
"Occurring" changes to "Reset"
in the status display.



6. Monitor the information output memory.
"H0002" is entered for "D00310".
It is confirmed that buffer No. 0 contains data.

7. Press the [Reset] switch. The switch lights up. Press it again within 2 seconds.
Data sampled in buffer No. 0 as well as the messages in the display area are cleared.

8. Monitor "D00310". "H0000" is entered.
It is confirmed that the buffering area contains no data.

9. Bring up 12 or more messages on the screen.
Check that the [Roll Up], [Roll Down], [Plus Block], [Minus Block], and [Graph Return] switches operate as intended. (Refer to page 11-14.)

12 Expressing Time-Varying Data in a Line Graph (Trend Sampling Mode)

Trend sampling mode is used to express time-varying data in a line graph. This mode stores time-varying data in the buffering area, thus allowing you to check data trends in reverse chronological order.

For ZM-70
Up to 8 lines can be displayed in a display area.

Up to 16 lines can be displayed in a trend sampling area.

Follow the steps below to use the trend sampling mode:

(1) Set up the [Buffering Area Setting] dialog for storing time-varying data.

(2) Set up the [Trend Sampling] dialog for expressing the stored data.

Keyword

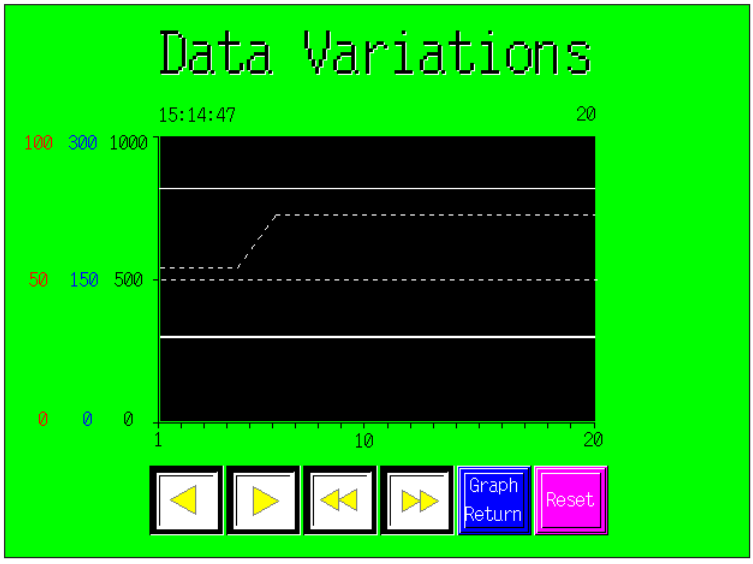
Buffering area

The buffering area stores data sampled. The internal buffer of ZM-80 (ZM-70) or memory cards can be chosen for data storage.

* Memory cards can be used only when ZM-80 (ZM-70) is available with internal or external memory cards (optional).

Unless the buffering area is cleared, sampled data can be stored and displayed anytime even after screen change.

Create the following screen.



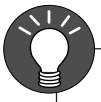
Procedure

Operation

Bring up a new screen for creating a trend sampling screen.
Check silver-color (extreme right) for [F (foreground)].
([Edit] -> [Screen Setting] - > [F (foreground)] -> Silver-color (extreme right)

Buffering Area Setting

The buffering area is set to store time-varying data.



The maximum capacity of the buffering area is 32K words. The buffering area can be divided into 12 sections (buffer Nos. 0 to 11). Sampling data can be stored in each buffer.

[Buffering Area Setting] Dialog

Select [System Setting] from the [Item] menu, and click [Buffering Area Setting]. The [Buffering Area Setting] dialog is displayed.

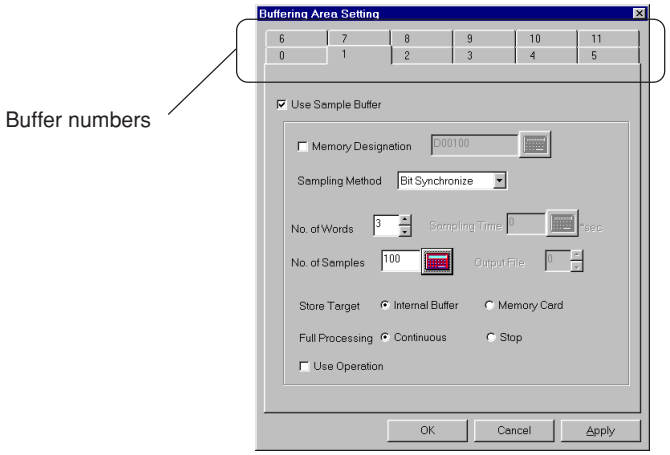
Buffer No. 0 has been used in Chapter 11. Use buffer No. 1 in this example.

Buffer No. 1 Setting

1. The memory address selected for [Info. Output] in the [Buffering Area Setting] dialog is used for all buffer Nos. 0 to 11.
Check that "D00310" is chosen for [Info. Output] (refer to page 12-17).

2. Click [1]. The [1] tab window is opened for buffer No. 1.
Check the [Use Sample Buffer] box. The options for buffer No. 1 are indicated.

3. The memory address to be sampled can be specified when [Memory Designation] is checked. Uncheck the box in this example.



When [Memory Designation] is not checked, sampling data memory addresses are allocated following the read area memory, the sampling control memory, and the sampling data memory for buffer No. 0.

For more information, refer to page 12-16.

4. Choose "Bit Synchronize" or "Constant Sample" for [Sampling Method]. Choose "Bit Synchronize" in this example.

Bit Synchronize:

Data is sampled at the edge of 0 -> 1 of bits in the sampling control memory.

Constant Sample:

Data is sampled at the specified intervals.

5. Specify the number of words to be sampled for [No. of Words].
3 words are sampled in this example.

[No. of Words] "3"

6. Specify "100" for [No. of Samples].
"20" is to be entered for [Trends] in the [Trend Sampling] dialog. "20" or more must be entered for [No. of Samples] (refer to page 12-7).

Specify [No. of Samples] as a larger number than the number of [Trends]. Otherwise, the linked switches (Roll Up, Reset, etc.) will be ineffective.

7. Specify an address for storing sampled data.

[Store Target] "Internal Buffer"

The internal buffer is installed in ZM-80 (ZM-70).
When "Internal Buffer" is chosen for [Store Target], the sampled data is cleared by turning off the system or by bringing up the local main screen on ZM-80 (ZM-70).

Clearing of sampled data as mentioned above can be avoided by choosing a memory card for storage. Sampled data can be saved in the memory card even in the event of a power failure, and the data can be displayed again when the system is turned on.
Also, the stored data can be imported to an application software (EXCEL, for example) using our software M-CARD SFT.
ZM-80 (ZM-70) must be available with internal or external memory cards when choosing "Memory Card" for [Store Target].

8. [Full Processing] determines what happens when the specified number of samplings has been exceeded.

Stop : Sampling is stopped when the specified number has been exceeded.

Continuous : Sampling is continued by discarding old ones when the specified number has been exceeded.

Choose "Continuous" in this example.

9. Click [OK]. The [Buffering Area Setting] dialog is closed.

Buffering Area Capacity Calculation

Calculate the capacity as indicated below when "Bit Synchronize" is chosen for [Sampling Method]:

For "Bit Synchronize"
1 sampling = Set number of words + 2 words
Buffering area size = Number of samples x 1 sampling

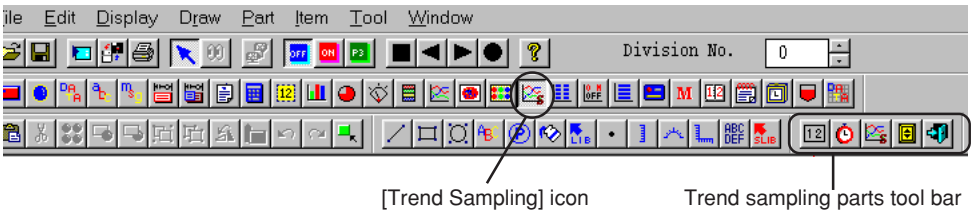
The buffering area size in this example corresponds to 500 words.

Calculation method 3 + 2 = 5
100 x 5 = 500

Trend Sampling Mode Selection

Set up how to indicate the data stored in the buffering area.

1. Click the [Trend Sampling] icon in the tool bar. The trend sampling parts tool bar is displayed.



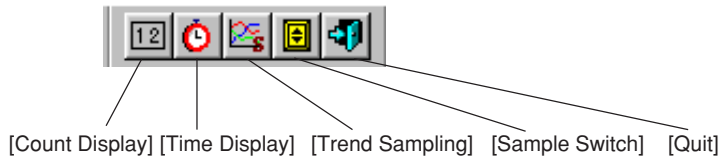
2. The trend sampling parts tool bar contains the parts that are required for setting up trend sampling mode.

<Essential parts>

[Trend Sampling]

<Parts to be used when necessary>

[Count Display], [Time Display], and [Sample Switch]

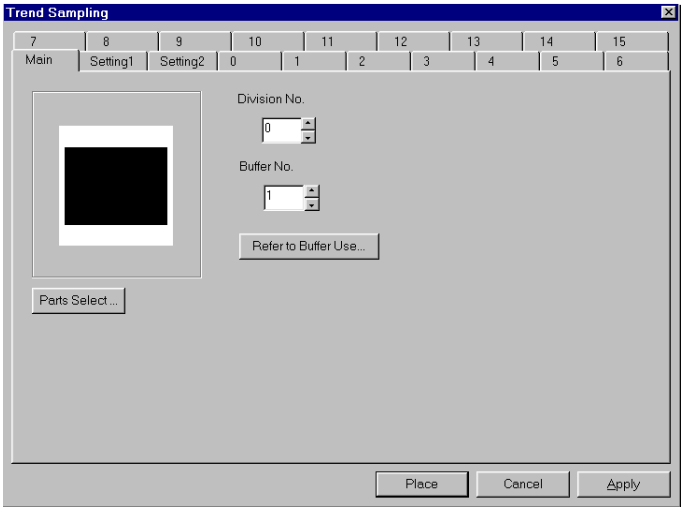


All parts are used in this example.

Notes on trend sampling parts setting:
Choose the same division number from 1 to 255 for [Count Display], [Time Display], [Sample Switch], and [Trend Sampling] so that all these trend sampling parts are linked.
Once the trend sampling parts tool bar is closed, the bar linked with the set trend sampling mode cannot be displayed again. To set up parts ([Sample Switch], [Count Display], etc.) for the trend sampling mode afterwards, click the [Switch] or [Num. Data Display] icon in the tool bar.

[Trend Sampling] Dialog

Click the [Trend Sampling] icon in the trend sampling parts tool bar.
The [Trend Sampling] dialog is displayed.



Up to 16 lines can be displayed in a trend sampling area.

For ZM-70
Up to 8 lines can be displayed in a display area.

Basic trend sampling data is set in the [Main], [Setting 1], and [Setting 2] tab windows. The [0] to [15] tab windows are used for setting details of respective trend lines.

[Main] Tab Window

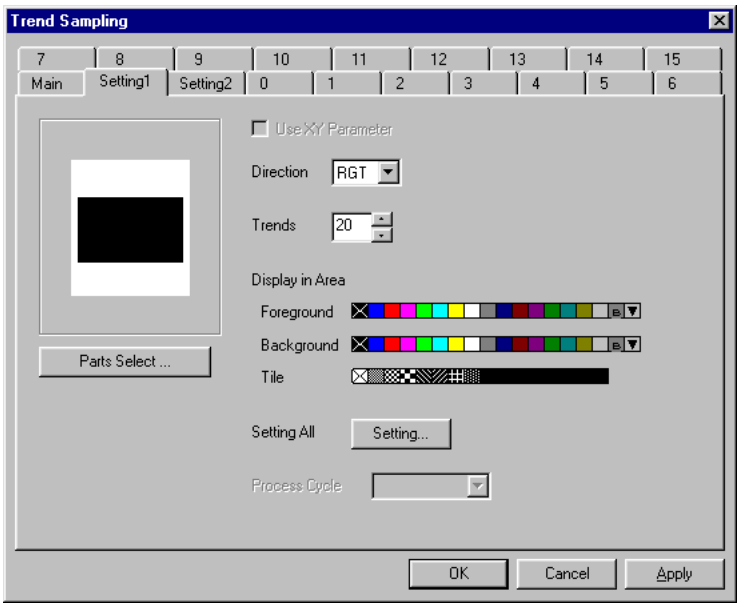
1. Specify "0" for [Division No.].

2. Specify the buffer number for execution of trend sampling.
   Buffer No. 1 has already been chosen in "Buffering Area Setting".
   Choose "1" for [Buffer No.].
   When checking the buffer No. 1 data, click [Refer to Buffer Use].

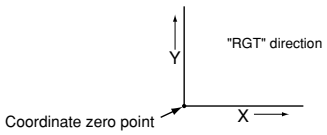
3. Click [Refer to Buffer Use]. The [0] tab window appears in the [Buffering Area Setting] dialog.
   Click [1] and check the data of buffer No. 1.
   Click [OK]. The [Trend Sampling] dialog is displayed.
   For more information about setting of the [Buffering Area Setting] dialog, refer to page 12-2.

4. Click [Parts Select] and choose the part for trend sampling. Choose No. 0 from file [Parts_e.z7p] in this example.

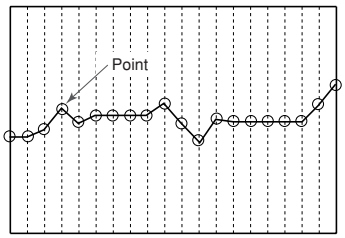
[Setting 1] Tab Window



1. Choose the desired direction for drawing the trend lines for [Direction].
Choose "RGT" in this example.



2. Specify the desired maximum number of plot points for [Trends].
Setting range: 3 to 639
Choose "20" in this example.



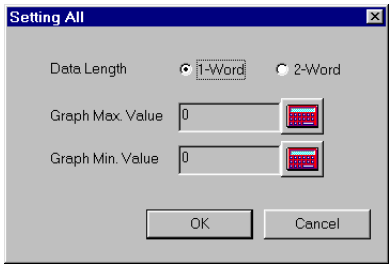
3. Choose line graph colors for [Display in Area].

Foreground	Black
Background	Black
Tile	No. 0

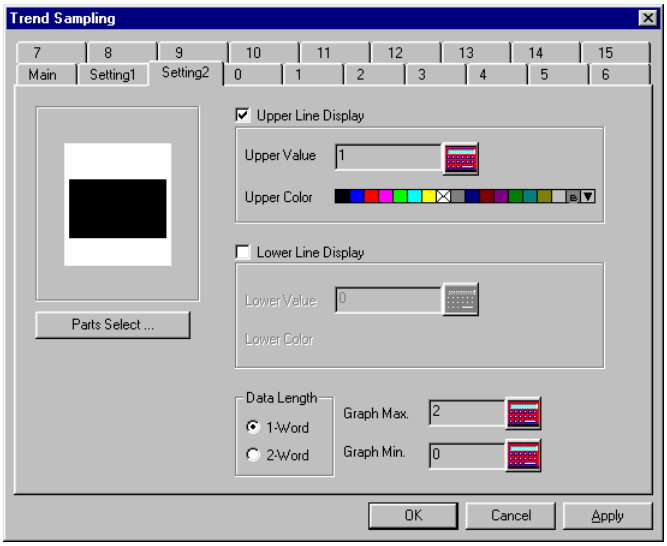
4. When setting up the same data for [Data Length], [Graph Max. Value], and [Graph Min. Value] of trend line Nos. 0 to 7, it is convenient to use [Setting All].
Click [Setting] in the [Setting 1] window when using this function.
Although 3 trend lines are drawn in this example, different data is set up for the lines. [Setting All] is not used.

[Setting All]

1. Open the desired tab windows, and check their [Trend Display] boxes.
2. Open the [Setting 1] tab window. Click [Setting] for [Setting All]. The [Setting All] dialog is displayed.
3. Set up the data of [Data Length], [Graph Max. Value], and [Graph Min. Value], and click [OK]. The trend line numbers of [Trend Display] boxes which are checked in respective tab windows can be set up in a batch.

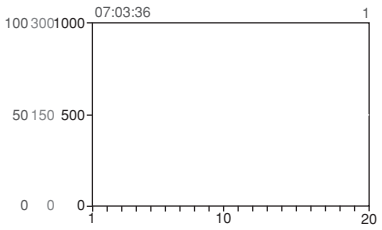


[Setting 2] Tab Window



1. It is possible to draw up to two lines for reference in the trend sampling area.
If you want to draw two lines, check both [Upper Line Display] and [Lower Line Display] boxes. If you want to draw one line, check either box.
A central line should be drawn in this example. Check [Upper Line Display].

2. Scales can be attached for reference of drawing the upper/lower lines.
Specify "2" for [Graph Max.] and "0" for [Graph Min.].



3. Choose either "1-Word" or "2-Word" for the [Graph Max.] and [Graph Min.] data.
Specify "1-Word" for [Data Length].

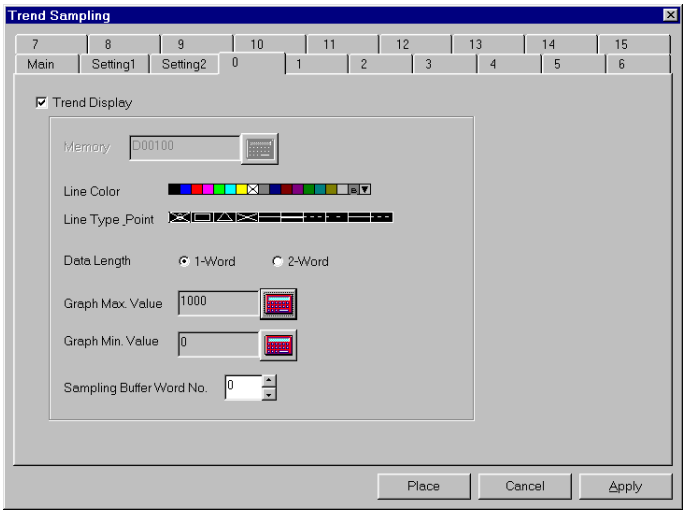
4. Specify "1" for [Upper Value] and check white for [Upper Color] of [Upper Line Display].

[0] Tab Window

1. Check the [Trend Display] box.

2. Set up [Line Color] and [Line Type & Point] as shown below:

Line Color	"White"
Line Type & Point	"Solid line (thin line, No. 5 from the left)"



3. Choose "1-Word" for [Data Length].

4. Specify the max. and min. graph values of trend line No. 0.

Graph Max. Value "1000"
Graph Min. Value "0"

5. When [Constant Sample] or [Bit Synchronize] is selected for [Sampling Method] in the [Buffering Area Setting] dialog, word addresses starting from "0" are determined.
Specify the word address number to be sampled in buffer No. 1 for [Sample Buffer Word No.].
"3" is specified for [No. of Words] in the [Buffering Area Setting] dialog in this example.
Addresses are allocated as shown below:

	Address
1st word	0
2nd word	1
3rd word	2

Data of the 1st word should be sampled in the buffering area. Specify "0" for [Sample Buffer Word No.].

[1] Tab Window

1. Check the [Trend Display] box.

2. Set up [Line Color] and [Line Type & Point] as shown below:

Line Color "Green"
Line Type & Point "Broken line (No. 2 from the right)"

3. Choose "1-Word" for [Data Length].

4. Specify the max. and min. graph values of trend line No. 1.

Graph Max. Value "300"
Graph Min. Value "0"

5. Specify "1" for [Sample Buffer Word No.].

[2] Tab Window

1. Check the [Trend Display] box.

2. Set up [Line Color] and [Line Type & Point] as shown below:

Line Color "Purple"
Line Type & Point "Solid line (thick line, No. 5 from the right)"

3. Choose "1-Word" for [Data Length].

4. Specify the max. and min. graph values of trend line No. 2.

Graph Max. Value "100"
Graph Min. Value "0"

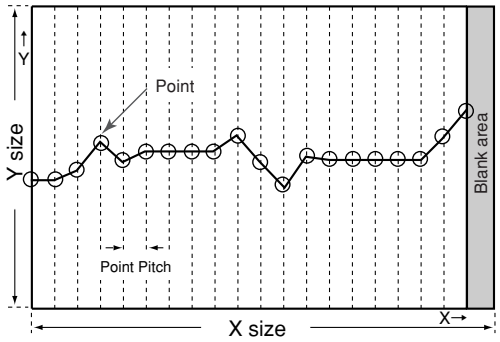
5. Specify "2" for [Sample Buffer Word No.].

Trend Sampling Area Placement

When the [Trend Sampling] dialog has been set up, click [Place] and place the trend sampling area at the center of the screen.

When the size of the trend sampling area is specified after setting [Trends], it will be determined automatically by adjusting the size with no remainder.
If the value of [Trends] is changed after placing the trend sampling area, there may be a remainder. The value of the remainder will be specified as the blank area.

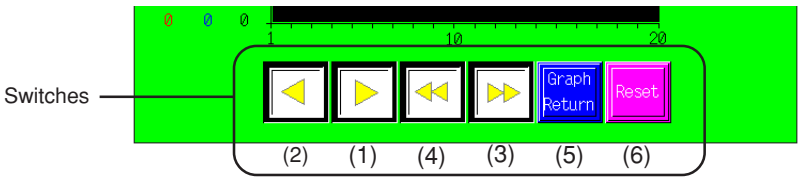
Point pitch (dot) = X size / (Trends - 1)



Switches for Trend Sampling

1. Click the [Sample Switch] icon in the trend sampling parts tool bar. The switches for the trend sampling mode are displayed in the drop-down menu.

2. Set up the switches and place them on the screen as shown below:



• Roll Up

Part selection No. 98 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Roll Up

(Character) tab window

(No setting)	

(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

Frame ON Color	Gray
ON Color	Gray
Frame OFF Color	Gray
OFF Color	Silver-color (extreme right)

• Roll Down

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 97 in file (Parts_e.z7p)

(Main) tab window

Function	Roll Down

• Plus Block

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 102 in file (Parts_e.z7p)

(Main) tab window

Function	Plus Block

• Minus Block

Set up the options in the tab windows in the same manner as those for the Roll Up switch, except the following:

Part selection No. 101 in file (Parts_e.z7p)

(Main) tab window

Function	Minus Block

• Graph Return

Part selection No. 65 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Graph Return

(Character) tab window

No. 0	Graph
No. 1	Return

(Char. Prop.) dialog (for No. 0 and No. 1)

Char. Type	Normal
Foreground	Black

Transparent	☑ checked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT

(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

ON Color	Blue
OFF Color	Green

• Reset

Set up the options in the tab windows in the same manner as those for the Graph Return switch, except the following:

(Main) tab window

Function	Reset

(Character) tab window

No. 0	Reset

(Color) tab window

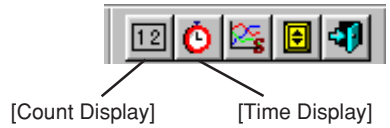
ON Color	Blue
OFF Color	Red

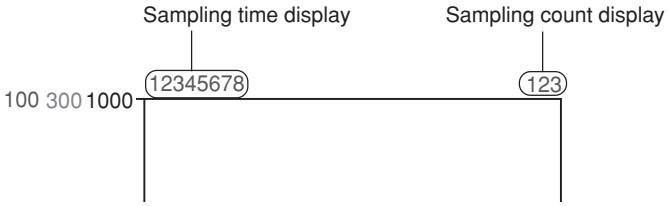
The following explains the switch functions.

Roll Up	Scrolls by one data element toward the most recent. If it cannot be held in the display area, one data element at a time scrolls into view.
Roll Down	Scrolls by one data element toward the oldest. If it cannot be held in the display area, one data element at a time scrolls into view.
Plus Block	Scrolls by one page toward the most recent.
Minus Block	Scrolls by one page toward the oldest.
Graph Return	Flashes when any of the Roll Up, Roll Down, Plus Block, and Minus Block switches is pressed. When the Graph Return switch is pressed while it is flashing, the display is restored to the most recent trend sampling data. Flashing is canceled as well as the selection.
Reset	Lights up when the switch is pressed once. When it is pressed again within 2 seconds, the buffering area in use is cleared and sampling is restarted immediately. If not pressed within 2 seconds, the switch is turned off, and resetting is nullified.

Trend Sampling Data Display Parts

1. Set up the [Count Display] and [Time Display] parts for indicating the number of samplings and the time recorded when the data was sampled.





2. Set up each display part and place it on the screen.

• Sampling time display

Part selection No. 9 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Sample Time Display
Digits	8
Decimal Point	0
Display Type	DEC (w/o sign)
Zero Suppress	☑checked
⦿Flush R	

(Char. Prop.) tab window

Char. Type	Normal

Transparent	☐unchecked
Italic	☐unchecked
Char. Size	⦿1-Byte
Rotate	Normal
Direction	RGT
Spacing	☐unchecked
Enlarge	X: 1 Y: 1
Foreground	Blue
Background	Silver-color

(Detail) tab window

Process Cycle	High Speed

Depending on the setting for [Digits], the sampling time is indicated in the following format:

8 digits or less
no display
greater than 8 digits and less than 14 digits (both inclusive)
hour: minute: second
15 or more greater
month - day hour : minute : second

• Sampling count display

Set up the options in the tab windows in the same manner as those for the sampling time display, except the following:

(Type) tab window

Display Function	Sample Count Display
Digits	3

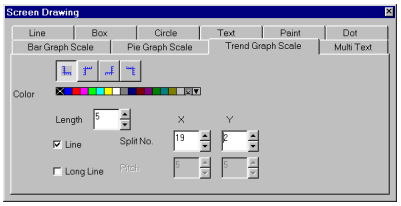
Sampling time display	This display indicates the last sampling time or that of the selected data element.
Sampling count display	This display indicates the total number of data sampled or the ordinal number of the selected data element among those sampled.

Drawing Scales

1. Draw scales.

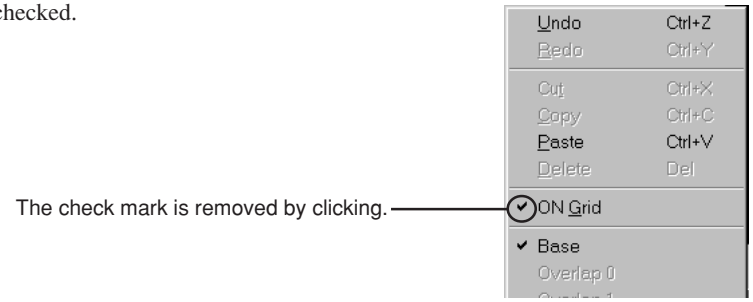
(1) Click [Trend Graph Scale] icon in the draw tool bar. The [Screen Drawing] dialog is displayed.
Set up as shown below:

Color	"Black"
Length	"5"
Line	checked
Split No.	X "19", Y "2"

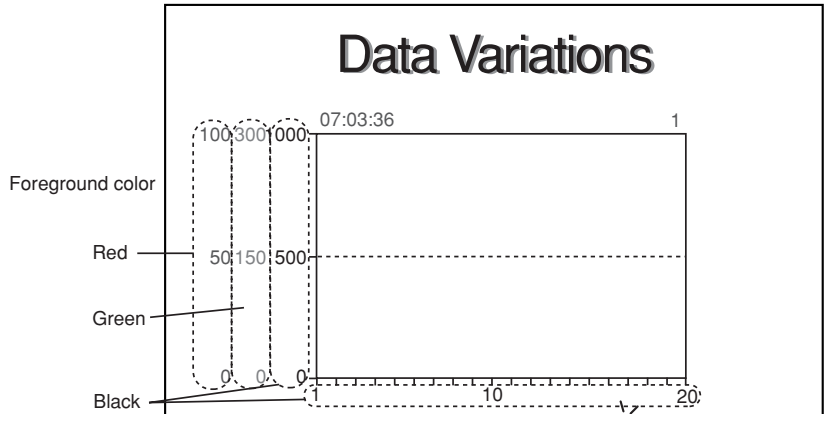


(2) Drag the mouse to the [Screen Edit] window. The cross-shaped cursor appears. Draw scales by dragging the cursor from the upper left to the lower right.

2. Right-click the mouse. The pop-up menu is displayed. Uncheck [ON Grid] when it is checked.



3. Draw graduation marks.
Click the [Text] icon. Create and place the marks as shown below:



<Common options>

Enlarge	X: 1, Y:1
Transparent	☑ checked
Rotate	Normal
Direction	RGT

Italic	☐ unchecked
Normal	☑ checked

4. Draw the screen title "Data Variations" by setting up properties as shown below:

Foreground	Blue
Background	Red
Rotate	Normal
Direction	RGT
Enlarge	X: 3, Y: 3
Italic	☐ unchecked
Shadow	☑ checked

ZM-80 Operation Check

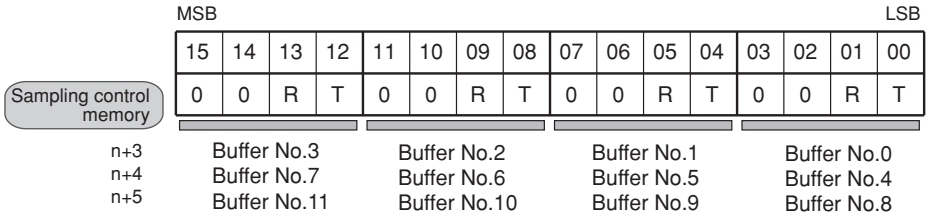
Memory Allocation

The following memory addresses are used in this example.
Read area memory address: D00000

Memory address	Contents
D00003	Sampling control memory
D00004	Sampling data memory (Buffer No. 0)
D00005	Sampling data memory (Buffer No. 1)
D00006	Sampling data memory (Buffer No. 1)
D00007	Sampling data memory (Buffer No. 1)
D00310	Information output memory

Sampling Control Memory

When any setting is made in the [Buffering Area Setting] dialog, sampling control memory addresses are automatically allocated following the Read Area memory. The number of allocated words and the contents depend on the number of buffers.



Read Area memory addresses: n, n + 1, n + 2 (3 words)

R: Reset

When this bit is set (1), the buffering area is cleared and no sampling occurs. When this bit is reset (0), sampling is started.

T: Trigger

This is effective only when [Bit Synchronize] is selected for [Sampling Method] in the [Buffering Area Setting] dialog.

Buffer No. 1 is used in this example. Address D00003 is allocated as the sampling control memory.
[Bit Synchronize] is selected for [Sampling Method] in the [Buffering Area Setting] dialog. Sampling is thus executed at the edge of 0 -> 1 of bit 4 of D00003.

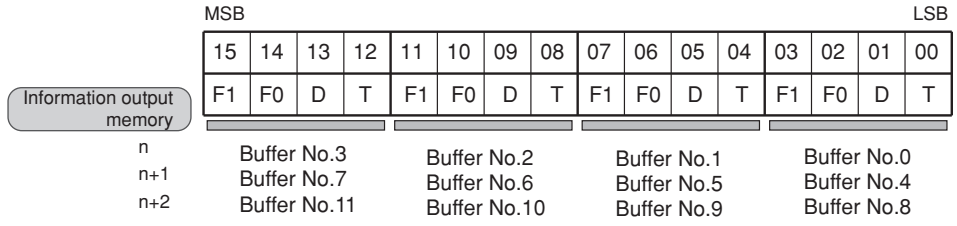
Sampling Data Memory

When [Memory Designation] is not checked in the [Buffering Area Setting] dialog, sampling data memory addresses of buffer No. 1 are allocated following the sampling control memory and the sampling data memory of buffer No. 0.
Addresses D00005, D00006, and D00007 (3 words) are allocated as the sampling data memory of buffer No. 1 in this example.

Information Output memory

Buffering area information is written to the memory address chosen for [Info. Output] (ZM80 -> PLC).
Memory addresses and bits correspond to buffers as shown below:

F1: Specified buffer is full.
F0: Specified buffer is 90 % full.
D: Specified buffer contains data.
T: Input trigger is output.



Buffer No. 1 is used in this example.
Address D00310 (1 word) is allocated as the information output memory of buffer No. 1 in this example (refer to page 12-2).

Trend Sampling Screen Operation Check

Save the created screen.
While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-80 and check that ZM-80 operates correctly.

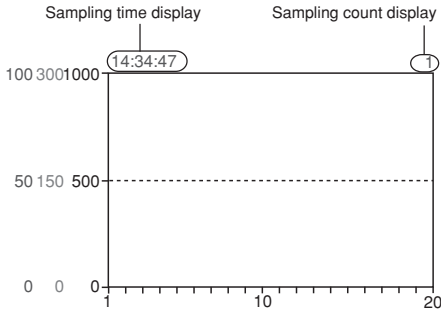
1. The stored data is displayed in the following format:

Sampling data	Graph max. value	Graph min. value	Line type	Line color
No. 0 (D00005)	1000	0	Thin line	White
No. 1 (D00006)	300	0	Broken line	Green
No. 2 (D00007)	100	0	Thick line	Purple

2. Specify the following constants for addresses D00005, D00006, and D00007.
D0005 <- 800
D0006 <- 230
D0007 <- 30

3. Set bit 4 of D00003 (0 -> 1).
D0003 <- H0010

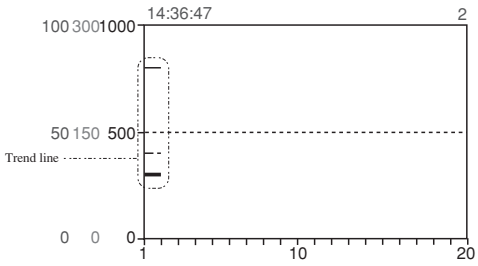
The sampling time and sampling count data are displayed.



4. Reset bit 4 of D00003 (0 -> 1).
D0003 <- H0000

5. Set bit 4 of D00003 (0 -> 1).
D0003 <- H0010

The displayed sampling time changes and the sampling count increases to "2".
A trend line is shown.



6. Reset bit 4 of D00003 (1 -> 0).
D0003 <- H0000

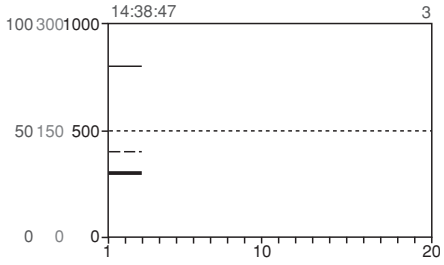
7. Set bit 4 of D00003 (0 -> 1).

D0003 <- H0010

The sampling count increases to "3".

8. Reset bit 4 of D00003 (1 -> 0).

D0003 <- H0000



9. Specify the following constant for address D00006.

D0006 <- 160

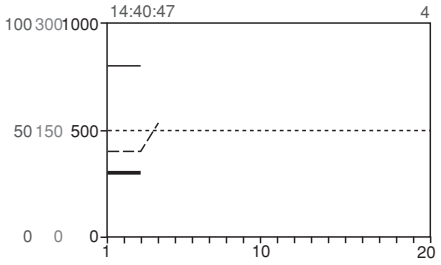
10. Set bit 4 of D00003 (0 -> 1).

D0003 <- H0010

The sampling count increases to "4".

11. Reset bit 4 of D00003 (1 -> 0).

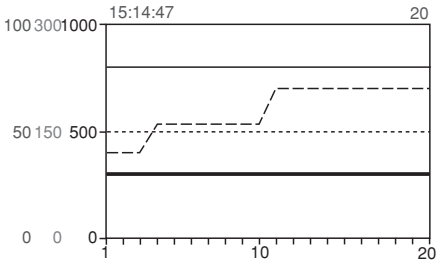
D0003 <- H0000



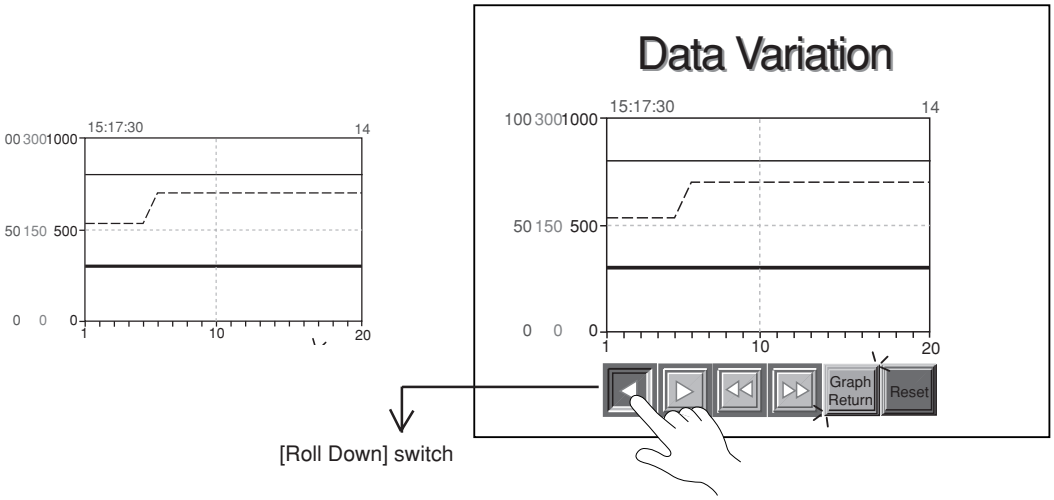
12. Execute sampling of the following data.

Memory \ Count	5	6	7	8	9	10	11	12	13	14
D00005	800	800	800	800	800	800	800	800	800	800
D00006	160	160	160	160	160	210	210	210	210	210
D00007	30	30	30	30	30	30	30	30	30	30

Memory \ Count	15	16	17	18	19	20	21	22	23	24
D00005	800	800	800	800	800	800	800	800	800	800
D00006	210	210	210	210	210	210	210	210	210	210
D00007	30	30	30	30	30	30	30	30	30	30



13. To check the old data, press the [Roll Down] switch.
The selection cursor appears at the center of the graph.
The sampling time and sampling count display parts indicate the data of the selected data element.
The [Graph Return] switch flashes.
(The sampling count display part indicates "20".)



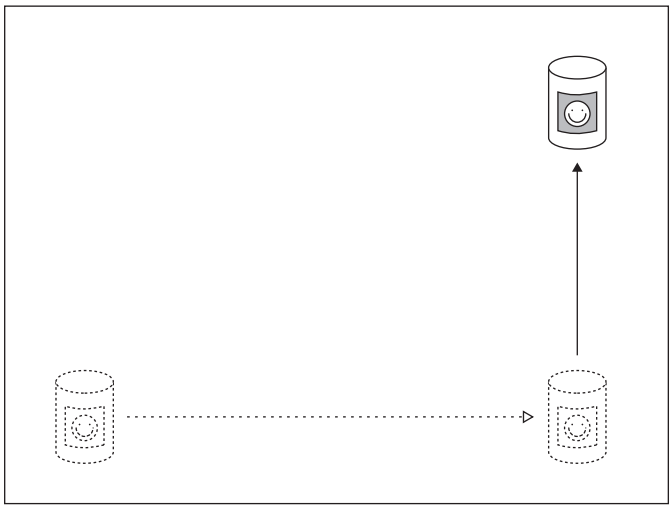
14. Press the [Roll Down] switch again. The selection cursor moves to the left.

15. Press the [Graph Return] switch. The display is restored to the most recent trend sampling data.

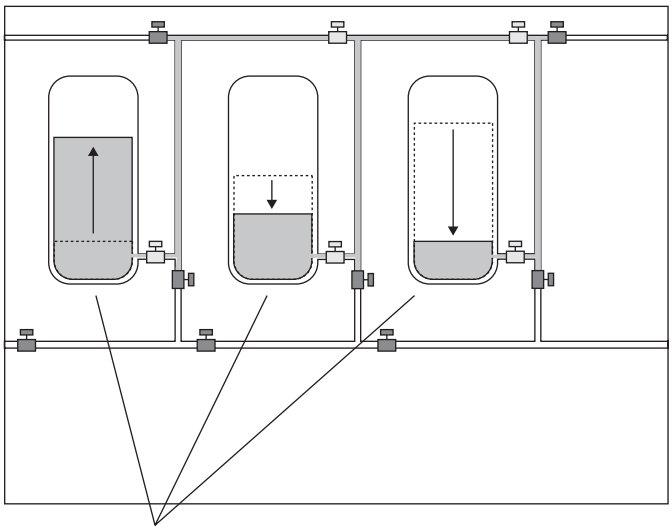
13 Creating Animation Screens

Control Terminal contains the function to animate or transform texts or graphics.

◎ By specifying coordinates of a graphic on the screen, it can be moved freely.



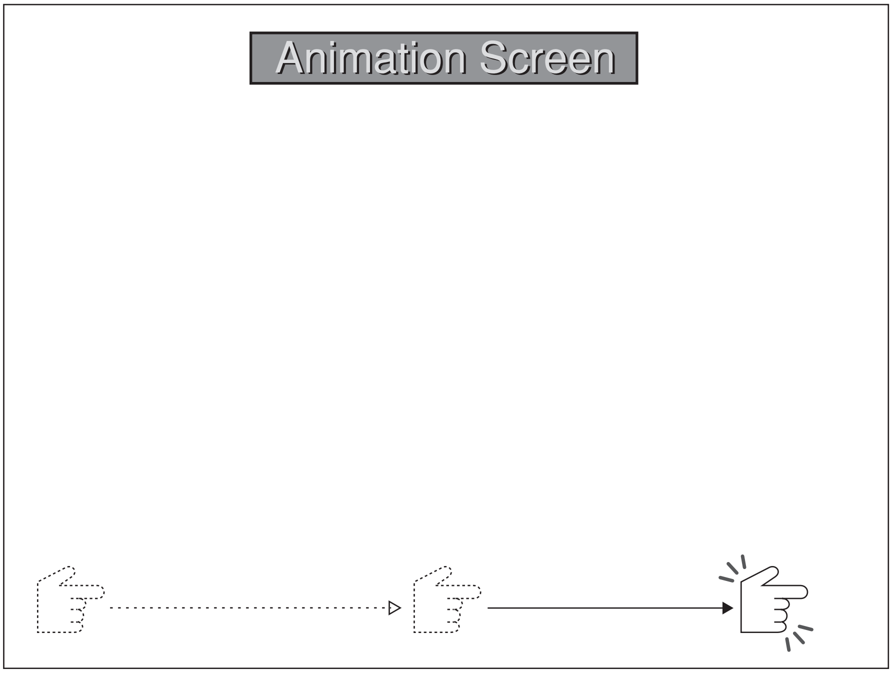
◎ Also, a graphic can be enlarged or reduced, or can be replaced with a different graphic.



The level in the tank can be moved up or down.

Animation Screen Creation

Create the following screen.

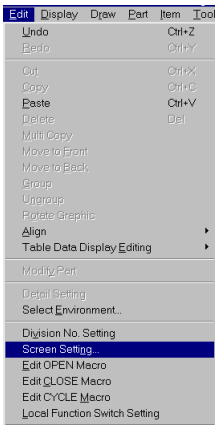


Procedure

1) Creating the screen title • P13-3
   The [Draw] menu is used.
2) Registering a graphic as a pattern • P13-3
   A graphic is registered in pattern editing.
3) Registering the graphic in the graphic library • P13-5
   The [Graphic LIB Edit] window is used.
4) Setting up parameters • P13-6
   The parameters of the graphic in the graphic library is set up.
5) Setting up graphic relay mode • P13-10
   The [Graphic Relay] dialog is used.

Operation

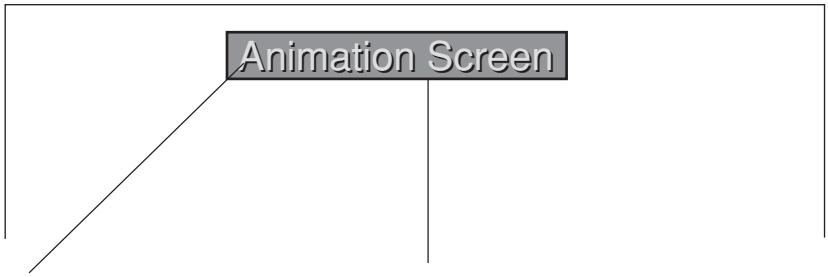
Screen Color and Title Setting



1. Select [Screen Setting] from the [Edit] menu. Set up as shown below.

F (foreground)	Black
T (tile)	No. 1 (extreme left)

2. Create the following screen title using the [Draw] menu.



Text "Animation Screen"

Foreground: Yellow	Enlarge X:2
Background: Black	Enlarge Y:2
Rotate: Normal	Italic:☐ unchecked
Direction: RGT	◉Shadow

Box

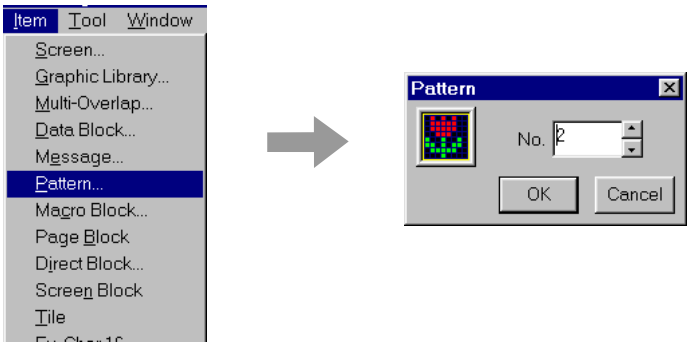
Foreground: Red	☑Paint: checked
Background: Black	☑Frame: checked

Frame color: Blue
Tile: No. 1 (extreme left)
Line Type: Thick line (No. 2 from the left)

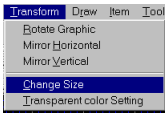
Graphic Registration as a Pattern

Create the following graphic to be moved on the animation screen.
Pattern editing of bit map data is useful to create complicated graphics.

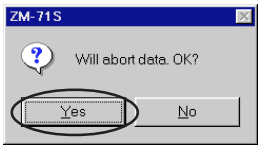
1. Select [Pattern] from the [Item] menu. The [Pattern] dialog is displayed. Choose "2" for [No.] and click [OK].



2. The [Pattern [2] Edit] window appears.
Select [Change Size] from the [Transform] menu.



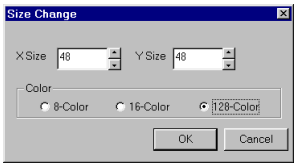
3. The following message appears. Click [Yes].



4. The [Size Change] dialog is displayed. Set up as shown below and click [OK].

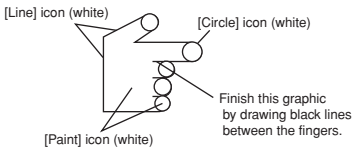
X Size: 48 Y Size: 48

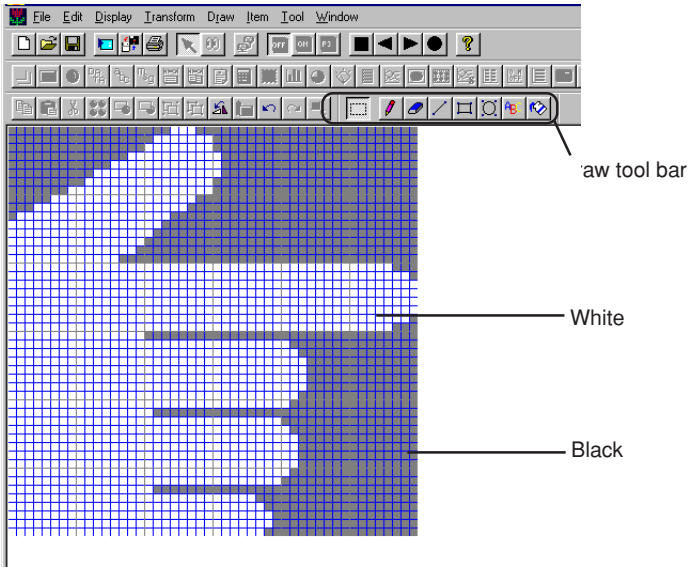
Color: 128-Color



5. Draw the following graphic using the drawing parts tool bar.

<How to draw this graphic:>





The back color in pattern editing is black as default.
A graphic created in pattern editing is thus shown on the screen with the black back color.
If the above graphic is placed on a light blue screen, it appears like this.
It is recommended that the back color in pattern editing be determined in advance as compared with the screen color.

For ZM-70

A background color of a pattern is usually "Black" unless any changes are not made to the background. The background color will remain when you place the pattern on the screen.

The above pattern is placed on the screen whose background color is cyan...

<-- The pattern is displayed as left.

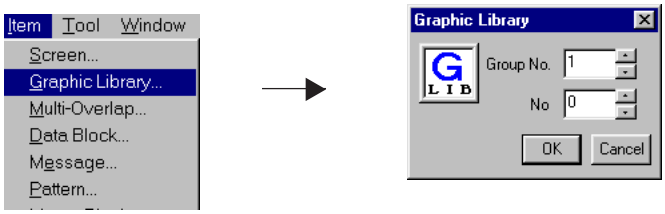
It is convenience to set the background color of the pattern first so that it matches with the color of the screen.

6. Close the [Pattern [2] Edit] window, and go back to the [Screen Edit] window.

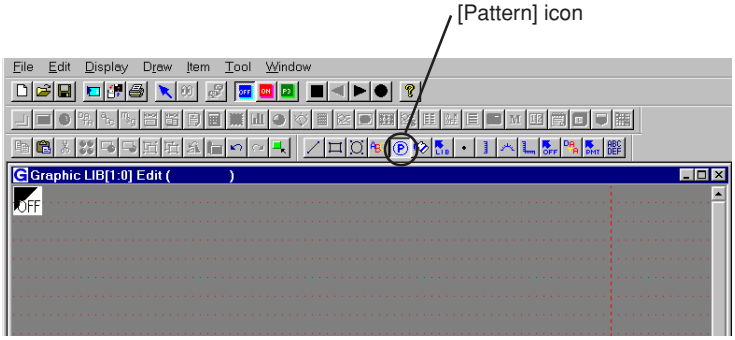
Graphic Registration in Graphic Library

Graphics must be registered in the graphic library before calling them up for display. The above graphic has been registered in pattern editing, but also must be registered in the graphic library.

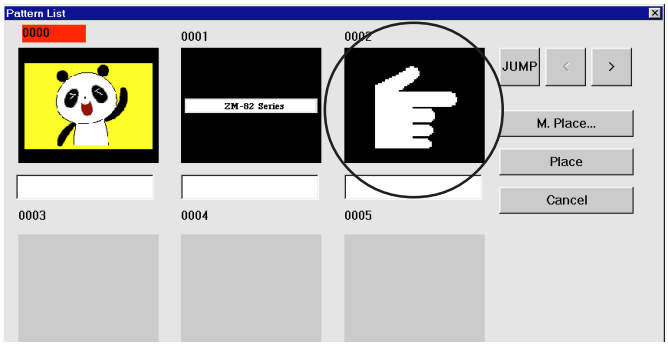
1. Select [Graphic Library] from the [Item] menu. The [Graphic Library] dialog is displayed. Choose "1" for [Group No.] and "0" for [No.].



2. The [Graphic LIB [1:0] Edit] window is displayed.
The graphic is registered in this window.
Click the [Pattern] icon in the draw tool bar.



3. The [Pattern List] window is displayed.
Select No. 2 and click [Place].



4. The cross cursor is displayed in the window. Drag the cursor in the following position and click the mouse.

Parameter Setting

When animating graphics registered in the graphic library, provide them with parameters.

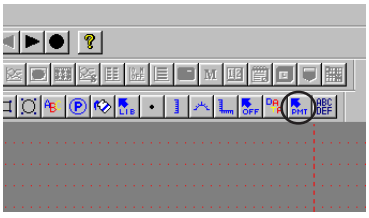
Keyword

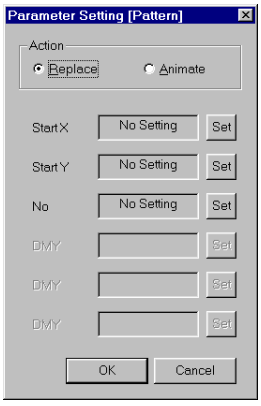
Parameter

When animating or transforming graphics or texts on the screen, it is necessary to secure memory for these purposes. These settings are made by parameters.
Set up parameters in graphic library editing.

1. Select the graphic (handles are shown) in the [Graphic LIB [1:0] Edit] window.

2. Click the [Parameter] icon in the draw tool bar. The [Parameter Setting [Pattern]] dialog is displayed.





3. Choose [Animate] for [Action].

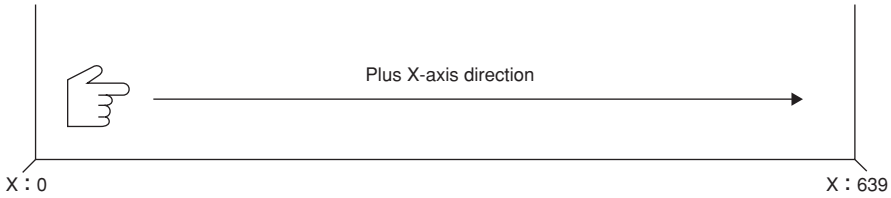
About [Animate] and [Replace]

When [Replace] is chosen, the graphic moves in the following manner.

When [Animate] is chosen, the graphic moves in the following manner. The previous graphic is cleared.

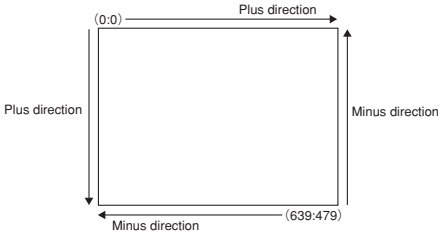
4. Set the graphic to move it in the X-axis direction.

When the graphic is moved to the right on the X axis, it is moved in the plus direction.



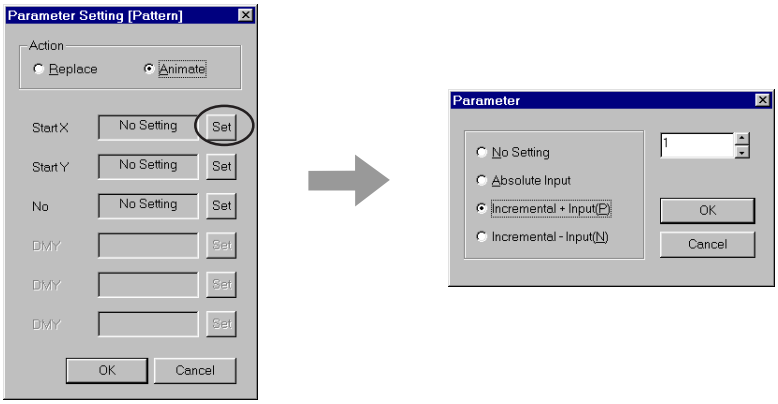
About the plus and minus directions

On the Control Terminal screen, the X-axis starts from the upper left corner of the screen to the right, and the Y axis starts from the same corner to the bottom. The coordinates of the starting point are [0,0], and the coordinates of the end point in the lower right corner are [639, 479].



When either axis is moved in the plus direction, its coordinate is increased.
When it is moved in the minus direction, its coordinate is decreased.

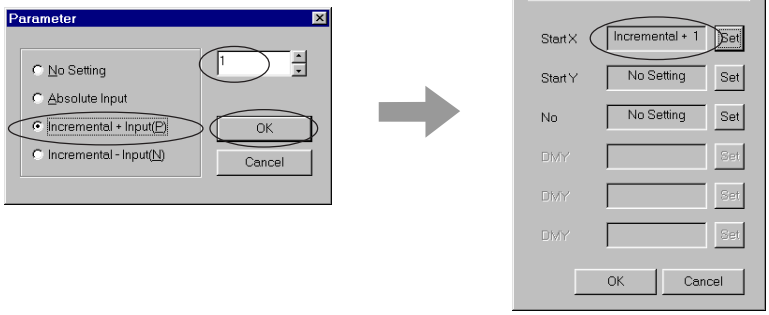
Click [Set] for [Start X]. The [Parameter] dialog is displayed.



About [Absolute Input] and [Incremental Input]

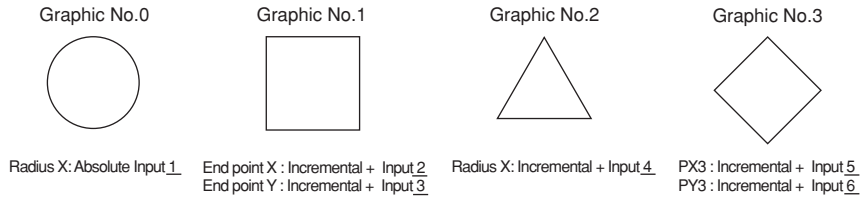
When [Absolute Input] is chosen, position inputs are expressed by the distances on the X and Y axes from the upper left corner (0, 0) of the screen.
When [Incremental Input] is chosen, position inputs are expressed by the distance on the X and Y axes from the reference position (0, 0) of the graphic.

5. Choose [Incremental + Input (P)]. The entry box becomes active. Enter "1", and click [OK]. "Incremental + 1" is now entered for [Start X] in the [Parameter Setting [Pattern]] dialog.



About parameter numbers

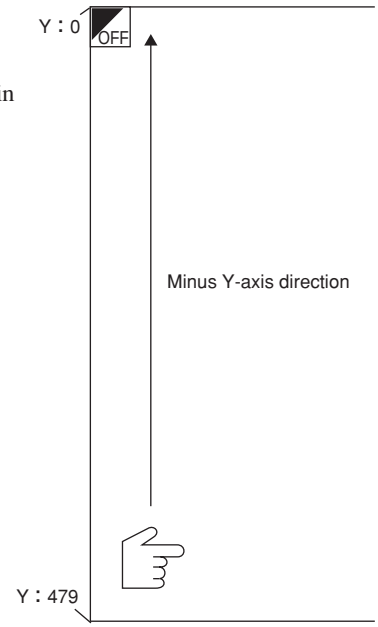
When displaying a graphic on the screen, memory for display must be secured. Memory for animation/transformation (parameter memory) also must be secured, but is allocated following the memory for display. By specifying a number in the [Parameter] dialog, the ordinal number for allocating memory for animation/transformation is determined.
Refer to the following example.



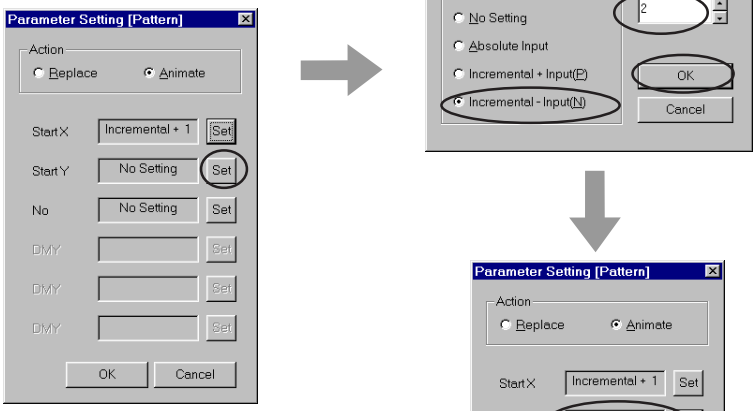
In the graphic relay mode, memory is allocated to the above graphics in the sequence as shown in the table.

Memory	Contents
n	Memory for display
n+1	For parameter1 (graphic No. 0)
n+2	For parameter2 (graphic No. 1)
n+3	For parameter3 (graphic No. 1)
n+4	For parameter4 (graphic No. 2)
n+5	For parameter5 (graphic No. 3)
n+6	For parameter6 (graphic No. 3)

6. Set the graphic to move it in the Y-axis direction.
When the graphic is moved up, it is moved in the minus direction.



Click [Set] for [Start Y]. The [Parameter] dialog is displayed.
Choose [Incremental - Input (N)]. The entry box is becomes active. Enter "2", and click [OK].



7. "Incremental - 2" is now entered for [Start Y] in the [Parameter Setting [Pattern]] dialog. Click [OK].

8. Close the [Graphic LIB [1:0] Edit] window. The [Screen Edit] window appears.

The above step completes parameter setting for the graphic in the graphic library edit window.

Graphic Relay Mode Setting

When animating or transforming the graphics registered in the graphic library, set up relay or graphic mode in screen editing.
In this example, choose the graphic relay mode to display graphics by bit activation.

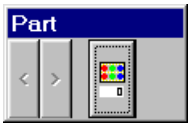
1. Click the [Graphic Relay Mode] icon in the tool bar.

2. The [Graphic Relay] dialog is displayed. Set up as shown below:

Division No	: 0	
Memory	: D450	
Type	: 1-Graphic	
Start Graphic	GNo: 1	No: 0
No. of Relays	: 1	
Parameter	: 2	
Process Cycle	: Low Speed	

XOR mode must be chosen for the animation function.
If [Type: 2-Graphic] and [Mode: REP] are chosen in the [Graphic Relay] dialog, the graphic cannot be animated normally in the REP mode. When [Type: 1-Graphic] is chosen, the graphic is displayed in the XOR mode, and animation can be normally executed.

3. Click [OK]. The [Graphic Relay] dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen.



ZM-80 Operation Check

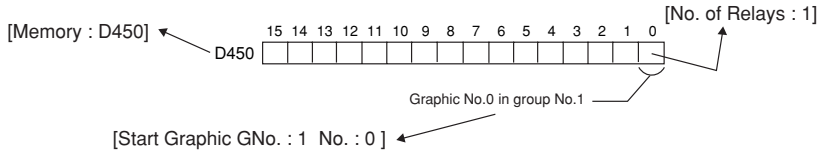
Memory Allocation

Option	Address	Contents	Direction	Set in:
[Memory]	D450	Memory for graphic display	PLC→ZM80	[Graphic Relay] dialog
[Parameter]	D451	Memory for parameter 1 (X coordinate of graphic)		2 addresses (2 words) are secured because "2" is specified for [Parameter].
	D452	Memory for parameter 2 (Y coordinate of graphic)		

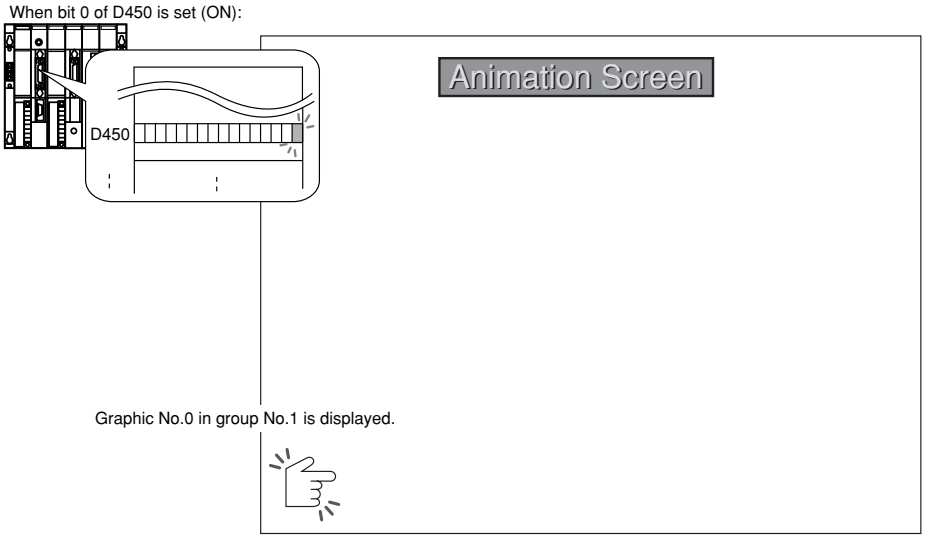
Graphic Display on Screen

Bring up the graphic on the screen.

1. In accordance with the setting of the [Graphic Relay] dialog ("D450" is specified for [Memory], "1" is specified for [No. of Relays], and "1" and "0" are specified for [Start Graphic GNo.] and [No.] respectively), bit 0 of address D450 is allocated to graphic No. 0 in group No. 1.

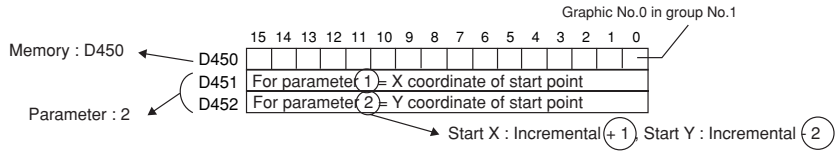


2. By setting bit 0 of address D450, the graphic is displayed in the left corner of the screen. By resetting the bit, the graphic is deleted.

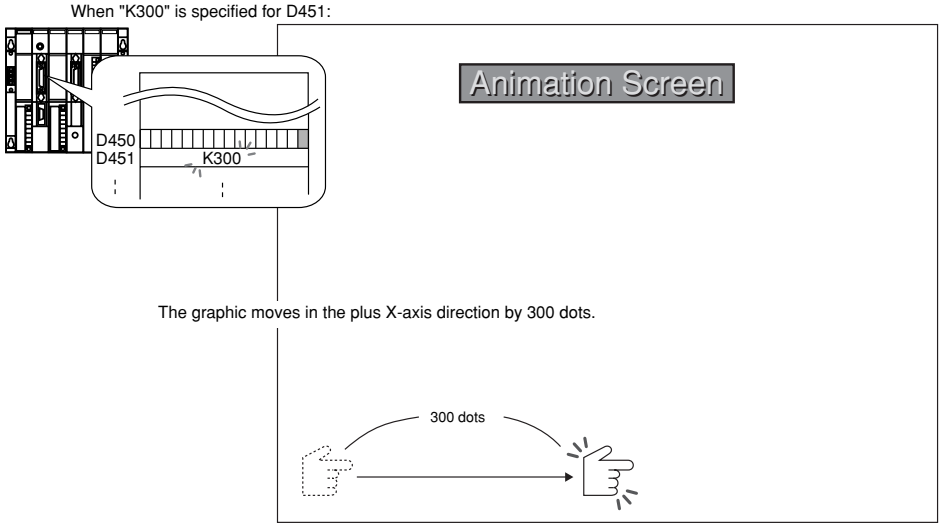


Graphic Movement in the X-axis Direction

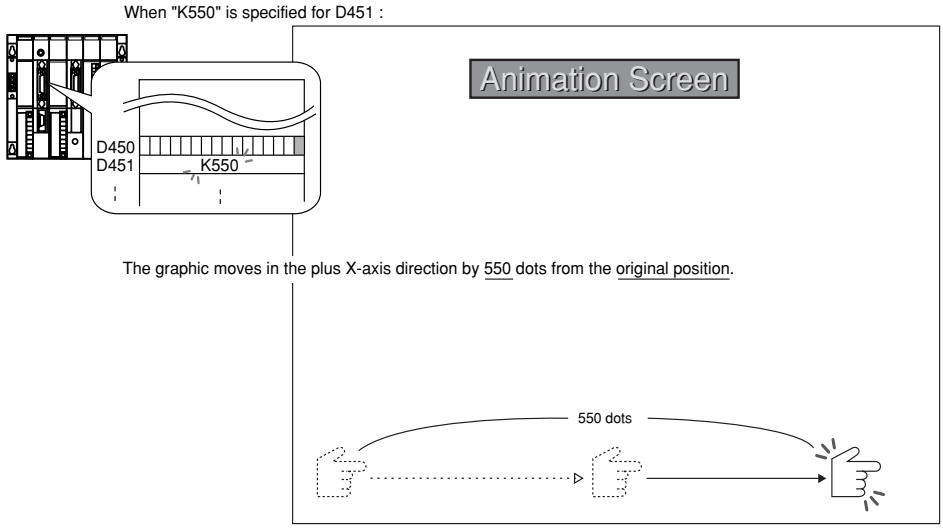
3. In the [Parameter] dialog, "1" and "2" are specified for [Start X] and [Start Y] respectively. In the [Graphic Relay] dialog, "D450" is specified for [Memory]. The X and Y axes are thus provided with D451 and D452 respectively.



4. Set bit 0 of D450.
By specifying "K300" for D451, the graphic is moved in the X-axis direction by 300 dots.

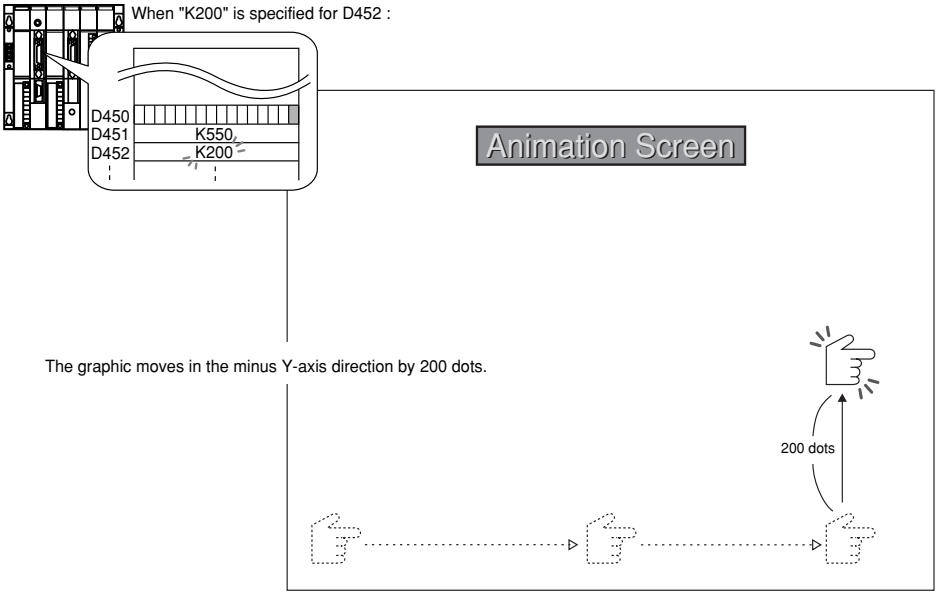


5. By specifying "K550" for D451, the graphic is moved to the extreme right (500 dots from the original position).

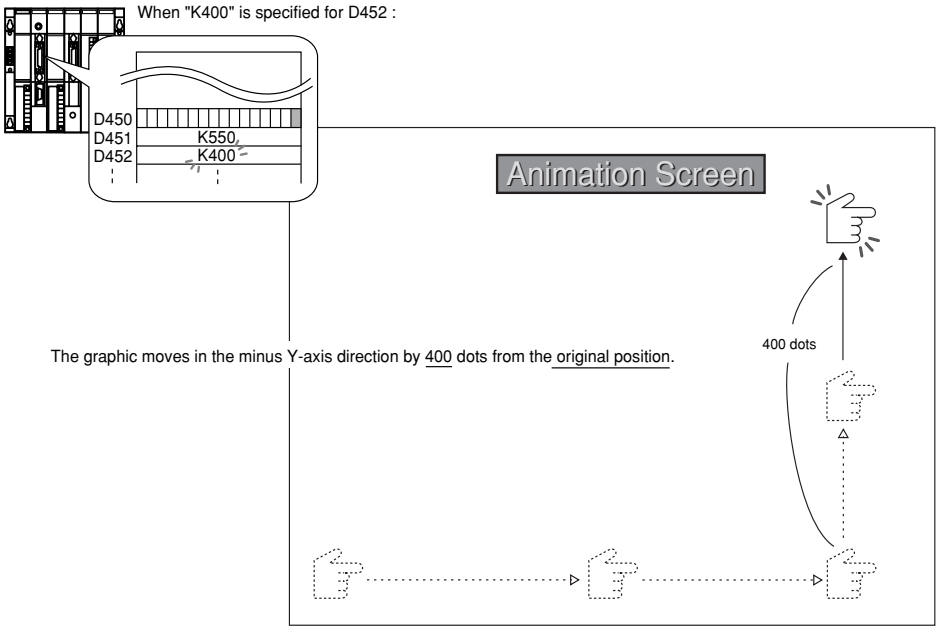


Graphic Movement in the Y-axis Direction

6. Specify "K200" for D452.
"Incremental -" is specified for [Start Y] in the [Parameter Setting [Pattern]] dialog. The graphic is thus moved in the minus Y-axis direction by 200 dots.

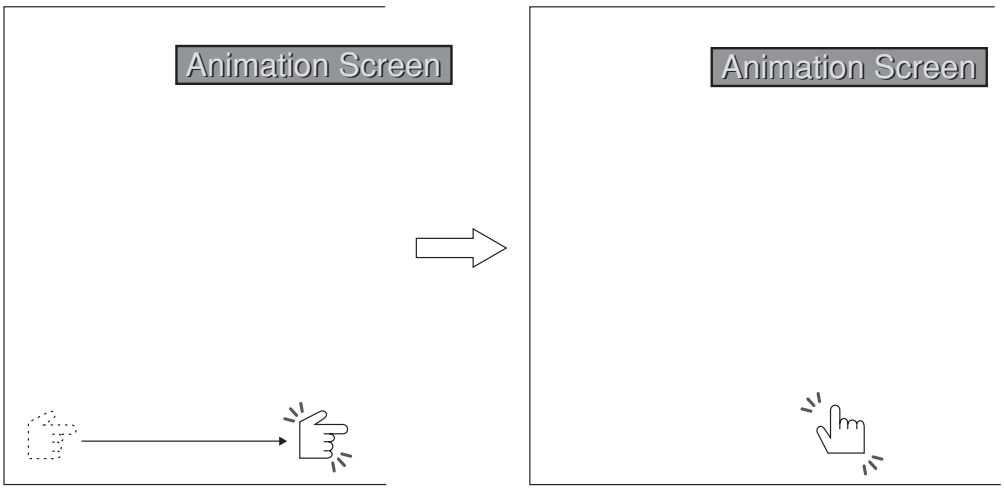


7. By specifying "K400" for D452, the graphic is moved in the minus Y-axis direction by 400 dots from the original position.



Graphic Change

Graphics can be replaced with different graphics.

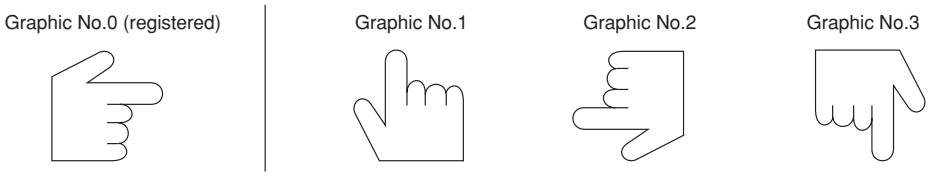


Procedure

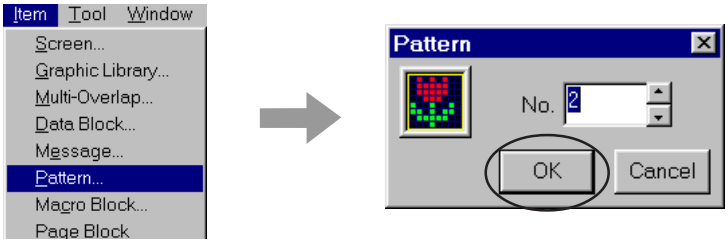
Operation

Additional Graphic Registration

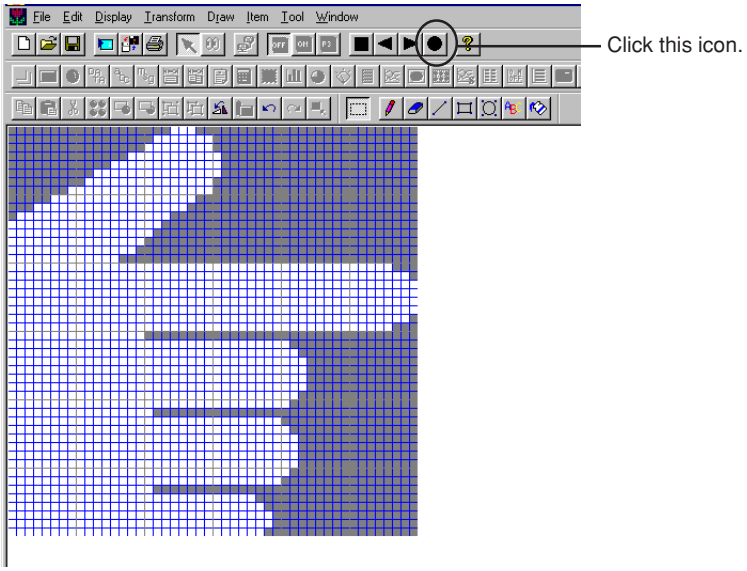
Register the following three additional graphics.



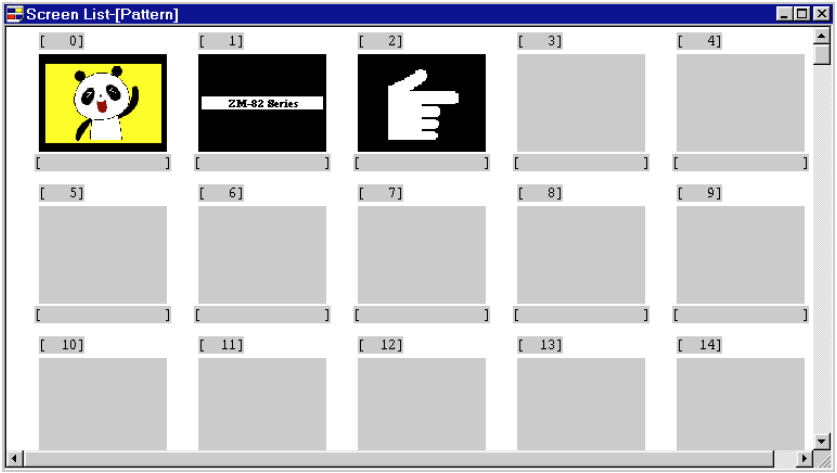
1. Select [Pattern] from the [Item] menu. The [Pattern] dialog is displayed. Choose "2" for [No.] and click [OK].



2. The [Pattern [2] Edit] window appears.
The registered graphic is shown in the window. Click the [Screen List] icon.

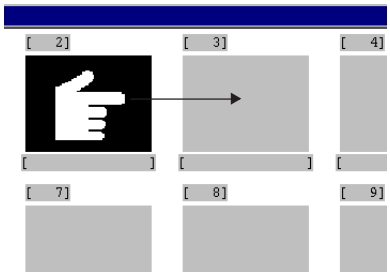


3. The [Screen List - [Pattern] window is displayed.
Graphic No.0 to No. 2 are registered.

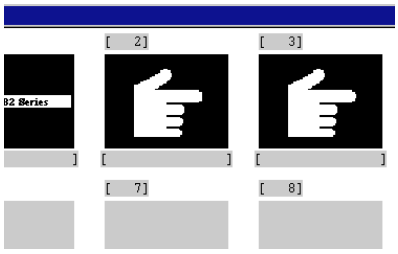


4. Drag graphic No. 2 to area Nos. 3, 4, and 5. It is copied to each area.

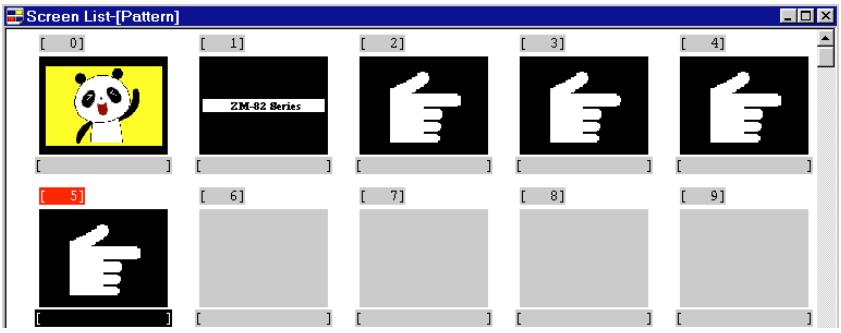
Click graphic No. 2 and drag it to area No. 3.



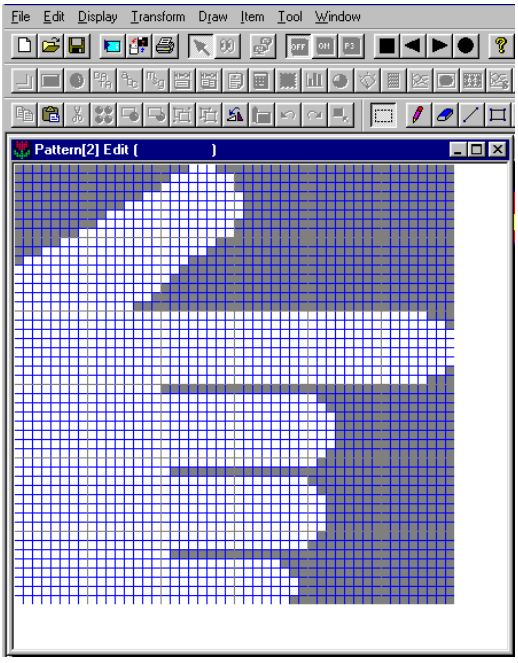
The copy appears in area No. 3.



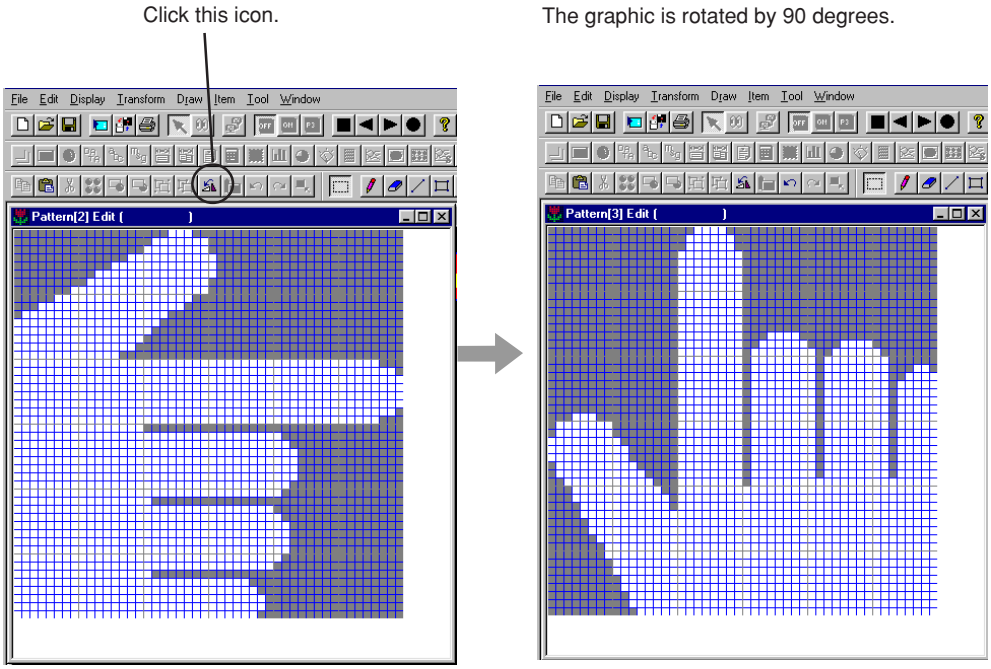
Copy the graphic to area No. 4 and 5 in the same manner.



5. Close the [Screen List - [Pattern]] window and go back to the [Pattern [2] Edit] window. Click the [Next] icon. The [Pattern [3] Edit] window is displayed.

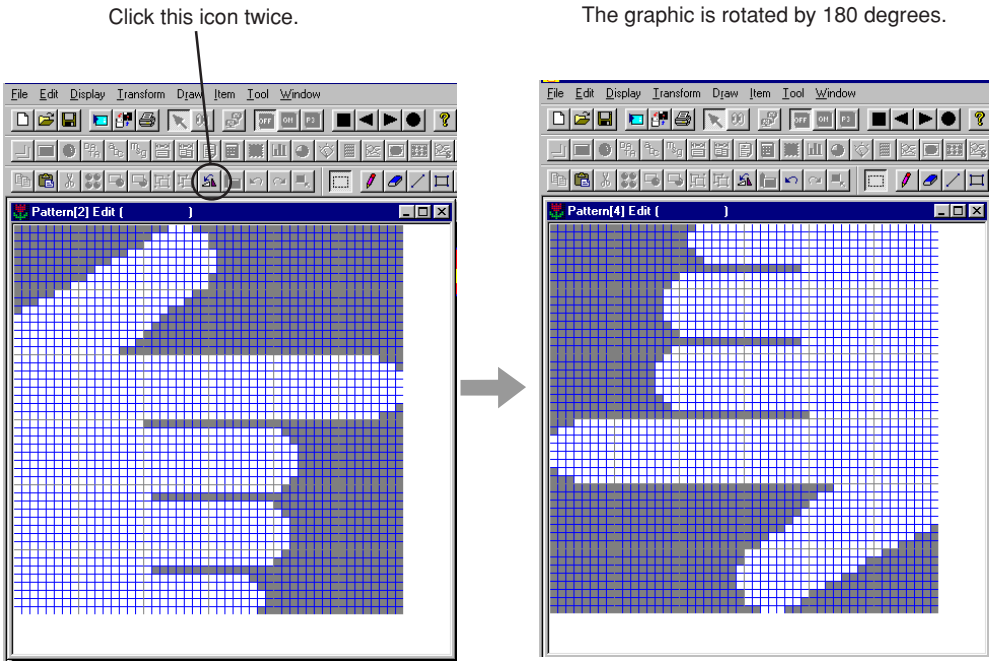


6. Click the [Rotate Graphic] icon. Graphic No. 3 is rotated by 90 degrees.



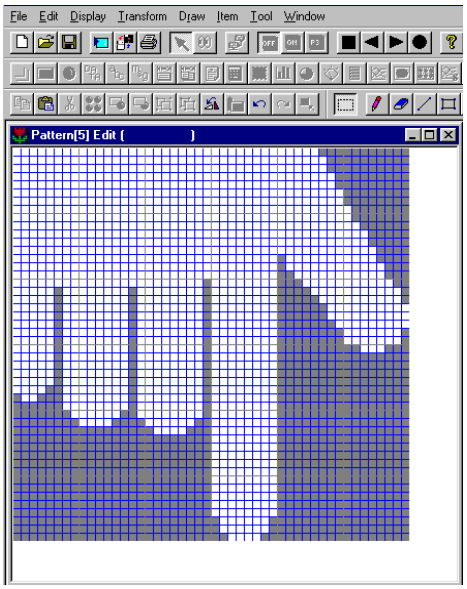
7. Click the [Next] icon. The [Pattern [4] Edit] window is displayed.

8. Click the [Rotate Graphic] icon twice. The graphic is rotated by 180 degrees.



9. Click the [Next] icon. The [Pattern [5] Edit] window is displayed.
Click the [Rotate Graphic] icon three times. The graphic is rotated by 270 degrees.

Click this icon three times. The graphic is rotated by 270 degrees.

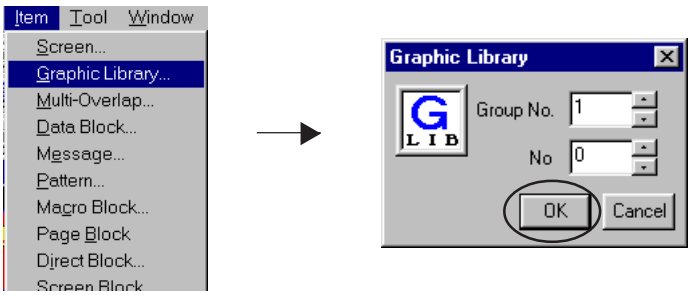


10. Close the [Pattern [3] Edit] window and go back to the [Screen Edit] window.

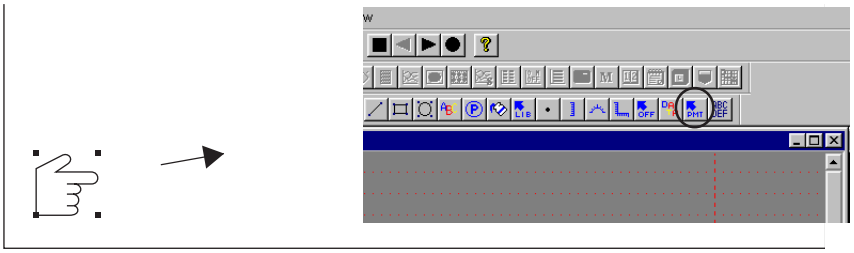
Additional Parameters Setting

Set up additional parameters for graphic change.

1. Select [Graphic Library] from the [Item] menu.
The [Graphic Library] dialog is displayed. Choose "1" and "0" for [Group No.] and [No.] respectively. Click [OK].

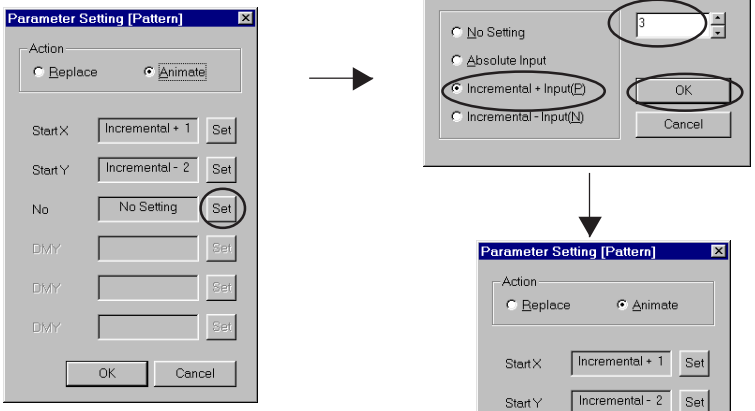


2. The graphic registered in the graphic library is displayed. Select the graphic (handles are shown) and click the [Parameter] icon.



3. The [Parameter Setting [Pattern]] dialog containing the set data is displayed.

4. [No.] is the option for the graphic change parameter.
Click [Set] for [No.]. The [Parameter] dialog is displayed.
Choose "Incremental + Input (P)". The entry box becomes active. Enter "3" and click [OK].

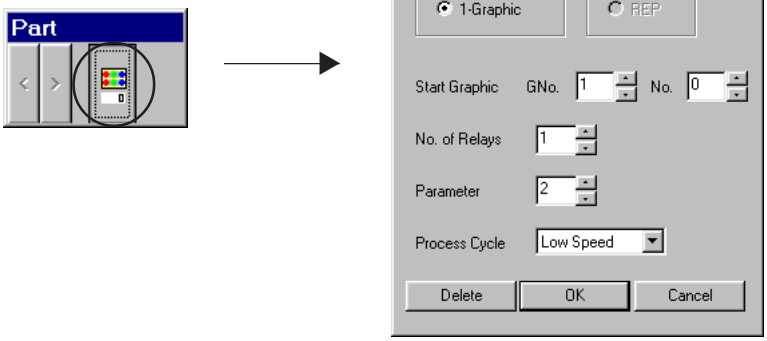


5. "Incremental + 3" is now entered for [No.] in the [Parameter Setting [Pattern]] dialog.

6. The above step completes setting in the graphic library. Close the [Graphic LIB [1:0] Edit] window.

Graphic Relay Mode Modification

1. Click the [Graphic Relay] icon in the [Part] auxiliary tool box in the left corner of the [Screen Edit] window. The [Graphic Relay] dialog is displayed.



2. "2" is specified for [Parameter]. Correct it to "3" and click [OK].
Memory addresses D451 to D453 (3 words) are secured.

The above step completes the setting for the animation screen. Save the created screen and transfer the data to V6.

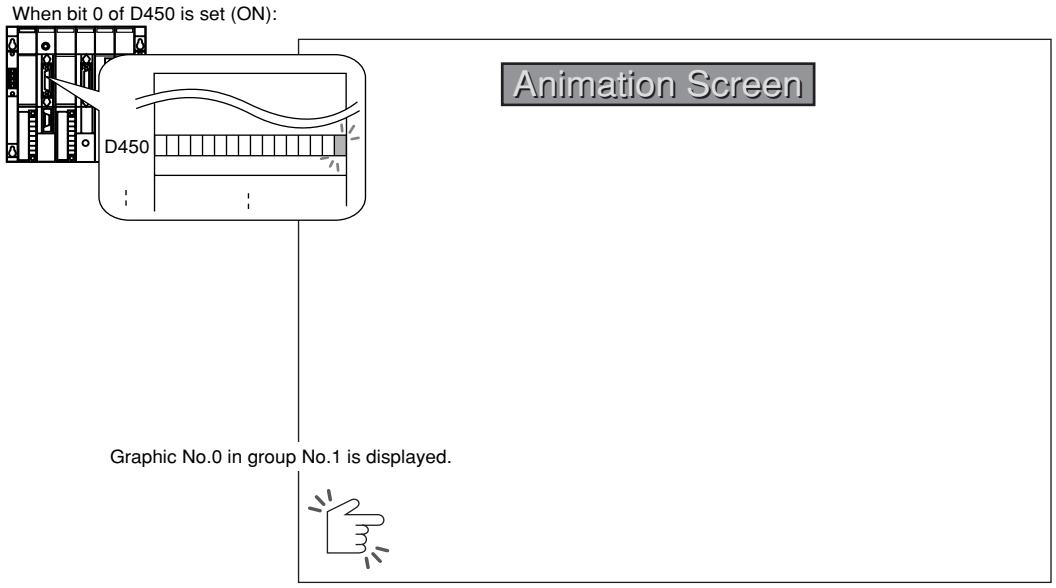
ZM-80 Operation Check

Memory Allocation

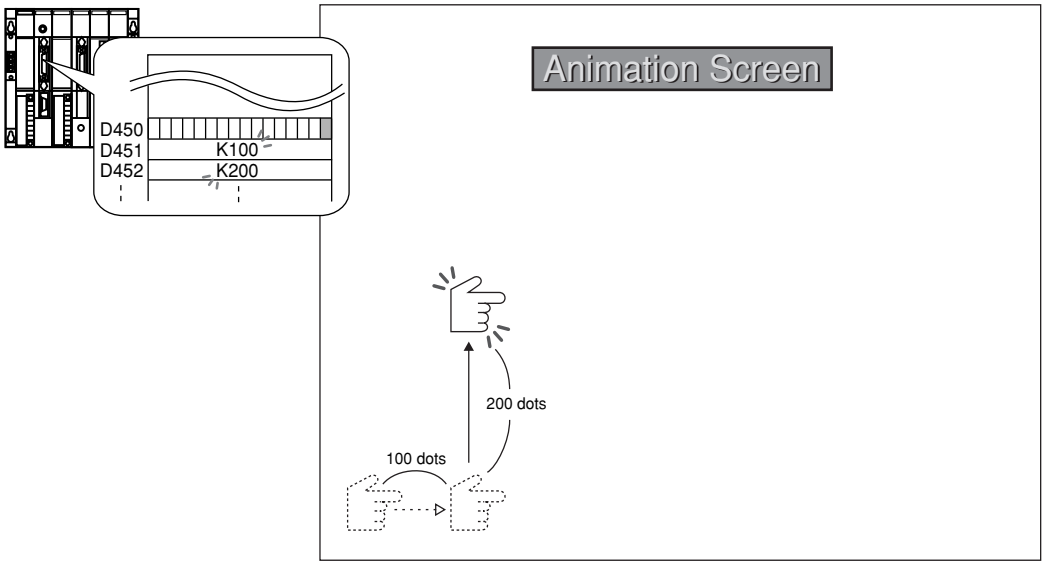
Option	Address	Contents	Direction	Set in:
[Memory]	D450	Memory for graphic display	PLC→V6	[Graphic Relay] dialog
[Parameter]	D451	Memory for parameter 1 (X coordinate of graphic)		3 addresses (3 words) are secured because "3" is specified for [Parameter].
	D452	Memory for parameter 2 (Y coordinate of graphic)		
	D453	Memory for parameter 3 (graphic number)		

Graphic Change on Screen

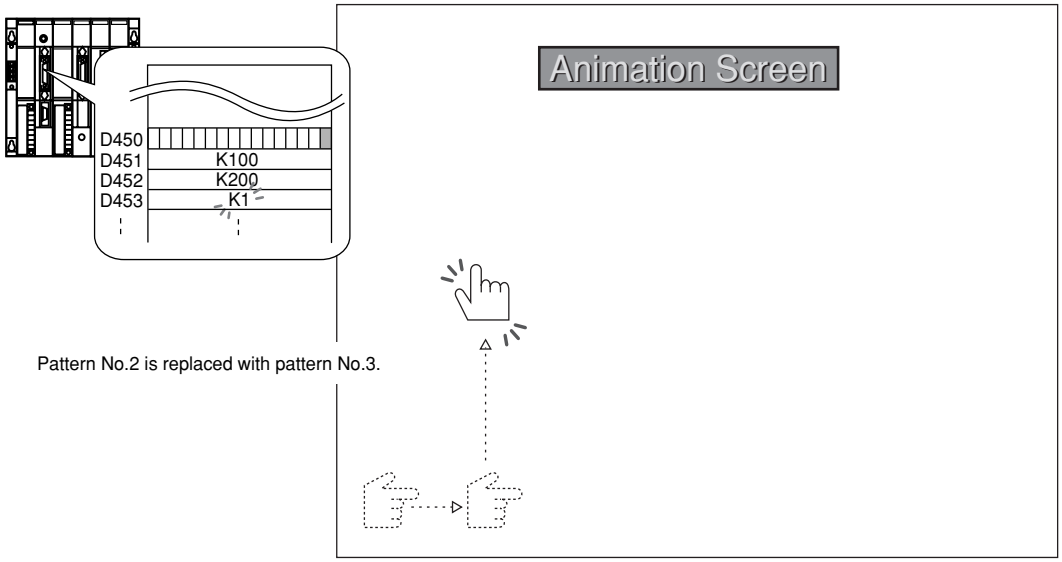
1. Bring up the registered graphic.
Set bit 0 (ON) of D450 (D450 = H0001).



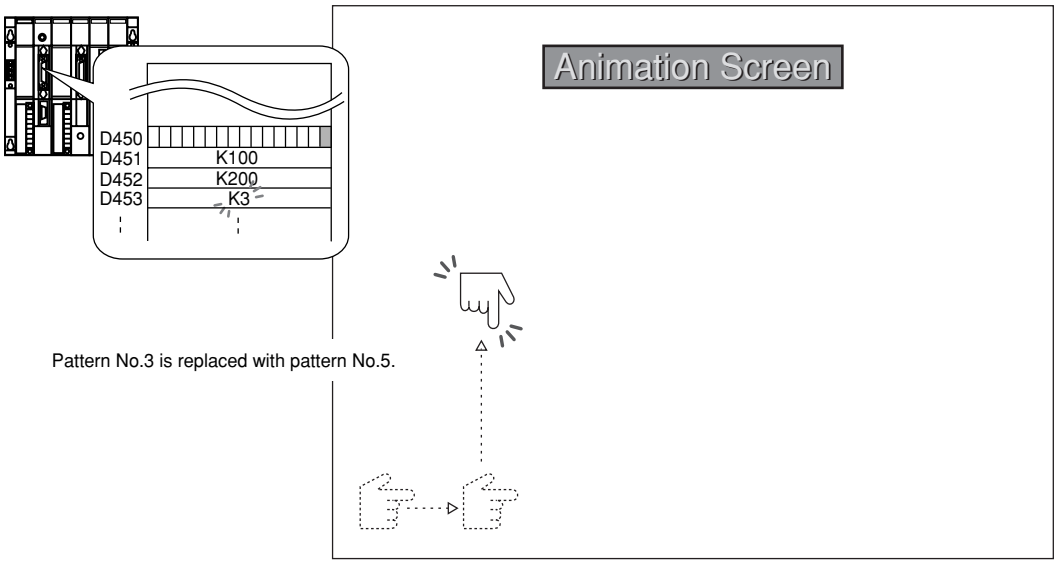
2. Move the graphic.
Specify "K100" for D451 and "K200" for D452. The graphic is moved in the plus X-axis direction by 100 dots, and in the minus Y-axis direction by 200 dots.



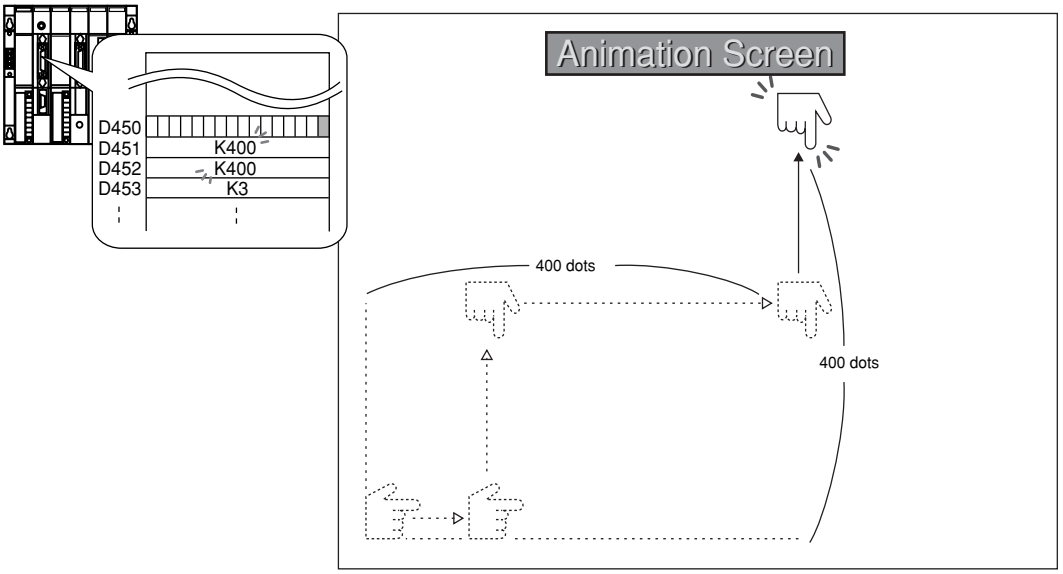
3. Change the graphic. Specify "K1" for D453. Pattern No. 3 is displayed in place of pattern No. 2.



4. Specify "K3" for D453. Pattern No. 5 is displayed in place of pattern No. 3.



5. The graphic called up for change can be moved by changing the data of D451 or D452.



14 Calendar Display

With the calendar function, the ZM-80 screen displays "year, month, day, hour, minute, second, and day of the week".

When using PLC with calendar function to display the calendar:

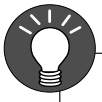
(1) ZM-80 automatically reads PLC's calendar data to display it on the screen. ZM-80 then corrects the calendar display by reading the PLC's data every 15 minutes.

(2) For the 15 minutes, ZM-80 displays the calendar using the inner clock.

(3) When ZM-80 must read PLC's calendar data forcibly to update the ZM-80 calendar after correction of PLC's calendar data, set bit 11 (ON) of the read area memory address "n".

If calendar data is forcibly read by setting this bit during constant sampling, timing may be shifted, disturbing the process. If this bit is set during sampling, we recommend resetting.

Calendar data can be corrected from PLC as mentioned above and also by the macro function of ZM-80. The procedures of calendar correction by the macro function and of calendar part modification are explained in this chapter.



When using PLC without calendar function to display the calendar:

(1)Select [System Setting] from the [Item] menu and click [Comm. Parameter]. Specify the memory to display the calendar in the [Comm. Parameter] dialog.
(2)Use ZM-80's CPU clock.
(3)This type of calendar causes a slight error in time because there is no PLC calendar to provide ZM-80 with the initial calendar data and allow it to check the time every 15 minutes. It is thus recommended that the data for the calendar memory be adjusted from time to time by setting bit 11 of the read area memory address "n". If this bit is set (ON) in conjunction with constant sampling, it is recommended that the sampling be reset as mentioned above.

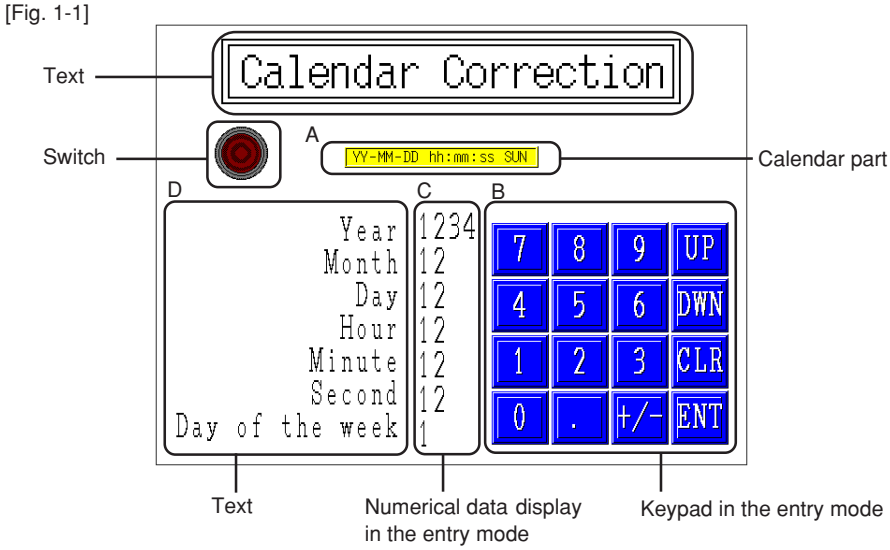
Examples

Operation

Calendar Data Correction by Macro

If calendar data has become different from the actual time, correct the data by setting the entry mode and by editing the macro.
PLC with calendar function is used in this example.
Create the following screen.

[Fig. 1-1]



Bring up a new screen for creating the above calendar screen.
Check silver-color (extreme right]) for [Back Color] in the [Screen Setting] dialog.
([Edit] menu -> [Screen Setting])
Create the screen title "Calendar Correction" and set up properties as shown below:

• Text "Calendar Correction"

Foreground	Slate blue (No. 3 from the right)
Background	Camel (No. 2 from the right)
Rotate	Normal
Direction	RGT

Enlarge X	3
Enlarge Y	3
Italic	☐ unchecked
Shadow	

• Inner painted box

Foreground	White
Background	Camel (No. 2 from the right)
Frame color	Mahogany (No. 6 from the right)
Tile	No. 0
Line type	Thick line

Paint	☑ checked
Frame	☑ checked

• Outer box

Foreground	Mahogany (No. 6 from the right)
Line type	Thick line

Calendar Part Setting

Set up the calendar part in Fig. 1-1.

(1) Click the [Calendar Display] icon. The [Calendar] dialog is displayed.

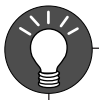
(2) Select the part and place it on the screen. (Refer to "(A)" in Fig. 1-1.)

Part selection No. 49 in file (Parts_e.v6p)
Do not check the (Save Setting) box.

(Main) tab window

Division No.	0

Do not set data in the (Year), (Month), (Day), (Hour), (Minute), (Second), (Week), and (Day-of-Week Message Setting) tab windows.



[Save Setting]
Clicking [Parts Select] in the [Calendar] dialog brings up the [Calendar List]. It is recommended that [Save Setting] be unchecked.

If calendar part No. 4 is selected from the file [Parts_e.z7p] while part No. 1 has been placed:

YY-MM-DD

YY-MM-DD hh:mm:ss SUN

<[Save Setting] is checked:>
Calendar part No. 4 is placed but the part No. 1 dialog data is still saved.

YY MM DD hh:mm:ss SUN

<[Save Setting] is unchecked:>
Calendar part No. 4 is placed and its dialog data is set up while the part No. 1 dialog data is cleared.

YY-MM-DD hh:mm:ss SUN

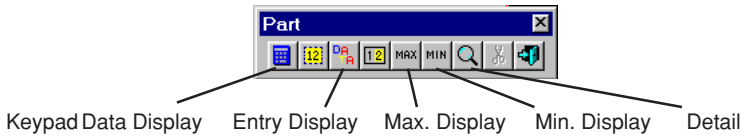
Calendar parts show calendar data (year, month, day, hour, minute, second, day of the week) in various ways with characters of "-", ":", etc. If a new calendar part is placed while the old part data is saved, the format of the new part may be altered. It will not be easy to correct such an altered format using the [Modify Part] window, etc. (refer to page 14-12). Thus, do not check the [Save Setting] box when placing the new calendar part. The part can be placed in the correct format.

* When placing other parts, such as switch parts, it is recommended that the [Save Setting] box be checked again.

Entry Mode Setting

The keypad is required to correct calendar data. Set up the entry mode for the key pad.

(1) Click the [Entry Mode] icon. The entry mode parts tool bar is displayed.
Clicking the [Entry Mode] icon brings up the message "Cannot register in this division. Register in [1]?". Click [Yes].



(2) Place a keypad on the screen. (Refer to "(B)" in Fig. 1-1.)
Click the [Keypad] icon in the entry mode parts tool bar.
[Keypad List] is displayed. Click [Parts File] and select "Parts_e.v6p". Select keypad No. 16 and place it on the screen.

(3) Set up the numerical data display part for "Year". (Refer to "(C)" in Fig. 1-1.)
Click the [Data Display] icon in the entry mode parts tool bar. Click [Numerical Data]. The [Num. Display] dialog is displayed. Set up as shown below and place it in the designated position.

• (Num. Display) dialog
Part selection No. 0 (Not Transparent) in file (Parts_e.z7p)
(Check the (☑Save Setting) box and select the part.)

(Main) tab window

Division No.	0
Memory	$u0001

(Type) tab window

Display Function	Entry Target
Order	0
Digits	4
Decimal Point	0
Display Type	DEC (w/o sign)
Input Type	DEC
Data Length	1-Word
Zero suppress	☑ checked
Flush R	☑ checked

(Char. Prop) tab window

Char. Type	Bold
Transparent	☐ unchecked
Italic	☐ unchecked
Char. Size	1-Byte
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X: 2 Y: 2
Foreground	Navy (No. 7 from the right)
Background	Silver-color (extreme right)

(Detail) tab window

Use Operation		☐ unchecked
Alarm		☑ checked
Max.		2100
Max. Color	Foreground	Blue
	Background	Black
Min.		1998
Min. Color	Foreground	Red
	Background	Black

(4) While the placed numerical display part is selected (handles are shown), select [Multi Copy] from the [Edit] menu. The [Multi Copy] dialog is displayed. Set up as shown below and click [OK].

• (Multi Copy) dialog

Dot	☑ Checked
Interval	☑ Checked
Direction	①②③ ④⑤⑥
X Distance	0
Y Distance	5
Quantity X	1
Quantity Y	7
Order INC	☑ checked
Memory INC	☑ checked
Num. Data Memory	$u0001
Step	1

(5) Set up the [Num. Display] dialog for the six copy numerical display parts as shown below:

- (Num. Display) dialog for month

(Type) tab window

Digits	2

(Detail) tab window

Alarm	☑checked
Max.	12
Min.	1

- (Num. Display) dialog for day

(Type) tab window

Digits	2

(Detail) tab window

Alarm	☑checked
Max.	31
Min.	1

- (Num. Display) dialog for hour

(Type) tab window

Digits	2

(Detail) tab window

Alarm	☑checked
Max.	23
Min.	0

- (Num. Display) dialog for minute

(Type) tab window

Digits	2

(Detail) tab window

Alarm	☑checked
Max.	59
Min.	0

- (Num. Display) dialog for second

(Type) tab window

Digits	2

(Detail) tab window

Alarm	☑checked
Max.	59
Min.	0

- (Num. Display) dialog for day of the week

(Type) tab window

Digits	1

(Detail) tab window

Alarm	☑checked
Max.	6
Min.	0

(6) Click [Detail] in the entry mode parts tool bar.
The [Entry] dialog is displayed. Set up as shown below:

- (Entry) dialog

(Main) tab window

Division No.	1
Type	Data Display
Command Memory	$u0000
Info. Output Memory	$u16340
Reverse	☑ checked
Target Memory	Direct
Input Item Select	Internal
GD80 Compatible	☐ unchecked

(Detail) tab window

Use Graphic	☐ unchecked
Default to 0	☐ unchecked
Process Cycle	Low Speed

Click (OK). The (Entry) dialog is reduced to an icon and stored in the (Part) auxiliary tool box in the lower left corner of the screen.

(7) Create the texts of "Year", "Month", "Day", "Hour", "Minute", "Second", and "Day of the week" and set up properties as shown below:
(Refer to "D" in Fig. 1-1.)

Foreground	Navy
Enlarge X	2
Enlarge Y	2
Rotate	Normal
Direction	RGT
Transparent	☑ checked
Italic	☐ unchecked
Normal	☑ checked

Create and place the text "Year" on the screen.
Make 6 copies of "Year", and change them to "Month", "Day", "Hour", "Minute", "Second", and "Day of the week" respectively using the (Detail/Prop Change) icon.

Macro Setting

Switch ON macro and screen OPEN macro are used.

••• Switch ON macro •••

Create the switch shown in Fig. 1-1 (page 15-2). Pressing this resets the calendar to the corrected data.

(1) Click the [Switch] icon.

(2) The [Switch] dialog is displayed. Set up as shown below:

• (Switch) dialog

Part selection No. 71 from file (Parts_e.z7p)

(Main) tab window

Division No.	1
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary
Function	No Function

(Character) tab window

(No setting)	

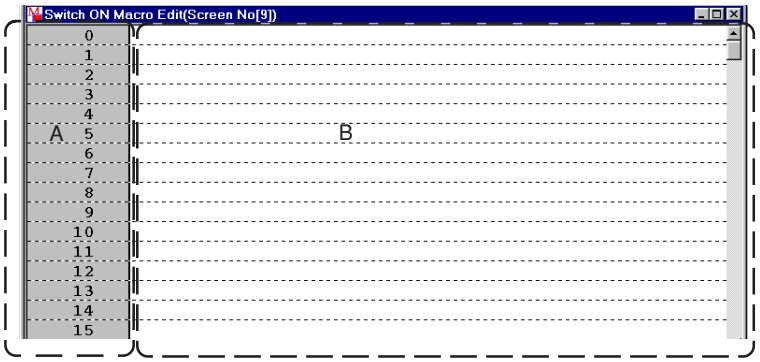
(Detail) tab window

Use ON Macro	☑checked
ON Macro Edit	Refer to step 3 below.
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

Frame ON Color	Gray
ON Color	Red
Frame OFF Color	Gray
OFF Color	Mahogany

(3) Click [ON Macro Edit]. The [Switch ON Macro Edit] window is displayed.

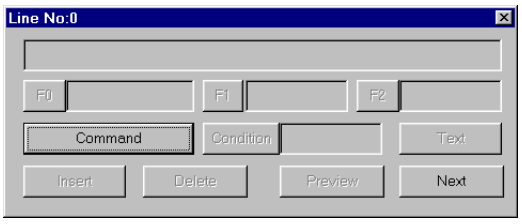


Click either area A or area B depending on purposes.

When executing cutting, copying, or pasting, click area A.

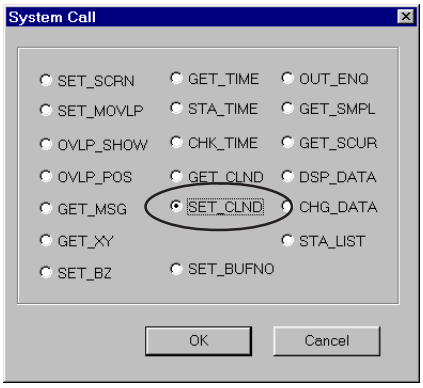
When setting macro commands, click area B.

1) Click area B of line No. 0. The [Line No: 0] dialog is displayed.



2) Set up macro for adjusting the calendar to the corrected data.
Click [Command]. The [Command] dialog is displayed. Choose [SYS] and click [OK]. The [Line No: 0] dialog appears.

3) Click [F0]. The [System Call] dialog is displayed.



Choose [SET_CLND] and click [OK]. The [Line No: 0] dialog appears.

Keyword

SET_CLND

The value in F1 is set for the use of the system calendar. When PLC has the calendar function, its clock data is also set.

F1 memory	
n + 0	Year (4 digits)
n + 1	Month
n + 2	Day
n + 3	Hour
n + 4	Minute
n + 5	Second
n + 6	Day of the week (0 - 6)
n + 7	Station number

0	Sunday
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday

Use for 1 : n (multi-drop)

All data should be binary.

If "SET_CLND" is executed during constant sampling, timing may be shifted, disturbing the process. After execution of this, we recommend resetting of the sampling.

4) Click [F1]. The [Memory Input] dialog is displayed.
Specify "$u0001" and click [OK]. The [Line No: 0] dialog appears.
Seven words are allocated to F1 memory.

5) Click "x" in the upper right corner of the [Line No. 0] dialog.
"SYS (SET_CLND) $u0001" is displayed in line No. 0.

6) Click "x" in the upper right corner of the window. The [Switch ON Macro Edit] window is closed and the [Switch] dialog appears.

(4) Click [Place] and place the switch in the designated position (Fig. 1-1).

••• Screen OPEN macro •••

Keyword

OPEN macro

OPEN macro is executed when the screen is opened.

(1) Select [Edit OPEN Macro] from the [Edit] menu. The [OPEN Macro Edit] window is displayed.

(2) Click line No. 0. Choose [MOV] in the [Command] dialog. With this command, the macro is set for setting bits 14 and 15 of the memory address specified for [Command Memory] in the [Entry] dialog.
"$u0000=C000H (W)" is indicated in line No. 0

Keyword

MOV

Calculation F0 = F1
F1 is moved to F0.
Both F0 and F1 can be located in the PLC memory at the same time.

(3) Click [Next] in the [Line No: 0] dialog. The [Line No: 1] dialog is displayed.

(4) Choose [SYS] in the [Command] dialog and choose [GET_CLND] in the [System Call] dialog. This system call gets the calendar data.
"SYS (GET_CLND) $u0001" is displayed in line No. 1

Keyword

GET_CLND

This system call gets the calendar data.

F1 memory	
n + 0	Year (4 digits)
n + 1	Month
n + 2	Day
n + 3	Hour
n + 4	Minute
n + 5	Second
n + 6	Day of the week

All data should be binary.

(5) Click the "X" button in the upper right corner of the [OPEN Macro Edit] window. The window is closed, and the [Screen Edit] window appears.

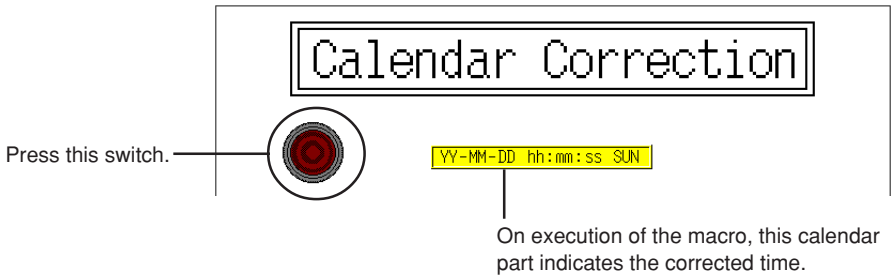
ZM-80 Operation Check

Save the created screen.
While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to ZM-80 and check that ZM-80 operates correctly.

1. Open the "Calendar Correction" screen. The calendar part indicates the calendar data from PLC.

2. Change the day.
Move the cursor to the part of "Day" by pressing the "▼" key on the keypad. In this example, enter "10" for "Day".
Likewise, enter "16" for "Hour", "50" for "Minute", and "10" for "Second".

3. Press the switch for ON macro.



4. The calendar part indicates the hour, minute, and second as entered.

5. Check that the clock memory data of PLC is also changed.
When the MITSUBISHI series A PLC is used, for example:

D9026	H1016 ->	(Day: 10, Hour: 16)
D9027	H5010 ->	(Minute: 50, Second: 10)

Calendar Part Modification

Modify the current calendar part by removing the areas for second and day of the week.

[Calendar] Dialog Modification

(1) Double-click the calendar part. The [Calendar] dialog is displayed.

(2) Click the [Second] tab. In the [Second] tab window, uncheck the [Display] box.

(3) Click the [Week] tab. In the [Week] tab window, uncheck the [Display] box. Click [OK]. The [Calendar] dialog is closed. The following calendar part is shown.

[Modify Part] Window

(1) While the calendar part is selected (handles are shown), click the [Change the setting of a part placed] icon. The [Modify Part] window is displayed.

(2) Select [Item List] from the [Tool] menu. [Item List (Placed Part)] is displayed.

```
Grouping Start    >>>>
      [Box Paint ]:(155,122)-(362,144)
      [Continuous Line ]:(362,122)-(155,144) [3]
      [Continuous Line ]:(155,144)-(362,122) [3]
Grouping End      <<<<
Grouping Start    >>>>
      [Continuous Line ]:(157,142)-(360,124) [3]
      [Continuous Line ]:(360,124)-(157,142) [3]
Grouping End      <<<<
      [Char ]:(182,141) [-]
      [Char ]:(209,141) [-]
      [Char ]:(263,141) [:]
      [Char ]:(290,141) [:]
[  0]:[Calendar ]: (155,122)-(362,144)
```

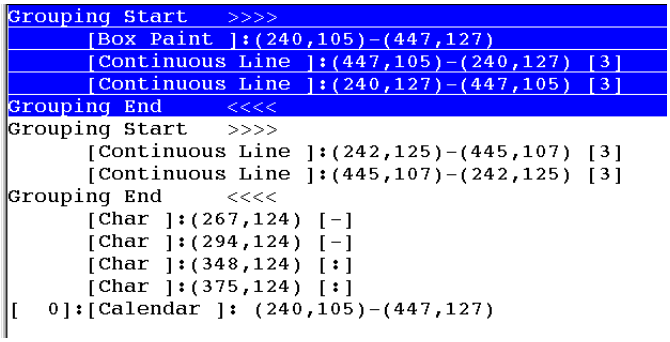
(3) Click and delete the "Char" lines for second, "(", and ")".

When selecting two or more lines at a time, hold down the [CTRL] key and click them.

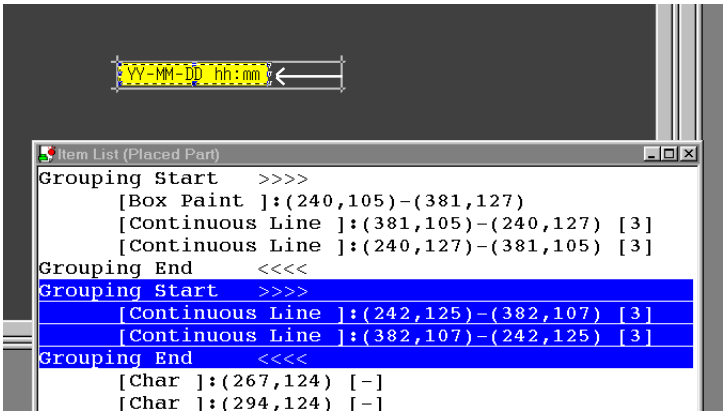
```
Grouping Start    >>>>
      [Box Paint ]:(155,121)-(3
      [Continuous Line ]:(362,1
      [Continuous Line ]:(155,1
Grouping End      <<<<
Grouping Start    >>>>
      [Continuous Line ]:(157,1
      [Continuous Line ]:(360,1
Grouping End      <<<<
      [Char ]:(182,140) [-]
      [Char ]:(209,140) [-]
      [Char ]:(263,140) [:]
      [Char ]:(290,140) [:]
[  0]:[Calendar ]: (155,121)-(3
```

(4) Bring up both [Item List (Placed Part)] and [Modify Part] window.

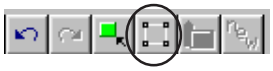
Click [Grouping Start >>>]. All included items are selected.
The calendar part in the [Modify Part] window is also selected.
Reduce the calendar display part by dragging the handle of the part in the X-axis direction.



(5) Click the next [Grouping Start >>>>]. Reduce the calendar part in the same manner.



(6) Click the [Frame Auto Fit] icon. The frame is snapped to the calendar part.

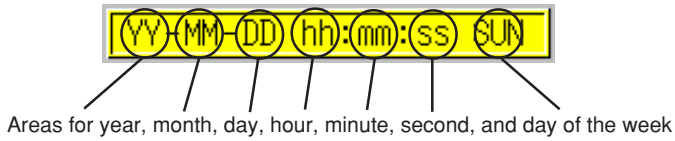


(7) Click "X" in [Item List (Placed Part)]. The list is closed.

(8) Click "X" in the [Modify Part] window. The [Screen Edit] window appears.

Notes on calendar part modification

1. When adding or removing an area for year, month, day, hour, minute, second, or day of the week of the calendar part, use the [Calendar] dialog. The [Modify Part] window is not valid for adding or removing areas because the [Calendar] dialog cannot be opened.



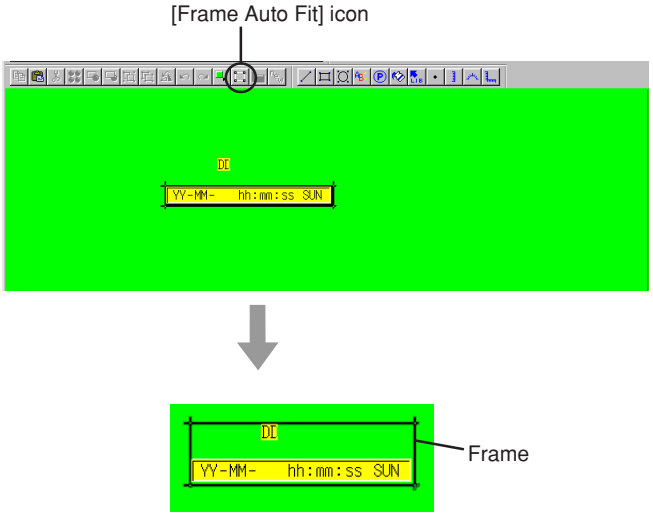
2. Calendar display part characters (":", "/", etc.) or frame can be modified in the [Modify Part] window.

3. In [Item List (Placed Part)], the calendar part areas for year, month, day, hour, minute, second, and day of the week are displayed as one item. When selecting each area, click the desired one on the screen.

4. When enlarging/reducing an area of the calendar part, click the area and drag a handle.

5. When aligning the characters or areas of the calendar part, display grids on the screen (select [Display Environment] from the [Display] menu. Open the [Grid] tab window and check [Grid Dsp.]. Choose "1-Byte" for [Grid Type].) Click the desired character/area and move manually.

6. If an area of the calendar part is placed outside the frame in the [Modify Part] window, the area may not be selected. In such a case, place the frame again by clicking the [Frame Auto Fit] icon, and select the area.



Option

Using Memory Cards as External Storage Media for a PLC

(The Memory Manager Function)

The memory card mode can be used when an optional built-in memory card or external memory card unit is attached to a ZM-80.

Use Sharp's SRAM cards, REC-MCARD (256 KB, 512 KB, 1 MB, 2 MB, and 4 MB are available).

For ZM-70

The followings are avairable:
256Kbyte
512Kbyte
1 Mbyte

Memory card mode has two major functions: the memory manager function and the data logging function.

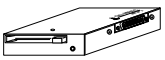
With the memory manager function, memory cards can be used as external storage media for the PLC.

Keyword

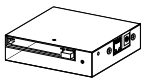
Memory Manager Function

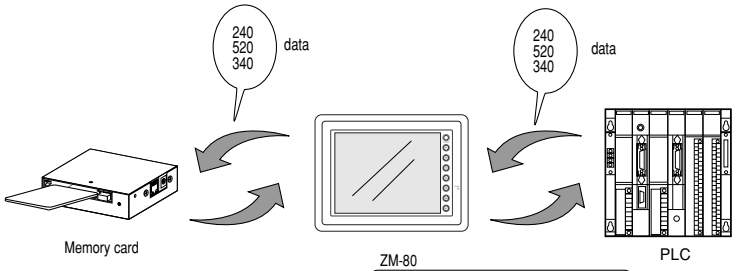
Memory cards can be used as external storage media for a PLC, and data can be read or written.
Since memory cards can store a great amount of data, it is not necessary to allocate memory in the PLC for storage purposes.

External Memory Card
With a ZM-70
(Recorder)



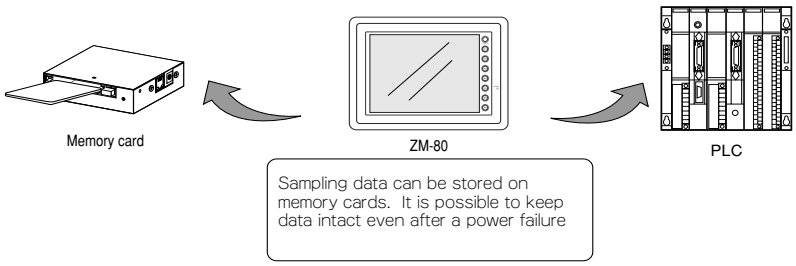
With a ZM-80
(Card recorder)





Data Logging Function

Sampling data can be stored on memory cards. Thus, in the event of a power failure, data on memory cards can be kept intact.



The memory manager function is used in this example:

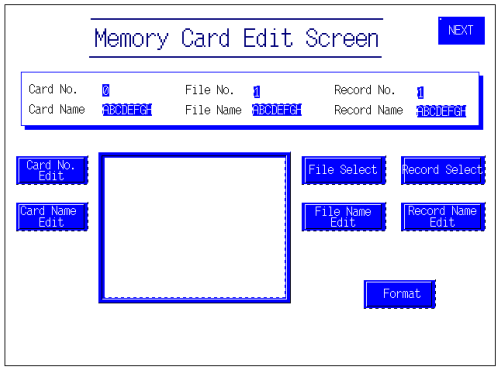
To set up the memory manager function, the following two settings are required.

1. [Memory Card Setting]
   This setting is required to partition the area on the memory card into files and to set up data for the files.
2. [Memory Card Mode]
   This setting is required to format memory cards, and to edit and transfer data.

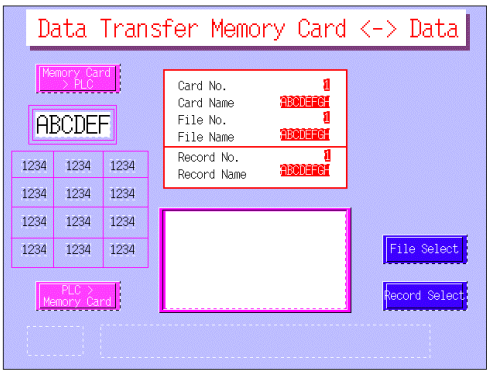
Create the following two screens:

Screen I	For memory card formatting, and for editing of the names of cards, files, and records.
Screen II	For data transfer between memory cards and the PLC

[Screen- I]



[Screen-II]



Procedure

1) Partitioning the area on the memory card into files and setting up the files
   [System Setting] -> [Memory Card Setting] • • • • • • • • • • • • • • • P Option-3
2) Creating the memory card format screen (Screen I)
   [Memory Card Mode] -> [Detail] ([Memory Card] dialog) [Format Switch]
   • P Option-6
3) Creating the edit screen for memory card names and numbers, file names, and record names (Screen I)
   [Memory Card Mode] -> [Detail] ([Memory Card] dialog) [Display Area]
   [Memory Card Memory Card Name] [Memory Card File Name], etc.
   • P Option-9
4) Creating the screen for data transfer between a V6 and a PLC (Screen II)
   [Memory Card Mode] -> [Detail] ([Memory Card] dialog) [Memory Card File No.] [Memory Card Record No.] [Data Transfer PLC > V6], etc.
   • P Opition-19
5) Creating an error indicator lamp and error message display part (Screen I)
   [Message Mode], etc. • P Option-26

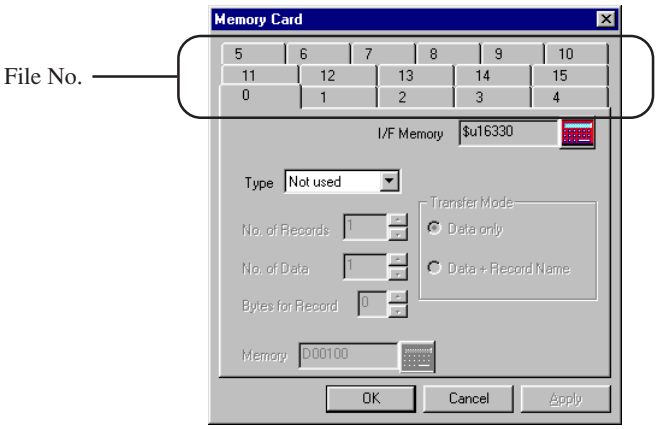
Operation

Memory Card Setting

When memory cards are used, set up the [Memory Card] dialog. The area on the memory card is partitioned, and either the memory manager function or the data logging function is chosen for each file from the options in this dialog.

[Memory Card] Dialog Setting

Select [System Setting] from the [Item] menu and click [Memory Card Setting]. The [Memory Card] dialog is displayed.



A memory card can be partitioned into a maximum of 16 files, and one file can be partitioned into a maximum of 4095 records.
Set up file Nos. 0 and 1 as in the following example.

1. Set up file No. 0.
Memory card status is written from the V6 to the PLC. Six memory words starting from the top address specified for [I/F Memory] are used for storage.
Specify "D600" in this example.
For the data to be written, refer to page Option-30.

2. Specify types of files for partitioning the memory card.
Choose from the following three settings for [Type].

[Not used]	Files are not used.
[Data File]	This is the file type for the memory manager function.
[Buffering File]	This is the file type for the data logging function.

Choose [Data File].

3. Specify the number of records to partition file No. 0 for [No. of Records].
(Setting range: 1 to 4095)
Specify "3".

For ZM-70

Setting range is 1 to 1024.

4. Specify the number of words to be recorded for [No. of Data].
(Setting range: 1 to 1024)
Specify "12".

5. Specify the maximum number of characters for [Bytes for Record] for giving names to records. (Setting range: 0 to 32)
Specify "6".

6. When transferring data between the ZM-80 and the PLC, choose whether only data or data plus record names will be transferred for [Transfer Mode].
Choose "Data + Record Name".

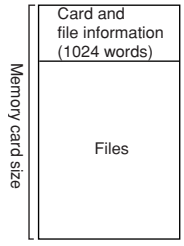
7. When transferring data from the ZM-80 to the PLC, specify the top memory address for [Memory] for storing data in the PLC memory.
Specify "D610".

8. The above step completes the [Memory Card] dialog setting for file No. 0. Next, open the [1] tab window for file No. 1. Set the options as shown below:

(File No.1)

Type	Data file
No. of records	2
No. of data	10
Bytes for record	8
Transfer mode	Data only
Memory	D630

9. Click [OK]. This step completes [Memory Card] dialog setting for file No. 1.



Calculation of File Size on a Memory Card

The first 1024 words on the memory card are used for card and file information. The 1025th word and after are used for files.

File size can be calculated by the following equation:

Calculation of file size (Unit: word)
File size = (bytes of record name / 2 + data) x record

Calculating the size of file No. 0:
(6 / 2+12) x 3 = 45 45 words
Calculating the size of file No. 1:
(8 / 2+10) x2 = 28 28 words

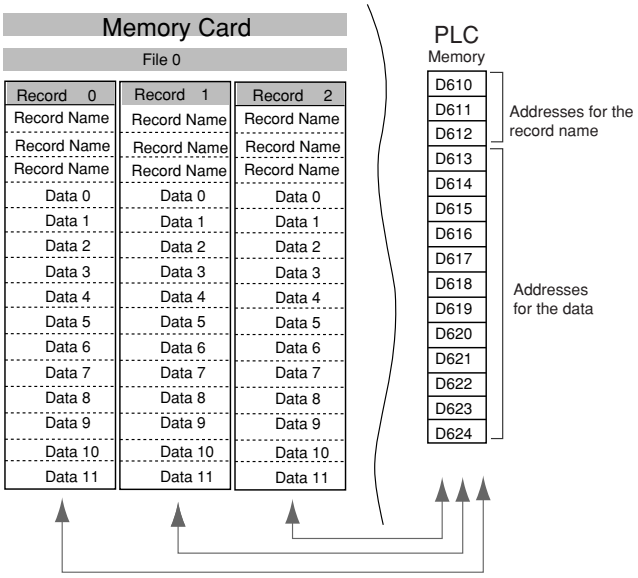
Thus 1097 words have been used on the memory card.
1024+45+28=1097

Relationship between File No. 0, 1 & PLC memory

The relationship between file Nos. 0 and 1 and the PLC memory is illustrated below:

[Memory Card] dialog setting for file No. 0

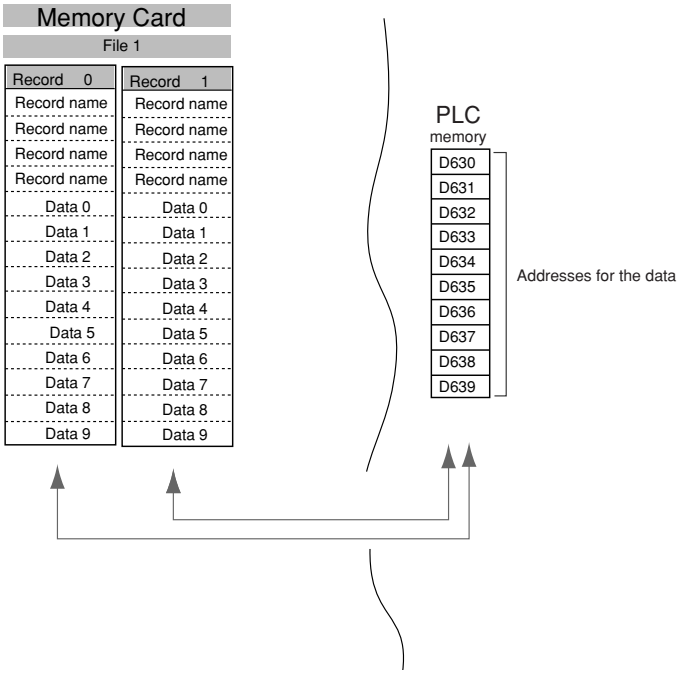
Type	Data File
No. of Records	3
No. of Data	12
Bytes for Record	6
Transfer Mode	Data + Record Name
Memory	D610



[Memory Card] dialog setting for file No. 1

Type	Data File
No. of Records	2
No. of Data	10
Bytes for Record	8
Transfer Mode	Data only
Memory	D630

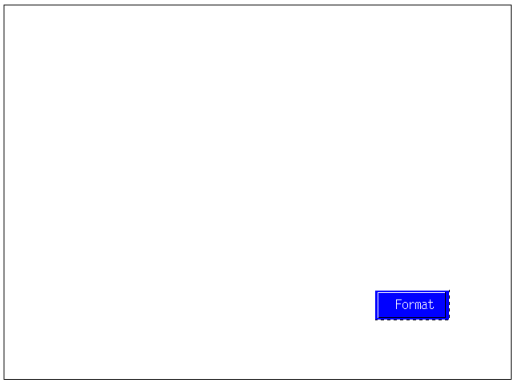
* Although (Bytes for Record) was set up, "Data only" was chosen for (Transfer Mode) in the example above. In such a case, record names are not stored in the PLC memory specified as (Memory); however, they are stored on the memory card.



Creation of the Memory Card Format Screen

When using a new memory card, it must be initialized (formatted) as set in the [Memory Card] dialog. Formatting is executed by pressing the format switch as shown in the following figure. Create this screen by opening the [Screen [10] Edit] window.

[Screen 1]

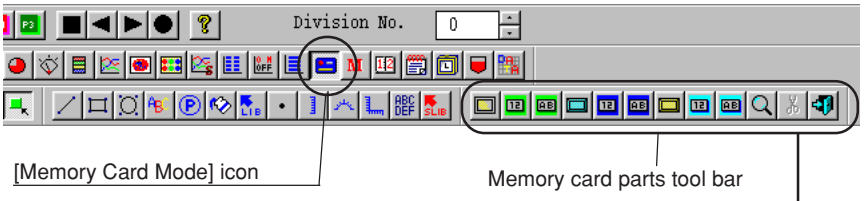


When creating a memory card format switch, click the [Format Switch] and [Detail] icons from the memory card parts tool bar, and set their respective dialog boxes.

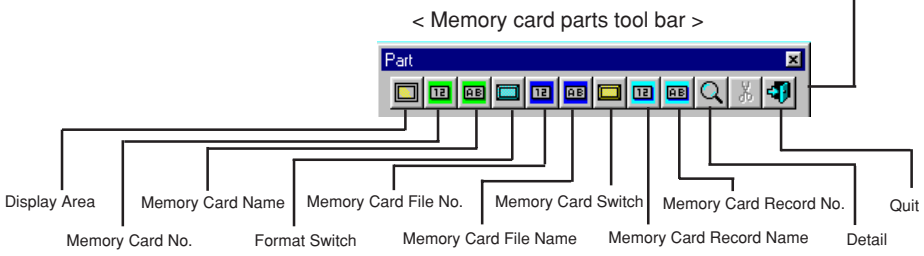
Selection of Memory Card Mode

1. Open the [Screen [10] Edit] window. Click silver-color (extreme right) for [F] (foreground) in the [Screen Setting] dialog. (Select [Screen Setting] from the [Edit] menu.)

2. Click the [Memory Card Mode] icon from the tool bar. The memory card parts tool bar is displayed.



3. Drag the memory card parts tool bar downward until all icons come into view. The following icons are included:



Setting of the Format Switch

1. Click the [Format Switch] icon from the memory card parts tool bar.

The [Switch] dialog is displayed.
"Card Format" has been specified for [Function] in the dialog.

2. Set the tab windows as shown below:

Part selection No. 9 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Card Format

(Character) tab window

No. 0	"Format" *

(Char. Prop.) dialog

Char. Type	Normal
Foreground	White
☑ Transparent	checked

☐ Italic	☐ unchecked
Rotate	Normal
Direction	RGT
Enlargement	X : 1 Y : 1

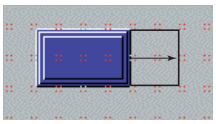
(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

ON color	Green
OFF color	Red

* Place the switch on the screen and enlarge it by two grids in the X direction. Bring up the [Switch] dialog again.

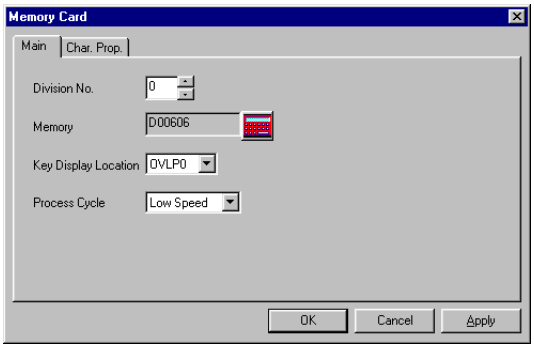


For the position of the switch on the screen, refer to [Screen I] on the previous page.

[Detail] Settings for a Memory Card

For formatting a memory card, click the [Detail] icon and specify a division number equivalent to the division number set for the editing layer (the base is used in this example) for the format switch.

1. Click the [Detail] icon from the memory card parts tool bar. The [Memory Card] dialog is displayed.



2. Set up the tab windows as shown below:

(Main) tab window

Division No.	0
Memory	D606
Key display location	OVLP0
Process Cycle	Low Speed

(Char. Prop) tab window

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked
Enlarge	X :2 Y : 2
Foreground	White
Background	Black

1) When editing or transferring data stored on the memory card between the ZM-80 and the PLC, the memory address specified for [Memory] is used for controlling the process.
Three words from the top address are used. For more information, refer to page Option-37.

2) When editing memory card names and numbers, file names, and record names, choose where to place the entry keys for [Key Display Location]. Choose one from "OVLP0" (overlap 0), "OVLP1", "OVLP2", and "BASE".

Choose "OVLP0" in this example.

3) Set up [Enlarge] in the [Char. Prop] tab window so as to double the sizes of file names and record names to be displayed in the display area. Specify "2" for [X] and [Y].

4) Click [OK].
The [Memory Card] dialog is then reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen. At the same time, the [Overlap (Multi)] dialog is displayed.

For ZM-70
Specify "$u4060" for [Memory] for the ZM-70.

Overlap No.	0
Item Select	☐ unchecked
Command	Internal
Memory	$u16340

Click [OK].

The [Overlap (Multi)] dialog is also reduced to an icon and stored next to the [Memory Card] dialog icon in the [Part] auxiliary tool box.

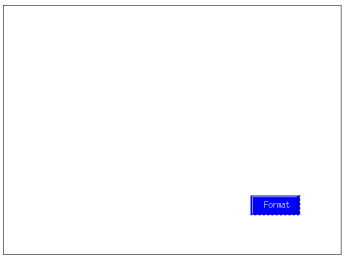
For the procedure for multi-overlap editing, refer to page Option-14.

The memory card format screen has been set.

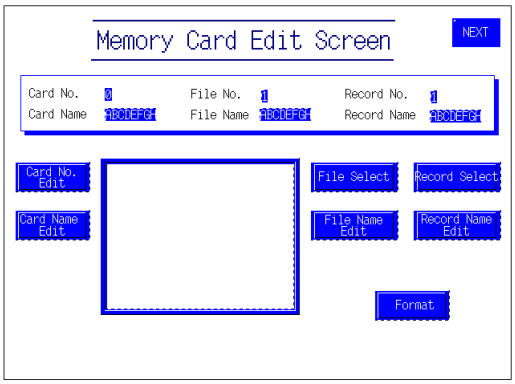
Creation of the Edit Screen for Memory Card Names and Numbers, File Names, and Record Names

Create an edit screen on Screen I. Memory card names and numbers, file names, and record names can be edited on the ZM-80.

[Screen I]



[Screen I-1]

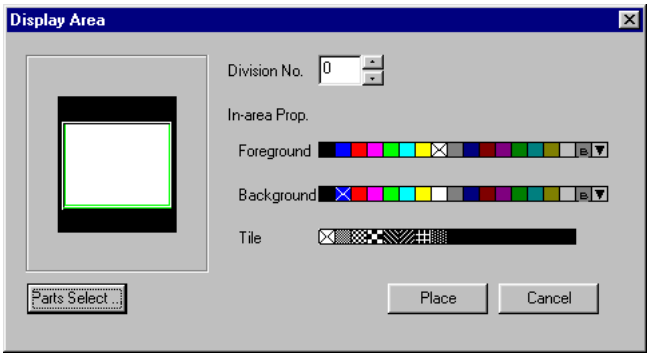


Setting of the Display Area

Set up the area to display the names and numbers of files and records.

1. Click [Display Area] from the memory card parts tool bar.
The [Display Area] dialog is displayed.

2. Set the dialog as shown below and set the area as shown in the above [Screen I-1].



Part selection No. 12 in file (Parts_e.z7p)

Division No.	0
In-area Prop.	
Foreground	White
Tile	No.0 (extreme left)

Setting of the Card Name & No. Display Parts

Setting of the Card Name and Number Display Parts

1. Click the [Memory Card Card No.] icon from the memory card parts tool bar. The [Num. Display] dialog is displayed.

2. Set the dialog as shown below:

• (Memory Card Card No.)

Part selection No. 1 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Memory Card No.
Digits	1
Decimal Point	0
Display Type	DEC (w/o sign)
Zero Suppress	☑ checked
	Flush R

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked

Italic	☐ unchecked
Char. Size	1-Byte
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X : 1 Y : 1
Foreground	White
Background	Blue

(Detail) tab window

Process Cycle	High Speed

Place the part as shown below.

Memory card number

3. Click the [Memory Card Memory Card Name] icon from the memory card parts tool bar. The [Char. Display] dialog is displayed.

4. Set the dialog as shown below:

• (Memory Card Memory Card Name)

Part selection No. 0 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Memory Card Name
Bytes	8 *
Flush L	

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked

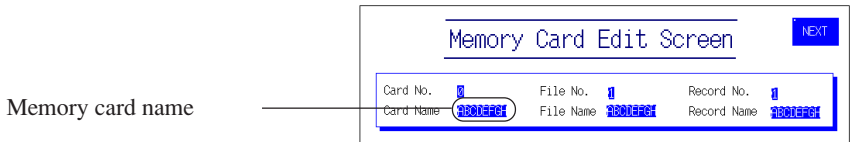
Italic	☐ unchecked
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X:1 Y: 1
Foreground	White
Background	Blue

(Detail) tab window

Process Cycle	High Speed

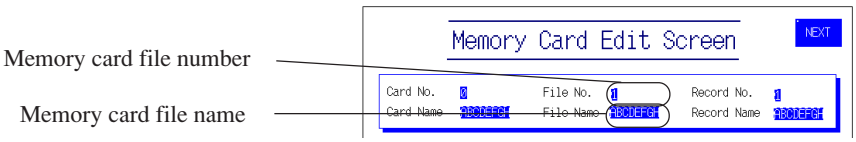
* [Bytes] can be specified in the range of 0 to 32. A memory card name within the specified number of bytes can be displayed in the part.

Place the display part as shown below.



Setting of the File Name & No. Display Parts

Set up the file name and number display parts to check the file name and number of the selected memory card.



1. Click the [Memory Card File No.] icon from the memory card parts tool bar. The [Num. Display] dialog is displayed.

2. Set the options in the tab windows in the same manner as those for the memory card number display part, except for the following:

- (Memory Card File No.)

(Type) tab window

Display Function	Memory Card File No.

Place the display part as shown above.

3. Click the [Memory Card File Name] icon from the memory card parts tool bar. The [Char. Display] dialog is displayed.

4. Set the options in the tab windows in the same manner as those for the memory card name display part, except for the following:

- (Memory Card File Name)

(Type) tab window

Display Function	Memory Card File Name

Place the display part as shown above.

Setting of the Record Name & No. Display Parts

Set up the record name and number display parts to check the record name and number of the selected memory card.

1. Click the [Memory Card Record No.] icon from the memory card parts tool bar. The [Num. Display] dialog is displayed.

2. Set the options in the tab windows in the same manner as those for the memory card number display part, except for the following:

(Memory Card Record No.) (Type) tab window

Display Function	Memory Card Record No.

Place the display part as shown above.

3. Click the [Memory Card Record Name] icon from the memory card parts tool bar. The [Char. Display] dialog is displayed.

4. Set the options in the tab windows in the same manner as those for the memory card name display part, except for the following:

(Memory Card Record Name) (Type) tab window

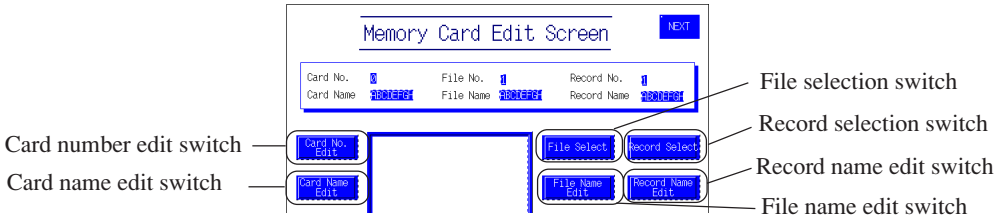
Display Function	Memory Card Record Name

(Bytes for Record) has been specified for each file in the (Memory Card) dialog. Check the maximum number for (Bytes for Record) and enter the same number for (Bytes).
In this example, "6" and "8" have been specified for (Bytes for Record) for file Nos. 0 and 1 respectively. Thus, enter "8" for (Bytes).

Place the display part as shown above.

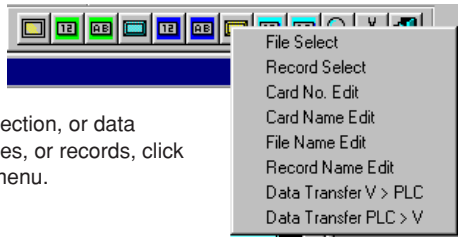
Setting of the Selection and Edit Switches

Set the switches for selecting files and records, and for editing card names and numbers, file names, and record names.



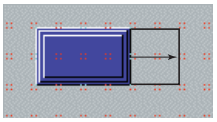
[Memory Card Switch] icon from the memory card parts tool bar

- Clicking the [Memory Card Switch] icon brings up the pull-down menu of the switches for memory card mode.



- When creating switches for edit, selection, or data transfer related to memory cards, files, or records, click the corresponding option from the menu.

1. Click the [Memory Card Switch] icon from the memory card parts tool bar. Click [Card No. Edit] and [Card Name Edit]. Enlarge their switches by 2 grids in the X direction and place them on the screen as shown on the previous page. Set their switch dialog boxes as shown below:



•(Card No. Edit)

Part selection No. 9 in file (Parts_e.z7p)

Division No. 0

(Main) tab window

Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary
Function	(ignored) Card No. Edit: 1 *

(Character) tab window

No.0	Card No. Edit

(Char. Prop.(No. 0)) dialog

Char. Type	Normal
Foreground	White
Transparent	☑ checked
Italic	☐ unchecked

Rotate	Normal
Direction	RGT
Enlarge	X:1 Y:1

(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed
Define MLIB Placement	☑ checked

(Color) tab window

ON Color	Red
OFF Color	Blue

* "Card No. Edit: 1" specified for (Function)

means multi-overlap No. 1. The entry keys set in multi-overlap editing No. 1 are called up for card number editing. Refer to page Option-14 for more information on multi-overlap editing.

•(Card Name Edit)

Set the options in the tab windows in the same manner as those for the card number edit switch, except for the following:

(Main) tab window

Function	Card Name Edit: 2 *

(Character) tab window

No.0	Card Name Edit

* Click (Change) for (Function). Click the (Memory Card) tab. Choose (Card Name Edit) and specify "2" for (Overlap No.).
The entry keys set in multi-overlap editing No. 2 is called up for card name editing.
Refer to page Option-16 for more information on multi-overlap editing.

• (File Select Edit)

Set up the options in the tab windows in the same manner as those for the card number edit switch, except for the following:

(Main) tab window

Function	File Select

(Character) tab window

No.0	File Select

• (File Name Edit)

Set the options in the tab windows in the same manner as those for the card number edit switch, except for the following:

(Main) tab window

Function	File Name Edit: 2

(Character) tab window

No.0	File Name Edit

• (Record Select)

Set the options in the tab windows in the same manner as those for the card number edit switch, except for the following:

(Main) tab window

Function	Record Select

(Character) tab window

No.0	Record Select

• (Record Name Edit)

Set the options in the tab windows in the same manner as those for the card number edit switch, except for the following:

(Main) tab window

Function	Record Name Edit: 2

(Character) tab window

No.0	Record Name Edit

Multi-Overlap Editing

Set the entry keys in multi-overlap editing for editing memory card names and numbers, file names, and record names.

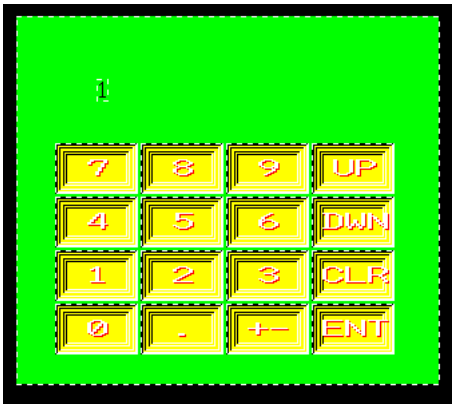
Memory card numbers -> Multi-overlap editing No.1

The names of memory cards, files, and records -> Multi-overlap editing No.2

Set up multi-overlap editing No. 1.

1. Select [Multi-Overlap] from the [Item] menu. The [Multi-Overlap] dialog is displayed. Specify "1" and click [OK].

2. The [Multi-Overlap [1] Edit] window is displayed. Create the overlap as shown on the right using the steps below.



3. Set a normal overlap on the base editing layer for multi-overlap editing No. 1. ("Base" appears in the lower right corner.)

1) Click the [Overlap] icon from the tool bar. The [Overlap (Normal)] dialog is displayed.

2) Set as shown below:

Part selection No. 0 in file (Parts_e.z7p)

Use System Button	☑ checked
Area Prop.	
Foreground	Yellow
Tile	No. 0 (extreme left)
Continue reading PLC memory when set to OFF	☐ unchecked

3) Place the overlap.

4) Enlarge the overlap so as to place the entry keys.

How to change the size of the overlap part:
Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed. Open the [Grid] tab window and set as shown below:

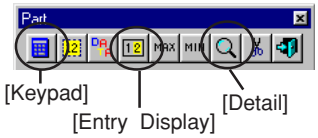
Grid Dsp. checked
Grid Color Red
Grid Type Mode

"Mode" type grids are displayed. Enlarge the placed overlap based on the grids.

X size by 8 grids Y size by 1 grid
Drag a handle of the overlap. (See figure on the previous page.)

4. Set up entry keys on the placed normal overlap.

1) Right-click the mouse. Click [Overlap 0] from the pop-up menu to switch the editing layer.
("OVLP0" appears in the lower right corner.)



2) Click the [Entry Mode] icon from the tool bar. Click the [Keypad], [Entry Display], and [Detail] icons from the entry mode parts tool bar, and set their respective dialog boxes.

• (Keypad)
Part selection No. 1 in file (Parts_e.z7p)

• (Entry Display) (Numerical Data)
Part selection No. 0 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Entry Display
Digits	1

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked
Char. Size	1-Byte

Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X: 1 Y: 1
Foreground	Black
Background	Yellow

(Detail) tab window

Process Cycle	High Speed

• (Detail) ((Entry) dialog)

(Main) tab window

Division No.	0
Type	Memory Card

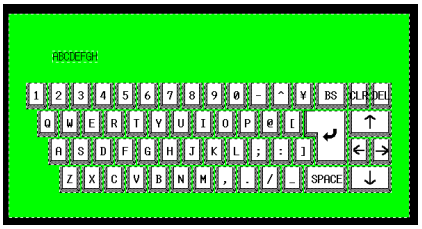
(Detail) tab window

Use Graphic	☐ unchecked
Default to 0	☐ unchecked
Process Cycle	Low Speed

* Memory card No. 0 is entered through the entry keys set up in this step.
0 to 255 can be designated as memory card numbers. In the (Type) tab window for (Entry Display), the number specified for (Digits) must be "3" or less. "1" is specified in this example.

5. Click the [Next] icon. The [Multi Overlap [2] Edit] window is displayed. Create the overlap as shown by the steps below.

6. Set up a normal overlap on the base editing layer for multi-overlap editing No. 2. ("Base" appears in the lower right corner.)



1) Click the [Overlap] icon. The [Overlap (Normal)] dialog is displayed.

2) Set as shown below:

Part selection No. 0 in file (Parts_e.z7p)

Use System Button	☑ checked
Area Prop.	
Foreground	Yellow
Tile	No. 0 (extreme left)
Continue reading PLC memory when set to OFF	unchecked

3) Place the overlap.

4) Enlarge the overlap so as to place the character entry keys. (See figure above.)
Bring up "mode" type grids.
X size by 40 grids
Y size by 2 grids
Drag a handle of the overlap. (See figure on the previous page.)

7. Set up the entry keys on the placed normal overlap.
1) Right-click the mouse. Click [Overlap 0] from the pop-up menu to switch the editing layer. ("OVLP0" appears in the lower right corner.)
2) Click the [Entry Mode] icon from the tool bar.

3) Click the [Keypad], [Entry Display], and [Detail] icons from the entry mode parts tool bar, and set their respective dialog boxes.

•(Keypad)

Part selection No. 18 in file (Parts_e.z7p)

•(Entry Display) (Character)

Part selection No. 6 in file (Parts_e.z7p)

(Main) tab window

Division No.	0

(Type) tab window

Display Function	Entry Display
Bytes	8
Flush L	

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked

Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X: 1 Y: 1
Foreground	Black
Background	Yellow

(Detail) tab window

Process Cycle	High Speed

* The entry keys set up in this step are used to enter the names of memory cards, files, and records.

•(Detail) ((Entry) dialog)

(Main) tab window

Division No.	0
Type	Memory Card

(Detail) tab window

Use Graphic	☐ unchecked
Default to 0	☐ unchecked
Process Cycle	Low Speed

8. Select [Screen] from the [Item] menu. Specify "10" in the [Screen] dialog and click [OK]. The [Screen [10] Edit] window is displayed.

9. Click [Quit] from the memory card parts tool bar. This step completes the setting of memory card mode.

Setting of the Next Screen Switch, Screen Title, and Boxes

1. Create a switch to bring up the next screen.
Click the [Switch] icon from the tool bar. The [Switch] dialog is displayed. Set as shown below and place the switch in the upper right corner of the screen.

Part selection No. 1 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	XOR

Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Screen: 1

(Character) tab window

No.0	"NEXT"

(Char. Prop.) dialog (No. 0)

Char. Type	Normal
Foreground	Black
Transparent	☑ checked
Italic	☐ unchecked

Rotate	Normal
Direction	RGT

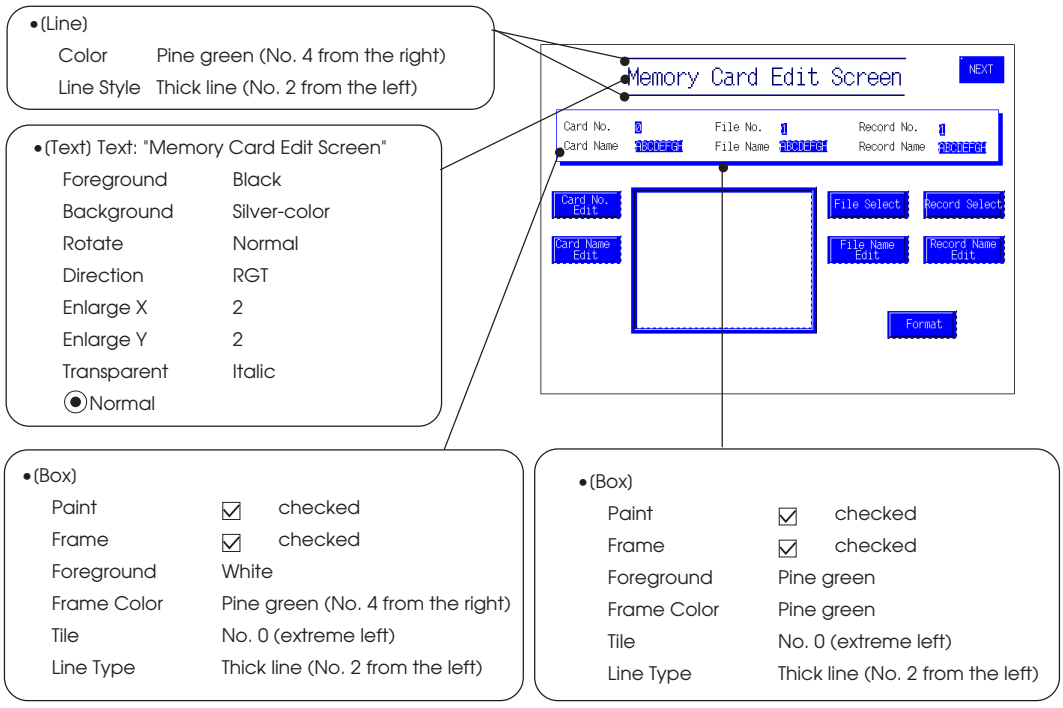
(Detail) tab window

Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

Frame Color	Black
ON Color	Red
OFF Color	Silver color
Frame Typefl	Type 1

2. Set the screen title and boxes as shown below:



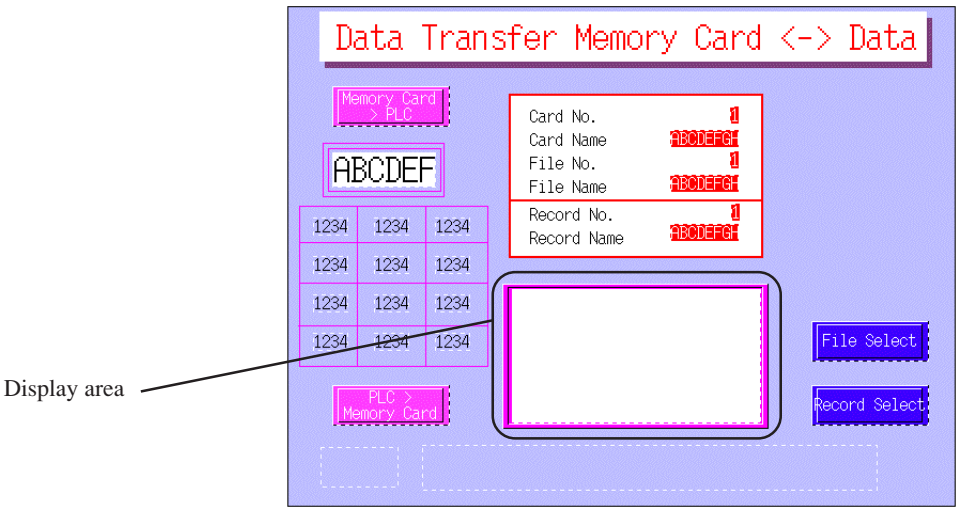
- Set the texts "Card No.", "Card Name", "File No.", "File Name", "Record No.", and "Record Name" as shown below:

Foreground	Blue
Background	White
Rotate	Normal
Direction	RGT
Enlarge X	1
Enlarge Y	1
Transparent	Italic

◉Bold

Creation of the Data Transfer Screen

By pressing the [PLC > Memory Card] switch, data is transferred from the PLC memory to a specified area on the memory card. (File No. 0 on the memory card is fixed for data transfer in this example, thus desired record numbers are specified.) By pressing the [Memory Card > PLC] switch, data is transferred from a specified area on the memory card to the PLC memory.



1. Click the [Next] icon. The [Screen [11] Edit] window is displayed. Click slate blue (No. 3 from the right) for [Back Color] in the [Screen Setting] dialog.
2. Click the [Memory Card Mode] icon from the tool bar.

The memory card parts tool bar is displayed.

3. Create a display area by referring to "Setting of the Display Area" in "Creation of the Edit Screen for Memory Card Names and Numbers, File Names, and Record Names" on page Option-9. Set properties as shown below:

Part selection	No. 11 in file (Parts_e.z7p)
Division No.	0
In-area Prop.	
Foreground	White
Tile	No. 0 (extreme left)

Click [OK], and place the area as shown on the previous page.

Reduce the Y size of the area by 3 grids.

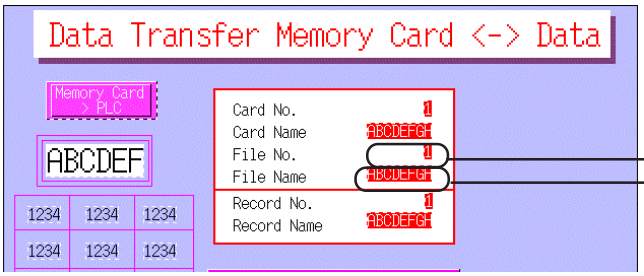
How to change the size of the display area:
Select [Display Environment] from the [Display] menu. The [Display Environment] dialog is displayed. Open the [Grid] tab window and set as shown below:

Grid Dsp.	checked
Grid Color	Red
Grid Type	1-Byte

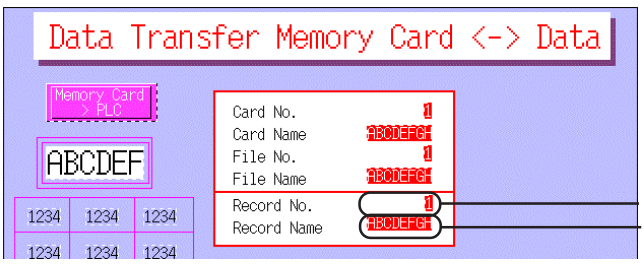
1-byte grids are displayed. Enlarge the placed area based on the grids.

4. Place the card name and number display parts by referring to "Setting of the Card Name and Number Display Parts" on page Option-10. Set properties in the same manner.

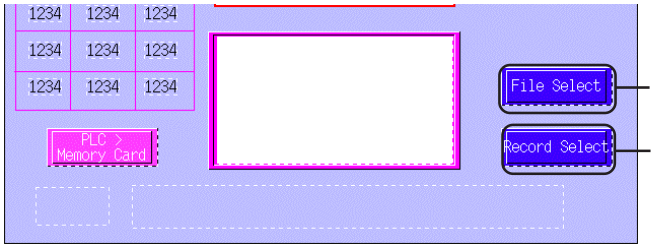
5. Place the file name and number display parts by referring to "Setting of the File Name and Number Display Parts" on page Option-11. Set properties in the same manner.



6. Place the record name and number display parts by referring to "Setting of the Record Name and Number Display Parts" on page Option-12. Set properties in the same manner.



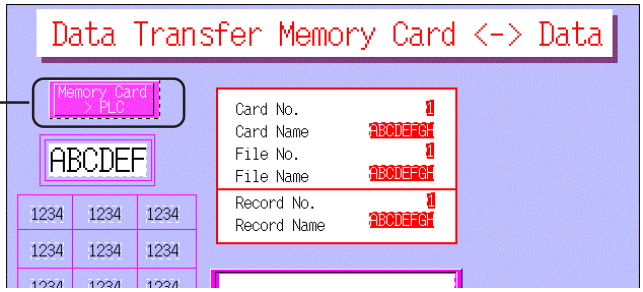
7. Place the file selection and record selection switches by referring to "Setting of the Selection and Edit Switches" on page Option-12.
Set properties in the same manner except that the switch OFF color is purple.



File selection switch

Record selection switch

8. Create the switch for data transfer from the memory card to the PLC.



Switch for transfer from the ZM-80 to the PLC

1) Click the [Memory Card Switch] icon from the memory card parts tool bar. The pull-down menu is displayed.

2) Select [Data Transfer ZM-80 > PLC].
Enlarge the switch part by 3 grids in the X direction so as to place the name "Memory Card > PLC" on the part. Set properties as shown below and place the switch part referring to the figure above.

• (Data Transfer ZM-80 > PLC)
Part selection No. 9 in file (Parts_e.z7p)
(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Data Transfer V6 -> PLC

(Character) tab window

No.0	Memory Card > PLC

(Char. Prop.) dialog

Char. Type	Normal
Foreground	White

Transparent	☑ checked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT

(Detail) tab window

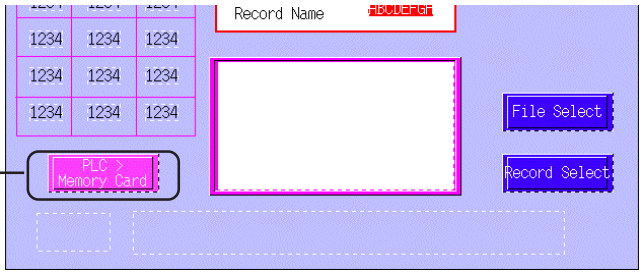
Use ON Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

ON Color	Yellow
OFF Color	Mahogany (No.6 from the right)

9. Create the switch for data transfer from the PLC to the memory card.

Switch for transfer from the PLC to the ZM-80



1) Click the [Memory Card Switch] icon from the memory card parts tool bar. The pull-down menu is displayed.

2) Select [Data Transfer PLC > ZM-80].
Enlarge the switch part by 3 grids in the X direction so as to place the name "PLC > Memory Card" on the part. Set properties as shown below and place the switch part referring to the figure above.

• (Data Transfer PLC > ZM-80)

Part selection No. 9 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Draw Mode	REP
Output Memory	☐ unchecked
Lamp Memory	☐ unchecked
Output Action	Momentary (ignored)
Function	Data Transfer PLC -> ZM-80

(Character) tab window

No.0	PLC > Memory Card

(Char. Prop.) dialog

Char. Type	Normal
Foreground	White
Transparent	☑ checked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT

(Detail) tab window

Use On Macro	☐ unchecked
Use OFF Macro	☐ unchecked
Use Interlock	☐ unchecked
Process Cycle	High Speed

(Color) tab window

ON Color	Yellow
OFF Color	Navy Blue(No.7 from the right)

10. Click the [Detail] icon from the memory card parts tool bar and set the [Memory Card] dialog by referring to "[Detail] Settings for a Memory Card" on page Option-7.

(Main) tab window

Division No.	0
Memory	D606
Key Display Location	BASE
Process Cycle	Low Speed

(Char. Prop) tab window

Char. Type	Normal
Transparent	☑ checked
Italic	☐ unchecked
Enlarge	X: 2 Y:2
Foreground	Black

1) Specify the same memory address for [Memory] for both screens I and II in this example.

2) When editing memory card names and numbers, file names and record

names, choose where to place the entry keys for [Key Display Location]. Choose one from "OVLP0" (overlap 0), "OVLP1", "OVLP2", and "BASE". Editing is not conducted on screen II, thus the setting for this option is ignored. The default "BASE" should remain unchanged.

3) Click [OK]. The [Memory Card] dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen.

11. Click the [Quit] icon from the memory card parts tool bar.

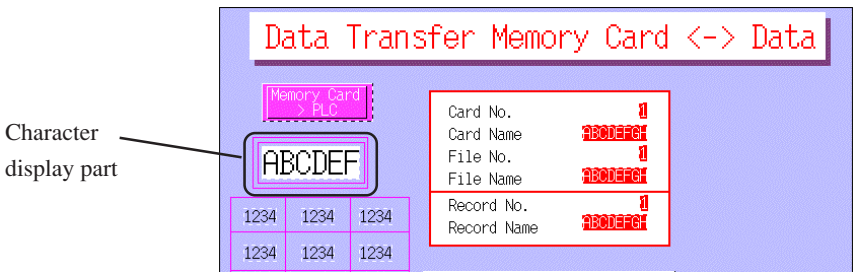
12. 12. Create a data display part to check data transfer from the memory card (file No. 0) to the PLC memory.

The following is the data set for file No. 0 on the memory card. (Select [System Setting] from the [Item] menu. Open the [0] tab window in the [Memory Card] dialog. Refer to page Option-3.)

No. of Data	12
Bytes for Record	6
Transfer Mode	Data + Record Name
Memory	D610

From the above setting, memory addresses D610, D611, and D612 are used for record name storage, and D613 to D624 are used for data storage.

1) Set up a character display part for record names to be stored in the PLC memory using the steps below.



Click the [Char. Display] icon from the tool bar. The [Char. Display] dialog is displayed. Set as shown below:

• (Char. Display) dialog

Part selection No. 0 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Memory	D610

(Type) tab window

Display Function	No
Bytes	6
Flush L	

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked

Italic	☐ unchecked
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X:2 Y:2

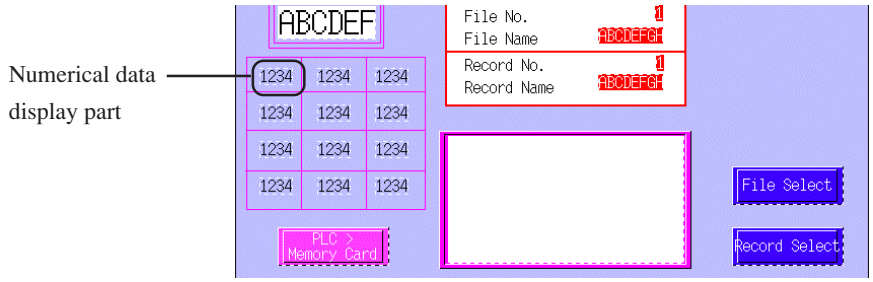
Foreground	White
Background	Green

(Detail) tab window

Process cycle	High speed

Place the part as shown on the previous page.

2) Set up a numerical data display part.



Click [Num. Data Display] icon from the tool bar. The [Num. Display] dialog is displayed. Set as shown below:

(Num. Display) dialog

Part selection No. 0 in file (Parts_e.z7p)

(Main) tab window

Division No.	0
Memory	D613

(Type) tab window

Display Function	No
Digits	4
Decimal Point	0
Display Type	DEC (w/o sign)
Input Type	DEC
Data Length	1-Word
Zero Suppress	☑ checked
	Flush R

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☐ unchecked
Italic	☐ unchecked
Char. Size	1-Byte
Rotate	Normal
Direction	RGT
Spacing	☐ unchecked
Enlarge	X:1 Y: 1
Foreground	White
Background	Slate blue (No. 3 from the right)

(Detail) tab window

Process Cycle	High Speed

Place the part as shown above.

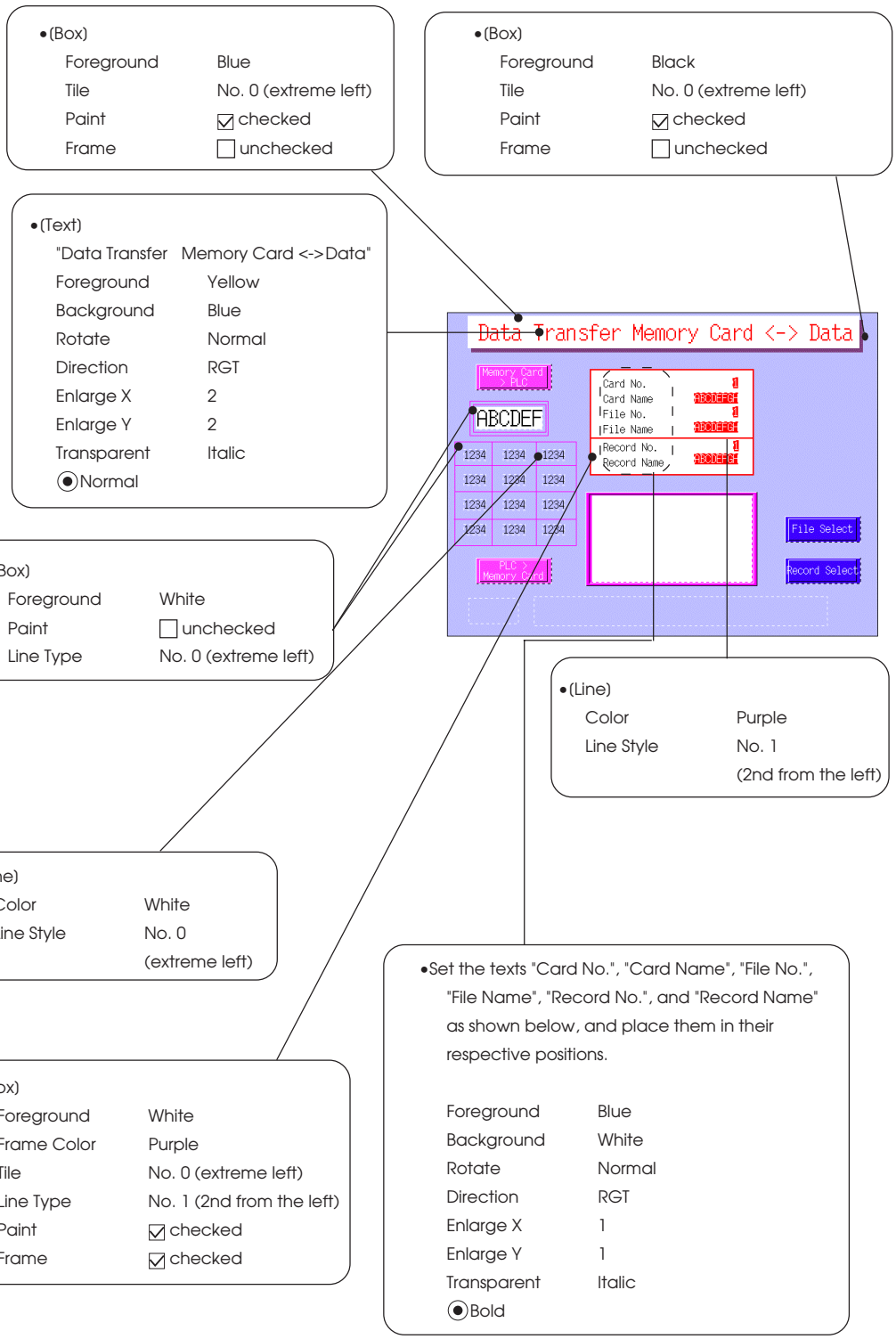
3) Create the remaining 11 numerical data display parts using the [Multi Copy] function. Click [Multi Copy] icon.

Dot	◉
Interval	◉
Direction	①②③ ④⑤⑥
X Distance	25
Y Distance	20

Quantity X	3
Quantity Y	4
Memory INC	☑ checked
Num. Data Memory	D613
Step	1

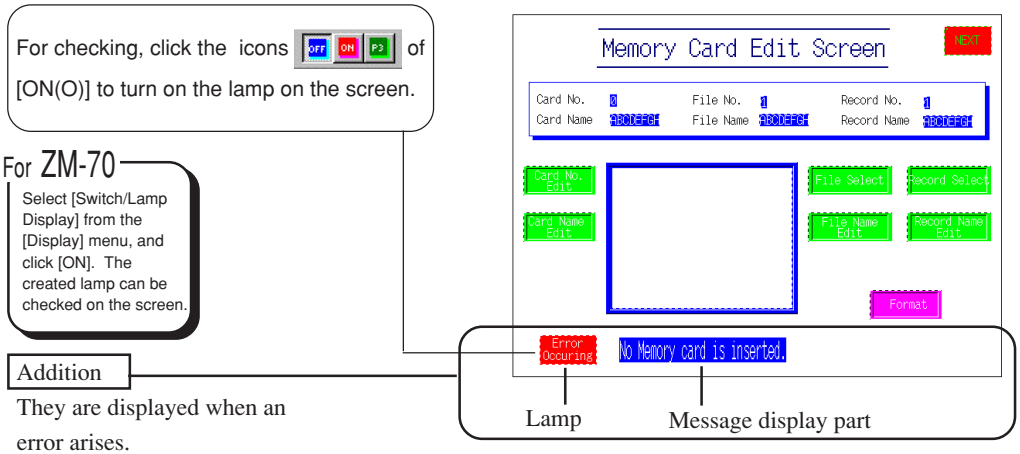
Setting of the Screen Title and Boxes

Create the screen title and boxes as shown below:



Display of Error Messages

Add a lamp and message display part to screen I (in the [Screen [10] Edit] window). If an error related to the memory card arises, the lamp will flash and a corresponding error message will be indicated.



1. Click the [Preview] icon. The [Screen [10] Edit] window is displayed. Specify "1" for [Division No.] in the upper right corner of the screen.

2. Create a lamp using the steps below.

1) Click the [Lamp] icon from the tool bar. The [Lamp] dialog is displayed. Set properties as shown below:

Part selection No. 0 in file (Parts_e.z7p)

Division No.	1
Draw Mode	REP
Function	Normal
Lamp Memory	D600-00
Process Cycle	High Speed

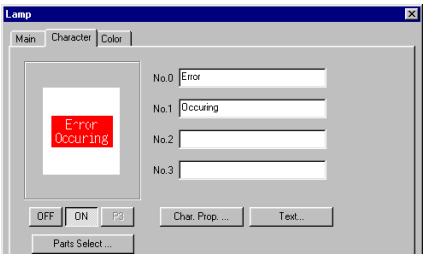
Clicking (OFF): No setting

Clicking (ON):

No.0	"Error"
No.1	"Occurring"

(Char. Prop.) dialog for both text Nos. 0 and 1

Char. Type	Normal
Foreground	Black Check (B) (blink).
Transparent	☑ checked
Italic	☐ unchecked
Rotate	Normal
Direction	RGT
Enlarge	X:1 Y:1



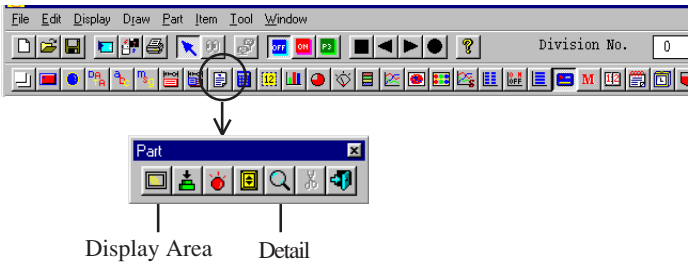
(Color) tab window

ON Color	Yellow
OFF Color	Silvercolor
Frame Type	No Frame

2) Click [Place] and place the lamp on the screen as shown in the figure above.

3. Create the message display part.

1) Click the [Message Mode] icon from the tool bar. The message mode parts tool bar is displayed.



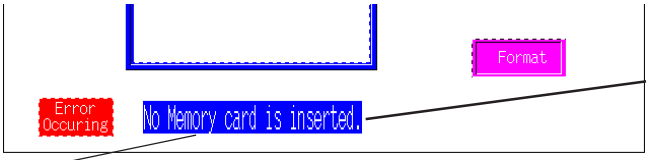
2) Click the [Display Area] icon from the message mode parts tool bar. Set the [Display Area] dialog as shown below:

Part selection No. 0 in file (Parts_e.z7p)

Division No.	1
In area Propaty	
Foreground	Silvercolor
Tile	No.0

3) Click [Place] and place the part on the screen in the same manner as the following.

4) Modify the size of the display part.



Message display part

Messages appear in this display part when errors arise. The part location can be checked on the screen. Select [Display Environment] from the [Display] menu. Open the [Detail] tab window in the [Display Environment] dialog, and choose [Area].

Bring up grids to be referred to for modifying the display part size.
Select [Display Environment] from the [Display] menu. Open the [Grid] tab window in the [Display Environment] dialog. Set as shown below:

Grid Dsp.	☑ Chiecked.
Grid Color	Red
Grid Type	1-Byte

Set the Y size approximately to 2 grids and the X size to 45 grids.

4. 4. Click the [Detail] icon from the message mode parts tool bar. The [Message] dialog is displayed.

• (Message) dialog

(Main) tab window

Division No.	1
Action Area	Area
Type	Page
Action Select	Message

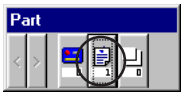
Message GNo.	0
Memory	D601
Process Cycle	Low Speed

(Char. Prop.) tab window

Char. Type	Normal
Transparent	☑ checked
Italic	☐ unchecked
Enlarge	X: 1 Y: 2
Foreground	Red, B (blink)

1) Memory card status is written from the ZM-80 to the memory address specified for (I/F Memory) in the (Memory Card) dialog. (Select (System Setting) from the (Item) menu, and click (Memory Card Setting). The dialog is displayed.)
When memory address "n" is specified for (I/F memory), an error number, if arisen, is stored in address "n + 1". Specify address "n + 1" for (Memory) in the (Main) tab window.

2) Specify a message group number for (Message GNo.). Register messages in this group corresponding to the error numbers which can be stored in "n + 1".



Click [OK]. The [Message] dialog is reduced to an icon and stored in the [Part] auxiliary tool box in the lower left corner of the screen.

5. Register the error messages as message edit group No. 3.

1) Select [Message] from the [Item] menu. The [Message] dialog is displayed. Specify "3" and click [OK].

2) The [Message [3] Edit] window is displayed. Register the following messages.

Error numbers which can be stored in memory address "n + 1" ([I/F Memory]: "n"), and the corresponding messages

Error No.	Details
No. 0	(blank)
No. 1	There is an error occurring within the memory card I/F board.
No. 2	ZM-1REC is not connected.
No. 3	ZM-80 and ZM-1REC are not connected.
No. 4	No memory card is inserted.
No. 5	Memory card format is different from the setting data.
No. 6	Memory card capacity is smaller than the setting data.
No. 7	The memory card is not compatible.
No. 8	(blank)
No. 9	(blank)
No. 10	Attempted to write to a memory card of FLASH ROM.
No. 11	The memory card is write-protected.
No. 12	There is an error in writing data to the memory card.
No. 13	(blank)
No. 14	The selected record or file number does not exist.

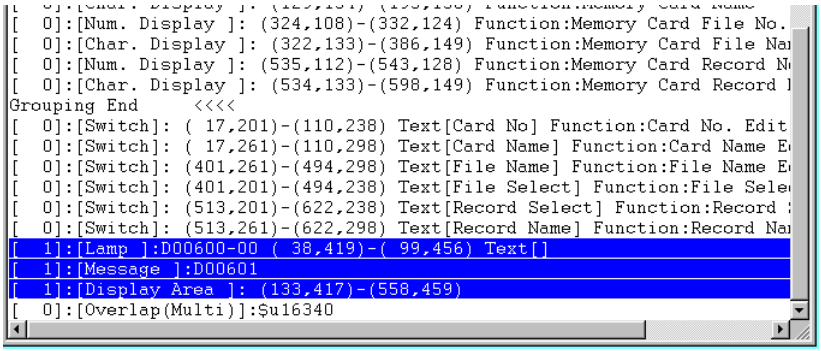
3) Close the [Message [3] Edit] window and go back to the [Screen [10] Edit] window.

6. The lamp and the message display part should be displayed on screen II as well. Copy these parts using the steps below:

1) Select [Item List] from the [Tool] menu. The item list is displayed.

2) Division No. 1 is specified for the lamp and the message mode. Select [By Division] from the [Display] menu.

3) Select the lines for the lamp, error message, and message display part belonging to division No. 1 as follows and copy them.



7. Open the [Screen [11] Edit] window. Right-click the mouse and select [Paste] from the pop-up menu. The lamp and message display part are pasted to the screen.

8. Double-click the lamp. The [Lamp] dialog is displayed. In the [Color] tab window, click slate blue (No. 3 from the right) for [OFF Color]. Click [OK].

9. Double-click the display part. The [Display Area] dialog is displayed. Click slate blue (No. 3 from the right) for [Foreground]. Click [OK].

Screen I and screen II have been completed. Save the data.

ZM-80 Operation Check

While referring to "Chapter 3 Screen Data Transference", transfer the created screen data to the ZM-80 and check that the ZM-80 operates properly.

1. Open the "Memory Card Edit Screen" (screen I). The error indicator lamp at the lower-left corner blinks, and the current error message "Memory card format is different from the setting data." also blinks.

2. Monitor memory addresses D600 (specified for [I/F memory]) and D601.

D600 H0001

Indicates that an error is occurring on the memory card.

D601 H0005

Indicates that error No. 5 "Memory card format is different from the setting data." (or "The memory card is not formatted".) has occurred.

About [I/F Memory]

Memory card status is written from the ZM-80 to the PLC. The top memory address is specified for [I/F Memory]. Memory is allocated as follows:

[I/F memory]: "n"

Memory	Contents	
n	CFM_STAT	The newest data is always written here.
n+1	CFM_ERRNo	
n+2	CFM_CARDNo	These addresses become effective only when memory card mode is set on the screen.
n+3	CFM_FILENo	
n+4	CFM_RECODNo	
n+5	CFM_TRFIN	

n CFM_STAT

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
0	0	0	0	0	0	0	0		0	0	0	0	0	0	

②Battery voltage ①Error

1) Error (bit 0)
If an error related to the memory card has occurred, this bit is set (ON). The error number is stored in "CFM_ERRNo" (n + 1).

2) Battery voltage (bit 7)
When battery voltage of the memory card decreases, this bit is set (ON). Replace the memory card as soon as possible.

n+1 CRM_ERRNo
When bit 0 of "CFM_STAT" (n) is set (an error has occurred), the corresponding error number is stored in "CFM_ERRNo" (n + 1). For the details corresponding to respective error numbers, refer to page Option-28.

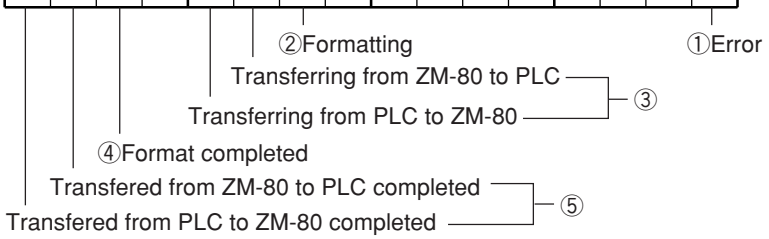
n+2 CRM_CARDNo
The current memory card number is stored.

n+3 CRM_CARDNo
The selected or transferred file number is stored.

n+4 CRM_CARDNo
The selected or transferred record number is stored.

n+5 CFM_STAT

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
			0				0	0	0	0	0	0	0	0	



1) Error
When an error occurs during formatting or transferring, this bit is set (ON).
2) Formatting
While formatting, this bit is set (ON).
3) Transferring from ZM-80 to PLC/Transferring from PLC to ZM-80
While transferring, respective bits are set (ON).
4) Format completed
When formatting has been completed, this bit is set (ON).
5) Transferring from ZM-80 to PLC completed/Transferring from PLC to ZM-80 completed When transferring has been completed, respective bits are set (ON).
After checking that transferring has been completed, reset these bits (OFF).

3. Format the memory card.

1) To format the memory card as specified in the [Memory Card] dialog, press the [Format] switch.
Monitor memory address D605.
While formatting, bit 9 is set (ON). Upon completion, bit 13 is set (ON).
D605 H0-> H200 (momentarily)-> H2000

2) Once bit 13 (format completed) is set (ON), it remains set. After checking that formatting has been completed, reset the bit (OFF).
Format the memory card before starting to use it.
D605 H2000 -> H0000

Format the memory card before you use it.

4. The error display goes off.

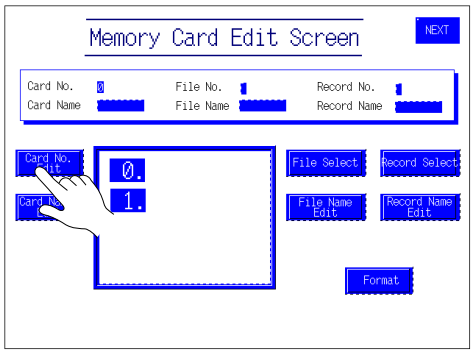
This confirms that no error is occurring.
Monitor D600 and D601.

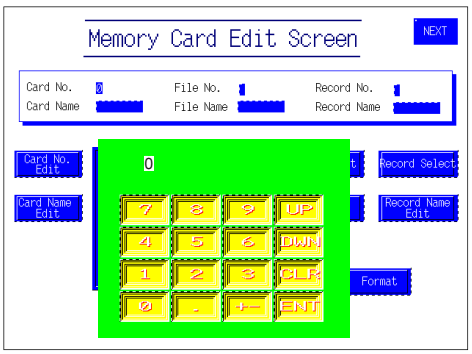
D600 H0000 D601 H0000

Memory Card Editing

1. Specify the memory card number.

1) Press the [Card No.] switch. The overlap with entry keys appears.

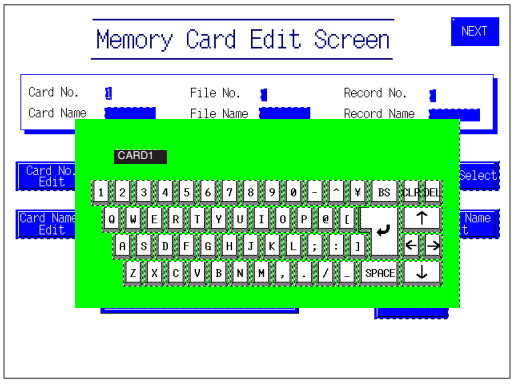




2) Key in "1" and press [ENT]. "1" is specified for "Card No.".

2. Specify the memory card name.

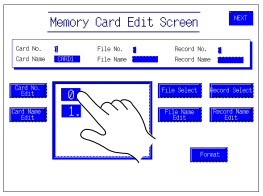
Press the [Card Name Edit] switch. The overlap with entry keys appears.
Key in "C", "A", "R", "D" and "1", and press [ENT]. "CARD 1" is specified for "Card Name".



3. Specify the file name.

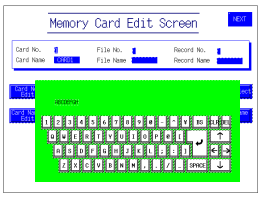
1) Check that the [File Select] switch is lit, and press the [File Name Edit] switch.

2) Press "0." in the display area. File No. 0 is selected and "0" is indicated on the screen.

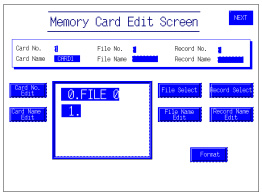


The overlap with entry keys appears at the same time.

3) Key in "F", "I", "L", "E", "(space)", and "0", and press [ENT].



"FILE 0" is entered for the file name, and "FILE 0" is indicated in the display area at the same time.



4) Press "1." in the display area.
File No. 1 is selected and "1" is indicated on the screen.

The overlap with entry keys appears at the same time.

5) Key in "F", "I", "L", "E", "(space)", and "1", and press [ENT]. "FILE 1" is entered for the file name, and "FILE 1" is indicated in the display area.

6) Press the lit [File Name Edit] switch. It goes off.

4. Specify the record name.

1) Enter the record names of file No. 0.
Select "0.FILE 0" in the display area. The [Record Select] switch lights up.

2) Press the [Record Name Edit] switch. The switch lights up.

3) Press "0." in the display area.
Record No. 0 is selected, and "0" is indicated on the screen. The overlap with entry keys appears at the same time.

4) Key in "A", "A", "A", "A", "A", and "A", and press [ENT]. "AAAAAA" is entered for the record name, and "AAAAAA" is indicated in the display area.

5) Press ".1" in the display area.
Record No. 1 is selected, and "1" is indicated on the screen. The overlap with entry keys appears at the same time.

6) Key in "B", "B", "B", "B", "B", and "B", and press [ENT]. "BBBBBB" is entered for the record name, and "BBBBBB" is indicated in the display area.

7) Press "2." in the display area.
Record No. 2 is selected, and "2" is indicated on the screen. The overlap with entry keys appears at the same time.

8) Key in "C", "C", "C", "C", "C", and "C", and press [ENT]. "CCCCCC" is entered for the record name, and "CCCCCC" is indicated in the display area.

9) Specify the record names of file No. 1 in the same manner.
Press the [File Select] switch.
Select "1.FILE 1", and specify record names as follows:
Record No. 0 Record name "XXXXXXXX"
Record No. 1 Record name "YYYYYYYY"

10) Press the lit [Record Name Edit] switch. It goes off.

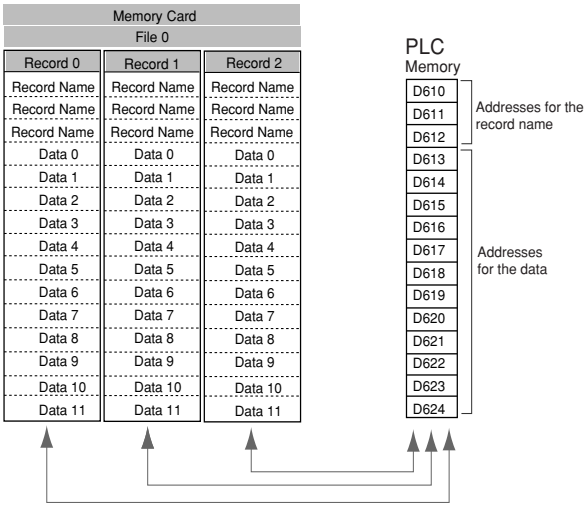
The above step completes memory card editing.

Open screen II by pressing the [Next] switch.

Data Transfer between Memory Card & PLC

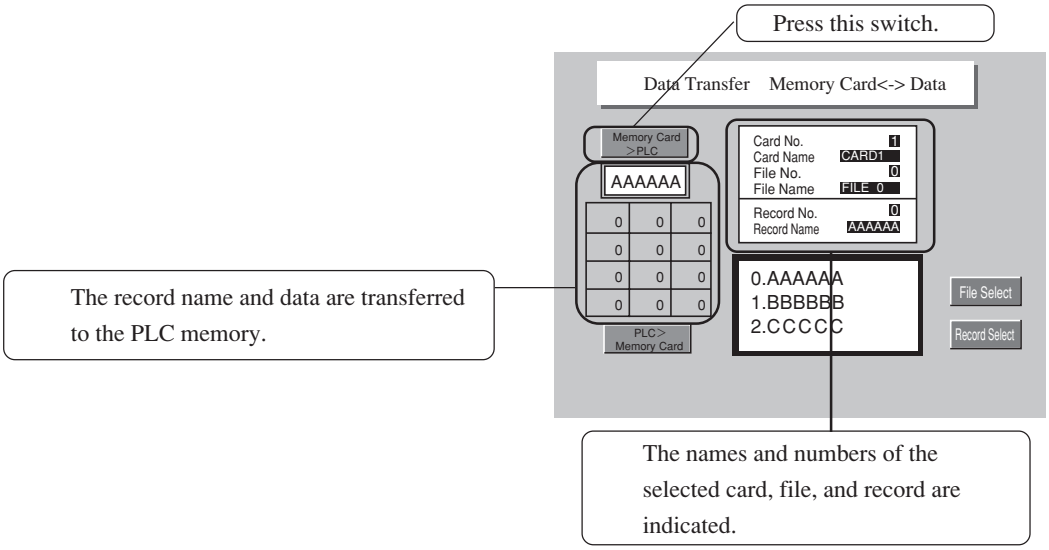
Data transfer is executed between file No. 0 on the memory card and the PLC (memory: D610 to D624) on this screen.

The memory card name and number, file names, and record names specified on the previous screen are stored on the memory card directly. File No. 0 is so set that record names are stored in the PLC memory as well.



1. Transfer the record name for file No. 0 and record No. 0 of the memory card to memory addresses D610 to D612 using the steps below:

1) The [File Select] switch blinks. Press "0.FILE 0" in the display area.
2) The [Record Select] switch blinks. Press "0.AAAAAA".
3) Press the [Memory Card > PLC] switch. The record name and the set data are transferred to the PLC memory. The screen appears as shown in the right-hand figure.



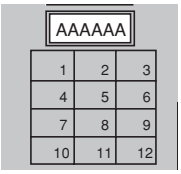
2. Monitor memory address D605. Bit 10 is set (ON) during the transfer. Bit 14 is set (ON) on completion.

D605 H0 -> H400 -> H4000

3. Specify data for memory addresses D613 to D624 as follows:

Memory	D613	D614	D615	D616	D617	D618	D619	D620	D621	D622	D623	D624
Data	1	2	3	4	5	6	7	8	9	10	11	12

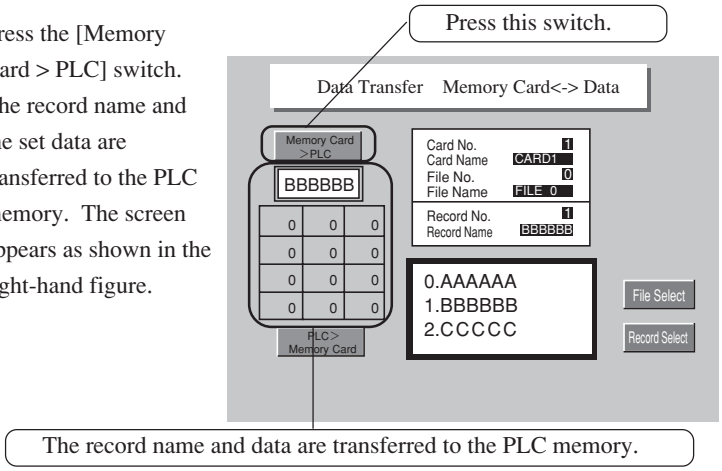
4. Press the [PLC > Memory Card] switch.
The record name and the set data are transferred to the memory card.



5. Transfer the record name for file No. 0 and record No. 1 of the memory card to memory addresses D610 to D612 using the steps below:

1) The [Record Select] switch blinks. Press "1.BBBBBB".

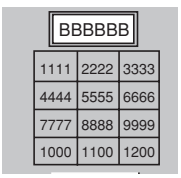
2) Press the [Memory Card > PLC] switch. The record name and the set data are transferred to the PLC memory. The screen appears as shown in the right-hand figure.



6. Specify data for memory addresses D613 to D624 as follows:

D613	D614	D615	D616	D617	D618	D619	D620	D621	D622	D623	D624
1111	2222	3333	4444	5555	6666	7777	8888	9999	1000	1100	1200

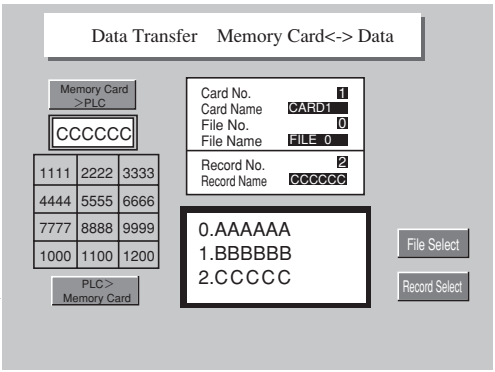
7. Press the [PLC > Memory Card] switch.
The record name and the set data are transferred to the memory card.



8. Transfer the record name for file No. 0 and record No. 2 of the memory card to memory addresses D610 to D612 using the steps below:

1) The [Record Select] switch blinks. Press "2.CCCCCC".

2) Press the [Memory Card > PLC] switch. The record name and the set data are transferred to the PLC memory. The screen appears as in the right-hand figure.



Data Transfer by Commands from the PLC

The previous section described the data transfer procedure between the ZM-80 and a PLC using the switches on the ZM-80. Data transfer is also possible by commands from the PLC. In such a case, three words from the top memory address specified for [Memory] in the [Memory Card] dialog are used. (The dialog is displayed by clicking the [Detail] icon from the memory card parts tool bar.)

About [Memory] in the [Memory Card] dialog

Memory contents from the top address are shown below:

[Memory]: "n"

Memory	Contents
n	RCV_FLAG
n+1	RCV_FILENo
n+2	RCV_RECDNo

15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
		0		0				0	0	0					

⑪Transfer from PLC to ZM-80
⑩Transfer from ZM-80 to PLC
⑨Quick selection
⑧File selection
⑦File lock
⑥Record lock
⑤Data transfer prohibited
④Format prohibited
③Card name and number edit prohibited
②File name edit prohibited
①Record name edit prohibited

n RCV_FLAG

1) Record name edit prohibited (bit 0)
When this bit is set (ON), record name editing is prohibited.

2) File name edit prohibited (bit 1)
When this bit is set (ON), file name editing is prohibited.

3) Card name and number edit prohibited (bit 2)
When this bit is set (ON), card name and number editing are prohibited.

4) Format prohibited (bit 3)
When this bit is set (ON), memory card formatting is prohibited.

5) Data transfer prohibited (bit 4)
When this bit is set (ON), data transfer between the ZM-80 (memory card) and the PLC is prohibited.

6) Record lock (bit 8)
When this bit is set (ON), the use of the [Record Select] switch is prohibited. In this case, a record number can be specified directly by "n + 2" [RCV_RECDNo] in the PLC memory.

7) File lock (bit 9)
When this bit is set (ON), the use of the [File Select] switch is prohibited. In this case, a file number can be specified directly by "n + 1" [RCV_FILENo] in the PLC memory.

8) File selection (bit 10)
This bit determines whether or not to display buffering file names in the display area for selecting a file.
0: Display 1: Do not display

9) Quick selection (bit 12)
When bit 14 (transferring from the ZM-80 to the PLC) or bit 15 (transferring from the PLC to the ZM-80) is set (ON) while this bit is set (ON), data is transferred upon selection of a record.

10) Transfer from ZM-80 to PLC (bit 14)
Data is transferred from the ZM-80 (memory card) to the PLC at the edge of [0 -> 1].

11) Transfer from PLC to ZM-80 (bit 15)
Data is transferred from the PLC to the ZM-80 (memory card) at the edge of [0 -> 1].

n+1 RCV_FILENo
This bit is used for specifying a file number from the PLC when bit 9 of [RCV_FLAG] (n) is set (ON). File numbers can be specified for this address.

n+2 RCV_RECDNo
This bit is used for specifying a record number from the PLC when bit 8 of [RCV_FLAG] (n) is set (ON). Record numbers can be specified for this address.

Specify file No. 0 and record No. 1 from the PLC, and transfer data from the ZM-80 (memory card) to the PLC.

1. Set bit 8 and bit 9 of memory address D606.
The [Record Select] switch goes off.

D606 H0300

2. Specify file No. 0 for D607.

D607 H0000

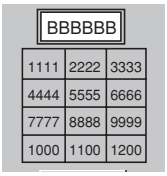
3. Specify record No. 1 for D608.
Record No. 1 is selected, and "1" is indicated on the screen.

D608 H0001

4. Set bit 14 of D606.

D608 H4000

5. The screen appears as follows:



Q&A

Q: When the [Format] switch is pressed, an error sound is emitted (pips) and the switch does not work.

A:
- ◎ Check bit 3 (format prohibited) of the memory address specified for [Memory] in the [Memory Card] dialog (displayed by clicking the [Detail] icon from the memory card parts tool bar). The bit may be set (ON).
- ◎ The division number for the switch may differ from the division number specified in the [Memory Card] dialog.
- ◎ Check whether either of the modular port is assigned as "Memory Card" is chosen in [P2] tab of the [Others] in [System Setting]
- ◎ The memory card may be write-protected.

Q: When changing the file name, the [File Name Edit] switch is pressed and the overlap with entry keys is displayed. However, pressing any key creates an error sound (pips), and the key does not work.

A:
- ◎ Has the entry mode been set on the overlap?
- ◎ Is "Memory Card" specified for [Type] in the [Entry] dialog?
- ◎ Is the same division number specified for [Division No.] in the [Entry] dialog and for the entry keys?
- ◎ Check the [Type] tab window in the [Char. Display] ([Num. Display]) dialog set for the display part on the overlap. Is "Entry Display" specified for [Display Function]?

Q: When the [File Name Edit] switch is pressed, an error sound is emitted (pips) and the switch does not work.

A: Check bit 1 (file name edit prohibited) of the memory address specified for [Memory] in the [Memory Card] dialog. The bit may be set (ON).

SHARP

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