NT610C/NT612G
Support Tool

Operation Manual

Produced January 1995

Notice:

OMRON products are manufactured for use according to proper procedures by a qualified operator and only for the purposes described in this manual.

The following conventions are used to indicate and classify precautions in this manual. Always heed the information provided with them. Failure to heed precautions can result in injury to people or damage to the product.

DANGER!	Indicates information that, if not heeded, is likely to result in loss of life or serious injury.
WARNING	Indicates information that, if not heeded, could possibly result in loss of life of serious injury.
Caution	Indicates information that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

OMRON Product References

All OMRON products are capitalized in this manual. The word "Unit" is also capitalized when it refers to an OMRON product, regardless of whether or not it appears in the proper name of the product.

The abbreviation "Ch," which appears in some displays and on some OMRON products, often means "word" and is abbreviated "Wd" in documentation in this sense.

The abbreviation "PC" means Programmable Controller and is not used as an abbreviation for anything else.

Visual Aids

The following headings appear in the left column of the manual to help you locate different types of information.

Note	Indicates information of particular interest for efficient and convenient operation of the product.
1, 2, 3...	1. Indicates lists of one sort or another, such as procedures, checklists, etc.

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TABLE OF CONTENTS

About this Manual:

This manual describes the basic functions and operation procedures of the NT-series NT610C/NT612G Support Tool and includes the sections described below.

Please read this manual carefully and be sure you understand the information provided before attempting to install and operate the NT-series NT610C/NT612G Support Tool.

WARNING Failure to read and understand the information provided in this manual may result in personal injury or death, damage to the product, or product failure. Please read each section in its entirety and be sure you understand the information provided in the section and related sections before attempting any of the procedures or operations given.

SECTION 1   Setting Up the Support Tool

   This section describes how to install the support tool at a personal computer.

SECTION 2   Basic Operations of the Support Tool

   This section describes the basic operations that apply to the support tool as a whole, such as those for start-up, exit, and settings.

SECTION 3   Support Tool Operations

   This section describes how to use the basic screens of the support tool, setting options, and the functions of the function keys.

SECTION 4   Creating Screen Data

   This section describes how to create the screen data to be displayed by the programmable terminal (PT).

SECTION 5   Creating a Marks, Images, and Library Data

   This section describes how to create special characters and symbols (marks), image data, and library data.

SECTION 6   Printing Data

   This section describes how to print various types of support tool data, such as screen data and the conditions of use of memory tables.

SECTION 7   Data Communication

   This section describes how to transfer screen data created using the support tool to the PT, and how to receive data from the PT.

Appendix   This section describes the specifications of the connecting cables, error messages, etc.

Organization of the Manual, and How to Use It:

In order to put a PT to use, screen data has to be created for it on the basis of various types of information.

When creating screen data, the user must be aware of the meanings of the settings, the restrictions that apply to them, and the differences in operation among different communication methods. Refer to the manuals listed below for this information.

[For operating the support tool]

• NT610C/NT612G Support Tool Operation Manual (V023-E1-1)
.... This manual

The support tool displays details of operations and procedures on the screen in the form of "help messages". Normally, operations can be performed by following these messages.

However, if you become unsure how to proceed during the course of an operation, or want to check the capabilities of the support tool, refer to this manual.

This manual only describes the operations pertinent to the support tool itself. It does not give detailed explanations of the meanings or effects of the items to be set. For this information, refer to the manuals below.

[For information on PT functions, operations, and restrictions]

• NT612G Programmable Terminal Operation Manual (V024-E1-1)

• NT610C Programmable Terminal Operation Manual (V025-E1-1)

These manuals contain full descriptions of PT functions, operations, and restrictions. They are organized in a manner that allows screen data to be created by following the User's Manual for the PT.

[For communication between the PT and host]

• NT-series Direct Connection Operation Manual (V026-E1-1)

The functions that can be executed and the methods for these functions differ widely according to the host interface unit. The user's manuals for the host interface units have been compiled with the PT, the PC, and the communication format taken into consideration.

Anyone familiar with the functions of the PT can create screen data by referring to the manual for the host interface unit alone.

[For information on the functions and operations of the PC]

• User's manual for each PC

When you need information about the operations, functions, etc., of the PC, refer to the operation manual for the PC, advanced function unit, or communication unit being used.

Functions of the Support Tool:

Things that can be done using the support tool

The support tool has the following functions.

Creation of screen data . . . . **SECTION 4 Creating Screen Data**

Creates screen data to be displayed by an NT610C/NT612G.

Besides creating characters and graphics, lamps, touch switches, etc., as screen data, it is also possible to allocate words for individual elements by using the direct connection function.

Management of screen data . . . . **SECTION 3 Support Tool Operations**

Operations relating to screen data, such as the setting of screen attributes, and copying and deletion in screen units, are possible.

File management . . . . **SECTION 3 Support Tool Operations**

Screen data can be managed in file units.

Data communication with the PT . . . . **SECTION 7 Data Communication**

The PT can be connected to the support tool for communication of screen data files and other types of data.

Printing data . . . . **SECTION 6 Printing Data**

Screen data, memory table data, etc., can be printed out at a printer.

Environmental settings . . . . **SECTION 3 Support Tool Operations**

The parameters of the working environment, such as the PT model and data memory capacity, can be set.

Creating files from screens . . . . **SECTION 3 Support Tool Operations**

Screen data can be saved in Microsoft Windows (TM) files (BMP format)

**Reading files created
with other available drawing software** . . . . **SECTION 5 Creating Marks, Images, and Library Data**

Reading BMP files

Image files (BMP format) created using packages such as Microsoft Windows (TM) Paintbrush can be read as data.

Menu Tree

```
┌─────────────┐
│             │     *  This comprises the function keys F1 through F10.
│  Main menu  │
│             │
└──────┬──────┘
       │
       │   ┌──────────────┐      ┌──────────────────┐      ┌──────────────┐
       │   │              │      │                  │      │              │
       ├───│File Selection│      │ Screen Selection │      │     Edit     │
       │   │              │      │                  │      │              │
       │   └──────────────┘      └──────────────────┘      └──────────────┘
```

File Selection (p.22)		Screen Selection (p.26)	
F1	Copy	F1	Copy
F2	Delete	F2	Delete
F3	Print	F3	Print
F4	Tools	F4	Attrib
F5	Hist.	F5	Read
F6	Tmx.	F6	Commnt
F7	Rcv.	F7	Image & Lib
F8	In.Scr	F8	Co/Ovl
F9	Title	F9	Mark
F10	Next	F10	Next

F1	ROM	F1	Check
F10	Prev	F2	Direct
		F3	CoFile
		F10	Prev

Tool Settings (p.20)

F3	Copy
F4	Delete

Exit

[Setting Items]

NT Model
Memory Size
Printer
Sheet Feeder
Mouse Use
Communication Port
Communication Mode
Work Directory
Data Directory

[Setting Items]

Fixed display
├─ Character input (p.58)
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├─ Delete
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SECTION 1
Setting Up the Support Tool

When using the support tool for the first time, the support tool system has to be installed in the personal computer you are using.

This section describes the environment in which the support tool can be used and the method for installing it in a personal computer.

1-1   Preparing Equipment

The following equipment and materials must be prepared in order to use the support tool.

1-1-1   Equipment to be Prepared

Software

• NT610C/NT612G Support Tool Operation Manual (Type NT610G-ZA3AT-EV3)

This software comes in the form of a 3.5 inch floppy disk.

• DOS

IBM DOS, Ver.5 or later version is required.

Hardware

• IBM PC/AT Personal computer

At least 640 Kbytes of main memory is required.

Use an IBM personal computer or 100% compatible.

• At least one floppy disk drive (2HD format type)

There must be one 3.5 inch drive.

• Display

VGA compatible display

When creating screen data for an NT610C, a color display is required.

• Mouse

Serial mouse or bus mouse

A Microsoft mouse driver is required.

[Common Items]

EPSON ESC/P printer (24 pin) or HP LASER Jet.

• Hard disk drive

A hard disk is essential. The available memory required for the support tool files and data area is 2 Mbytes.

**Equipment Relating to Transfer of Screen Data**

• RS-232C connecting cable

For the cable specifications, see Section 7 Data Communication, and the Appendix.

1-1-2   Before Starting Preparations

Be sure to make a back-up disk for the support tool system disk and keep the original somewhere safe.

When making the back-up, ensure that the original disk is write-protected, as shown below:
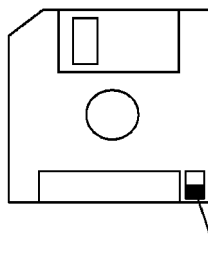
Write-protection tag

1-2   IBM PC/AT Preparations

To enable the support tool to be run on your IBM PC/AT, install the system in its hard disk by using the support tool installation program.

1-2-1   Installation Method

Explained here is the method for installing the system in a hard disk that already has a history of use.

Check that the following conditions are satisfied.

• IBM DOS (Version 5.0 or later) is installed.

• [FORMAT.EXE] and [DISKCOPY.EXE] are loaded.

If these files are loaded in a subdirectory, set an environment variable PATH.

For the purposes of this explanation, the drive configuration is assumed to be as follows:

Drive A: 3.5 inch floppy disk

Drive B: 3.5 inch floppy disk

Drive C: Hard disk

If the drives of the system you are using differ from those in this example, rename the drive names in the example to achieve correspondence with your system (remember that there must be at least one 3.5 inch floppy disk drive).

Procedure 1. Start up a DOS compatible personal computer with a hard disk.

2. Prepare a new floppy disk and use it to create a back up disk for the support tool system disk in the following way.

Set the new disk in the B drive.

Enter "FORMAT B: ⏎ ". The new disk will be formatted.

On completion of formatting, set the support tool system disk in the A drive.

Enter "DISKCOPY A: B: ⏎ ". The back up disk will be created.

▶ If the disks in drive A and drive B are of different types, use the command "DISKCOPY A: A: ⏎ " and create the back up disk in the same drive.

Now take the original disk out of the A drive and store it, and transfer the back up disk to the A drive.

3. Use the command "A: ⏎ " to set the current drive to "A".

4. Enter "INSTALL C: \NTC ⏎ ".

The underlined part (\NTC) is the directory in the hard disk to which the support tool is copied; if it does not exist already it is created automatically. It is possible to specify another directory name.

WARNING If a directory that already exists is specified, the support tool system will be copied to that directory with no request for confirmation. Make sure that no necessary files will be overwritten.

5. When the message indicating completion is displayed, the installation work is finished.

SECTION 2
Basic Operations of the Support Tool

This section explains the basic operations that apply to the support tool as a whole, such as those for starting up and exiting the support tool, and operations using the keyboard and mouse.

When using the support tool, "help messages" which explain the operating procedures are displayed on the screen. After becoming familiar with the basic operations by reading this section, you will therefore be able to use the support tool by following the help messages.

2-1   Starting Up and Exiting the Support Tool

This section describes the procedure for starting up the support tool once it has been installed in a personal computer.

2-1-1   Start-Up Procedure

The method for start-up differs a little according to the hard disk drive and directory in which the support tool is installed.

Procedure   **1.**   Switch on the power supply to the personal computer to start up DOS.

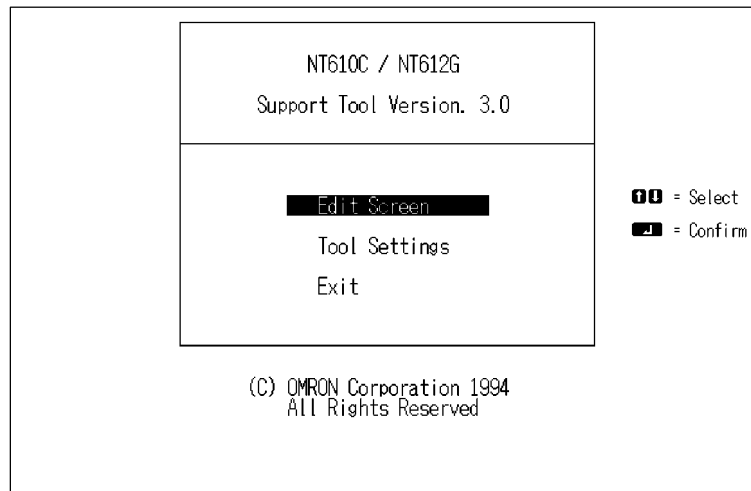Check that the current drive is the drive for the hard disk in which the support tool is installed.

If it is not, enter "C: ⏎ " to change the current drive. For the underlined part (C:), specify the drive name of the drive in which the support tool is installed.

2.   Use the command "CD \NTC ⏎ " to change the current directory to the directory that contains the support tool. For the underlined part (\NTC), specify the name of the directory into which the support tool was copied.

3.   Input "NTC ⏎ ".

The support tool will start up.

• "Main Menu" screen of the support tool

When the support tool starts up the "Main Menu" screen shown below will be displayed.

```
┌──────────────────────────────────────────────┐
│   ┌────────────────────────────────┐          │
│   │        NT610C / NT612G          │          │
│   │    Support Tool Version. 3.0    │          │
│   ├────────────────────────────────┤          │
│   │                                 │  ▯▯ = Select   │
│   │        ▉Edit Screen▉            │  ▬ = Confirm   │
│   │                                 │          │
│   │         Tool Settings           │          │
│   │         Exit                    │          │
│   └────────────────────────────────┘          │
│                                                │
│   (C) OMRON Corporation 1994                   │
│       All Rights Reserved                      │
└──────────────────────────────────────────────┘
```

2-1-2   Exit Procedure

When the "Main Menu" screen is displayed, move the cursor to "Exit" using the [↑] [↓] keys and press enter key (⏎).

The support tool will be exited and the DOS prompt will be displayed.

After the prompt has appeared, switch the power off.

2-2　　Basic Operating Procedures

The support tool is a software package that allows the creation of screen data for a PT, and communication with a PT, using simple operations. The user can perform these operations simply by following the help displays that appear on the screen.

Support tool operations can be performed either by using the keyboard or by using a mouse.

This section explains basic operations such as the selection of menu options and operation of the mouse.

2-2-1　　Cursors

The following types of cursor are displayed on the screen in different circumstances.

- Bar cursor (▮▮▮▮▮▮)

  Used to select options, file names, etc.

  This cursor is moved by using the [↑][↓][←][→] keys or the mouse.

- Mouse cursor (▶)

  This cursor follows the motion of the mouse. When performing operations using the mouse, locate this cursor on the required item and click the left mouse button.

- Cup cursor (☕)

  This cursor is displayed while the support tool is carrying out processing. When the processing is finished it changes into the mouse cursor.

- Enquiry cursor (🔧)

  This cursor is displayed while the support tool is waiting for the input of a reply, such as YES/NO. When this cursor is displayed, press the ⏎ key (for YES) or the [Esc] key (for NO).

  When using the mouse, press either the left button (for YES) or the right button (for NO). It is also possible to click on icons with the pointed part of the enquiry cursor (at its top left corner) (p.12).
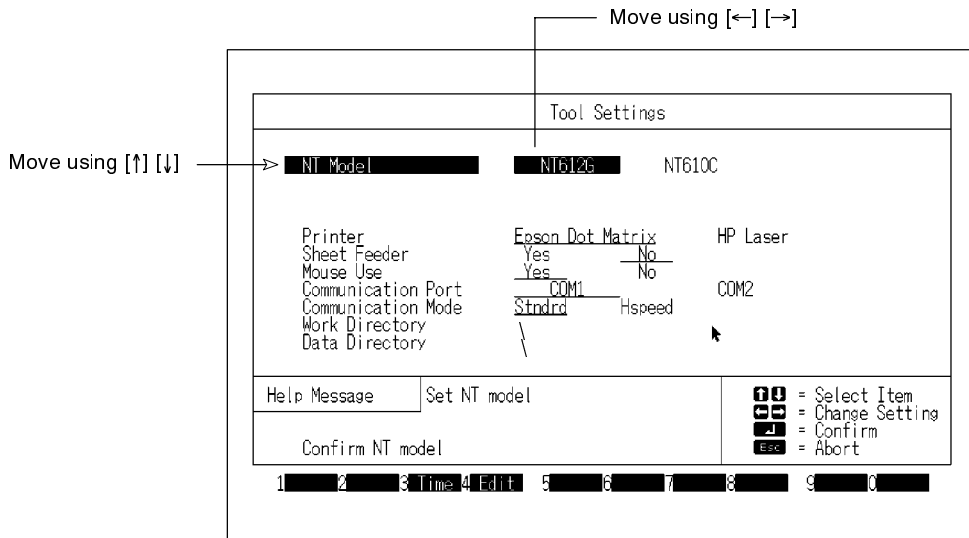
- Key input prompt cursor (⬆)

  This cursor is displayed when input is required. When it is displayed, carry out input from the keyboard or by using the mouse.
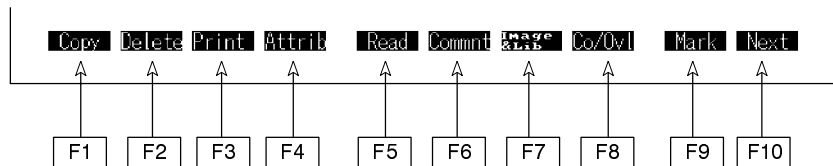
2-2-2   Selecting Options

When performing operations using the support tool it will be necessary to select menu options, choices, file names, etc.

Such selections are made by locating the bar cursor on the item to be selected by using the arrow keys ([↑][↓][←][→] keys) and pressing the ⏎ key.

Move using [←] [→]

Move using [↑] [↓]

```
                              Tool Settings

 ⇒  NT Model              NT612G      NT610C


    Printer              Epson Dot Matrix    HP Laser
    Sheet Feeder         Yes             No
    Mouse Use            Yes             No
    Communication Port        COM1          COM2
    Communication Mode   Stndrd    Hspeed
    Work Directory
    Data Directory            \

    Help Message     Set NT model              ⊡⊡ = Select Item
                                               ⬛⬛ = Change Setting
                                               ⏎ = Confirm
                     Confirm NT model          Esc = Abort
    1        2       3 Time 4 Edit  5      6      7      8      9      0
```

2-2-3   Using the Function Keys

The currently available functions and currently selectable options are displayed at the bottom of the screen. The items displayed correspond to the function keys on the keyboard. To execute one of the displayed options, press the function key on the keyboard that corresponds to it.

```
 Copy  Delete Print Attrib   Read  Commnt Image Co/Ovl   Mark  Next
                                           &Lib

 F1    F2    F3    F4      F5    F6    F7    F8      F9   F10
```

2-2-4   Using the Mouse

It is possible to perform all the support tool operations by using a mouse.

The left button of the mouse has the same function as the ⏎ key on the keyboard and right button the same function as the [Esc] button.

Selection or specification of items using the mouse is achieved by clicking one of its buttons. "Clicking" means pressing the button and releasing it immediately.

Reference: Whether the mouse is used or not is specified with the "Mouse Use" option of the "Tool Settings" menu (see p.20). If "No" is specified, the mouse cursor ceases to be displayed (however, even if "No" is specified, the mouse cursor will be displayed and will be able to be used when editing image data).

• Selection

Select items by moving the cursor to them and clicking on them.

For example, to select a file, locate the mouse cursor at the intended file name and click the left mouse button. When the bar cursor has moved, click on the file name again with the left button. This will select the file.
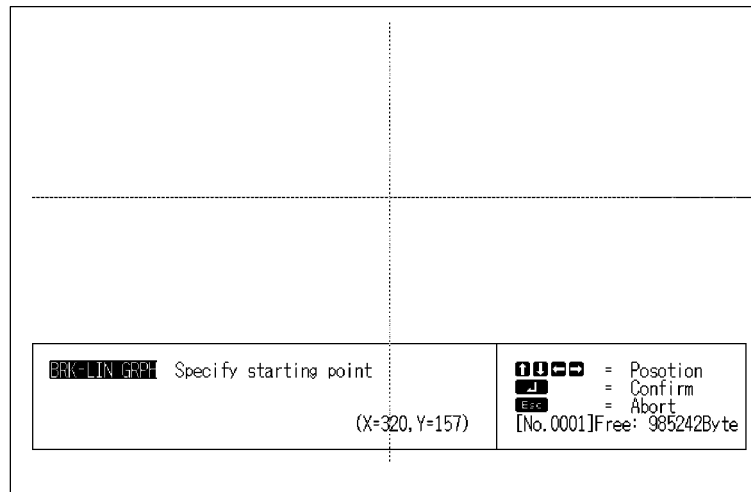
• Icon operations

The key marks displayed in the help message area and elsewhere are icons that can be actuated with the mouse. Clicking on an icon with the left mouse button will execute the function represented by that icon.

For example, clicking on the ▄◢▄ mark displayed on the screen with the left mouse button will have the same effect as pressing the ⏎ key.
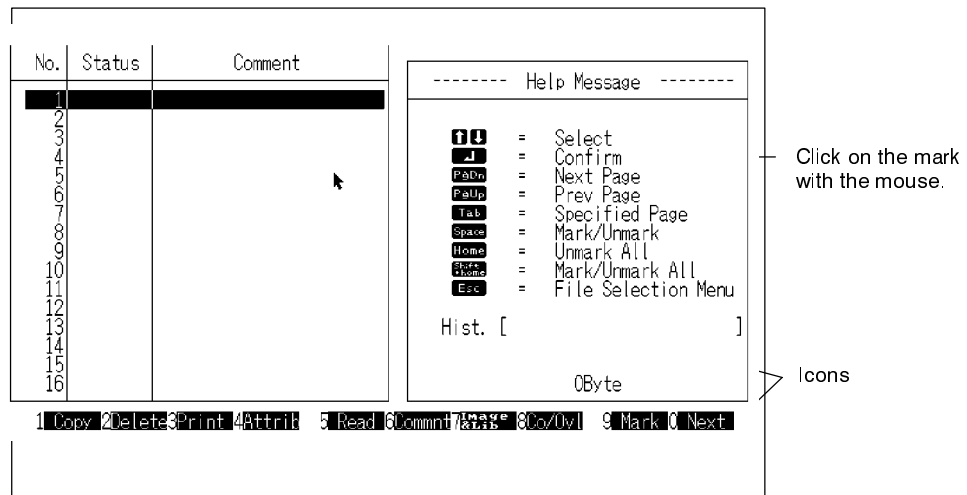
• Operations on the editing screen

When specifying coordinate positions etc. on the editing screen, the cross-hair cursor (intersecting vertical and horizontal lines) is displayed. The cross-hair cursor follows the motion of the mouse. To fix a position, click the left mouse button.

```
┌─────────────────────────────────────────────────────┐
│                          ┊                            │
│                          ┊                            │
│                          ┊                            │
│                          ┊                            │
│  ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┼┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄       │
│                          ┊                            │
│                          ┊                            │
│                          ┊                            │
│ ┌────────────────────────┊──┐ ┌────────────────────┐ │
│ │ BRK-LIN GRPH  Specify starting point │ │◻◻◻◻ = Posotion  │ │
│ │                        ┊     ┘    = Confirm  │ │
│ │                  (X=320,Y=157) │ │Esc   = Abort     │ │
│ │                        ┊     [No.0001]Free: 985242Byte │ │
│ └──────────────────────────────┘ └────────────────────┘ │
└─────────────────────────────────────────────────────┘
```

Reference: Whether or not a menu box is displayed when the cross-hair cursor is displayed is specified in the "environmental settings" (tool settings for the "Edit" screen).

• Double click

To specify the end points for continuous lines and polygons, double-click the mouse. "Double-clicking" means pressing the left mouse button twice in rapid succession.
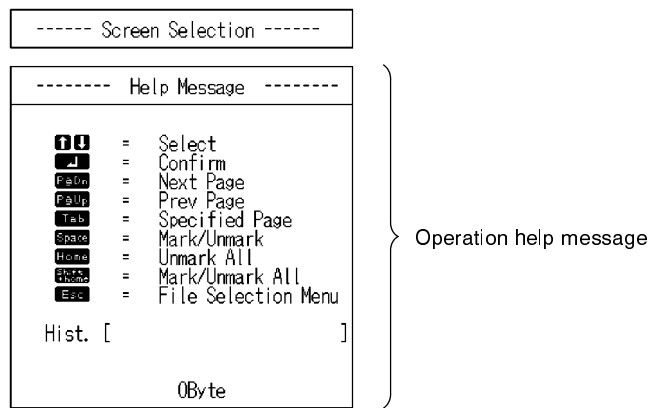
2-2-5   Using Help Messages

The support tool is provided with "help messages" for each screen: they display the key operations that can currently be used, or prompt parameter input or selections.

The key displays in the help message area also function as icons that can be actuated using the mouse.

Operate the support tool by following the help messages. There are two types of help message, distinguished on the basis of the screen and function, as indicated below.
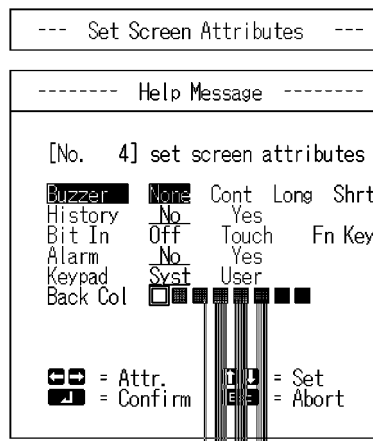
• Help messages that display the operating procedure

Usually, as shown in the screen below, the operation keys that can be used with the current screen, and their details, are displayed in the help message area.

```
------ Screen Selection ------

-------- Help Message --------

  ⬆⬇    =   Select
   ↵    =   Confirm
 PgDn   =   Next Page
 PgUp   =   Prev Page
 Tab    =   Specified Page          ⎫
 Space  =   Mark/Unmark             ⎬  Operation help message
 Home   =   Unmark All              ⎭
 Sh+Home=   Mark/Unmark All
 Esc    =   File Selection Menu

Hist. [                      ]

              0Byte
```

• Help messages for parameter input

In cases such as when a function has been selected with a function key, settings and parameters can be specified in the help message area.

```
---   Set Screen Attributes   ---

-------- Help Message --------

 [No.   4] set screen attributes

 Buzzer  None  Cont  Long  Shrt
 History   No        Yes
 Bit In   Off       Touch      Fn Key
 Alarm     No        Yes
 Keypad   Syst      User
 Back Col ☐▦▦▦▦▦▦▪▪

  ⬅➡  = Attr.      ⬆⬇  = Set
   ↵  = Confirm    Esc = Abort
```

2-2-6   Selecting Numbers and Codes

The support tool allows simple selection of the following numbers and codes.

- Screen numbers

- Numeral table numbers

- Character-string memory table numbers

- Bit memory table numbers

- Image codes

- Library codes

- Extended I/O input terminal numbers (*)

- Extended I/O output terminal numbers (*)

(*)   Only number specification using the [Tab] key can be used for these.

When a screen that displays a list of numbers or codes is displayed, the key operations indicated below can be used:

[Shift] + [↑] key   :   Moves the bar cursor from the position where it is currently located to the previous number or code for which there is data.

[Shift] + [↓] key   :   Moves the bar cursor from the position where it is currently located to the next number or code for which there is data.

Example:

Assume that the bar cursor is on screen number 6 and there is data only for screen numbers 2, 4, and 10:

[Shift] + [↑] key   :   The bar cursor moves to screen number 4.

[Shift] + [↓] key   :   The bar cursor moves to screen number 10.

If now, while the bar cursor is at screen number 10, [Shift] + [↓] is pressed again, the bar cursor will move full cycle to screen number 2.

```
[NEW_FILE] Scr list NT610C-V3-0 1024KB        ------ Screen Selection ------

 No.  Status        Comment                  -------- Help Message --------
  1
  2    C        ! Production Qty Disp.         ██  =    Select
  3                                            ⏎   =    Confirm
  4    C        ! Production Qty Disp.         PgDn =   Next Page
  5                                            PgUp =   Prev Page
  6                                            Tab  =   Specified Page
  7                                            Space =  Mark/Unmark
  8                             ▶              Home =   Unmark All
  9                                            Shift =  Mark/Unmark All
 10             ! Material Temp. Disp.         +Home
 11                                            Esc  =   File Selection Menu
 12
 13                                           Hist. [                    ]
 14
 15
 16                                                      0Byte

 1 Copy 2Delete 3Print 4Attrib  5 Read 6Commnt 7Image 8Co/Ovl  9 Mark 0 Next
```

[Tab] key : The number/code input field is displayed. When a number of code is input and the ⏎ key pressed, the bar cursor moves to the specified number or code.

Example: Screen number input field

```
Screen No. [█  6]
```

SECTION 3
Support Tool Operations

The support tool has the following 5 screens: the "Main Menu" screen, the "Tool Settings" screen, the "File Selection" screen, the "Screen Selection" screen, and the "Edit" screen. This section describes the four screens other than the "Edit" screen.

3-1 Using the Support Tool

The support tool is a software package for creating screen data and transferring it to an NT612G/NT610C.

The support tool has five basic screens and on these five screens it is possible to create data, and to select various functions and execute them.

The relationships between the screens are shown below.

Support Tool Start-Up

Main Menu

"Tool Settings" screen

Used to set the environmental settings for the support tool, such as the PT model used.

"File List" screen

Used to select screen data files. Permits various file-related operations.

Communication with the PT

Execute communication of screen data etc. with the PT.

Print

Print screen data, conditions of use of memory tables, etc., at a printer.

"Screen Selection" screen

Used to select screen data. Screen data attributes can be set and various operations relating to screen data are possible.

"Edit" screen

Used to create screen data using characters and graphics.

3-2   Main Menu

When the support tool is started up, the "Main Menu" screen is displayed first.

```
                NT610C / NT612G

           Support Tool Version. 3.0



                Edit Screen                  ⬛⬛ = Select
                                             ⬛⬛ = Confirm
                Tool Settings

                Exit



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```

The items in the main menu have the following functions.

• Edit Screen: Select this item to create or edit screen data. The "File Selection" screen will be displayed and operations relating to screen data and files will be possible.

• Tool Settings: Used to set the environmental conditions for using the support tool, such as the model of the PT used in conjunction with the support tool, the image data memory capacity, and the model of printer used. Provided there are no changes, these settings only have to be set once.

• Exit :   Used to exit the support tool. To exit, select this item, wait for the DOS prompt to be displayed and then switch the power off.

3-3   "Tool Settings" Screen

This screen is used to set the environmental settings required to use the support tool, such as the PT model, capacity of the screen data memory board, and the directory in which data is saved.

When using the support tool for the first time, be sure to set the tool settings in accordance with the models you are using. After this first setting, it will not be necessary to set the tool settings again unless there is some change.

Settings

When "Tool Settings" is selected from the main menu, the "Tool Settings" screen is displayed.

<"Tool Settings" screen>

```
                             Tool Settings

      NT Model                  NT612G      NT610C


         Printer            Epson Dot Matrix    HP Laser
         Sheet Feeder           Yes       No
         Mouse Use              Yes       No
         Communication Port       COM1           COM2
         Communication Mode    Stndrd    Hspeed
         Work Directory           \
         Data Directory           \              ▶

      Help Message      Set NT model              ⬆⬇ = Select Item
                                                  ⬅➡ = Change Setting
                                                  ⏎  = Confirm
         Confirm NT model                         Esc = Abort

         1      2    3 Time 4 Edit   5    6    7    8    9    0
```
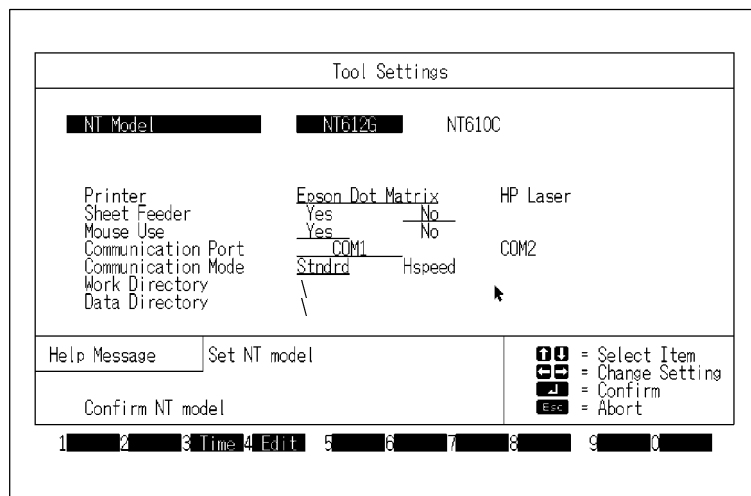
- NT Model: Specify the PT model being used (NT610C) here.

- Printer: Specify the type of the printer used to print screen data, etc., here.

- Sheet Feeder: Specify whether or not the printer is fitted with a sheet feeder here.

- Mouse Use: Specify whether or not a mouse is used with the support tool.

                         If "No" is selected the mouse cursor ceases to be displayed. However, during image data editing, the mouse cursor is displayed and can be used even when "No" is specified.

- Communication Port: Specify the port on the computer to be used to communicate with the PT. If possible, do not specify the same port as the one used for the mouse.

• Communication Mode: Set the communication speed for communication of data with the PT.

Set "Stndrd" if the conditions for communication are unfavorable due to interference, etc.

• Work Directory: The support tool temporarily creates work files for data creation and communication, etc. This setting specifies the directory in which work files can be created.

• Data Directory: Specify the directory in which created screen data files are saved here.

Functions of the function keys

[Time]   [F3] . . . PT time setting

Used to make the time setting for the PT.

(1)   Connect the PT and the support tool (see Section 7 Data Communication).

(2)   Press the [F3] (time) key.

(3)   To change the current time, enter the time on the screen.

(4)   Press the ⏎ key: the time data will be sent and set in the PT.

▶ It is also possible to receive the time set in the PT and set it. Press the [F1] (receive) key with the time setting screen displayed.

[Edit]   [F4] . . . Tool settings for the "Edit" screen (environmental settings)

Used to set the "Edit" screen settings, such as grid display and "snap ON" setting.

These settings can also be made by selecting SET ENV on the initial editing screen. For the details of these settings see "Environmental Settings" (p.47).

Quitting tool setting

• Press Enter key twice: the support tool will be set in accordance with the details displayed on the screen and the display will return to the main menu.

• Press the [Esc] key to return to the main menu without making any settings.

3-4 "File Selection" Screen

When the "Edit Screen" option is selected from the main menu, the "File Selection" screen is displayed.

In support tool terminology, an assemblage of screen data is called a "file".

Settings

On the "File Selection" screen, besides creating and selecting files, it is also possible to perform functions such as data communication with the PT.

<"File Selection" screen>
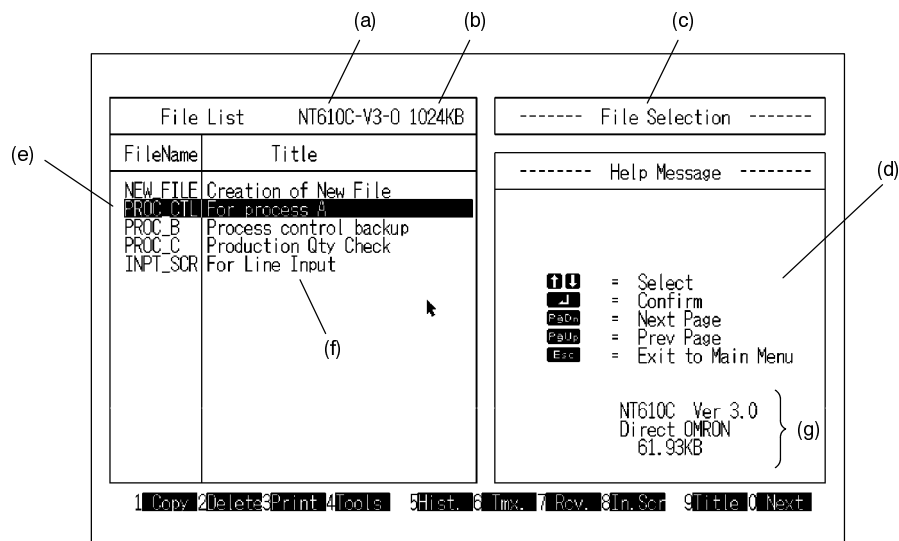
(a)   PT model name: This is the PT model and direct connection version number set in the "Tool Settings". The final 0 indicates direct connection.

(b)   PT memory size

(c)   Name of task currently being executed

(d)   Help message area: Displays a guide to operation and allows parameter input.

(e)   File name: The file names are indicated in this column. If the bar cursor is located on a file name and the ⏎ key pressed, the "Screen Selection" screen will be displayed. To create a new file, select "NEW_FILE".

(f)   Title: This is a comment that indicates the contents of a file. It is input when the file is saved.

(g)   File information: The PT model, direct connection version, direct connection and file size for the file at the bar cursor location are displayed here.

The support tool allows the creation of up to 254 files. If the required file is not displayed on the screen, screens earlier and later in the sequence can be displayed by using the [Page Down] and [Page Up] keys.

Reference: • To use more than 254 files, create another directory. The data directory can be changed by using the "Tool Settings" option.

• All the files in the specified data directory are displayed.

It is possible to read files set using other models but you are advised to check the details of the file information displayed when the file is specified before reading it.

Returning to the main menu

To return to the main menu, press the [Esc] key.

Functions of the Function Keys

[Copy]   [F1] . . . Copy file

Used to copy the contents of a file to another file.

(1)   Press the [F1] (copy) key.

(2)   Select the file to be copied.

(3)   Input the file name and title of the copy destination and press the ⏎ key.

▶ If [F1] (drive) is now selected, the file can be copied to the directory of another drive.

[Delete]   [F2] . . . Delete file

Used to delete unnecessary files.

(1)   Locate the bar cursor at the file to be deleted and press the [F2] key.

(2)   Check the file name and then press the ⏎ key: the file will be deleted.

[Print]   [F3] . . . Print data

Used to print out files, information relating to screen data, character-strings, the conditions of use of numeral tables, etc.

See Section 6 "Printing Data".

[Tools]   [F4]] . . . Tool settings

Displays the "Tool Settings" screen.

Used to change the support tool environment during file operations.

For details of the setting operation, see 3-3 "Tool Settings" Screen (p.20).

[Hist.]   [F5] . . . Receive display history registration data

Used to read display history registration data registered in the PT and save it in a file.

This file is a text style of DOS format file and is therefore different from the files in which screen data is saved.

See Section 7 "Data Communication".

| [Tmx.] | [F8] . . . Send data to the PT |

Establishes a connection with the PT, sends created data to it in file units and writes it to the image data memory. The types of data that can be sent are screen data, character-string memory table and numeral table data, system memory data, mark data, image data, library data, and direct information.

See Section 7 "Data Communication".

| [Rcv.] | [F7] . . . Receive data from the PT |

Used to receive data registered in the PT in file units. The types of data that can be received are screen data, character-string memory table and numeral table data, system memory data, mark data, image data, library data, and direct information.

See Section 7 "Data Communication".

| [In.Scr] | [F8] . . . Set system memory |

Used to set the screen number and PT statuses at startup that are displayed when the PT is started up.

The following items can be set:

- Initial screen: Number of the screen data displayed when the PT is started up.

- Key input buzzer: ON/OFF status of key input sound.

- Buzzer: Buzzer sound ON/OFF or ON only when an error occurs.

- Resume function: ON/OFF status of the "resume" function.

- Alarm output: ON/OFF status of alarm output.

- Backlight OFF (prevention of afterimage): This is an afterimage prevention function which automatically switches off the backlight (or makes the display blank). The available settings are to switch the backlight off after a time lapse of 10 minutes/1 hour, or "off". In the case of the NT610C this function switches the backlight OFF. In the case of the NT612G, it makes the screen blank.

- Printer: Type of printer connected to the PT: EPSON Esc/P printer (24 pin) or HP LASER Jet.

- Print way: Printing method used when printing a screen displayed on the PT: color or greyscale (only valid when using NT610C).

• Numeral tables:	The number of numeral tables: 512 or 1000 (if reduced to 512, the memory capacity available for screen data is increased by 4880 bytes).
• String tables:	The number of character-string memory tables: 256 or 1000 (if reduced to 256, the memory capacity available for screen data is increased by 29760 bytes).
• Alarm fast I/O:	Processing method when the maximum number of alarm instances (1000) is exceeded when using the alarm history.

- "Yes": Old records are deleted as new ones are registered.

- "No": The registration of new history records is prevented.

On completion of setting, press the ⏎ key.

[Title] [F9]Change file title

Used to change the titles of files for which titles have been set.

(1) Locate the bar cursor at the file whose title is to be changed and press the [F9] (Title) key.

(2) Enter the new title and press the ⏎ key.

[Next] [F10] . . Display next function keys

Pressing this key changes the function key display to the next set of function keys.

```
┌──────────────────────────────────────────────────┐
│  ███ROM███  ████  ████  ████   ████  ████  ████  ████   ████ Prev │
└──────────────────────────────────────────────────┘
```

The functions of these function keys are explained below.

[ROM] [F1] . . . Data communication with P-ROM writer

Used to communicate with a P-ROM writer in order to create or modify EP-ROMs for IC socket type image memory boards.

See Section 7 "Data Communication".

[Prev] [F10] . . Display previous function keys

Pressing this key changes the key display to the previous set of function keys.

3-5   "Screen Selection" Screen

The "Screen Selection" screen is displayed when a file to be edited is selected from the "Select File" screen, or when NEW_FILE is selected.

Functions of the "Screen Selection" Screen

Settings

Besides specifying the screen number for which screen data is to be created, various other operations and settings relating to screen data are possible on this screen, for example the setting of attributes for screen data and reading of data from other files in screen units.

Select the required screen and press the ⏎ key to enable editing of the screen.

<"Screen Selection" Screen>
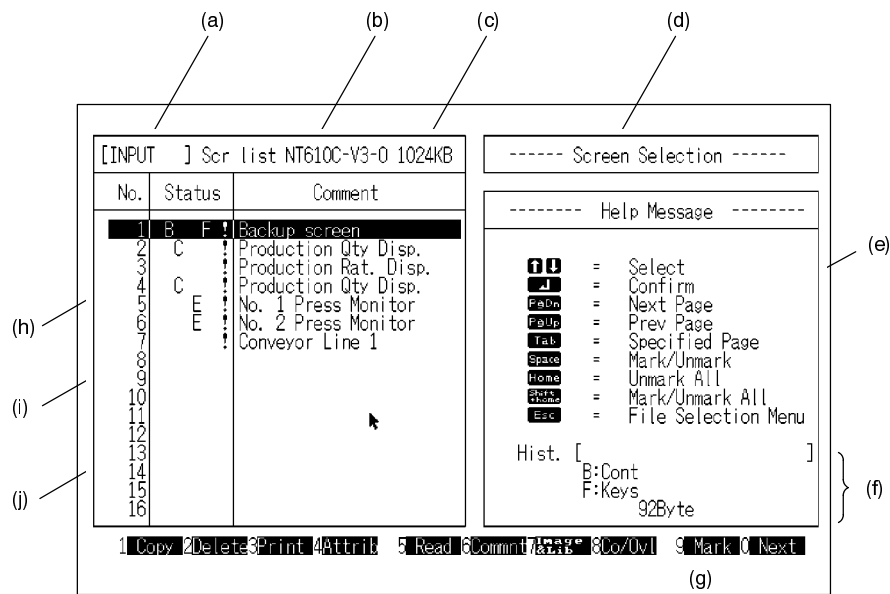
(a)   Selected file name

(b)   PT model name: The PT model name and direct connection version set for the file is displayed here. Data for direct connection has a "0" appended as the final character.

(c)   PT memory size

(d)   Name of task currently being executed

(e)   Help message area: Displays a guide to operation and allows parameter input.

(f)   Screen status details: Detailed information on screen data is displayed here.

(g)   Screen data size

(h)   Screen number: The support tool manages screen data under screen numbers from 1 to 2000. Screen data can be created under any screen number.

The previous and next pages can be displayed by using the [Page Up] and [Page Down] keys.

The bar cursor can be moved to the previous and next screen number for which there is data by using [Shift] + [↑] and [Shift] + [↓].

The "No." column is displayed by pressing [Tab] key.

(i)   Screen status, attribute: In the "Status" column, the presence/absence of screen data and the set attribute are displayed in symbolic form.

More detailed information relating to these indications is displayed in the "Screen Status" area at the bottom right of the screen.

Symbol	"Screen Status" Information	Meaning
(Blank)	(No data)	No data has been created for this number.
!	(Data exists)	There is data for this number.
A	A: Cont	Parent screen of continuous screens
A	A: Ovlp	Parent screen of overlapping screens
B	B: Cont	Buzzer attribute (continuous tone)
B	B: Long	Buzzer attribute (intermittent long tones)
B	B: Shrt	Buzzer attribute (intermittent short tones)
C	C: Hist	Display history attribute
D	D: Touch	Bit input (touch switch)
D	D: Fn key	Bit input (function key)
E	E: Alrm	Alarm attribute
F	F: Keys	"Keypad" ten keys are set by the user.
G	G: Ext	Background color

(j)   Comment: This is a comment assigned to the screen data. It is set when the screen data is saved.

It can be changed using the [F6] (Commnt) key.

<Screen Numbers and Their Applicability>

Some screens are earmarked for special applications, as shown below.

Screen No.	Application	User Editing	Remarks
0	Screen display OFF	×	Specified in order to switch the screen display off.
1 to 1899	User screens	○	Can be used without restriction
1900 to 1979	Keyboard screen	○	Can be used as a keyboard screen called to set character-strings. Can also be used as a normal screen.
1980 to 1996	Reserve screens for expansion functions	○	If data is registered for these screens, treating them as normal screens, the registered data takes priority.
1997 1998	Display history screens 1997: Order or occurrence 1998: Order of frequency	△	Only when using the direct connection function (necessary to create scroll keys).
1999	"Connecting Host" screen	○	If no data is registered, the "Connecting Host" screen set by the system is displayed.
2000	"Host Error" screen	○	If no data is registered, the "Host Error" screen set by the system is displayed.

○: Possible   △: Partly possible   ×: Not possible

<Using the Marking Function>

When, for example, deleting screen data, a number of screens can be handled together by using the marking function. All marked (*) screen data is taken as the object of the executed operation, regardless of the location of the bar cursor. In a copy operation, the screen data at the location of the bar cursor is copied to all screen numbers marked by (*). This is useful when creating very similar screens.

[Space] key: Marks the selected screen data. If the data is already marked, the mark is deleted.

[Home] key: Deletes all marks.

[Shift] + [Home]: Deletes the marks of all marked screen data and marks all unmarked screen data.

Reference: To perform an operation all screens except a specified screen (or screens), use the following procedure:

Example: Deleting all screen numbers except screens 1 to 3.

1. Clear all marks by pressing the [Home] key.

2. Mark screens 1 through 3 by pressing the [Space] key.

3. Press [Shift] + [Home].

All screen numbers except 1 through 3 will be marked.

4. Delete the screen data by pressing [F2] (delete).

<Saving and Quitting Screen Data Files>

Pressing the [Esc] key while the "Screen Selection" screen is displayed quits screen creation. There are two types of quitting: quitting after saving the file, and quitting without saving the file.

⏎ key:　　　　　Press after inputting the file name and comment to save the file and return to the "File Selection" screen.

[Space] key:　　Used to return to the "File Selection" screen without saving the file.

[Esc] key:　　　Used to abort quitting and continue screen selection.

Functions of the Function Keys

[Copy]　　　　　[F1] ... Copy screen data

Used to copy screen data to another screen number.

(1) Locate the bar cursor at the screen data to be copied, and press the [F1] (Copy) key.

(2) Input the copy destination screen number and comment and press the ⏎ key.

▶ It is also possible to batch copy all marked screen numbers.

[Delete]　　　　[F2] ... Delete screen data

Used to delete unnecessary screen data.

(1) Locate the bar cursor at the screen data to be deleted and press the [F2] (Delete) key.

(2) Press the ⏎ key.

▶ It is also possible to batch copy all marked screen numbers.

[Print]　　　　　[F3] ... Print data

Used to print out screen images and the numbers of lamps and touch switches at a printer.

See Section 6 "Printing Data".

[Attrib]　　　　　[F4] ... Set attribute

Used to set screen attributes. Setting is accomplished by making selections in the Help Message area. The following attributes can be set.

• Buzzer:　　　None, Cont (continuous sound), Long (long intermittent sounds), Shrt (short intermittent sounds)

• History:　　　No, Yes

• Bit In:　　　　Off, Touch (touch switch), Fn key (function key)

• Alarm:　　　　No, Yes

• Keypad:　　　System, User

• Back Col:　　Screen background colors (applicable to NT610C only)

For details on each attribute, refer to the User's Manual for the PT.

WARNING The attributes of the parent screen are used in the case of continuous screens and overlapping screens. Screen attributes set for child screens are invalid.

[Read]   [F5] . . . Read screen data

Used to read screen data and memory table data from other files.

(1) Press the [F5] (Read) key.

(2) Select the file whose data is to be read and press the ⏎ key.

▶ Pressing the [F1] (Drive) key allows the specification of a file in another drive directory. Only files for which the "Direct Connection" setting is the same can be specified.

(3) The procedure after this point differs according to the type of data: see the scheme below. Specify the data to be read, the reading source and reading destination by following the directions on the screen in order to read the data.
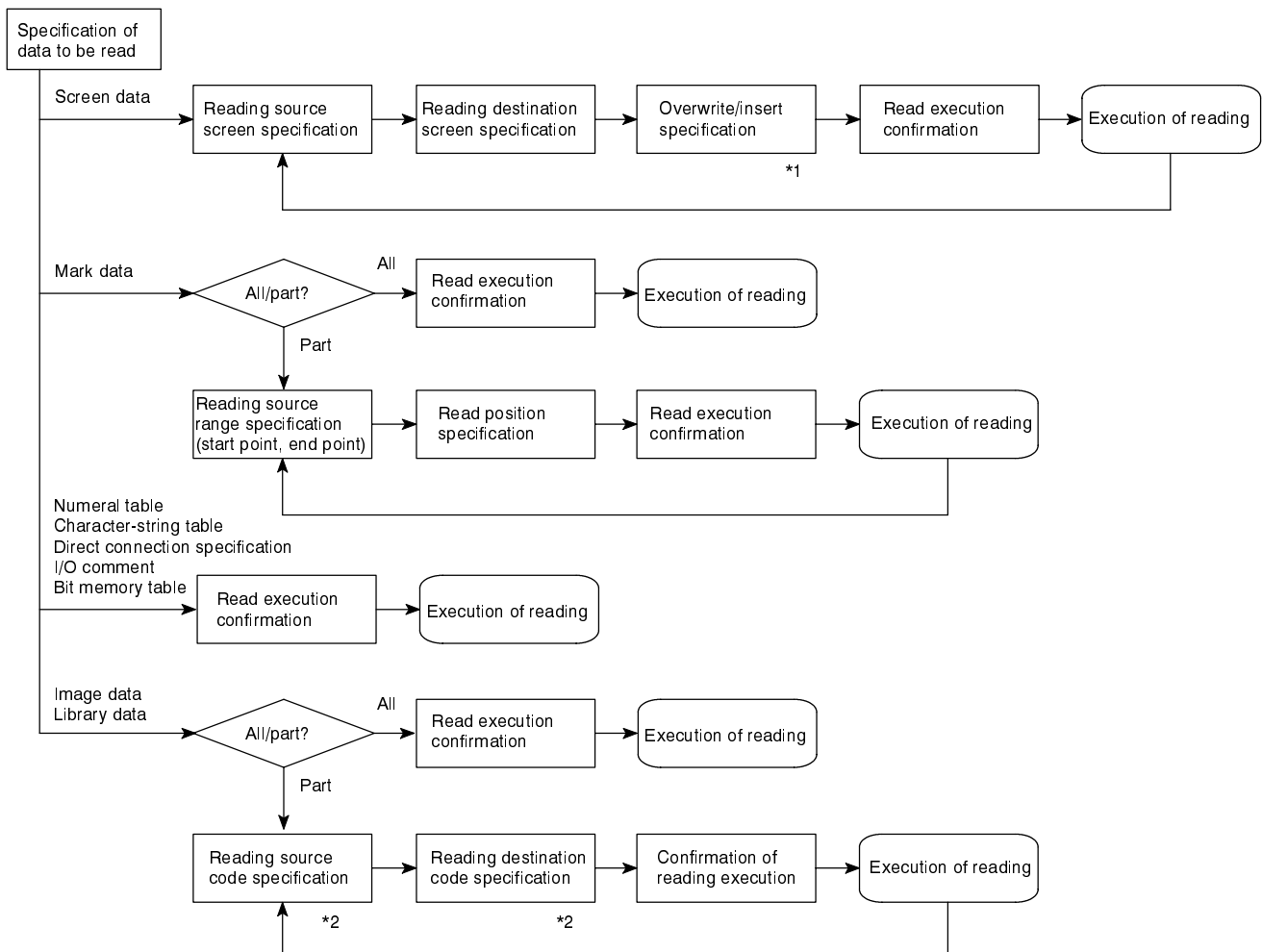
(*1)   Overwrite: If data already exists at the destination it is overwritten (the original data is cleared).

Insert: If data already exists at the destination the data is read into the file without clearing the original data.

(*2)   • Image data is selected from codes FE20 through FEFF.

• Library data is selected from FA20 through FAFF, FB20 through FBFF, FC20 through FCFF, FD20 through FDFF.

• Use [Shift] + [↑] or [Shift] + [↓] to move the bar cursor to the previous or next code for which there is data.

• The bar cursor can be moved to a specified code by pressing the [Tab] key and inputting the code.

It is possible to continue reading more data from the same file.

To quit data reading, press the [Esc] key; the display will return to the "Screen Selection" screen.

[Commnt]   [F6] . . . Change comment

Used to change the comments assigned to screen data.

(1)   Locate the bar cursor at the screen number whose comment is to be changed and press the [F6] (Commnt) key.

(2)   Input the new comment and press the ⏎ key.

[Image & Lib]   [F7] . . . Edit Image/library data

Used to create and modify image library items.

See Section 5 "Creating a Mark Image Library".

[Co/Ovl]   [F8] . . . Continuous screen & overlapping screen setting

Used to specify continuous screens and overlapping screens.

(1)   Locate the bar cursor at a screen number for which there is no data and press the [F8] (Co/Ovl) key.

▶ If a number for which there is data is specified, a message asking whether or not the data is to be cleared is displayed.

(2)   Select either "Cont Scr" or "Ovlp Scr" and press the ⏎ key.

The set screen will become the parent screen.

(3)   Set the child screens by following the help messages.

▶ Up to 8 child screens can be set in the case of both continuous screens and overlapping screens.

[Mark]   [F9] . . . Mark creation

Used to create and modify marks.

See Section 5 "Creating a Mark, Images, and Library Data".

[Next]   [F10] . . Display next function keys

Pressing this key changes the function key display to the next set of function keys.

```
1Check 2Direct 3CoFile 4▮▮▮    5▮▮▮ 6▮▮▮ 7▮▮▮ 8▮▮▮    9▮▮▮ 0 Prev
```

For an explanation of the function of each function key, see the following.

[Check]   [F1] . . . Check on continuous screens/overlapping screens

Used to check if there is any abnormality in the relationship between the parent and child screens of continuous screens and overlapping screens.

(1) Select the file to be selected on the "File List" screen.

(2) Press the [F10] (Next page) key and then press the [F1] (Check) key.

(3) Set whether or not the results are to be output at a printer and execute the check.

The results of the check are displayed in the following form.

No.	Error	Details

No.   : The parent screen number is displayed here.

Error   : If an error is found, its details are displayed.

Error Type	Cause	
Prnt	A screen set as child screen has been specified as the parent screen for another continuous screen or overlapping screen.	
Keys	Overlapping screen	There are two or more child screens for which a numeral setting has been made (when carrying out system setting).
	Continuous screen	There is a child screen for which a numeral setting has been made.
Num	Overlapping screen	In direct connection, the total of the numbers the following functions exceeds the maximum number that can be set. Number of functions settable: Numeral displays + graphs + numeral settings = Max. 1024
Attr	Overlapping screen	The "keypad attribute" is different for the parent screen and child screens.

Details: The numbers of the child screens that make up the overlapping screen or continuous screen are displayed.

If there is an error, the relevant screen number is underlined.

[Table]   [F2] ... Edit table

Used to write data to, and change the data in, character-string memory tables and numeral memory tables.

(1) Press the [F2] (Table) key.

(2) Select the character-string memory table or numeral memory table and press the ⏎ key.

(3) Edit the contents of the memory table.

• Move the bar cursor with the arrow keys, make the selection by pressing the ⏎ key, and change the data.

• Previous and next screens can be displayed by using the [Page Up] and [Page Down] keys.

The bar cursor can be moved to a specified number by pressing the [Tab] key and inputting the number.

▶ Pressing the [F1] (Ref) key will display a list of the screens that refer to the memory table with the specified number. When editing a character-string memory table, marks can be input using [F3] (Mark) and images using [F4] (Image).

(4) To quit editing, press the [Esc] key.

[Direct]   [F2] ... Set direct connection information

Data area allocations for direct connection can be made using batch settings.

See "Setting Direct Connection Information" (p.34).

[CoFile]   [F3] ... Creating files from screens

Screen data can be saved in Microsoft Windows (TM) files (BMP format)

[Prev]   [F10] .. Display previous function keys

Pressing this key changes the key display to the original set of function keys.

3-5-1   Setting Direct Connection Information

The "Direct" menu option on the "Screen Selection" screen allows batch setting of the following functions:

- PT status control area allocation

- PT status notify area allocation

- Numeral table allocation and initial value setting

- Character-string table allocation and initial value setting

- Expanded I/O unit input terminal allocation and function setting

- Expanded I/O unit output terminal allocation

- Setting of the functions, display, and allocations of bit memory tables

Note   Be sure to allocate the data area referenced in the PC to the PT status control area and PT status notify area.

Procedure   1.   Press the [F10] (Prev) key on the "Screen Selection" screen.

2.   Press the [F2] (Direct) key.

3.   Locate the bar cursor at the function to be set and press the ⏎ key.

    The function setting window will be displayed: carry out allocations to the data area in the PC and function setting in this window. For details of the settings, refer to the descriptions of the individual functions.

4.   On completion of setting, press the [Esc] key.

PT Status Control Area, PT Status Notify Area

Allocate data areas at the PC for the PT status control area, which controls the PT from the PC, and the PT status notify area, which notifies the PC of information from the PT.
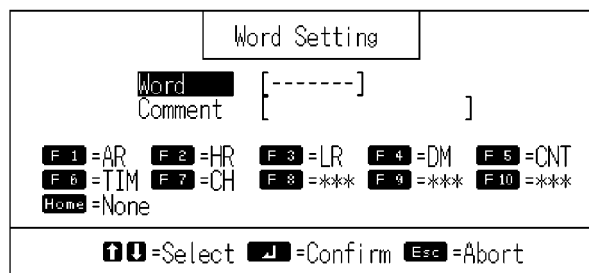
For details of the settings, see "Setting Words and Bits" (p.57).

WARNING   It is not possible to set timers (TIM) or counters (CNT).

Numeral Table Settings, Character-String Memory Table Settings

Set the initial values and word allocations for numeral tables and character-string memory tables.

Pressing the [F1] (Ref) key displays the screen number used by the memory table at the current bar cursor location.

<Numeral table setting>

```
┌──────┬──────────┬──┬─┬──────┬──────────┐
│ No.  │ Init Val │In│#│ Word │ Comment  │
├──────┼──────────┼──┼─┼──────┼──────────┤
│ 000  │        0 │No│0│ ---- │          │
│ 001  │        0 │No│0│ ---- │          │
│ 002  │        0 │No│0│ ---- │          │
│ 003  │        0 │No│0│ ---- │          │
│ 004  │        0 │No│0│ ---- │          │
│ 005  │        0 │No│0│ ---- │          │
│ 006  │        0 │No│0│ ---- │          │
│ 007  │        0 │No│0│ ---- │          │
│ 008  │        0 │No│0│ ---- │          │
│ 009  │        0 │No│0│ ---- │          │
│ 010  │        0 │No│0│ ---- │          │
│ 011  │        0 │No│0│ ---- │          │
│ 012  │        0 │No│0│ ---- │          │
│ 013  │        0 │No│0│ ---- │          │
│ 014  │        0 │No│0│ ---- │          │
│ 015  │        0 │No│0│ ---- │          │
└──────┴──────────┴──┴─┴──────┴──────────┘
 NUM TABLE  Select a numeral table
   ⬆⬇ = Slct   Esc = Abort  PgDn = Next Page
   F1 = Ref    ⏎ = Conf   PgUp = Prev Page
```

<Character-string memory table setting>

```
┌──────┬───────────────────────────┬──┬─┬──────┬──────────┐
│ No.  │      Initial Data         │In│#│ Word │ Comment  │
├──────┼───────────────────────────┼──┼─┼──────┼──────────┤
│ 000  │                           │No│0│ ---- │          │
│ 001  │                           │No│0│ ---- │          │
│ 002  │                           │No│0│ ---- │          │
│ 003  │                           │No│0│ ---- │          │
│ 004  │                           │No│0│ ---- │          │
│ 005  │                           │No│0│ ---- │          │
│ 006  │                           │No│0│ ---- │          │
│ 007  │                           │No│0│ ---- │          │
│ 008  │                           │No│0│ ---- │          │
│ 009  │                           │No│0│ ---- │          │
│ 010  │                           │No│0│ ---- │          │
│ 011  │                           │No│0│ ---- │          │
│ 012  │                           │No│0│ ---- │          │
│ 013  │                           │No│0│ ---- │          │
│ 014  │                           │No│0│ ---- │          │
│ 015  │                           │No│0│ ---- │          │
└──────┴───────────────────────────┴──┴─┴──────┴──────────┘
 STR TABLE    Select a character string table
   ⬆⬇ = Select   Esc = Abort  PgDn = Next Page   PgUp = Prev Page
   F1 = Ref      ⏎ = Confirm
```

For details of the settings, see "Setting Numeral Tables" (p.55), and "Setting Character-String Memory Tables" (p.56).

Expanded I/O Input Setting

Set the functions, and allocate the bits referenced at the PC, for expanded I/O unit input terminals.

The following functions can be set for the input terminals of the expanded I/O unit.

- Screen switching

  When the input terminal comes ON, the display changes to the set screen number. If the screen number is set as "0", the display will return to the previously displayed screen.

- Notify bit

  Notifies the status (ON/OFF) of the input terminal to the bit at the PC.

- Ten key

  When the input terminal comes ON, it has the same effect as pressing the set control key.

- Backlight OFF cancelling attribute

  When the input terminal comes ON the backlight, which had been switched off by the "backlight OFF function" (afterimage prevention function) set by memory switch, comes back ON (in the case of the NT612G, the screen display is redisplayed).

  The backlight OFF cancellation function is automatically featured in conjunction with the screen switch function and ten key function.

```
┌─────────────────────────────────────────────────────────────────┐
│ ┌───┬──┬────────┬──────────┬───┬──┬────────┬────────────┐        │
│ │No.│Cl│Function│          │No.│Cl│Function│            │        │
│ ├───┼──┼────────┼──────────┼───┼──┼────────┼────────────┤        │
│ │000│██│--------│██████████│016│  │--------│            │        │
│ │001│  │--------│          │017│  │--------│            │        │
│ │002│  │--------│          │018│  │--------│            │        │
│ │003│  │--------│          │019│  │--------│            │        │
│ │004│  │--------│          │020│  │--------│            │        │
│ │005│  │--------│          │021│  │--------│            │        │
│ │006│  │--------│          │022│  │--------│            │        │
│ │007│  │--------│          │023│  │--------│            │        │
│ │008│  │--------│          │024│  │--------│            │        │
│ │009│  │--------│          │025│  │--------│            │        │
│ │010│  │--------│          │026│  │--------│            │        │
│ │011│  │--------│          │027│  │--------│            │        │
│ │012│  │--------│          │028│  │--------│            │        │
│ │013│  │--------│          │029│  │--------│            │        │
│ │014│  │--------│          │030│  │--------│            │        │
│ │015│  │--------│          │031│  │--------│            │        │
│ └───┴──┴────────┴──────────┴───┴──┴────────┴────────────┘        │
│ EXTD I/O IN SET  Select extended I/O No.                         │
│       ↑↓←→=Slct  PgDn=Next Page  PgUp=Prev Page  Home=Bklight Off Cncl │
│  F1=Del   F2=Noti   F3=Keypad   ↵=SwScreen   Esc=Abort    ( P-1 )  │
└─────────────────────────────────────────────────────────────────┘
```

- NO.:   Expanded I/O unit input terminal number.

- Cl: Presence/absence of the backlight OFF cancelling attribute.

- Function: Function set for the input terminal. In the case of the input notification function, the bit number is displayed.

            In the area to the right of the Function column, screen numbers (screen switching), comments (input notification), and control keys (ten keys) are displayed.

• Key operations

⏎ key:	Sets a screen switching function at the input terminal at which the bar cursor is located.
[F1] (Del) key:	Deletes the function set for the input terminal at which the bar cursor is located.
[F2] (Noti) key:	Sets an input notification function at the input terminal at which the bar cursor is located.
[F3] (Keypad) key:	Sets a ten key function for the input terminal at which the bar cursor is located.
[Home] (Bklight Off Cncl) key:	Sets the backlight OFF cancelling attribute at the input terminal at which the bar cursor is located.
[Tab] key:	Used to move the bar cursor and display the terminal number input field.

Expanded I/O Output Setting

The output terminals of the expanded I/O unit are controlled in accordance with the status (ON/OFF) of PC bits (output control function). Set the bit numbers of the PC bits that will control the output terminals.

```
┌──────────────────────────────────────────────────────┐
│  ┌─────┬──────────┬───────────┬─────┬──────────┐      │
│  │ No. │ Function │           │ No. │ Function │      │
│  ├─────┼──────────┤           ├─────┼──────────┤      │
│  │ 000 │ -------  │           │ 016 │ -------  │      │
│  │ 001 │ -------  │           │ 017 │ -------  │      │
│  │ 002 │ -------  │           │ 018 │ -------  │      │
│  │ 003 │ -------  │           │ 019 │ -------  │      │
│  │ 004 │ -------  │           │ 020 │ -------  │      │
│  │ 005 │ -------  │           │ 021 │ -------  │      │
│  │ 006 │ -------  │           │ 022 │ -------  │      │
│  │ 007 │ -------  │           │ 023 │ -------  │      │
│  │ 008 │ -------  │           │ 024 │ -------  │      │
│  │ 009 │ -------  │           │ 025 │ -------  │      │
│  │ 010 │ -------  │           │ 026 │ -------  │      │
│  │ 011 │ -------  │           │ 027 │ -------  │      │
│  │ 012 │ -------  │           │ 028 │ -------  │      │
│  │ 013 │ -------  │           │ 029 │ -------  │      │
│  │ 014 │ -------  │           │ 030 │ -------  │      │
│  │ 015 │ -------  │           │ 031 │ -------  │      │
│  └─────┴──────────┴───────────┴─────┴──────────┘      │
│  EXTD I/O OUTSET  Select extended I/O No.             │
│       ↑↓←→=Slct  PgDn=Next Page  PgUp=Prev Page       │
│   F1=Del   F2=Ctrl              Esc=Abort   ( P-1 )    │
└──────────────────────────────────────────────────────┘
```

• NO.:   Expanded I/O unit output terminal number

• Key operations

[F1] (Del) key:	Deletes the output control function set for the output terminal at which the bar cursor is located.
[F2] (Ctrl) key:	Sets an output control function at the output terminal at which the bar cursor is located.
[Tab] key:	Used to move the bar cursor and display the terminal number input field.

Bit Memory Table Setting   This setting sets screen switching functions, which switch the screen when a PC bit comes ON, and the alarm list/history function, which is actuated in accordance with bit statuses (ON/OFF). The bit memory table bit allocations are also set in this setting.

Note   1.   The bit memory table can only be set on the "Screen Selection" screen. It cannot be set on the "Edit" screen.

2.   The allocated bits for the screen switching functions and alarm history function in the bit memory tables are continually read by data communication while the PT is operating. If too many settings are made, PT processing may be delayed.

No.	Hist	#	Table	Dsp Cl	Image &Lib°	SwScreen	Bit	Comment
000	No	No	000	Whit	0000	0000	-------	
001	No	No	000	Whit	0000	0000	-------	
002	No	No	000	Whit	0000	0000	-------	
003	No	No	000	Whit	0000	0000	-------	
004	No	No	000	Whit	0000	0000	-------	
005	No	No	000	Whit	0000	0000	-------	
006	No	No	000	Whit	0000	0000	-------	
007	No	No	000	Whit	0000	0000	-------	
008	No	No	000	Whit	0000	0000	-------	
009	No	No	000	Whit	0000	0000	-------	
010	No	No	000	Whit	0000	0000	-------	
011	No	No	000	Whit	0000	0000	-------	
012	No	No	000	Whit	0000	0000	-------	
013	No	No	000	Whit	0000	0000	-------	
014	No	No	000	Whit	0000	0000	-------	
015	No	No	000	Whit	0000	0000	-------	

```
BIT TABLE        Select bit memory table
     ⬆⬇ = Select  ⏎ = Confirm  Esc = Abort
     F1 = Delete   F2 = Copy     F3 = History  F4 = SwScreen
```

NO.:   Bit memory table number

Hist: Execution/non-execution bit status check (reading) for alarm history.

#:   Presence/absence of screen switching function

Table: Character-string memory table number displayed in the alarm list/history

Dsp Cl: Display color for the character-string memory table. For the NT612G, this color is fixed as "white".

Image & Lib: Image library code displayed in the alarm list/history.

SwScreen: Displayed screen number if screen switching is executed.

Bit: Bit allocated in the bit memory table

Comment: Comment indicating information such as the details of allocated bits.

- Setting procedure

  The bit memory table includes the following two functions:

- Screen switching function

- Alarm list/history function

For details on these functions, see the user's manual for the relevant PT.

<Setting screen switching functions>

(1) Locate the bar cursor at the number of the bit memory table to be set and press the [F4] (SwScreen) key.

▶ To register changes in bit statuses in the alarm history, press the [F3] (History) key.

▶ [Shift] + [↑] and [Shift] + [↓] can be used to move the bar cursor to the previous and next positions in the bit memory table where there is a setting in the "Bit" column.

▶ Pressing the [Tab] key displays the memory table number input field.

▶ Pressing the [F1] (Delete) key clears the settings of the bit memory table at which the bar cursor is located (applies only if there is a setting in the "Bit" column).

(2) Press the ⏎ key three times (or 4 times in the case of the NT610C) to move to the screen switching input field.

▶ When the screen switching function is used, the "Table", "Dsp Cl", and "Image & Lib" settings are invalid.

(3) Input the screen number whose display is to be switched and press the ⏎ key.

(4) Carry out bit setting.

   For details of the setting procedure, see "Setting Words and Bits" (p.57).

<Setting the alarm list/history function>

(1) Locate the bar cursor at the number of the bit memory table to be set.

▶ To register changes in bit statuses in the alarm history, press the [F3] (History) key.

▶ [Shift] + [↑] and [Shift] + [↓] can be used to move the bar cursor to the previous and next positions in the bit memory table where there is a setting in the "Bit" column.

▶ Pressing the [Tab] key displays the memory table number input field.

▶ Pressing the [F1] (Delete) key allows the setting of the bit memory table at which the bar cursor is located to be cleared (applies only when there is a setting in the "Bit" column).

(2) Press the ⏎ key.

(3) Input the character-string memory table number and press the ⏎ key.

▶ Pressing the [F1] key allows the number to be selected from a displayed list.

(4) In the case of the NT610C, specify the display color.

For details of the setting procedure, see "Specify the Display Color" (p.53).

(5) To display an image library entry, input the code and press the ⏎ key.

▶ Pressing the [F1] (List Select) key allows the code to be selected from a list.

(6) To switch the display, input the screen number and press the ⏎ key.

(7) Carry out bit setting.

For details of the setting procedure, see "Setting Words and Bits" (p.57).

Note   The allocated bits for the screen switching functions and alarm history function in the bit memory tables are continually read by data communication while the PT is operating. If too many settings are made, PT processing may be delayed.

SECTION 4
Creating Screen Data

Screen data has to be created for display by the PT. Screen data can be created by selecting the editing functions of the "Edit" screen.

This chapter explains the creation procedure, with emphasis on key operations. The mouse can be used to execute all operations except character and numeral input.

4-1 Initial Editing Screen and Basic Operations

On the "Edit" screen, characters and graphics can be drawn, and elements such as lamps and touch switches can be created.

4-1-1 Displaying the "Edit" Screen

The "Edit" screen is displayed when a screen number is selected on the "Screen Selection" screen.

The initial editing screen displays the editing menu, from which the functions for creating screen data can be selected.

<Initial editing screen>
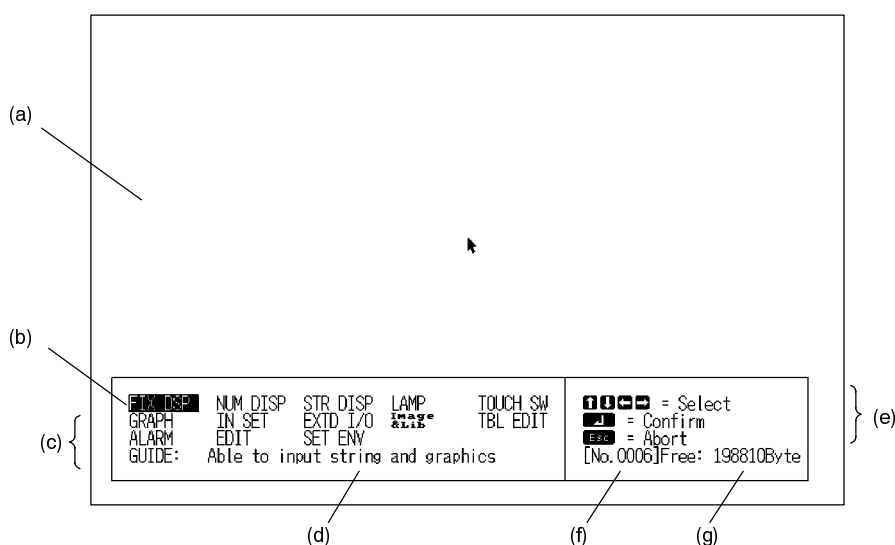
(a)	"Edit" screen:	This is a data creation screen with the same number of dots as the PT screen. A grid is displayed on it to make it easy to create data. It is possible to select whether or not to display this grid by changing a setting in the environmental settings (tool settings for the "Edit" screen).
(b)	Menu box:	The editing menu and help messages are displayed here.
		The display position of this box, and the setting to determine whether it is displayed or not, can be changed by pressing the [Home] key.
(c)	Editing menu:	The editing function to be executed is selected from this menu.
(d)	Help message display:	Displays an explanation of the function.
(e)	Key operation guide:	The keys and functions that can currently be used are displayed here. Functions can be executed either by pressing the relevant key or by clicking on the corresponding icon with the mouse.

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(f)   Screen number: This is the screen number of the screen data currently being edited.

(g)   Free capacity: This is the free capacity for file storage.

Saving Screen Data and Quitting

Pressing the [Esc] key while the initial editing screen is displayed quits screen data creation. There are two types of quitting: quitting after saving the data and quitting without saving data.

- ⏎ key: After comment input, saves the data and returns the display to the "Screen Selection" screen.

- [Space] key: Returns the display to the "Screen Selection" screen without saving data.

- [Esc] key: Aborts quitting and allows editing to continue.

Grid Display

In order to provide help with input and drawing, a grid is displayed on the "Edit" screen.

If the "snap ON" function is set, the cursor position is locked to the grid intersections.

Whether a grid is displayed or not, the grid type, and the "snap ON" function setting are specified in the SET ENV settings in the "Edit" screen editing menu (see p.47).

The intervals of the grid display can be set anywhere between 2 and 99 dots in both the X direction (horizontal direction) and the Y direction (vertical direction). It is also possible to make a grid display aligned with touch switches (in the case of the NT610C this grid has intervals of 20 dots in both horizontal and vertical directions, and in the case of the NT612 the intervals are 25 dots in the vertical direction and 20 dots in the horizontal direction).

Screen Data Display Sequence

Elements are displayed in the following sequence on the PT screen.

WARNING Take the display sequence into consideration when creating screen data.

(1)   Image data

(2)   Touch switches, alarm list, alarm history

(3)   Lamps

(4)   Fixed data

(Polygons → squares → circles/arcs → fans → continuous lines → tiling → characters/marks)

(5)   Character-strings

(6)   Numeric values

(7)   Graphs

(8)   Numeric value and character-string setting input fields

(9)   Function keys

4-1-2   Basic Operations on the "Edit" Screen

Basic Operations

• Moving the cursor

There are various cursors, including a cross-hair cursor (intersecting vertical and horizontal lines) used for drawing graphics and a box used for specifying the position of character displays. These cursors can be moved either with the arrow keys ([↑][↓][←][→]) or with the mouse. Pressing one of the arrow keys while holding down the [Shift] key gives larger motion increments (of 16 dots).

To fix a position, either press the ⏎ key or click the left mouse button.

• Character input

Insert/overwrite:	The [Insert] key is used to select whether the insert or overwrite mode is effective for character input.
Character deletion:	An input character can be deleted by pressing the [Back Space] key or the [Delete] key.
Mark input:	Pressing the [F3] (Mark) key on the character input screen displays the mark list window. Select the mark to be input with the cursor and press the ⏎ key.
Image input:	Pressing the [F4] (Image) key on the character input screen enables input of image data.

• Numeric value/character-string input

Numeric value/character-string clearance:

To clear an input numeric value or character-string during numeric value/character-string input, press the [Home] key.

• Shortcut keys

It is possible to move characters, or delete them, by pressing specific character keys while holding down the [Ctrl] key.

Shortcut key	Corresponding key
[Ctrl]+[S]	[←] key
[Ctrl]+[D]	[→] key
[Ctrl]+[E]	[↑] key
[Ctrl]+[X]	[↓] key
[Ctrl]+[R]	[Page Down] key
[Ctrl]+[C]	[Page Up] key
[Ctrl]+[H]	[Back Space] key
[Ctrl]+[G]	[Delete] key
[Ctrl]+[I]	[Tab] key
[Ctrl]+[M]	⏎ key
[Ctrl]+[[ ]	[Esc] key

Operations Exclusive to NT610C

The screen size for the NT610C is 640 x 480 dots.

The following two types of scrolling are featured.

(1) Automatic scrolling

When moving the cross-hair cursor, for example to specify the display position of character-strings or specify the start point and end point of graphics, the screen scrolls vertically in accordance with cursor motion.

(2) Manual scrolling

When the initial editing menu is displayed, the display can be scrolled vertically by using the following keys:

- [Page Up] key: Used to scroll upwards (i.e. display the screen below the current one)

- [Page Down] key: Used to scroll downwards (i.e. display the screen above the current one)
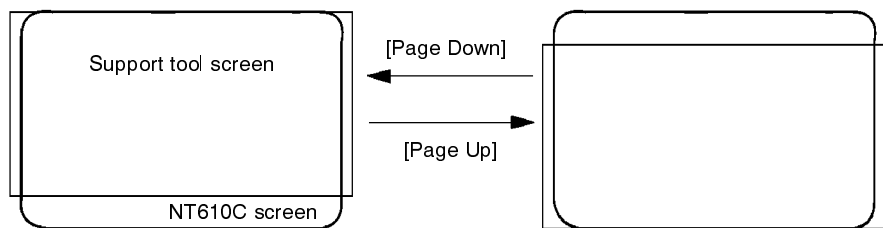
Operations Inside Windows

During operation, windows for parameter input and settings are sometimes displayed. Use the displayed keys in order to perform operations in these windows.

If using a mouse, click the relevant item.

<Operation example: numeral display setting>
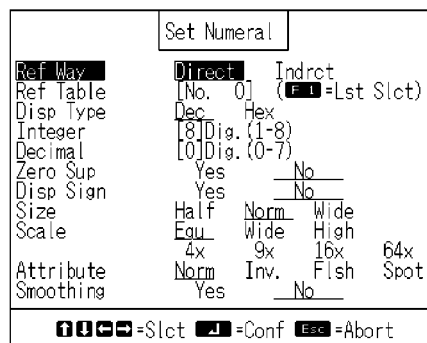
4-1-3 Environmental Settings (Tool Settings for the "Edit" Screen)

These are the "Edit" screen settings, such as those for grid display and the snap ON function.

The environmental settings can also be changed during screen editing.

Select "ENV SET" on the initial editing screen. The "Tool Settings (for edit screen)" screen will be displayed. To quit setting, press the ⏎ key.

```
                Tool Settings (For edit screen)

    Grid Display X Width    X = [ 0] Dot (0-99)
    Grid Display Y Width    Y = [ 0] Dot (0-99)
    Snap ON Fun.              On         Off
    Lamp/TouchSw # Disp.      NO        1/16       1/4
    Memory Table # Disp.      NO        1/16       1/4
    Guide DSP (Crs Crsr)     Yes         No
    Brkn Line Frame Disp     Yes         No
    Edit Specify Way        In frm     On frm     Simple
    Lamp/TSW Disp Mode       Ptot       Light      Flash

  Help Message    Grid display on screen        ▯▮ = Select Item
                                                ◀▶ = Change Setting
                                                ⏎  = Confirm
              Specify grid's horizontal interval  Esc = Abort

  1 TchSw  2      3      4      5      6      7      8      9      0
```

- Grid Display X Width
- Grid Display Y Width:

  A grid is displayed on the screen. The intervals for this grid display are specified in the range of 2 to 99 dots in both the X direction (horizontal direction) and Y direction (vertical direction). If "0" or "1" is specified, the grid is not displayed.

  If [F1] (TchSw) is pressed a grid corresponding to the smallest unit for touch switches is specified.

- Snap ON Fun.:

  When this function is set, cursor motion is automatically locked to the grid intersections while a grid is displayed. Cancel this function if fine positioning is required. By pressing the [Space] key during graphics creation, it is possible to temporarily switch the snap ON function on or off (when the creation of one graphic has been completed, the original snap ON function status is restored).

- Lamp/Touch Sw Disp Mode:

  After having created lamps and touch switches, the lamp bit numbers that correspond to the lamps and touch switches can be displayed in the graphics. These numbers are not displayed on the PT screen. The setting for this function also determines whether or not lamp bit numbers are printed when screen data is printed out.

- Memory Table # Disp.:

  It is possible to display the memory table number referenced when numeric values and characters are displayed. This number is not displayed on the PT screen. The setting for this function also determines whether or not memory table numbers are printed when screen data is printed out.

- Guide DSP (Crs Crsr):

  This setting makes it possible to choose not to display the menu box when the cross-hair cursor for drawing graphics is displayed.

- Brkn Line Frame Disp:

  This setting makes it possible to display a broken line frame at the display locations for numeral/character-string tables, images, and library items. Set this function when you need to make a distinction with fixed-display characters, and when you want to check areas. Even if there are spaces in a character-string, the character-string display range is made clear with this function. This frame is not displayed on the PT screen.

- Edit Specify Way:

  Specifies the method used when selecting graphics to be edited.

(1) In frm

  All graphics that are completely contained within the specified range are selected as the objects of editing operations.

(2) On frm

  All graphics which are completely or partly contained within the specified range are selected as the objects of editing operations.

(3) Simple

  Only the one graphic at the specified position (1 point) is selected as the editing object.

  If several graphics overlap each other the one displayed last is selected (see p.44).

- Lamp/TSW Disp Mode:

  Specifies the way in which lamps and touch switches are displayed.

  The appearance of the display during operation at the PT can be checked in advance using the support tool.

4-2   Common Setting Operations

Some setting operations are used frequently with all editing functions, such as numeral display setting and word setting. These are explained here by summarizing the representative setting operations.

Refer to this section if you are unsure how to perform a setting operation during screen creation.

4-2-1   Setting Character/Character-String Displays

<Character input>

```
┌─────────────────────────────────────────┐  ┌────────────────────────────┐
│ STR IN  Display setting                  │  │ ⬆⬇⬅➡  =  Select           │
│ Size    Half  Norm      Smoothin  Yes No │  │ ⏎     =  Confirm          │
│ Scale   Equ   Wide High  4x  9x 16x 64x  │  │ Esc   =  Abort            │
│ Attr.   Norm  Inv. Flsh Spot             │  │ [No.0001]Free: 985076Byte │
└─────────────────────────────────────────┘  └────────────────────────────┘
```

<Character-string display>

```
┌──────────────────────────────────────┐
│            ┌─────────────┐            │
│            │  Set String │            │
│            └─────────────┘            │
│ Ref Way   Direct  Indrct              │
│ Ref Table [No. 0] (F 1=Lst Slct)      │
│ Length    [40]char (1-40)             │
│ Size      Half        Norm            │
│ Scale     Equ  Wide   High            │
│           4x   9x     16x    64x      │
│ Attribute Norm Inv.   Flsh   Spot     │
│ Smoothing Yes         No              │
│ ─────────────────────────────────     │
│   ⬆⬇⬅➡=Slct  ⏎=Conf  Esc=Abort      │
└──────────────────────────────────────┘
```

- Ref Way

  Specify the method used to reference the memory table used for the display here. This item can only be specified when using direct connection.

  (1) Direct

  The character string in the specified character-string memory table is displayed.

  (2) Indrct

  The numeric value in the specified numeral table is taken as the number of a character-string memory table, and the character-string in that character-string memory table is displayed.

  ▶ Do not specify the "indirect" setting if not using a C200H interface unit.

- Ref Table

  Specify the number of the memory table to be referenced here. In direct specification, specify the character-string memory table number, and in indirect specification, specify a memory table number.

  Pressing the [F1] key enables selection from a memory table list.

- Length

  In the case of character-string display, a display area equivalent to the specified number of characters is created. The character string is displayed displaced as far to the left as possible in the display area (applies only to character-string displays).

- Size

  Specify whether the half-size font or normal font is to be used for one-byte characters here.

WARNING This font specification is not valid in the case of mark data and image data.

OMRON   OMRON

Half-size   Normal

- Scale

  Characters can be displayed at magnifications from 1x (Equ) to 64x.

PT   PT   PT   PT   PT   PT   PT

Equ   Wide   High   4x   9x   16x   64x
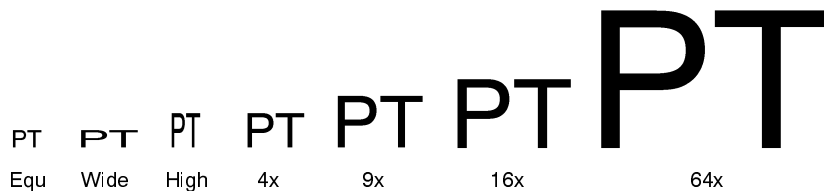
- Attribute

  Characters can be displayed with any of the following attributes: "Norm" (normal), "Inv." (inverted), "Flsh" (flashing), or "Spot". In the case of NT612G screen data, "Flsh" and "Spot" are displayed in yellow on the support tool screen.

- Smoothing

  This function smooths out the jaggedness that appears in magnified characters. It can be specified for characters whose magnification is 4x or greater and marks whose size is 16 x 16 dots or greater.

Enlarged Characters   Enlarged Characters

With smoothing   Without smoothing

Special Characters

Characters not on the keyboard can be input via character codes. A list of character codes is provided at the end of the manual (Appendix C). To input a character code, press the [Alt] key followed by the decimal code.

4-2-2   Setting Numeral Displays

These settings set the display size and display status for numerals.

```
┌─────────────────────────────────────────────┐
│            ┌──────────────┐                  │
│            │ Set Numeral  │                  │
│            └──────────────┘                  │
│  ▐Ref Way▌    ▐Direct▌   Indrct              │
│  Ref Table    [No.  0]   (▐F 1▌=Lst Slct)    │
│  Disp Type    Dec_   Hex                      │
│  Integer      [8]Dig. (1-8)                   │
│  Decimal      [0]Dig. (0-7)                   │
│  Zero Sup       Yes      No_                   │
│  Disp Sign      Yes      No_                   │
│  Size         Half   Norm_  Wide              │
│  Scale        Equ_   Wide   High              │
│                 4x     9x    16x      64x     │
│  Attribute    Norm_  Inv.   Flsh     Spot     │
│  Smoothing      Yes      No_                   │
│  ─────────────────────────────────────────   │
│   ⬆⬇⬅➡=Slct  ◄┘=Conf  Esc=Abort             │
└─────────────────────────────────────────────┘
```

- Ref Way

  Specify the method used to reference the memory table used for the display here. This item can only be specified when using direct connection.

  (1) Direct

      The numeric value in the specified character-string memory table is displayed.

  (2) Indrct

      The numeric value in the specified numeral table is taken as the number of a numeral table, and the numeric value in that numeral table is displayed.

▶ Do not specify the "Indrct" setting if not using a C200H interface unit.

- Ref Table

  Specify the number of the numeral table to be referenced here.

  Pressing the [F1] key enables selection frome~ numeral table list.

- Disp Type: Specify whether the displayed numeric value will be decimal or hexadecimal format.

- Integer: Specify the number of digits in the integral part of the numeric value here.

•

Decimal:

Specify the number of digits in the decimal fraction here.

- Zero Sup: When "No" is specified here, if the numeric value does not have the available number of digits, "0" will be displayed for the digits preceding the digits comprising the numeric value.

- Disp Sign: When "Yes" is specified here, a minus sign will be displayed for negative numeric values.

- Size: Three fonts are available for numeric value display: "Half", "Norm" and "Wide".

<div align="center">

0123   0123   0123

Half-size   Normal   Wide

</div>

- Scale: Characters can be displayed at magnifications from 1x (Equ) to 64x.

- Attribute: Numeric values can be displayed with any of the following attributes: "Norm" (normal), "Inv." (inverted), "Flsh" (flashing), or "Spot". In the case of NT612G screen data, "Flsh" and "Spot" are displayed in yellow on the support tool screen.

- Smoothing: This function smooths out the jagged appearance of magnified numerals. It can be specified for numerals whose scale is 4x or greater.

Reference: The display of numeric values changes in the following way in accordance with the specifications made for "Integer", "Decimal", "Zero Sup", and "Disp Sign".

Integer	Decimal	Zero Sup	Disp Sign	Contents of the numeral table	Screen display
3	0	No	No	12	012
3	0	No	No	−12	012
3	0	Yes	No	12	12
3	0	Yes	No	−12	12
3	0	Yes	Yes	12	12
3	0	Yes	Yes	−12	−12
3	1	No	No	1	000.1
3	1	No	No	−12	001.2
2	1	No	Yes	1	00.1
2	1	No	Yes	−12	−01.2
2	1	Yes	Yes	1	0.1
2	1	Yes	Yes	−12	−1.2

* In the memory table, those characters suffixed by a "−" symbol are actually suffixed by an "F" in decimal notation.

For example, "−12" is represented as "F0000012".

4-2-3   Specifying the Display Color (NT610C Only)

When using the NT610C, both the color used to display characters and graphics and the color used for the background can be specified. Depending on the screen elements created, the following colors can be specified.

Characters/Numeric Values

- Display color: Specifies the color of characters and numeric values.

- Background color: Specifies the color of the background to characters and numeric values. If ▧ (transparent color) is specified, the background becomes transparent and elements underneath it can be seen through it.

Background color
Character color
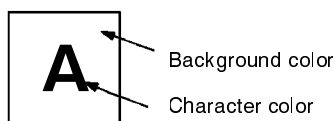
Graphics

- Basic color: In the case of graphics drawings this is the color of lines and in the case of tiled figures it is the color of the tiling.

- Background color: Specifies the color that will be the background after a graphic has been tiled (the color that can be seen in the gaps in a pattern). If transparent color is specified, the elements underneath can be seen through the background.

- Boundary color: Specifies the color that indicates the boundaries of tiled areas.

Graphic

Green (Basic color)

Tiling

Boundary line color
Pattern display color (Basic color)
Pattern background color
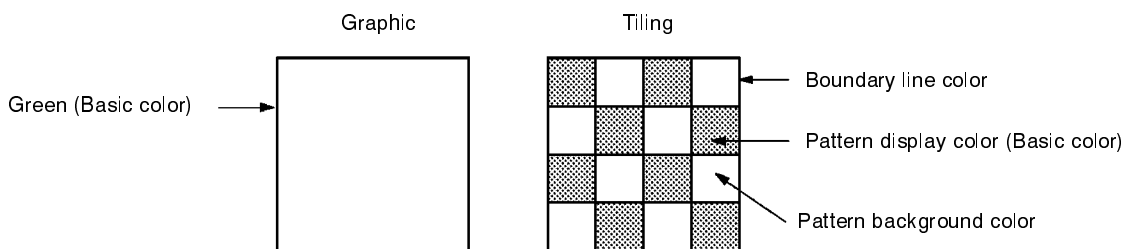
Lamps/Touch Switches

- Frame color: frame   This specifies the color of the frame if "Frame" is set for display.

- Ptot color: This specifies the color of a lamp or touch switch when it is OFF. If transparent color is specified, the elements underneath can be seen through the OFF color.

- Lit color: This specifies the color of a lamp or touch switch when it is ON.

• Flashing color: This specifies the color of a lamp or touch switch when it is flashing. During flashing, the OFF color and ON color are displayed alternately.

When "OFF"   When "ON"   When flashing

"OFF" color   Frame color   "ON" color

"OFF" color

Frame color

Flashing color
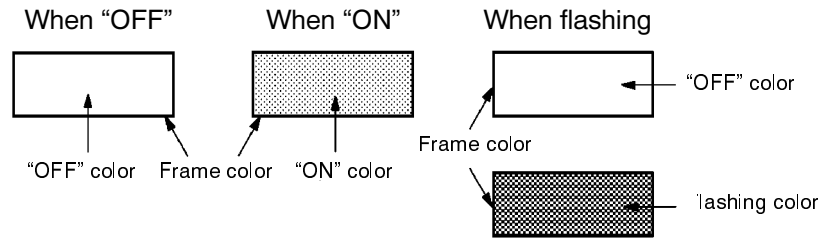
Reference: The appearance of lamps and touch switches during operation at the PT can be checked in advance on the support tool screen by using the "Lamp/TSW Disp Mode" option in the environmental settings (tool settings for the "Edit" screen).

Graphs

• Frame color   Specifies the color for the frame of a graph.

• Frame + range   Specifies the color of the graph when the numeric value is positive.

• Frame – range   Specifies the color of the graph when the numeric value is negative.

Bar graph   Trend graph   Polygonal line graph

–100%   0%   100%
When positive

Display color
for positive value   Frame color

–100%   0%   100%
When negative

Display color
for negative value   Frame color

"+" range in frame
100%
0%
–100%
Frame color   "–" range in frame

"+" range in frame
100%
0%
–100%
Frame color   "–" range in frame
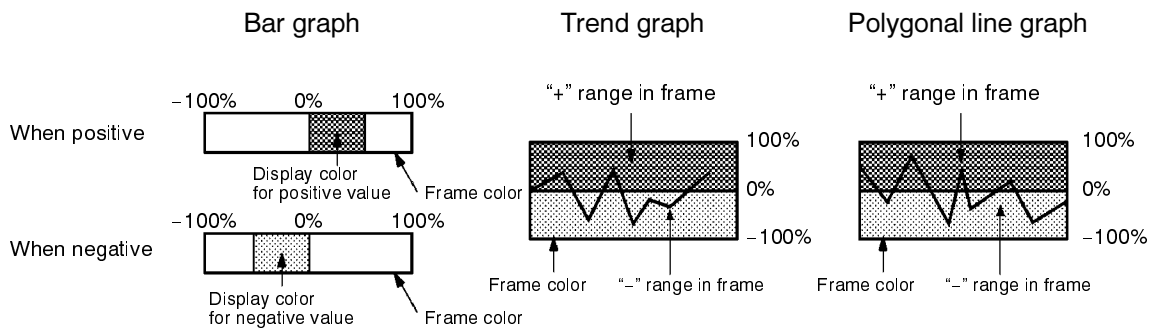
4-2-4   Setting Numeral Tables

This section describes how to set the initial values, and data area referenced in the PC, for numeral tables.

Caution: Numeral table numbers 247 through 255 are used for the clock function and, therefore, setting operations cannot be performed for them.

No.	Init Val	In	#	Word	Comment
000	0	No	0	-----	
001	0	No	0	-----	
002	0	No	0	-----	
003	0	No	0	-----	
004	0	No	0	-----	
005	0	No	0	-----	
006	0	No	0	-----	
007	0	No	0	-----	

- No.:   Numeral table number
- Init Val: Initial value
- In: Execution/non-execution of numeral table initialization in accordance with initial values set using the support tool when the PT is started up.
- #:   Number of words used at the PC for reference by the numeral table.
- Word: First word (lower word) in the data area at the PC referenced by the numeral table.
- Comment: Comment indicating word contents, etc., input when the word is set.

<Setting method>

Procedure 1.   Locate the bar cursor at the number of the numeral table to be set and press the ⏎ key.

▶ [Shift] + [↑] or [Shift] + [↓] can be used to move the bar cursor to the previous or next numeral table for which the "Init Val" setting is not "0".

▶ Press the [Tab] key to display the memory table number input field.

▶ Press the [F1] (Ref) key to display the screen number that references a particular numeral table.

2.   Input the initial value for the numeral table and press the ⏎ key.

▶ The input value can be deleted by pressing the [Home] key.

3.   Carry out word setting.

For details of the setting procedure, see "Setting Words and Bits" (p.57).

4-2-5   Setting Character-String Memory Tables

This section describes how to set the initial values, and data area referenced in the PC, for character-string memory tables.

No.	Initial Data	In	#	Word	Comment
000		No	0	-----	
001		No	0	-----	
002		No	0	-----	
003		No	0	-----	
004		No	0	-----	
005		No	0	-----	
006		No	0	-----	
007		No	0	-----	

- No.:   Character-string memory table number

- Initial Data: Initial value

- In: Execution/non-execution of character-string table initialization in accordance with initial values set using the support tool when the PT is started up.

- #:   Number of words used at the PC for reference by the character-string memory table.

- Word: First word (lower word) in the data area at the PC referenced by the character-string memory table.

- Comment: Comment indicating word contents, etc., input when the word is set.

Caution: Only "Initial Data" can be set for character-string memory table numbers 256 through 999. It is not possible to reference PC data areas with these numbers.

<Setting Method>

Procedure **1.** Locate the bar cursor at the number of the character-string memory table to be set and press the ⏎ key.

▶ [Shift] + [↑] or [Shift] + [↓] can be used to move the bar cursor to the previous or next character-string memory table for which the "Initial Data" setting is not blank.

▶ Press the [Tab] key to display the memory table number input field.

▶ Press the [F1] (Ref) key to display the screen number that references the character-string memory table in question.

2. Input the initial value for the character-string memory table and press the ⏎ key.

▶ Pressing the [F3] (Mark) key enables mark input.

▶ Pressing the [F4] (Image) key enables image input.

3. If using direct connection, carry out word setting.

For details of the setting procedure, see "Setting Words and Bits" (p.57).

4-2-6   Setting Words and Bits

The words and bits referenced in the PC have to be set.

```
┌─────────────────────────────┐    ┌─────────────────────────────┐
│        Word Setting         │    │        Lamp Bit Set         │
│                             │    │                             │
│ Word    [--------]          │    │ Lamp Bit  [  000000]        │
│ Comment [                ]  │    │ Comment   [            ]    │
│ Init     Yes        No      │    │                             │
│ St. Word [2](1-2)           │    │ F1=AR  F2=HR  F3=LR  F4=DM  F5=CNT │
│                             │    │ F6=TIM F7=CH  F8=*** F9=*** F10=*** │
│ F1=AR F2=HR F3=LR F4=DM F5=CNT │  │ Home=None                   │
│ F6=TIM F7=CH F8=*** F9=*** F10=*** │                           │
│ Home=None                   │    │  ⬆⬇=Select ⏎=Confirm Esc=Abort │
│  ⬆⬇⬅➡=Slct ⏎=Conf Esc=Abort │    │                             │
└─────────────────────────────┘    └─────────────────────────────┘
```

- Word/Bit:

   In the case of numeral tables and character-string memory tables, specify the lower word number of the referenced words. In the case of lamps, touch switches, and bit memory tables, set the bit number to be allocated. Word names and bit names are input using the function keys and numbers are input using the numeric keys.

- Comment: Input a memo here, for example one that indicates the purpose of use.

- Init: Specify whether or not the memory table will be initialized in accordance with the initial values set with the support tool when the PT starts uphere.

- St. Word: Specify the number of words used at the PC side (in the case of a memory table).

Caution: • If the host interface unit's DIP switch is set for initialization of the data contents of the allocated words in the PC, the "Initial Value" setting will be invalidated.

- When specifying a DM area for a bit, append the bit number (00 to 15) at the end of the DM number.

- Timers (TIM) and counters (CNT) cannot be set in bits or the words of character-strings.

4-3   Creating Fixed Displays

This section describes how to create fixed characters and graphics in screen data.

The following characters and graphics can be created.

Characters (fixed display), marks (display)

Continuous lines, squares, polygons, circles/arcs, fans, tilings

4-3-1   Inputting Characters

Characters to be displayed have to be input. For details on the display of character-strings and numeric values, setting the display color (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Procedure   **1.**   Select"FIX DISP" on the initial editing screen.

The fixed display menu will be displayed.

2.   Select "STR IN".

3.   Input the characters to be displayed at the keyboard and press the ⏎ key.

▶   Pressing the [F3] (Mark) key enables mark input.

▶   Pressing the [F4] (Image) key enables image input.

4.   Set the display settings and press the ⏎ key.

5.   If using an NT610C, set the character color and background color.

6.   A box indicating the size of the character data is displayed.

Move this box to the required display position and press the ⏎ key. The characters will be displayed.
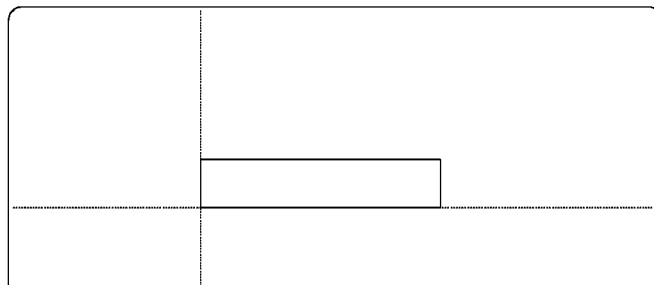
7.   Press the [Esc] key to quit character input.

Deleting Displayed Characters

This is the procedure for deleting displayed characters. Deletion is executed in character-string units.

Procedure 1. Select "STR IN" from the fixed display menu.

2. Press the [F1] (Delete) key.

3. Locate the cross-hair cursor at a position inside the character-string to be deleted and press the ⏎ key. The selected character-string will be enclosed by a dotted line.

4. Check the message, then press ⏎ to delete the character-string.

Modifying Displayed Characters

This is the procedure for modifying displayed characters, their character size, attributes, or position. Modification is executed in character-string units.

Procedure 1. Select "STR IN" from the fixed display menu.

2. Press the [F2] (Modify) key.

3. Locate the cross-hair cursor at a position inside the character-string to be modified and press the ⏎ key.

4. Select the required item in the window and modify the character-string.

```
Modify String

Set Display
  Size        Norm
  Scale       Equ
  Attribute   Norm
  Smoothing   No

Color

Display Position
  X = 284
  Y = 307
```
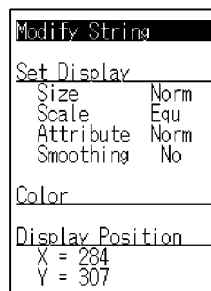
- Modify String: Select to change characters.
- Set Display: Select to change the character font, scale, or display attribute.
- Color: Select to change the character color or background color. (NT610C only)
- Display Position: Select to move the character box in order to change the display position.

5. Press the [Esc] key to quit modification.

4-3-2   Inputting Marks

Created marks are input during screen editing. Marks can be handled in the same way as characters and magnification scales can be specified for them.

However, smoothing is only possible for 16 x 16 dot marks.

Displaying Marks

Select the mark that you want to display from the mark selection screen.

Marks can be displayed in the following two ways.

(1)   Specification during character input

Press the [F3] (Mark) key after inputting characters or a label to display the mark selection screen.

(2)   Specification using the fixed editing menu

Select "Mark" from the fixed display menu and specify the display position: the mark selection screen will be displayed.

Select the mark to be displayed from this screen and specify the display position. 32 x 32 dot marks and 64 x 64 dot marks can be displayed at the same time.

The mark will be displayed in its actual form in the character input field. It will be displayed on the editing screen with its bottom left extremity take as the origin.

Deleting Marks

Marks displayed on the screen can be deleted using the following method.

Procedure   1.   Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2.   Select "MARK".

3.   Press the [F1] (Delete) key.

4.   Locate the cursor at the mark to be deleted and press the ⏎ key.

5.   Check the message and then press the ⏎ key.

Modifying Marks

Use the following procedure to modify marks displayed on the screen.

Procedure   1.   Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2.   Select "MARK".

3.   Press the [F2] (Modify) key.

4.   Locate the cursor at the mark to be modified and press the ⏎ key.

5.   Select the required item and execute the modification.

- Modifying code: Select to modify a code.

- Set display: Select to change the character font, scale, or display attribute.

- Color: Select to change the character color or background color. (NT610C only)

- Display position: Select to move the mark box in order to change the display position.

6.   Press the [Esc] key to quit modification.

4-3-3   Creating Polylines

This is the procedure for drawing continuous lines (polygonal lines). It is possible to connect a maximum of 255 individual line segments.

Procedure   **1.**   Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2.   Select "POLYLINE" from the fixed display menu.

3.   Select the type of line.

The selectable options are solid line, broken line, 1-dot chain and 2-dot chain.

▶   It is not possible to use more than one line type in the same continuous line.

4.   If using an NT610C, specify the line color.

5.   Draw the continuous line.

1)   Press the ⏎ key at the start point.

2)   Locate the cursor at an intermediate point and press the ⏎ key.

Set as many intermediate points as required.

3)   At the end point, press the ⏎ key while holding down the [Shift] key (or double click if using the mouse).

Intermediate
points

d point
(Shift+ ⏎

Start point （⏎ ）
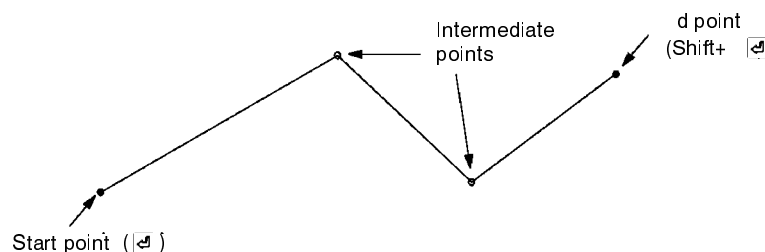
▶   Pressing the [Esc] key before the end point has been set deletes the last drawn line segment.

▶   Pressing the [Esc] key while holding down the [Shift] key aborts the drawing.

6.   Press the [Esc] key to quit continuous line drawing.

Deleting Polylines

Procedure   **1.**   Select "POLYLINE" from the fixed display menu and then press the [F1] (Delete) key.

A □ mark will be displayed at the start point of the continuous line.

2.   Locate the cursor at the □ mark of the continuous line to be deleted and press the ⏎ key.

3.   Check the message and then press the ⏎ key; the continuous line will be deleted.

To abort deletion, press the [Esc] key.
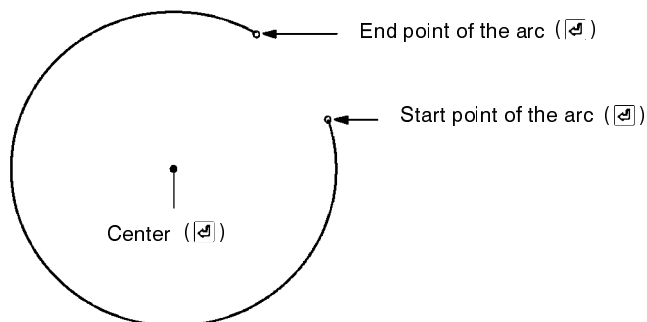
Modifying Polylines

Procedure **1.** Select "POLYLINE" from the fixed display menu, then press the [F2] (Modify) key.

A □ mark will be displayed at the start point of the continuous line.

2. Locate the cursor at the □ mark of the continuous line to be modified and press the ⏎ key.

3. Select the required item and execute the modification.

- Line Type: Select to change the line type.
- Color: If using an NT610C, select to change the line color.
- Display position: The cursor moves to the end point of the continuous line.

                            Change the shape using the same operations as used for drawing. Pressing the [Esc] key deletes the last straight line and allows the creation of a new straight line.

                            After changing the shape, press the ⏎ key while holding down the [Shift] key.

4. Press the [Esc] key to quit modification.

4-3-4   Creating Squares

This is the procedure for drawing squares.

Procedure **1.** Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2. Select "SQUARE" from the fixed display menu.

3. Select the display attribute.

The selectable options are "normal", "inverted", "flashing" and "spot".

4. If using an NT610C, specify the line color.

5. Draw the square.

1) Press the ⏎ key at the start point.

2) Locate the cursor at the end point (diagonally opposite point) and press the ⏎ key.
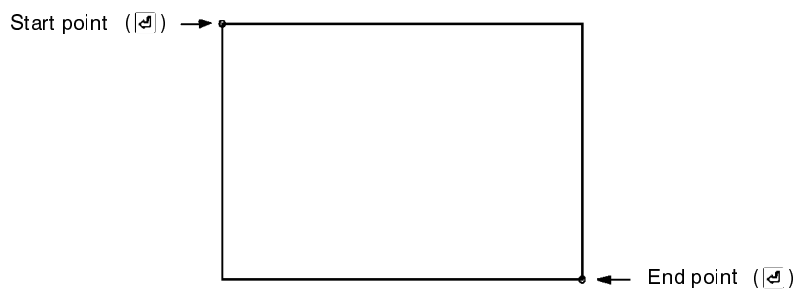
► Pressing the [Esc] key before the end point has been set aborts the drawing.

6. Press the [Esc] key to quit square drawing.

Deleting Squares

Procedure   **1.**   Select "SQUARE" from the fixed display menu and then press the [F1] (Delete) key.

A ☐ mark will be displayed at the start point of the square.

2.   Locate the cursor at the ☐ mark of the square to be deleted and press the ⏎ key.

3.   Check the message and then press the ⏎ key; the square will be deleted.
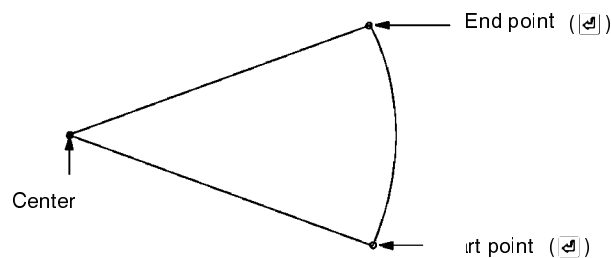
To abort deletion, press the [Esc] key.

Modifying Squares

Procedure   **1.**   Select "SQUARE" from the fixed display menu, then press the [F2] (Modify) key.

A ☐ mark will be displayed at the top left corner of the square.

2.   Locate the cursor at the ☐ mark of the square to be modified and press the ⏎ key.

3.   Select the required item and execute the modification.

• Attribute: Select to change the display attribute.

• Color: If using an NT610C, select to change the line color.

• Display position: Select to move the bottom right point of the square.

Pressing the [Esc] key makes it also possible to move the top left point of the square.

Change the size and shape and then press the Enter key.

4.   Press the [Esc] key to quit modification.

4-3-5   Creating Polygons

This is the procedure for drawing polygons. It is possible to create polygons with up to 255 sides.

Procedure   **1.**   Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2.   Select "POLYGON" from the fixed display menu.

3.   Select the display attribute.

The selectable options are "normal", "inverted", "flashing" and "spot".

4.   If using an NT610C, specify the line color.

5. Draw the polygon.

1) Press the ⏎ key at the start point.

2) Locate the cursor at a the next vertex and press the ⏎ key.

Set as many vertices as required.

3) At the final vertex, press the ⏎ key while holding down the [Shift] key (or double click if using the mouse).

The final vertex will be joined to the start point automatically.
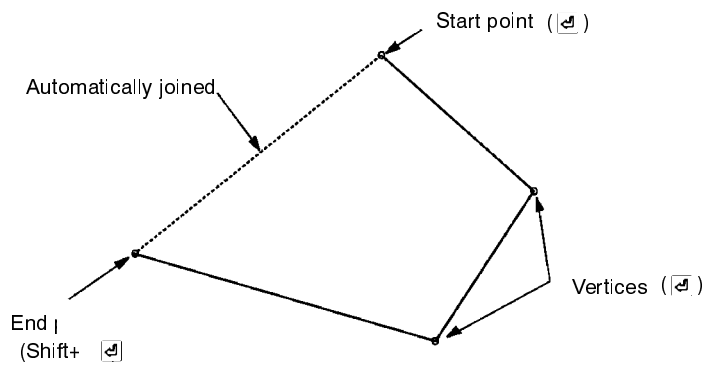
▶ Pressing the [Esc] key before the end point has been set deletes the last drawn straight line.

▶ Pressing the [Esc] key while holding down the [Shift] key aborts the drawing.

6. Press the [Esc] key to quit polygon drawing.

Deleting Polygons

Procedure   **1.** Select "POLYGON" from the fixed display menu and then press the [F1] (Delete) key.

A ☐ mark will be displayed at the start point of the polygon.

2. Locate the cursor at the ☐ mark of the polygon to be deleted and press the ⏎ key.

3. Check the message and then press the ⏎ key; the polygon will be deleted.

To abort deletion, press the [Esc] key.

Modifying Polygons

Procedure   **1.** Select "POLYGON" from the fixed display menu, then press the [F2] (Modify) key.

A ☐ mark will be displayed at the start point of the polygon.

2. Locate the cursor at the ☐ mark of the polygon to be modified and press the ⏎ key.

3. Select the required item and execute the modification.

• Attribute: Select to change the display attribute.

• Color: If using an NT610C, select to change the line color.

64

- Display position:

  The cursor moves to the end point of the polygon.

  Change the shape using the same operations as used for drawing. Pressing the [Esc] key deletes the last vertex and allows the creation of a new vertex.

  After changing the shape, press the ⏎ key while holding down the [Shift] key.

- Attribute position:

  Select to change the starting point for tiling when the "Normal", "Flashing" or "Spot" attribute is set. Use this feature when graphics are overlapped, making tiling difficult.

4. Press the [Esc] key to quit modification.

4-3-6 Creating Circles/Arcs

This is the procedure for drawing circles and arcs.

Procedure
1. Select "FIX DSP" from the initial editing menu.

   The fixed display menu will be displayed.

2. Select "CIRC/ARC" from the fixed display menu.

3. Select the display attribute.

   The selectable options are "normal", "inverted", "flashing", and "spot".

   The selected attribute will be valid only for circles.

4. If using an NT610C, specify the line color.

5. Draw the circular/arc.

   1) Press the ⏎ key at the center of the circle or arc.

   2) Move the cursor to set the size of the circle or arc and press the ⏎ key.

   3) For a circle:

   After setting the size, simply press the ⏎ key once more.

   For an arc:

   Specify the direction in which the arc is to be drawn by using the [Insert] key. Locate the cursor at the end point of the arc and press the ⏎ key.

6. Press the [Esc] key to quit circle/arc drawing.

Deleting Circles/Arcs

Procedure 1. Select "CIRC/ARC" from the fixed display menu and then press the [F1] (Delete) key.

A ☐ mark will be displayed at the start point of the circle/arc.

2. Locate the cursor at the ☐ mark of the circle/arc to be deleted and press the ⏎ key.

3. Check the message and then press the ⏎ key; the circle/arc will be deleted.

To abort deletion, press the [Esc] key.

Modifying Circles/Arcs

Procedure 1. Select "CIRC/ARC" from the fixed display menu, then press the [F2] (Modify) key.

A ☐ mark will be displayed at the start point of the circle/arc.

2. Locate the cursor at the ☐ mark of the circle/arc to be modified and press the ⏎ key.

3. Select the required item and execute the modification.

- Attribute: Select to change the display attribute. This selection is only valid if a circle has been created.

- Color: If using an NT610C, select to change the line color.

- Display position: Select to move the end point of an arc.

  Pressing the [Esc] key makes it possible to change the start point and center point also.

  After changing the shape, press the ⏎ key.

4. Press the [Esc] key to quit modification.

4-3-7   Creating Fans

This is the procedure for drawing fans.

Procedure 1. Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2. Select "FAN" from the fixed display menu.

3. Select the display attribute.

The selectable options are "normal", "inverted", "flashing", and "spot".

4. If using an NT610C, specify the line color.

5. Draw the fan.

1) Press the ⏎ key at the center of the fan.

2) Move the cursor to set the size and start point of the fan and press the ⏎ key.

3) Specify the direction in which the fan is to be drawn by using the [Insert] key.

4) Locate the cursor at the end point of the arc and press the ⏎ key.

6. Press the [Esc] key to quit fan drawing.

Deleting Fans

Procedure 1. Select "FAN" from the fixed display menu and then press the [F1] (Delete) key.

A ☐ mark will be displayed at the start point of the fan.

2. Locate the cursor at the ☐ mark of the fan to be deleted and press the ⏎ key.

3. Check the message and then press the ⏎ key; the fan will be deleted.

To abort deletion, press the [Esc] key.

Modifying Fans

Procedure   **1.**   Select "FAN" from the fixed display menu, then press the [F2] (Modify) key.

A ☐ mark will be displayed at the center of the fan.

2.   Locate the cursor at the ☐ mark of the fan to be modified and press the ⏎ key.

3.   Select the required item and execute the modification.

• Attribute: Select to change the display attribute.

• Color: If using an NT610C, select to change the line color.

• Display position: Select to move the end point of the fan.

Pressing the [Esc] key makes it possible to change the start point and center point also.

After changing the shape, press the ⏎ key.

4.   Press the [Esc] key to quit modification.

4-3-8   Tiling

This is the procedure for filling an area enclosed by lines, such as a square or circle, with a specified tiling pattern.

Procedure   **1.**   Select "FIX DSP" from the initial editing menu.

The fixed display menu will be displayed.

2.   Select "TILING" from the fixed display menu.

3.   Select the tiling pattern to be used.
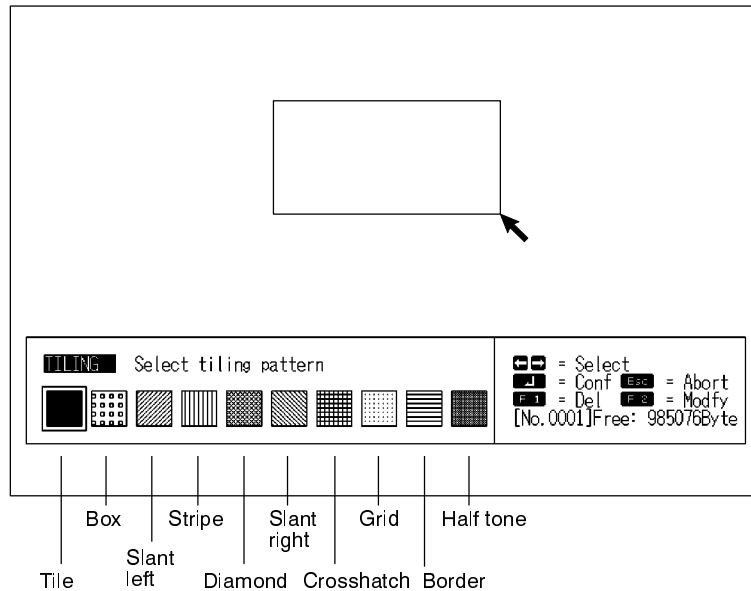
4. If using an NT610C, specify the base color, background color, and boundary color.

5. Locate the cursor inside the area to be tiled and press the ⏎ key.

   Any point inside an area that is enclosed by solid lines can be specified.

▶ If using an NT610C, make the specification inside the boundary color area.

6. A message asking for confirmation that the area is to be tiled will be displayed.

   Press the ⏎ key to tile the area.

   Press the [Esc] key to abort tiling.

```
┌──────────────────────────────────────────────────┐
│                                                    │
│                                                    │
│                    ┌───────────────┐               │
│                    │               │               │
│                    │               │               │
│                    │          ⬛❓  │               │
│                    └───────────────┘               │
│                                                    │
│  ┌──────────────────────────┬──────────────────┐  │
│  │ TILING  Define tiling ?  │  ⏎    = Confirm  │  │
│  │                          │  Esc  = Abort     │  │
│  │                          │ [No.0001]Free: 985060Byte │
│  └──────────────────────────┴──────────────────┘  │
└──────────────────────────────────────────────────┘
```
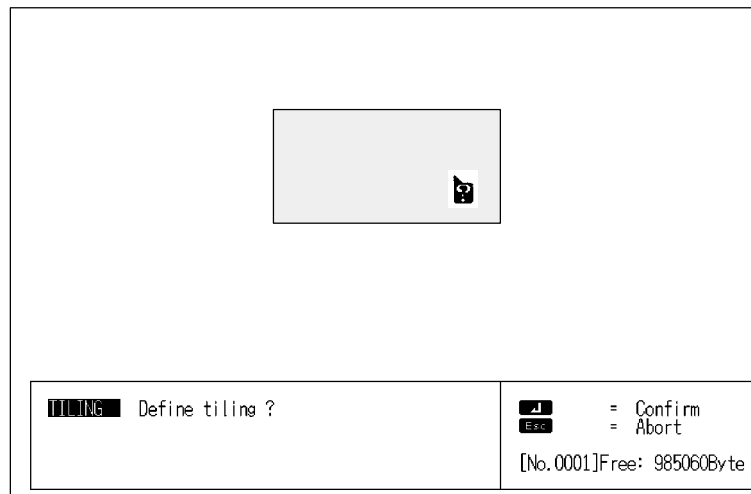
Reference: • Take the display sequence into consideration when creating screen data. The created screen may sometimes differ from the displayed screen (see p.44).

• The tiling patterns on the support tool screen may differ a little from the tiling patterns on the PT screen.

• If an area which is not closed is specified, the entire screen may be tiled. In addition, when using an NT610C, if a graphic for which the boundary color is not closed is specified, the tiling may extend outside the specified area.

Caution: Do not specify tiling inside graphics assigned the "flashing" attribute.

Deleting Tiling

Procedure 1. Select "TILING" from the fixed display menu and then press the [F1] (Delete) key.

A ☐ mark will be displayed at the point at which the tiling was specified.

2. Locate the cursor at the ☐ mark of the tiling to be deleted and press the ⏎ key.

3. Check the message and then press the ⏎ key; the tiling will be deleted.

To abort deletion, press the [Esc] key.

Modifying Tilings

Procedure 1. Select "TILING" from the fixed display menu, then press the [F2] (Modify) key.

A ☐ mark will be displayed at the point where the tiling was specified.

2. Locate the cursor at the ☐ mark of the tiling to be modified and press the ⏎ key.

3. Select the required item and execute the modification.

• Pattern: Select to change the tiling pattern.

• Color: If using an NT610C, select to change the color.

• Display position: Select to change the tiling location.

4. Press the [Esc] key to quit modification.

4-4   Setting Numeral Displays

This section describes how to display the contents of numeral tables on the screen.

A maximum of 50 numeral displays can be set for display on one screen.

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

4-4-1   Setting Numeral Displays

This is the procedure for setting numeral displays. For details on the display of character-strings and numeric values, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Procedure   1. Select "NUM DISP" on the initial editing screen.

2. Select the field in which the numeral display is to be registered in the window and press the ⏎ key.

▶ To delete an entry that has already been set, locate the cursor at that number and press the [F1] (Delete) key.

3. Set the display settings for the numerals and press the ⏎ key.

4. If using an NT610C, specify the display color and the background color.

▶ These specifications cannot be made when using an NT612G.

5. A box that indicates the size of the numeral display will be displayed.

Move this box to the required display position and press the ⏎ key.
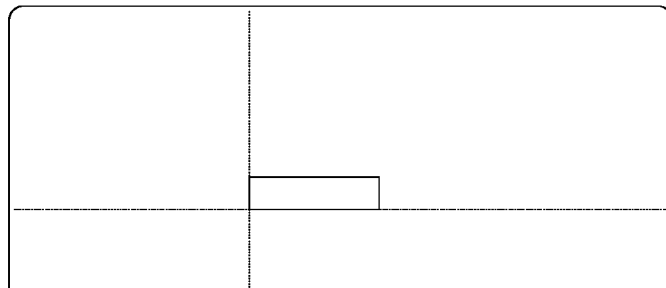
If required, more numeral displays can be set by repeating steps 2. through 5.

To quit numeral display, press the [Esc] key; the display will return to the menu.

Reference: If "Yes" is set for "Brkn Line Frame Disp" in the environmental settings (tool settings for the "Edit" screen), the display range for the numerals can be continually monitored on the screen.

4-4-2   Modifying Numeral Displays

The contents and position of numeral displays created on the screen can be modified.

Procedure **1.** Select "NUM DISP" on the initial editing screen.

2. In the window, select the entry corresponding to the numeral display to be modified and press the ⏎ key.

▶ It is also possible to make the selection by locating the mouse cursor on the numeral display to be modified and clicking the left mouse button.

3. Select the required item in the window and execute the modification.

```
┌─────────────────────────┐
│█Num Disp Setting█        │
│  Ref Way    Dir.         │
│  Table  [No.  0]         │
│  Disp Type  Dec          │
│  Integer    8Dig         │
│  Decimal    0Dig         │
│  Zero Sup   No           │
│  Disp Sign  No           │
│  Size       Norm         │
│  Scale      Equ          │
│  Attribute  Norm         │
│  Smoothing  No           │
│ Num Disp Color           │
│ Display Position         │
│  X = 288 Y = 130         │
│                          │
│                          │
│ ⬆⬇=Slct  ⏎=Conf          │
│ Home=Shift Menu          │
│ Esc=Abort                │
└─────────────────────────┘
```
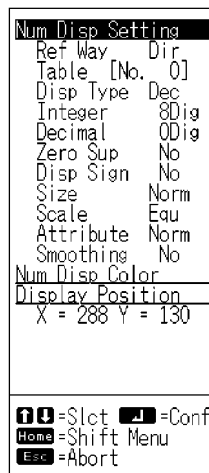
• Num Disp Setting: Select to change settings such as the referenced memory table, the scale, and the attribute.

• Num Disp Color: If using an NT610C, select to change the display color and background color.

• Display Position: Select to change the display position.

4. Press the [Esc] key to quit modification.

4-5   Setting Character-String Displays

This section describes how to display the contents of character-string memory tables on the screen.

A maximum of 50 character-string displays can be set for display on one screen.

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

4-5-1   Setting Character-String Displays

This is the procedure for setting character-string displays. For details on the display of character-strings and numeric values, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Procedure   **1.**   Select "STR DISP" on the initial editing screen.

2.   Select the field in which the character-string is to be registered in the window and press the ⏎ key.

▶ To delete an existing character-string from the field in which it is registered, locate the cursor at that number and press the [F1] (Delete) key.

3.   Set the display settings for the character-string and press the ⏎ key.

4.   If using an NT610C, specify the display color and the background color.

▶ These specifications cannot be made when using an NT612G.

5.   A box that indicates the size of the character-string display will be displayed.

Move this box to the required display position and press the ⏎ key.
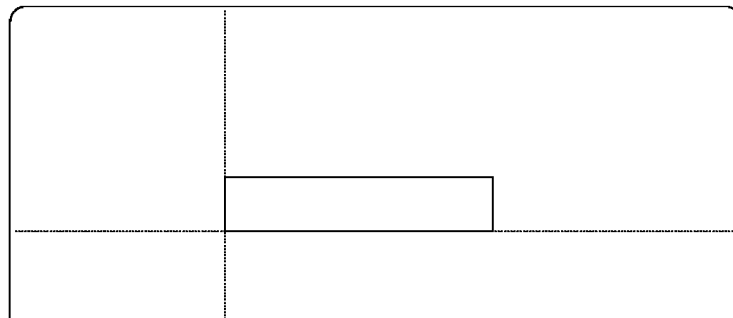
If required, more character-string displays can be set by repeating steps 2. through 5.

To quit character-string display, press the [Esc] key; the display will return to the menu.

Reference: If "Yes" is set for "Brkn Line Frame Disp" in the environmental settings (tool settings for the "Edit" screen), the display range for the character-string can be continually monitored on the screen.

4-5-2   Modifying Character-String Displays

The contents and position of character-string displays created on the screen can be modified.

Procedure   1.   Select "STR DISP" on the initial editing screen.

2.   In the window, select the entry corresponding to the character-string display to be modified and press the ⏎ key.

▶ It is also possible to make the selection by locating the mouse cursor on the character-string display to be modified and clicking the left mouse button.

3.   Select the required item in the window and execute the modification.

```
┌─────────────────────────┐
│▐Num Disp Setting▌       │
│ Ref Way     Dir.        │
│ Table  [No.   0]        │
│ Disp Type  Dec          │
│ Integer    8Dig         │
│ Decimal    0Dig         │
│ Zero Sup   No           │
│ Disp Sign  No           │
│ Size       Norm         │
│ Scale      Equ          │
│ Attribute  Norm         │
│ Smoothing  No           │
│ Num Disp Color          │
│ Display Position        │
│   X = 288 Y = 130       │
│                         │
│                         │
│                         │
│                         │
│ ▮▮=Slct ▭=Conf          │
│ Home=Shift Menu         │
│ Esc=Abort               │
└─────────────────────────┘
```
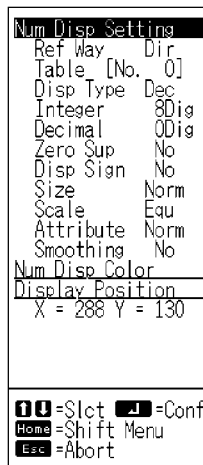
• Str Disp Setting: Select to change settings such as the referenced memory table, the scale, and the attribute.

• String Disp Color: If using an NT610C, select to change the display color and background color.

• Display Position: Select to change the display position.

4.   Press the [Esc] key to quit modification.

4-6 Setting Lamps

This section describes how to create lamp graphics whose display can be controlled from the PC.

A maximum of 256 lamps can be set for display on one screen.

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

WARNING When lamps are displayed in the same location as numeral table data or character-string memory table data, depending on the timing for lamp lighting and memory table update timing, the lamp and numeral displays may overlap on the screen. Refer to the NT612G Operation Manual (V024-E1-1) and the NT610C Operation Manual (V025-E1-1).

4-6-1 Setting Lamps

This is the procedure for setting lamps. For details on the display of character-strings and numeric values, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

▶ By using the "Lamp/TSW Disp Mode" in the environmental settings (tool settings for the "Edit" screen), it is possible to check how lamps appear on the PT during operation by viewing the support tool screen.

Setting Normal Lamps

This is the procedure for setting "Normal lamps", which come on, go off, or flash, in accordance with the status of PC bits.

Procedure
1. Select "LAMP" on the initial editing screen.

2. Select the field in which the lamp is to be registered in the window and press the ⏎ key.

▶ To delete an existing lamp from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

3. Select "Normal" as the lamp type and press the ⏎ key.

4. Select the graphic to be used for creating the lamp and press the ⏎ key.

   Four types of graphic can be selected for lamp creation: square, circle, polygon, and fan.

5. Create the lamp graphic.

   For details on the creation method, see 4-3 "Creating Fixed Displays" (p.58).

6. Set the allocated PC bit (lamp bit) and press the ⏎ key.

7. Set the display settings for the lamp and press the ⏎ key.

```
┌─────────────────────────────────────┐
│          Lamp Setting                │
│                                      │
│   Frame        Yes      No           │
│   Attribute    Lit      Flsh         │
│   Label        Yes      No           │
│                                      │
│  ⬆⬇⬅➡=Slct  ⏎=Conf  Esc=Abort      │
└─────────────────────────────────────┘
```

- Frame: Specify whether or not a frame is to be displayed around the lamp graphic here.

- Attribute: Specify whether the lamp will come on continuously or flash when there is an instruction for it to light from the PC here.

- Label: Specify whether or not characters (a label) are to be displayed together with the lamp here.

8. If using an NT610C, specify the frame color, OFF color, ON color, and flashing color of the lamp.

9. Input the label and press the ⏎ key.

▶ If the setting for "Label" in the "Lamp Setting" window is "No", the label will not be displayed.

▶ The input label can occupy one line.

▶ Press the [F3] (Mark) key to enable marks to be input.

▶ Press the [F4] (Image) key to enable image data to be input.

10. Set the display settings for the label and press the ⏎ key.

▶ If "No" is set for the "Label" setting in the "Lamp Setting" window, it will not be possible to make these settings.

11. If using an NT610C, specify the character color and background color.

12. A box indicating the size of the label will be displayed in the center of the lamp graphic.

    Move this box to the required display position and press the ⏎ key.

▶ If "No" is set for the "Label" setting in the "Lamp Setting" window, it will not be possible to make this setting.
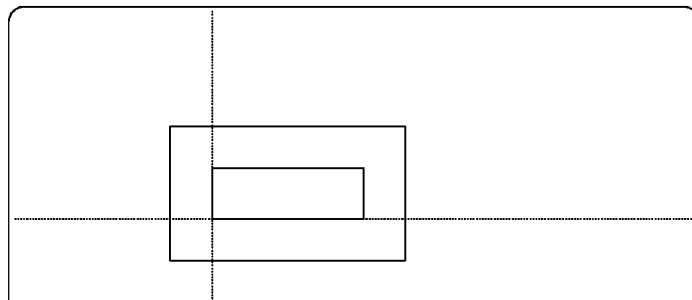
13. The specified label and lamp graphic will be displayed.

14. The screen on which registration fields for lamps can be selected will be displayed.

To create another lamp, select a field.

To quit lamp creation, press the [Esc] key.

Setting Image/Library Lamps
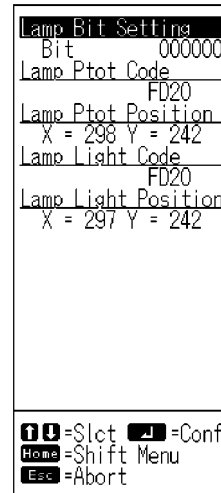
This is the procedure for setting image/library lamps, which display different image data or library data according to the status of a PC bit.

Procedure

1. Select "LAMP" on the initial editing screen.

2. Select the field for lamp registration in the window and press the ⏎ key.

▶ To delete an existing lamp from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

3. Select "Image & Lib" as the lamp type and press the ⏎ key.

4. Set the allocated PC bit and press the ⏎ key.

5. Set the code for the image data or library data that is displayed when the lamp is off (when the PC bit is OFF) and press the ⏎ key.

▶ Press the [F1] (List Select) key to enable selection of the code from a list display. If "0" is specified, nothing will be displayed when the lamp is off.

6. Specify the display position for the image data or library data that is displayed when the lamp is off, and press the ⏎ key.

▶ If "0" (no display) is set for the code, it is not possible to specify a display position.

7. Set the code for the image data or library data that is displayed when the lamp is on (when the PC bit is ON) and press the ⏎ key.

▶ Press the [F1] (List Select) key to enable selection of the code from a list display. If "0" is specified, nothing will be displayed when the lamp is off.

8. Specify the display position for the image data or library data that is displayed when the lamp is on, and press the ⏎ key.

▶ If "0" (no display) is set for the code, it is not possible to specify a display position.

9. The screen on which registration fields for lamps can be selected will be displayed.

To create another lamp, select a field.

To quit lamp creation, press the [Esc] key.

4-6-2 Modifying Lamps

It is possible to modify the contents, shape, and position of created lamps.

Procedure   1.   Select "LAMP" on the initial editing screen.

2.   In the window, select the lamp to be modified and press the ⏎ key.

▶   It is also possible to select the lamp to be modified by locating the mouse cursor on it and clicking the left mouse button.

3.   Select the type of modification from the options in the window and execute the modification.

For a "Normal lamp"

```
Display Position
Attribute Position
Lamp Bit Setting
  Bit        000000
Lamp Setting
  Frame       Yes
  Attribute   Lit
  Label       Yes

Modify Label
Label Setting
  Size       Norm
  Scale      Equ
  Attribute  Norm
  Smoothing  No

Label Position
  X = 267 Y = 164

⬆⬇=Slct ⏎=Conf
Home=Shift Menu
Esc=Abort
```

For an "Image & library lamp"

```
Lamp Bit Setting
  Bit        000000
Lamp Ptot Code
           FD20
Lamp Ptot Position
  X = 298 Y = 242
Lamp Light Code
           FD20
Lamp Light Position
  X = 297 Y = 242




⬆⬇=Slct ⏎=Conf
Home=Shift Menu
Esc=Abort
```

- Display Position: Select to modify the shape and size of the graphic.

- Attribute Position: Select to change the starting position for tiling when the lamp is on or off. This item is only displayed when a lamp's touch switch is selected.

- Lamp No. Input: Select to change the lamp number.

- Lamp Bit Setting: Select to change the allocated PC bit.

- Lamp Setting: Select to modify the status of a set lamp.

- Lamp Color: Select to modify the frame color, OFF color, ON color, or flashing color. (NT610C only)

- Modify Label: Select to modify the label.

- Label Setting: Select to modify the size or attribute of the label.

- Lamp Label Color: Select to modify the color of a label. (NT610C only).

- Label Position: Select to modify the position at which a label is displayed.

- Lamp Ptot Code: Select to modify the code for the image or library data displayed when the lamp is OFF.

- Lamp Ptot Position: Select to modify the display position of the image or library data when the lamp is OFF.

- Lamp Light Code: Select to modify the code for the image or library data displayed when the lamp is OFF.

- Lamp Light Position: Select to modify the display position of the image or library data when the lamp is ON.

4. Press the [Esc] key to quit modification.

4-7 Setting Touch Switches

This section describes how to create touch switch graphics that are displayed on the PT screen and can be used as input switches.

A maximum of 256 touch switches can be created for display on one screen.

The sensitive area (area that senses being touched) of a touch switch is not set in accordance with the ordinary coordinates but with touch switch elements (NT612G: 25 dots vertically x 20 dots horizontally, NT610C: 20 dots vertically x 20 dots horizontally) as the minimum units.

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

4-7-1 Setting Touch Switches

This is the procedure for setting touch switches.

• Input Notification: Notifying the PC that a touch switch has been pressed.

```
            ┌─────────────────────┐
            │  InNotice Bit Set   │
            └─────────────────────┘
        ███████  [   000000]              ]
        Comment  [                        ]
        Act Type  Moment Altnat Set Rset

      F 1 =AR   F 2 =HR   F 3 =LR   F 4 =DM   F 5 =CNT
      F 6 =TIM  F 7 =CH   F 8 =***  F 9 =***  F 10 =***
      Home =None

          ↑↓←→=Slct   ↵=Conf   Esc =Abort
```

• Not Bit: Specify the PC bit that is notified that the touch switch has been pressed here.

• Comment: Input a memo here, for example one that indicates the purpose of use.

• Act Type: Specify the effect of pressing the touch switch here.

     Moment: The PC bit comes ON when the touch switch is pressed and goes OFF when it is released.

     Altnat: Each time the touch switch is pressed the status of the PC bit (ON/OFF) is changed to the opposite status.

     Set: The PC bit is switched ON when the touch switch is pressed.

     Rset: The PC bit is switched OFF when the touch switch is pressed.

• Screen Switching: Switching to a specified screen when the touch switch is pressed.

```
┌─────────────────────────────────────┐
│       ┌──────────────────┐          │
│       │ SwScreen No. In  │          │
│       └──────────────────┘          │
│                                      │
│    SwScreen No.    [    1]           │
│        ( 0=Screen Pop )              │
├─────────────────────────────────────┤
│    ⏎  = Confirm  Esc = Abort         │
└─────────────────────────────────────┘
```

SwScreen No.:   Specify the screen number of the screen to be displayed here. If "0" is specified the display will return to the screen that was displayed before the current one.

• Character keys: Used as input keys when setting character-strings. A character-string that is the same as the label on the touch switch is input when the touch switch is pressed.

• Keyboard keys: When one of these touch switches is pressed in character-string setting, the specified keyboard is displayed.

```
┌─────────────────────────────────────┐
│     ┌──────────────────┐            │
│     │ Keyboard Scr No. In │         │
│     └──────────────────┘            │
│                                      │
│  Keyboard Scr No    [1900]           │
│           ( 1900-1979 )              │
├─────────────────────────────────────┤
│     ⏎  = Confirm  Esc = Abort        │
└─────────────────────────────────────┘
```

Keyboard Scr No: Specify the screen number of the keyboard to be called here.

• Control keys: Used as numeric keys and system keys in numeral setting.

```
┌─────────────────────────────────────┐
│       ┌──────────────┐              │
│       │ Ctrl Key Selct │            │
│       └──────────────┘              │
│                                      │
│  0  1  2  3  4  5  6  7  8  9        │
│  A  B  C  D  E  F  CLR ±  ,  HOME    │
│  ↑  ↓  ←  →  ⏎ •))) ↑  ↓  MENU       │
│  CA BS DEL ◄  ►  ENT ⬆  ⬇  ▲  ▼      │
├─────────────────────────────────────┤
│  ⬆⬇◄► =Slct  ⏎ =Conf  Esc =Abrt     │
└─────────────────────────────────────┘
```

Select the numeric keys and system keys that will be allocated to touch switches.

• Copy Setting: When a touch switch is pressed, the contents of a memory table, or a code, are copied to the input field (cursor position) for a memory table or numeral/character-string setting.

```
┌─────────────────────────────────────────────────┐
│              ┌──────────────────┐                │
│              │   Copy Setting   │                │
│              └──────────────────┘                │
│ Copy From      Num Tbl  Strng Tbl   Code         │
│ No/Fixed      [No.    0] ( F1 =List selct)        │
│                                                   │
│ Copy To        Num Tbl  Strng Tbl  Crs Posi       │
│ Crsr Posi     [No.    0] ( F1 =List selct)        │
│                                                   │
│  ⬆⬇⬅➡=Slct  ⏎=Conf  Esc=Abort                   │
└─────────────────────────────────────────────────┘
```

Copy From: Specify the type of copy source here.

No/Fixed: Specify the memory table number and numeric value (code) of the copy source here. In the case of memory table specifications, pressing the [F1] (List select) key enables the selection to be made from a displayed list.

Copy To: Specify the type of copy destination here.

Crsr Posi: When copying between memory tables, specify the copy destination memory table number here. Pressing the [F1] (List select) key enables the selection to be made from a displayed list.

When copying to an input field, the data is copied into the specified input field when the touch switch is pressed. There are no particular specifications to be made.

• Cursor Motion: When a touch switch is pressed, the cursor moves to the input field for a specified numeral/character-string setting.

```
┌───────────────────────┐
│ DATA IN        1/ 50  │
│ ┌───────┬──────┬────┐ │
│ │ Type  │Table │    │ │
│ ├───────┼──────┼────┤ │
│ │ Num In│   0  │    │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ │ - - - │- - - │- - │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ │       │      │    │ │
│ └───────┴──────┴────┘ │
│  ⬆⬇=Slct  Esc=Abrt    │
│  ⏎=Conf   F1=Del      │
│  F2=Ord               │
└───────────────────────┘
```

Select the input field to which the cursor will move. Input fields of the sum rotary type cannot be selected.

- Print Screen Setting: When a touch switch is pressed, printing of the displayed screen is started or suspended.

```
┌─────────────────────────────────┐
│       ┌──────────────┐          │
│       │ Print Scr Set │          │
│       └──────────────┘          │
│                                 │
│     Start        Abort          │
│                                 │
│   ◄►=Slct  ↵=Conf  Esc=Abort    │
└─────────────────────────────────┘
```
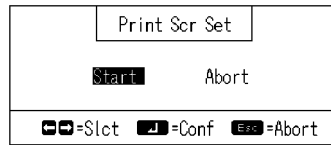
Reference: The type of printer used (EPSON Esc/P printer (24 pin)) and the printing method at the NT610C (color, greyscale) are set using the memory switches on the PT body (see p.24).

The following eight types of display area can be specified for touch switches.

In the case of squares, circles, polygons and fans, the sensitive area (the area that senses being touched) and display area (the area that lights, goes off, or flashes in accordance with the status of the PC bit) can be specified separately.
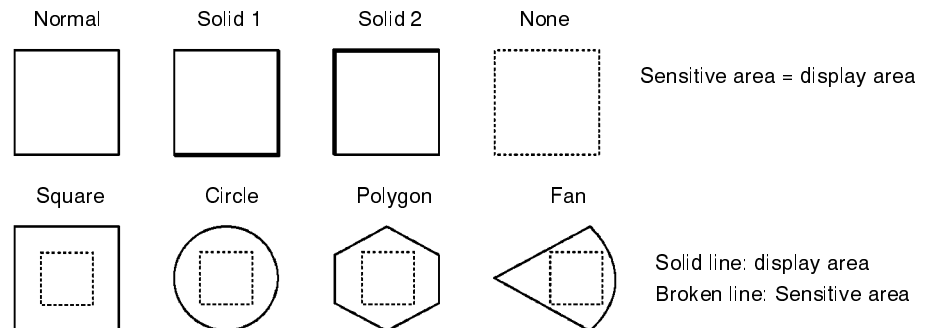
WARNING "Solid 2" can only be used with the NT610C.

For details on the display of character-strings and numeric values, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Reference: By using the "Lamp/TSW Disp Mode" function in the environmental settings (tool settings for the "Edit" screen), it is possible to check how touch switches appear on the PT during operation by viewing the support tool screen.

Procedure 1. Select "TOUCH SW" on the initial editing screen.

2. Select the field in which the touch switch is to be registered in the window and press the ↵ key.

▶ To delete an existing touch switch from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

3. Select the touch switch function and press the ↵ key.

   If "Input key" is selected, make a further function selection and then press the ↵ key.

4. Make the settings appropriate for the function of the touch switch.

5. Select the type of touch switch display area and press the ↵ key.

6. If a square, circle, polygon, or fan has been specified, create the display area for the touch switch.

   For details on the creation of the area, see 4-3 "Creating Fixed Displays" (p.58).

7. Create the sensitive area for the touch switch.

   Specify the start point and end point by using the [+] cursor.

8. Specify the PC bit (lamp bit) that controls the OFF / ON / flashing status of the touch switch.

9. Make the touch switch display settings and press the ⏎ key.

   ```
   ┌─────────────────────────────┐
   │     │Set Touch Switch│      │
   │                             │
   │  Inverse      Yes     No    │
   │  Attribute    Lit     Flsh  │
   │  Label        Yes     No    │
   └─────────────────────────────┘
    ⬆⬇⬅➡=Slct ⏎=Conf Esc=Abort
   ```

   - Inverse: Specifies whether or not the graphic will be inverted when there is input on the PT screen.

      [Normal, solid 1, square, circle, polygon, fan]

      NT612G: Becomes inverted
      NT610C: Assumes the ON color

      [Solid 2] (NT610C only)

   - Attribute: Specify ON display or flashing display.
   - Label: Specify whether or not characters (the label) are displayed together with the graphic.

10. If using an NT610C, specify the frame color, OFF color, ON color (inverse color on input) and flashing color.

11. Input the label and press the ⏎ key.

▶ If the setting for "Label" in the "Lamp Setting" window is "No", the label will not be displayed.

▶ The label can occupy one line.

▶ Press the [F3] (Mark) key to enable marks to be input.

▶ Press the [F4] (Image) key to enable image data to be input.

12. Set the display settings for the label.

13. If using an NT610C, specify the character color and background color.

14. A box indicating the size of the label will be displayed.

Move this box to the required display position and press the ⏎ key.
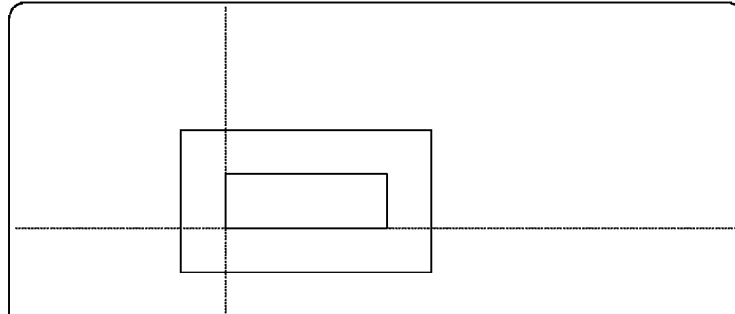
15. The specified label and touch switch graphic will be displayed.

16. The screen on which registration fields for touch switches can be selected will be displayed.

To create another touch switch, select a field.

To quit touch switch creation, press the [Esc] key.

4-7-2 Modifying Touch Switches

The contents, shape, and position of a touch switch created on the screen can be modified.

Procedure **1.** Select "TOUCH SW" on the initial editing screen.

2. Select the touch switch to be modified in the window and press the ⏎ key.

3. Select the type of modification from the options in the window and press the ⏎ key.

▶ It is also possible to make the selection by locating the mouse cursor on the numeral display to be modified and clicking the left mouse button.
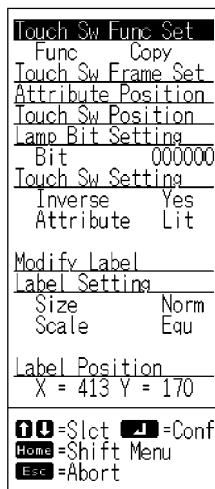
- Touch Sw Func Set: Select to change the function.

- Touch Sw Frame Set: Select to change the frame of the display area.

- Attribute Position: Select to change the tiling start position when the touch switch is lit or flashing.

     This option is only displayed when a polygonal touch switch is selected.

- Touch Sw Position: Select to change the sensitive area. The location of the modification (start point/end point) can be changed by pressing the [Esc] key.

- Lamp Bit Setting: Select the change the PC bit that controls display.

- Touch Sw Setting: Select to change the settings relating to display of the touch switch.

- Touch Switch Color: Select to change the frame color, OFF color, ON color (inversion color on input), flashing color, etc. (NT610C only).

- Modify Label: Select to change the label.

- Label Setting: Select to change the font and scale of the label.

- Label Color: Select to change the color of the label and its background (NT610C only).

- Label Position: Select to change the display position of the label.

4. Press the [Esc] key to quit modification.

4-8   Creating Graphs

This section describes how to create graphs whose display corresponds to the numeric values in numeral tables. There are the following three types of graph.

• Bar graph: Numeral table contents are displayed in the form of a bar graph.

43%

• Trend graph: Numeral table contents that change with time are displayed in the form of broken lines.

1000

——— : Numeral table 1 84%

----- : Numeral table 2 21%

0

→ Time
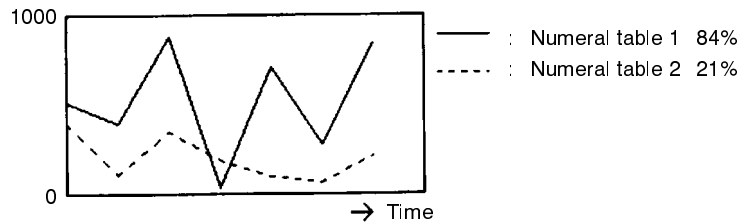
• Broken line graph: The contents of several consecutive numeral tables are displayed in the form of a broken line. The display intervals can be changed without restriction.
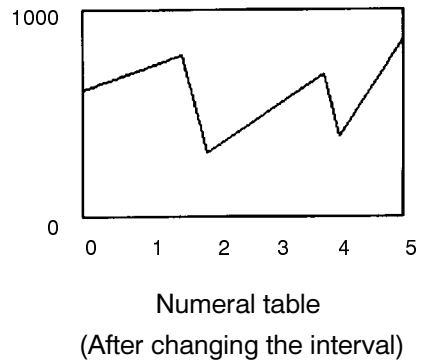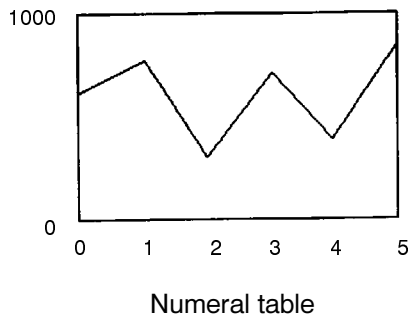
1000

0   0   1   2   3   4   5

Numeral table

1000

0   0   1   2   3   4   5

Numeral table
(After changing the interval)

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

4-8-1   Setting Graphs

These are the procedures for setting graphs. For details on the display of charac-
ter-strings and numeric values, setting display colors (NT610C), setting numeral
tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Setting Bar Graphs   A maximum of 50 bar graphs can be set for display on one screen.

Procedure   **1.**   Select "GRAPH" from the initial editing screen.

The graph menu will be displayed.

2.   Select "BAR GRAPH" from the graph menu.

3.   Select the field in which the bar graph is to be registered in the window and
press the ⏎ key.

▶ To delete an existing bar graph from the field in which it is registered, locate the
cursor at that field and press the [F1] (Delete) key.

4.   Locate the cursor at the start point for the bar graph frame and press the ⏎
key.

Bar graphs are created as rectangular graphics. They can be oriented either
vertically or horizontally.

5.   Set the display settings for the bar graph and press the ⏎ key.

```
                ┌─────────────────────┐
                │  Bar Graph Setting  │
     ┌──────────┴─────────────────────┴──────────┐
     │ Ref Way       Direct   Indrct              │
     │ Ref Table     [No.  0]      (F1=Lst Slct)  │
     │ Direction     Rt  Up  Lf  Dn               │
     │ Frame          Yes       No                │
     │ Disp Sign      Yes       No                │
     │ 100% Ref Way   Fix Num  Num Table          │
     │ 100% Val      [    100]     (F1=Lst Slct)  │
     │   0% Ref Way   Fix Num  Num Table          │
     │   0% Val      [      0]     (F1=Lst Slct)  │
     │-100% Ref Way   Fix Num  Num Table          │
     │-100% Val      [   -100]     (F1=Lst Slct)  │
     │ Display %      Yes       No                │
     │ Size of %     Half  Norm   Wide            │
     │ Scale of %    Equ   Wide   High            │
     │                4x     9x     16x     64x   │
     │ Smooth of %    Yes       No                │
     ├───────────────────────────────────────────┤
     │  ⬆⬇⬅➡ = Slct   ⏎ = Conf   Esc = Abort      │
     └───────────────────────────────────────────┘
```

- Ref Way: Specify the method used to reference the memory table used for the display here.

  ▶ Do not specify the "indirect" setting if not using a C200H interface unit.

- Ref Table: Specify the number of the memory table to be referenced here.

  Pressing the [F1] key enables selection from a memory table list.

- Direction: Specify the orientation of the bar (vertical or horizontal) here.

- Frame: Specify whether or not a graph frame is displayed here.

  If "No" is specified, only the bar (without a frame) will be displayed.

- Disp Sign: Specify whether or not a minus sign is to be displayed in the case of negative values here. If "Yes" is specified, the center of the graph area is displayed at the origin to allow the display of negative values.

- 100% Ref Way:
- 0% Ref Way:
- −100% Ref Way: Specify the reference methods for 100%, 0%, and −100% values. If a numeral table has been specified, specify the numeral table number. Pressing the [F1] key enables the table to be selected from a displayed list.

- 100% Val
- 0% Val
- −100% Val: Specify the reference methods for 100%, 0%, and −100% values. If "Num Table" is specified, specify the numeral table number.

  Pressing the [F1] key enables the memory table to be selected from a displayed list.

- Display %:   Specify whether or not a percentage value is displayed on the screen.

- Size of %:   Specify the display font for the percentage display. (Half, Norm, Wide)

- Scale of %:   Specify the magnification of the percentage display. (Equ, Wide, High, 4x, 9x, 16x, 64x)

- Smooth of %:   Specify whether or not the jaggedness of characters that have been enlarged is to be eliminated. (Applies to characters 4x and larger only.)

6. If using an NT610C, specify the frame color, display color for a positive value, display color for a negative value, display color for the % character, and the background color.

7. A box that indicates the size of the percentage display will be displayed.

   Move this box to the required display position and press the ⏎ key.

   The specified percentage display and bar graph will be displayed.

50%
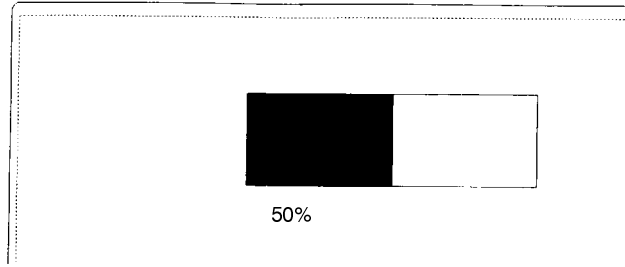
8. The screen on which registration fields for bar graphs can be selected will be displayed.

   To create another bar graph, select a field.

   To quit bar graph creation, press the [Esc] key.

Setting Trend Graphs   Only one trend graph can be created per screen; it can comprise up to 50 broken lines.

Procedure   1. Select "GRAPH" from the initial editing screen.

   The graph menu will be displayed.

2. Select "TREND GRAPH" from the graph menu.

3. Locate the cursor at the start point for the trend graph frame and press the ⏎ key.

   Trend graphs are created as rectangular graphics. They can be oriented either vertically or horizontally.

4. Locate the cursor at the end point of the trend graph frame and press the ⏎ key.

5. Set the basic settings for the trend graph and press the ⏎ key.

```
┌─────────────────────────────────────────────┐
│        ┌──────────────────────┐             │
│        │  Trnd Grph Basic Setting │          │
│        └──────────────────────┘             │
│                                              │
│   Type         ███████  Normal   Pen Reco    │
│   Mv Direction    Rt  Up  Lf  Dn             │
│   Frame           ─Yes─          No          │
│   Disp Sign        Yes           No          │
│   Drwing Width   [   1]        (1-640)       │
│   Smpling Cycl   [   1]x0.1sc (1-65535)      │
│                                              │
│  ▲▼◀▶ = Slct    ◼◢ = Conf   Esc = Abort      │
└─────────────────────────────────────────────┘
```

- Type: Specify the type of trend graph.

  Normal: The graph remains in a fixed position and successive points in the graph are drawn in the "Mv Direction".

  Pen Reco: The latest point is always drawn at a fixed position and the entire graph moves in the "Mv Direction".

- Mv Direction: Specify the direction in which the broken line moves with time here.

- Frame: Specify whether or not a graph frame is displayed.

  If "No" is specified here only the broken lines within the graph are displayed.

- Disp Sing: Specify whether or not a minus sign is to be displayed in the case of negative values here. If "Yes" is specified, the center of the graph area is displayed at the origin to allow the display of negative values.

- Drwing Width: Specify how many dots to move the graph within a fixed time during drawing here.

- Smpling Cycl: Specify the cycle in which the graph is rewritten here in 0.1 sec units.

  Range: 1 to 65535 = 0.1 to 6553.5 seconds

6. If using an NT610C, specify the frame color, the color of the positive area inside the frame, and the color of the negative area inside the frame.

7. Set the display settings for the trend graph and press the ⏎ key.

These settings have to be made for each broken line.

```
                    ┌─────────────────────┐
                    │ Trnd Grph Disp Setting │
                    └─────────────────────┘
 Ref Way          Direct    Indrct
 Ref Table        [No.  0]       (F1=Lst Slct)
 100% Ref Way     Fix Num   Num Table
 100% Val         [      100]     (F1=Lst Slct)
   0% Ref Way     Fix Num   Num Table
   0% Val         [        0]     (F1=Lst Slct)
 -100% Ref Way    Fix Num   Num Table
 -100% Val        [     -100]     (F1=Lst Slct)
 Grph Line Typ    Sold Lin  Brkn Lin  1Dot Chn  2Dot Chn
 Display %           Yes       No
 Size of %         Half    Norm   Wide
 Scale of %        Equ     Wide   High
                     4x       9x      16x     64x
 Smooth of %         Yes         No

     ⬆⬇⬅➡ = Slct    ⏎ = Conf   Esc = Abort
```

- **Ref Way:**   Specify the method used to reference the memory table used for the display here.

                      Do not specify the "indirect" setting if not using a C200H interface unit.

- **Ref Tabl:**   Specify the number of the memory table to be referenced here.

                      Pressing the [F1] key enables selection from a memory table list.

- **100% Ref Way**

- **0% Ref Way**

- **–100% Ref Way:**   Specify the reference methods for 100%, 0%, and –100% values. Specifying "Num Table" allows you to use the numeric value in a number table.

- **100% Val**

- **0% Val**

- **–100% Val:**   Specify the reference methods for 100%, 0%, and –100% values. If "Num Table" is specified, specify the numeral table number.

                      Pressing the [F1] key enables the memory table to be selected from a displayed list.

- **Grph Line Typ:**   Specify the line type for the broken lines.
                      (Sold Lin, Brkn Lin, 1 Dot Chn, 2Dot Chn)

- **Display %:**   Specify whether or not a percentage value is displayed on the screen.

- **Size of %:**   Specify the display font for the percentage display.
                      (Half, Norm, Wide)

- **Scale of %:**   Specify the magnification of the percentage display.
                      (Equ, Wide, High, 4x, 9x, 16x, 64x)

- **Smooth of %:**   Specify whether or not the jaggedness of characters that have been enlarged is to be eliminated. (Applies to characters 4x square and larger only.)

8. If using an NT610C, specify the display color and background color for the percentage display.

9. A box that indicates the size of the percentage display will be displayed.

   Move this box to the required display position and press the ⏎ key.

   The specified percentage display and trend graph will be displayed.

10. The screen on which registration fields for trend graphs can be selected will be displayed.

    To create another trend graph, select a field.

    Further broken lines can be added by repeating the operation from step 7.

    To quit trend graph creation, press the [Esc] key.

Reference: If a broken line extends beyond the frame, only the part contained by the frame will be displayed, as shown below.
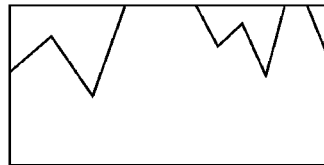
Setting Broken Line Graphs

No more than one frame for a broken line graph can be created per screen; up to 256 broken lines can be set within this frame. Each broken line can display the data in up to 512 numeral tables. Broken line graph frames can be set for screen (maximum of eight) in an overlapping screen but in this case that the total number of broken lines for the overlapping screen as a whole cannot exceed 256.

Procedure
1. Select "GRAPH" from the initial editing screen.

   The graph menu will be displayed.

2. Select "BRK-LIN GRAPH" from the graph menu.

3. Locate the cursor at the start point for the broken line graph frame and press the ⏎ key.

   Broken line graphs are created as rectangular graphics. They can be oriented either vertically or horizontally.

4. Locate the cursor at the end point of the broken line graph frame and press the ⏎ key.

5. Set the basic settings for the broken line graph and press the ⏎ key.

- Dirction: Specify the direction in which the broken line is to be drawn in accordance with the ascending order of memory table numbers here.

- Frame: Specify whether or not a graph frame is displayed.

  If "No" is specified here only the broken lines within the graph are displayed.

- Disp Sign: Specify whether or not a minus sign is to be displayed in the case of negative values here. If "Yes" is specified, the center of the graph area is displayed at the origin to allow the display of negative values.

6. If using an NT610C, specify the frame color, the color of the positive area inside the frame, and the color of the negative area inside the frame.

7. Set the display settings for the broken line graph and press the ⏎ key.

   These settings have to be made for each broken line.
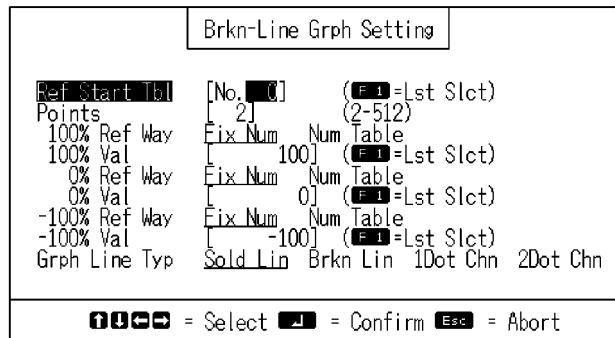
- Ref Start Tbl: Specify the memory table number from which reference is to be started here.

  Pressing the [F1] key allows the memory table to be selected from a list.

- Points: Specify the number of vertices in the broken line.

  The contents of a number of numeral tables equivalent to this number and starting with the "reference start table" will be displayed in the form of a broken line.

- 100% Ref Way:

- 0% Ref Way:

- –100% Ref Way: Specify the reference methods for 100%, 0%, and –100% values. Specifying "Num Table" allows you to use the numeric value in a number table.

- 100% Val:

- 0% Val:

- −100% Val: Specify the reference methods for 100%, 0%, and −100% values. If "Num Table" is specified, specify the numeral table number.

                      Pressing the [F1] key enables the memory table to be selected from a displayed list.

- Grph Line Typ: Specify the line type for the broken lines.

                      (Solid line, broken line, 1-dot chain, 2-dot chain)

8. If using an NT610C, specify the color for broken lines.

9. The screen on which registration fields for broken line graphs can be selected will be displayed.

    To create another broken line graph, select a field.

    Further broken lines can be added by repeating the operation from step 7.

    To quit broken line graph creation, press the [Esc] key.

Reference: If a broken line extends beyond the frame, only the part contained by the frame will be displayed, as shown below.
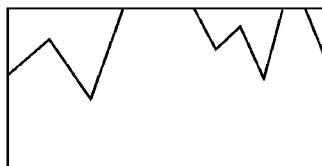
4-8-2   Modifying Graphs

The contents and position of a graph created on the screen can be modified.

Reference: The interval between the vertices in a broken line graph can be changed as required during modification.

Procedure 1. Select "GRAPH" on the initial editing screen.

    The graph menu will be displayed.

2. Select the type of graph to be modified from the graph menu and press the ⏎ key.

3. Select the graph to be modified in the window and press the ⏎ key.

▶ To delete a graph that has already been set, locate the cursor at the field for that graph and press the [F1] (Delete) key.

    Batch deletion of trend graphs and broken line graphs in frame units is possible by pressing the [F2] (All delete) key. Pressing the [F10] (Basic) key allows modification of the basic settings.

4. Select the required item and execute the modification.

    For details on the meanings of each of the items, refer to the sections describing the creation of each of the graph types.
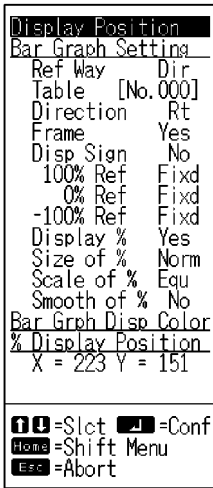
Bar graph	Trend graph basic settings	Trend graph	Broken line graph basic settings	Broken line graph
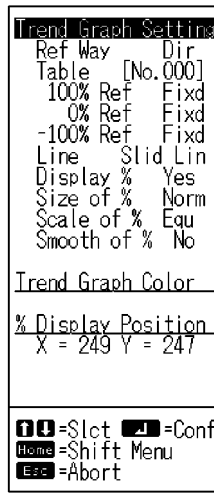
```
Display Position
Bar Graph Setting
  Ref Way    Dir
  Table   [No.000]
  Direction   Rt
  Frame      Yes
Disp Sign    No
  100% Ref   Fixd
    0% Ref   Fixd
 -100% Ref   Fixd
Display %    Yes
Size of %   Norm
Scale of %   Equ
Smooth of %  No
Bar Grph Disp Color
% Display Position
  X = 223 Y = 151



↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

```
Display Position

Trnd Grph Basic Set
  Type      Norm
  Mv Dirct    Rt
  Frame      Yes
  Disp Sign   No
  Dw Width  [ 40]
  Smpling Cycl
          [   1]

Trnd Grph Color Set




↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

```
Trend Graph Setting
  Ref Way    Dir
  Table   [No.000]
  100% Ref   Fixd
    0% Ref   Fixd
 -100% Ref   Fixd
  Line    Slid Lin
  Display %   Yes
  Size of %  Norm
  Scale of %  Equ
  Smooth of %  No

Trend Graph Color

% Display Position
  X = 249 Y = 247



↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

```
Brkn-Line Grph Set
  Ref Start Tbl
         [No.000]
  Points    [  2]
  100% Ref   Fixd
    0% Ref   Fixd
 -100% Ref   Fixd
  Line    Slid Lin

Brkn-Line Grph Col

Brkn-Line Grph Intv




↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

```
Display Position

Brkn-Line Grph Set
  Direction   Rt
  Frame      Yes
  Disp Sign   No

Brkn-Line Grph Col




↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

- "Brkn-Line Grph Intv" setting

  Used to change the interval between vertices in a broken line graph.

  Use the space key to assign and delete marks. Vertices will be displayed at the locations where marks have been assigned. Always assign a number of marks equal to the number of vertices.
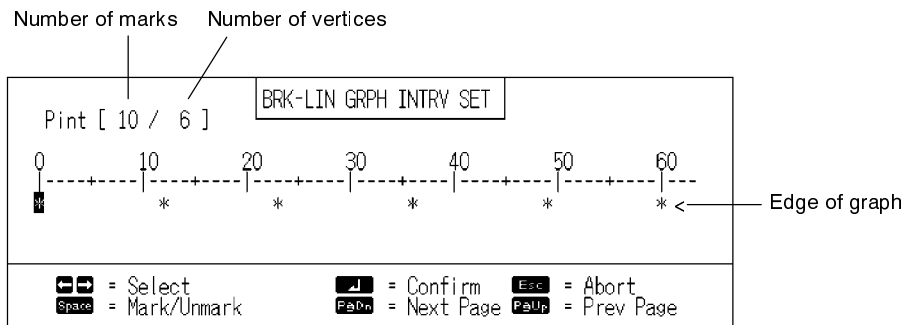
Press the ↵ key to quit interval setting.

5. Press the [Esc] key to quit modification.

4-9   Creating Input Settings

This section describes how to create the "numeral setting" and "character-string setting" input fields required to input numeric values and character-strings from a touch panel or extension I/O unit.

What is a "Numeral Setting"?

Once a numeral setting input field has been created, it is possible to input numeric values from touch switches or extension I/O units.

The touch switches used to input numeric values (ten keys) can be arranged without restriction on the screen. See "Creating Ten Keys" (p.102).

There are the following two types of input for numeral settings.

- Ten keys: Used to input numeric values into input fields as if using an electronic calculator.

- Thumb rotary:

There is a plus/minus touch switch for each digit of the numeric value and the value is input in one digit units (input from an extension I/O unit is not possible).

The switches come in three sizes, as shown below.

With thumb rotary setting, if "Yes" is set for "Disp Sign", the maximum number of digits in the numeric value is reduced to 7.
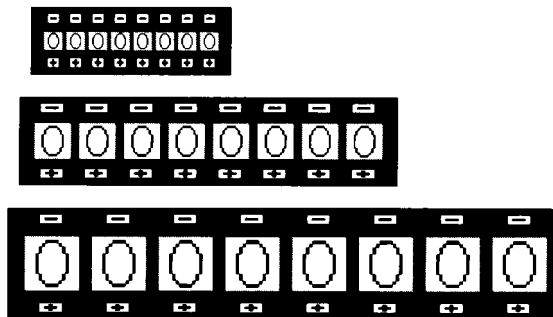
What is a "Character-string Setting"?

Once a character-string setting has been created, the label that appears on a touch switch can be input as a character-string with one press of the switch.

Further, if several keyboard screens – which each comprise a group of related touch switches – are created, the keyboards required for specific purposes can be displayed whenever necessary, allowing various types of input. Keyboards can be created in screen numbers 1900 through 1979 and can be displayed by pressing touch switches that have been set as "keyboard keys".

WARNING Character-string setting and keyboard display is only possible when using direct connection.

Character-string setting screen

Keyboard screen
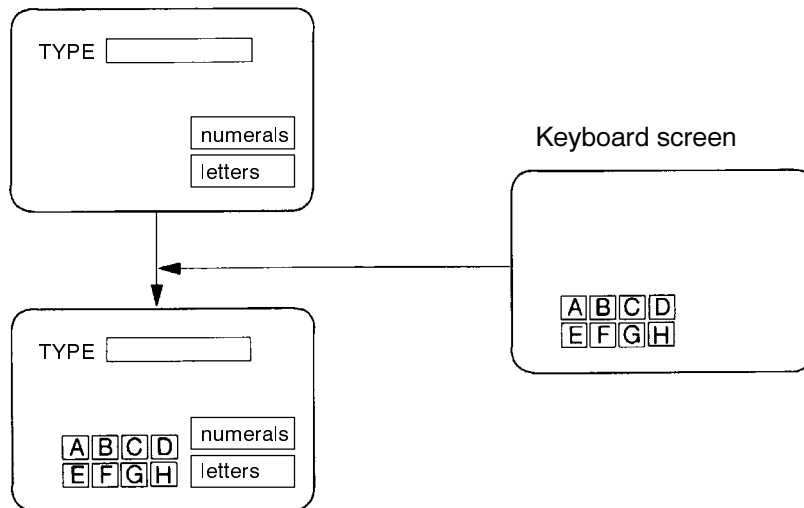
4-9-1 Creating Numeral Setting Input Fields

This is the procedure for creating input fields for numeral settings. For details on the display of numeric values, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).

Procedure 1. Select "IN SET" from the initial editing screen.

The input setting menu will be displayed.

2. Select "DATA IN" from the input setting menu.

3. Select the field in which the numeral setting input field is to be registered and press the ⏎ key.

▶ To delete an existing numeral setting from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

4. Specify either "Number Input" or "Thumb Rotary" as the input type for numeral setting.

▶ If "Mv Crsr Sw" is set for "Yes", touch switches for which the "cursor motion" function has been set will be automatically created and displayed overlying the input field (this function is not available when using the thumb rotary input type).

5. Set the conditions for numeral display and press the ⏎ key.

Thumb rotary

```
        Tenkey Setting
Ref Table   [No. 0]  (F 1=Lst Slct)
Disp Type   Dec_   Hex
Integer     [8]Dig. (1-8)
Decimal     [0]Dig. (0-7)
Zero Sup      Yes      No
Disp Sign     Yes      No
Max         [99999999]
Min         [       0]
Size        Half   Norm   Wide
Scale       Equ    Wide   High
            4x     9x     16x
Attribute   Norm   Inv.   Flsh   Spot
Smoothing     Yes      No
Crsr Frm      Yes      No
Slct Frm    Norm   Inv.   Flsh   Spot

 ⬆⬇⬅➡=Slct ⏎=Conf Esc=Abort
```

```
       Sum Rotary Setting
Ref Table   [No. 0]  (F 1=Lst Slct)
Disp Type   Dec_   Hex
Integer     [8]Dig. (1-8)
Decimal     [0]Dig. (0-7)
Disp Sign     Yes      No
Max         [99999999]
Min         [       0]
Attribute   Norm   Inv.   Flsh   Spot
Size          S      M      L
End Plate     Yes      No

 ⬆⬇⬅➡=Slct ⏎=Conf Esc=Abort
```

The settings that are specific to numeral setting are listed below.

- Max, Min: Specify the upper and lower limits for the numeric value.

- Crsr Frm: Specify whether or not a cursor frame, which indicates the currently selected input field, is to be displayed, here.

- Slct Frm: Specify the display method for the cursor frame here.

- Size: Specify the size for thumb rotary type touch switches here.

- End plate: Specify whether or not end plates are to be displayed at the left and right of thumb rotary type switch displays.

6. If using an NT610C, specify the display color and background color.

7. A box indicating the size of the input field will be displayed.

Locate this box at the required display position and press the ⏎ key.

8. The specified input field for display setting, ten keys, or system keys, will be displayed.

▶ If the keypad attribute for the screen is "User", ten keys and system keys are not displayed. If the numeral setting attribute is changed from "Syst" to "User" after completing numeral setting, the ten keys and system keys will be lost.
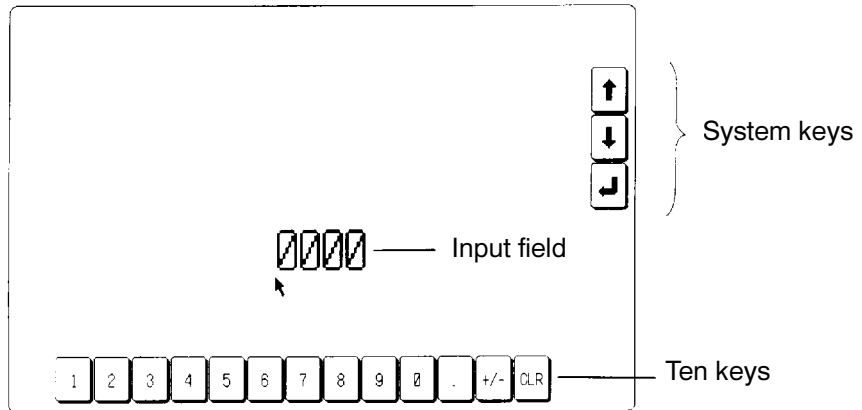
9. It is now possible to select another registration field and create another numeral setting input field.

Press the [Esc] key to quit numeral setting.

Note In comparison with the result when an NT600M screen is converted, a "." (decimal point) is added, and consequently the number of digits is increased by one at the left hand side.

4-9-2　Creating Character-String Setting Input Fields

This is the procedure for creating input fields for numeral settings. For details on the display of character-strings, setting display colors (NT610C), setting numeral tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49).
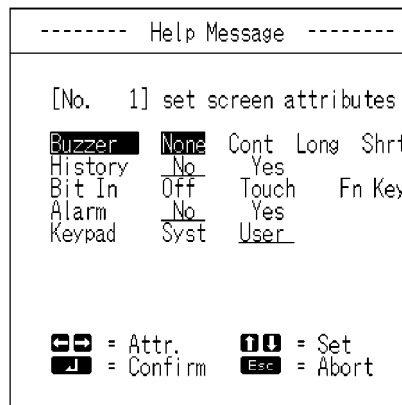
Procedure　**1.** Select "IN SET" from the initial editing screen.

The input setting menu will be displayed.

2. Select "DATA IN" from the input setting menu.

3. Select the field in which the character-string setting input field is to be registered and press the ⏎ key.

▶ To delete an existing character-string setting input field from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

4. Specify "Str In".

▶ If "Mv Crsr Sw" is set for "Yes", touch switches for which "cursor motion" has been set will be automatically created and displayed overlying the input field.

5. Set the conditions for the character-string display and press the ⏎ key.

```
┌─────────────────────────────────────┐
│          ┌──────────────┐           │
│          │  Set String  │           │
│          └──────────────┘           │
│ ▋Ref Table▋  [No. 0]  (F1=Lst Slct) │
│ Length       [40]char (1-40)        │
│ Size          Half       Norm       │
│ Scale         Equ   Wide  High      │
│               4x    9x    16x   64x │
│ Attribute     Norm  Inv.  Flsh  Spot│
│ Smoothing     Yes        No         │
│ Crsr Frm      Yes        No         │
│ Slct Frm      Norm  Inv.  Flsh  Spot│
│─────────────────────────────────────│
│  ◧◨◩◪=Slct  ⏎=Conf  Esc=Abort      │
└─────────────────────────────────────┘
```

The settings that are specific to character-string setting are listed below.
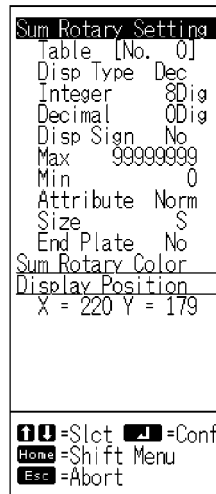
- Crsr Frm:　　Specify whether or not a cursor frame, which indicates the currently selected input field, is to be displayed, here.

- Slct Frm:　　Specify the display method for the cursor frame here.

6. If using an NT610C, specify the display color and background color.

7. A box indicating the size of the input field will be displayed.

Locate this box at the required display position and press the ⏎ key.

8. The input field for the specified display setting will be displayed.

9. It is now possible to select another registration field and create another character-string setting input field.

Press the [Esc] key to quit character-string setting.

4-9-3   Setting Keyboard Displays

This is the procedure for setting keyboards to be displayed when a switch is made to a character-string setting screen.

It is also possible to display a created keyboard and check the display position etc. during screen creation. It is possible to arrange elements on the screen so that they do not overlap with the displayed keyboard.

Procedure   **1.**   Select "IN SET" from the initial editing screen.

The input setting menu will be displayed.

2.   Select "KEYBD DSP" from the input setting menu.

3.   Specify the screen number of the keyboard to be displayed when the screen is displayed and press the ⏎ key.

The specified keyboard will be displayed.

▶   If "0" is specified, the keyboard display disappears, and when the screen is displayed during operation, it is displayed without the keyboard.

4.   To check the display status when another keyboard is displayed, repeat steps 1 through 3.

4-9-4   Creating Ten Keys

Ten keys are touch switches for inputting numeric values. If the keypad attribute for the screen is set as "User", the keys can be positioned wherever required on the screen.

The arrangement of the ten keys displayed on the screen can be changed by using the "TOUCH SW" and "EDIT" functions on the "Edit" screen.

Procedure   **1.**   On the "Screen Selection" screen, locate the cursor at the screen number for which the ten keys are to be created and press the F4 (Attrib) key.

2.   Set "User" for "Keypad".

▶   "F" will be displayed in the "Status" column of the screen for which attribute setting has been performed.

```
+-------------------------------------+
|  --------  Help Message  --------   |
|                                     |
|  [No.   1] set screen attributes    |
|                                     |
|  Buzzer   None  Cont  Long  Shrt    |
|  History   No    Yes                |
|  Bit In    Off   Touch      Fn Key  |
|  Alarm     No    Yes                |
|  Keypad   Syst   User               |
|                                     |
|                                     |
|  ◀▶ = Attr.    ▲▼ = Set             |
|  ⏎ = Confirm   Esc = Abort          |
+-------------------------------------+
```

3.   Select the screen for which the attribute has been set: the "Edit" screen will be displayed.

4.   Select "IN SET" on the initial editing screen.

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5. Specify "USER TKEY".
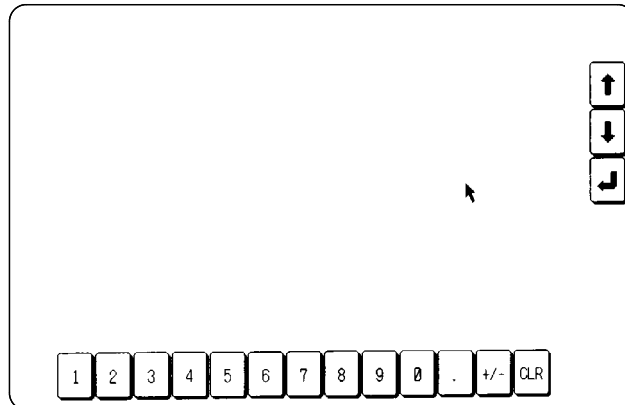
6. To change the arrangement of the ten keys, use the following functions:

- TOUCH SW: Specify the relevant touch switch and change its position or other characteristics.

- EDIT: Move the ten keys by using the "Move" function.

Example of a Change
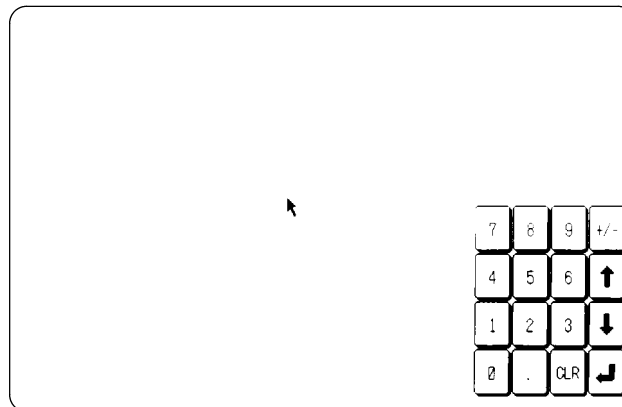
4-9-5   Modifying Numerals and Character-Strings

This is the procedure for modifying the contents of existing numeral and character-string settings.

Procedure   **1.** Select "IN SET" from the initial editing screen.

The input setting menu will be displayed.

2. Select "DATA IN" from the input setting menu.

3. Select the numeral or character-string setting to be modified and press the ⏎ key.

▶ Locate the mouse cursor at the numeral or character-string setting to be modified and click the left mouse button to select it.

4. Select the required item and execute the modification.
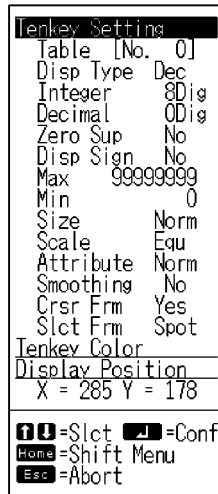
Ten key type   Thumb rotary type   Character-string setting

```
Tenkey Setting
Table  [No.   0]
Disp Type   Dec
Integer     8Dig
Decimal     0Dig
Zero Sup    No
Disp Sign   No
Max   99999999
Min          0
Size       Norm
Scale       Equ
Attribute  Norm
Smoothing   No
Crsr Frm    Yes
Slct Frm   Spot
Tenkey Color
Display Position
  X = 285 Y = 178

↑↓=Slct ◢=Conf
Home=Shift Menu
Esc=Abort
```

```
Sum Rotary Setting
Table  [No.   0]
Disp Type   Dec
Integer     8Dig
Decimal     0Dig
Disp Sign   No
Max   99999999
Min          0
Attribute  Norm
Size         S
End Plate   No
Sum Rotary Color
Display Position
  X = 220 Y = 179




↑↓=Slct ◢=Conf
Home=Shift Menu
Esc=Abort
```

```
Str Disp Setting
Table  [No.   0]
Length      40
Size       Norm
Scale       Equ
Attribute  Norm
Smoothing   No
Crsr Frm    Yes
Slct Crs   Spot
String Disp Color
Display Position
  X = 158 Y = 176





↑↓=Slct ◢=Conf
Home=Shift Menu
Esc=Abort
```

- Tenkey Setting:

- Thumb Rotary Setting:

- Str Disp Setting: Used to change the referenced memory table or the numeral/character-string display settings.

- Tenkey color:

- Thumb Rotary Color:

- String Disp Color: Used to change the color of the numeral/character-string display.

- Display Position: Used to change the display position of the numeral/character-string display.

5. Press the [Esc] key to quit modification.

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4-9-6 Changing Orders

In cases where there is more than one numeral/character-string setting on one screen, the order of movement between input fields can be changed using the system keys.

Procedure
1. Select "IN SET" from the initial editing screen.

   The input setting menu will be displayed.

2. Select "DATA IN" from the input setting menu.

3. Press the [F2] (Ord) key.

   The mode in which order specifications can be made will be established.

4. Locate the cursor at the numeral/character-string setting field that is to be set as No.1, and press the [Space] key.

   "1" will be displayed in the "Or" column.

5. Set the order for the remaining numeral/character-string settings by using the [Space] key.

▶ Specify a position in the order for all numeral/character-string settings.

No.	Type	Table	Or
1	Num In	0	
2	STR IN	0	
3	SumRot		1
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

⬆⬇=Slct [Esc]=Abrt
[↵]=Confirm
[Space]=Set Order

6. After setting a position in the order for all settings, press the ⊿ key.

   The order will be changed as specified.

7. Press the [Esc] key to quit.

4-10   Extended I/O Settings

This section describes how to apply the screen switching function to the input terminals of extension I/O units using the "Edit". When the input terminal of an extension I/O unit comes ON, the display switches to the specified screen.

Procedure   1.   Select "EXTD I/O" from the initial editing menu.

2.   Locate the cursor at the extension I/O unit input terminal number at which the screen switching function is to be used.

▶ To delete an existing terminal number setting from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

3.   Specify the screen number of the screen to be switched to.

If "0" is specified the display will return to the screen that was displayed before the current one.

4.   Press the [Esc] key to quit extended I/O setting.

Reference: The settings made for an input terminal on the "Edit" screen are valid only while the relevant screen is displayed at the PT.

4-11   Inputting Image and Library Data

This section describes how to display image and library data created on the "Screen Selection" screen.

WARNING The codes that can be used for library data are listed below.

FA20 to FAFF, FB20 to FBFF, FC20 to FCFF, FD20 to FDFF (896 codes)

• Displaying Images and Library Data

Images can be displayed in one of two ways: by specifying a code during character input, or by making a selection from the fixed display menu (library data can only be selected by making a selection from the fixed display menu).

Images and library data can also be specified for display when an "image & library lamp" goes OFF or comes ON (see p.77).

Caution: • To modify an image or library data that is already being used for display, either re-edit the registered data by using the "Image & Lib" option on the "Screen Selection" screen, or delete it and then redisplay it. However, note that when the registered data is modified, the data identified by the relevant code is changed for all screens that use that code.

• If an attempt is made to display the codes of image and library data for which no data is registered, "x" marks will be displayed.

Reference: When using an NT610C, if an image is displayed in the two-color mode, the display color and background color can be specified.

(1)   Specification during character input

Pressing the [F4] (Image) key when inputting characters or a label enables selection of an image from the image selection screen.

It is possible to use images in combination with characters and marks.

Image data in a character input field is displayed as a [I] mark. In image editing, the real image is displayed, taking the left bottom extremity of the image as the origin.

Image   :

Character input field   :   A B I D E   ➜   A B   D E

Display on Edit screen:
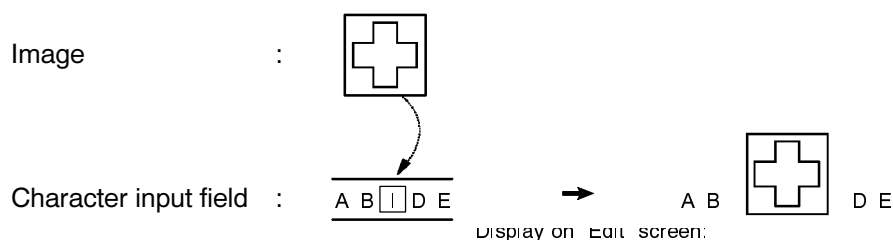
Caution: The following specifications are not valid for image displays:

Scales, smoothing, display attributes

(2) Specification from the fixed display menu

Images and library data can be displayed by selecting the "Image & Lib" option from the fixed display menu in the following way.

Procedure 1. Select "Image & Lib" in the initial editing menu.

2. Locate the cursor at the code corresponding to the image or library data to be displayed and press the ⏎ key.

The image codes are FE20 to FEFF. The library codes are FA20 to FAFF, FB20 to FBFF, FC20 to FCFF, and FD20 to FDFF.

▶ Use [Shift] + [↑] or [Shift] + [↓] to move the bar cursor to the previous or next code for which there is data.

▶ Press the [Tab] key to display the code input field.

3. Press the [Esc] key to quit image & library display.

Reference: If "Yes" is set for "Brkn Line Frame Disp" in the environmental settings (tool settings for the "Edit" screen), the registration range for images and library data can be checked at any time on the screen.

Deleting Images and Library Data

The images and library data displayed on the screen can be deleted by selecting the "EDIT" option on the initial editing screen. For details on the procedure, see "Delete" (p.116).

Caution: Images and library data are sometimes registered in a more extensive range than that visible on the screen. If the broken line frame display function is not used, select such images and data either by using "Simple", or by using "In frm" and enclosing the entire area saved at registration.

4-12 Editing Memory Tables

It is possible to check the initial values in numeral tables and character-string memory tables, and to change these values.

For details of the procedure, see 4-2 "Common Setting Operations" (p.49).

Procedure 1. Select "TBL EDIT" from the initial editing menu.

2. Select "Numeral" or "String".

3. Input data to the memory table or change its contents.

4. Press the [Esc] key to quit table editing.

4-13 Creating Alarm Lists/Histories

This section describes how to create "alarm lists" – which automatically display a character-string memory table in accordance with the status of the allocated bit in a bit memory table – and "alarm histories", which record and display the status of allocated bits.

- Alarm list: The contents (messages) of character-string memory tables, or images/library data, that correspond to the allocated bit in a bit memory table are displayed.

    If a screen number is set in advance, screen switching is also possible.

```
Process 3 operation stopped    ▲
Water bath over max. tempera-  ⬆
                               ⬇
                               ▼
```
URGENT!

Check the
thermostat!!
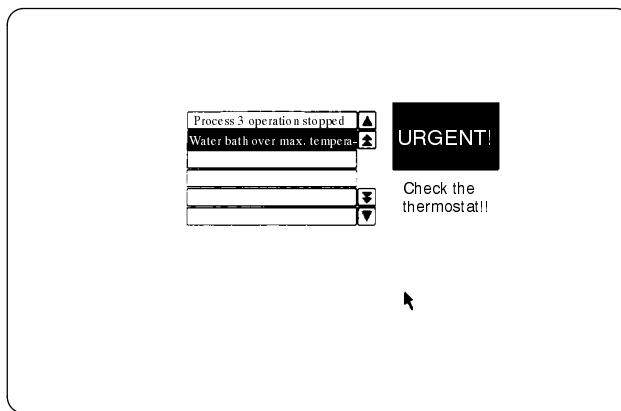
- Alarm history: The day and hour on which the allocated bits in a bit table are set to "1" (come ON) is recorded and the order of occurrence or order of frequencies is displayed. It is also possible to display corresponding images or library data.
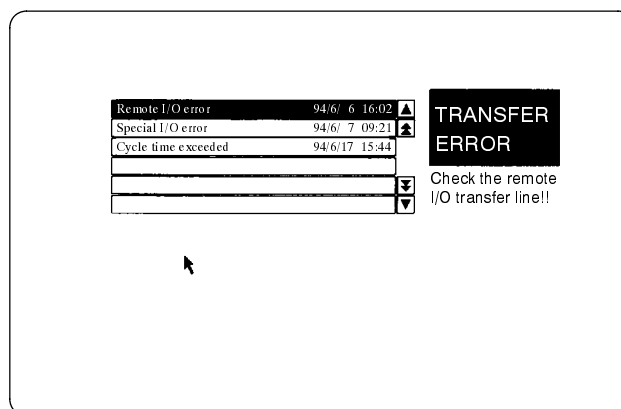
```
Remote I/O error        94/6/ 6  16:02   ▲
Special I/O error       94/6/ 7  09:21   ⬆
Cycle time exceeded     94/6/17  15:44
                                         ⬇
                                         ▼
```
TRANSFER
ERROR

Check the remote
I/O transfer line!!

The same operations are used for both the NT610C and NT612G, with the exception of color specification.

4-13-1 Setting Alarm Lists/Histories

This is the procedure for setting alarm lists and histories. For details on the display of character-strings, setting display colors (NT610C), setting bit memory tables, and setting words and bits, see 4-2 "Common Setting Operations" (p.49), and "Bit Memory Table Setting" (p.38).

A maximum of four alarm lists and alarm histories can be created on one screen. In the case of alarm histories, both an order of occurrence display and order of frequency display can be created on the same screen.

Procedure 1. Select "ALARM" on the initial editing screen.

2. Select the field in which the alarm list/history is to be registered and press the ⏎ key.

▶ To delete an existing alarm list/history from the field in which it is registered, locate the cursor at that field and press the [F1] (Delete) key.

3. Specify either "List" or "History" as the display type.

4. Set the display conditions and press the ⏎ key.

Alarm list

```
                 List Setting
Start Bit Tbl No.  [No. 0]  (F1=Lst Slct)
Ref Bit Tbl Qty    [   1]      ( 1-128 )
Display Line Qty   [  1]Line   ( 1-24 )
Length             [40]Dig.    ( 1-40 )
Scale              Equ    Wide   High
                   4x     9x     16x    64x
Smoothing          Yes           No
Display Image      Yes           No
      = Slct    = Conf    = Abort
```

Alarm history

```
                 Hist Setting
Disp Order     Occur      Freq
Line Qty       [   1]Line   ( 1-24 )
Length         [40]Dig.    ( 1-40 )
Scale          Equ    Wide   High
               4x     9x     16x    64x
Smoothing      Yes           No
Dsp &Lib       Yes           No
Hist Info      Yes           No
Info Type      Y/M/D h:m    M/D h:m    h:m
      = Slct    = Conf    = Abort
```

• Start Bit Tbl No.: Specify the bit memory table number from which reference is to start here.

Pressing [F1] allows selection from a memory table list.

• Ref Bit Tbl Qty: Specify the number of bits to be checked (read) for the alarm list.

This number of bit memory tables, starting from the "start bit table number", will be subjected to the check. A maximum of 128 memory tables can be subjected to the check.

• Disp Order: Specify whether the order of display in the alarm history is to follow the order of occurrence or the order of frequency.

- Display Line Qty: Specify the number of messages/history entries to be displayed here.

    The numbers of lines that can be displayed are as follows:

    NT610C: Max. 24 lines

    NT612G: Max. 16 lines

- Length: Specify the number of displayed characters in one message or history entry here. An area that will just accommodate the specified number of digits will be created.

- Scale:

- Smoothing: Specify the display method for messages or history entries here.

- Image library display: Specify whether or not images and library data corresponding to messages/histories are to be displayed here.

- Hist Info: When an order of frequency is displayed, specify whether or not the times of occurrence are also to be displayed here. This setting is invalid with order of frequency displays.

- Info Type: Specify one of the following formats for expressing times of occurrence:

    Y/M/D/ h : m: Year/Month/Day Hour/Minute

    M/D h : m: Month/Day Hour/Minute

    h : m: Hour/Minute

5. If using an NT610C, specify the frame color, OFF/background color, and ON color, for alarm lists/histories, and the display color and background color for images/library data.

    Display color specifications for images and library data are only valid for images in the 2-color mode.

6. A box indicating the size of the alarm list/history will be displayed.

    Move this box to the required display position and press the ⏎ key.

7. Locate the cursor at the start point for the image & library data display area and press the ⏎ key, then move the cursor to the end position and press the ⏎ key once more.

▶ If "No" has been specified for image & library display in "List setting", nothing will be displayed.

8. The specified alarm list/history, image & library display area, and scroll keys will be displayed.

▶ If the "Display Line Qty" set in the display settings is 1 to 3 lines, "up" and "down" line scroll keys will be automatically displayed. If the "Display Line Qty" set was 4 or more lines, "up" and "down" line scroll keys and a page scroll key will be automatically displayed.

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4-13-2   Modifying Alarm Lists/Histories

This is the procedure for changing the contents, display position, etc., of created alarm lists and histories.

Procedure   1.   Select "ALARM" on the initial editing screen.

2.   Select the alarm list/history to be modified and press the ⏎ key.

▶ The alarm list/history to be modified can also be selected by locating the mouse cursor on it and left clicking with the mouse button.

3.   Select the required item and execute the modification.
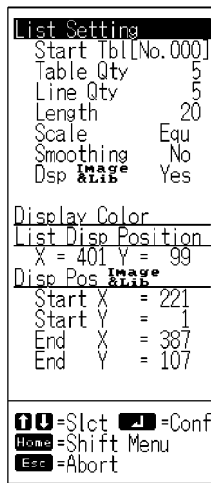
<div align="center">Alarm list   Alarm history</div>

```
List Setting
  Start Tbl[No.000]
  Table Qty      5
  Line Qty       5
  Length        20
  Scale        Equ
  Smoothing     No
  Dsp Image     Yes
      &Lib

Display Color
List Disp Position
  X = 401 Y =  99
Disp Pos Image
         &Lib
  Start X   = 221
  Start Y   =   1
  End  X    = 387
  End  Y    = 107


↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

```
History Setting
  Dsp Order Oc Ord
  Line Qty       5
  Length        10
  Scale        Equ
  Smoothing     No
  Dsp Image     No
      &Lib
  Hist Info    Yes
  Info Type YMDhm
Display Color
List Disp Position
  X = 401 Y = 119
Disp Pos Image
         &Lib
  Start X   =
  Start Y   =
  End X     =
  End Y     =

↑↓=Slct ↵=Conf
Home=Shift Menu
Esc=Abort
```

- List Setting:
- History Setting: Select to change the number of bit memory tables checked, and the alarm list/history display settings.
- Display Color: Select to change the color of the alarm list/history.
- List Disp Position: Select to change the display position of the alarm list/history.
- Disp Pos Image & Lib: Select to change the display position of an image or library data.

4.   Press the [Esc] key to quit modification.

5. Use the following editing functions to change the arrangement of the scroll keys or to add page scroll keys.

- TOUCH SW: The control keys used for the "input keys" are set. Their positions and other characteristics can be changed by using the touch switch modification operation. New scroll keys can be set for existing alarm lists/histories by using control keys.

- EDIT: The scroll keys can be moved by using the "Move" function.

Caution: The scroll keys will automatically light if there are undisplayed messages or histories in the scrolling directions. Do not set lamp bits for them.

4-14   Editing Screen Data

This section describes how to copy, move, and delete existing screen data.

Selecting the applicable screen data

Editing is executed in existing screen data units.

The method for specifying the object of the editing operation is set in the environmental settings (tool settings for the "Edit" screen). The object of the editing operation is selected in the following way.

- For "In frm" specifications

Procedure   1.   Specify the start point of the area that is to encompass the object of the editing operation.

2.   Set the end point at a diagonally opposite point chosen so that the object of the editing operation is accommodated within the frame.
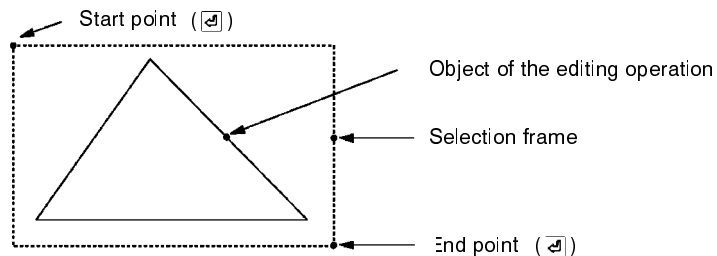
The object of the editing operation will be encompassed by a dotted line.

For copy and move operations, a frame the same size as the area enclosed by this dotted line becomes a cursor and can be moved.

- For "On frm" specifications

Procedure   1.   Specify the start point and end point of an area that contains some part of the object of the editing operation.
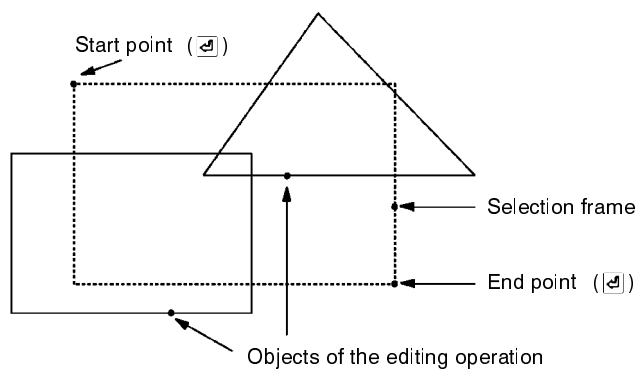
All the graphics that are wholly or partly contained within the area are selected as objects of the editing operation.

The objects of the editing operation will be encompassed by dotted lines.

For copy and move operations, a frame the same size as the area enclosed by this dotted line becomes a cursor and can be moved.

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• For "Simple" specifications

Procedure 1. Locate the cursor over the object of the editing operation and press the ⏎ key.
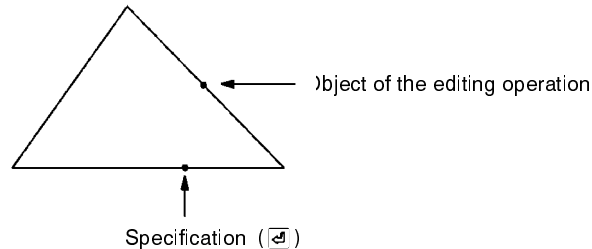
The object of the editing operation will be encompassed by a dotted line.

For copy and move operations, a frame the same size as the area enclosed by this dotted line becomes a cursor and can be moved.

Copy and Move This is the procedure for copy and move operations. In a copy operation, the original object remains in existence. In a move operation, it does not.

Procedure 1. Select "EDIT" from the initial editing menu.

2. Select "Copy" or "Move" from the editing menu.

3. Select the object that is to be the copy source (or move source).

4. Locate the cursor at the copy destination (move destination) and press the ⏎ key.

5. Check the message and then press the ⏎ key.

To abort the operation, press the [Esc] key.

Delete This is the procedure for deleting the object of the editing operation.

Procedure 1. Select "EDIT" from the initial editing menu.

2. Select "Delete" from the editing menu.

3. Select the object of the deletion operation.

4. Check the message and then press the ⏎ key.

To abort deletion, press the [Esc] key.

Centering

This is the procedure for centering labels or character input (fixed display) to locate them at the center of a lamp or touch switch display area (this positional adjustment is only performed in the left/right direction; the position in the vertical direction remains unchanged).

Reference: • In the case of lamps, only those characters that are completely contained within the area of the graphic will be subject to the centering operation.

Only "ABC" is centered.
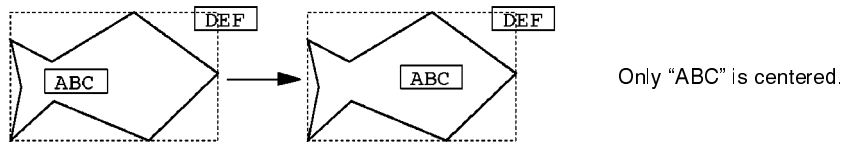
• In the case of touch switches, only those characters that are completely contained within the sensitive area will be subject to the centering operation.

Only "EFG" is centered.
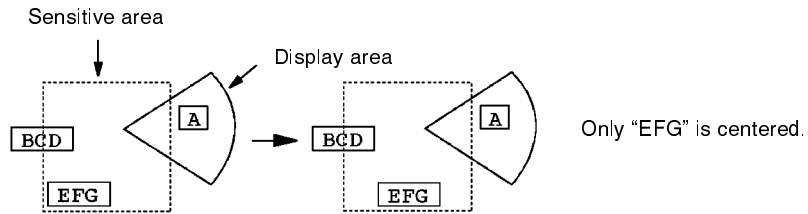
Procedure 1. Select "EDIT" from the initial editing menu.

2. Select "Centering" from the editing menu.

3. Select the object of the centering operation (a lamp or touch switch).

4. Check the message and then press the ⏎ key.

   To abort centering, press the [Esc] key.

Quitting Editing

Select whether to quit after saving the result of editing or to quit without saving the result of editing.

Procedure 1. Press the [Esc] key while the editing menu is displayed.

2. Check the message.

   • Press the ⏎ key to quit after saving the result of editing.

   • Press the [Space] key to quit without saving the result of editing.

SECTION 5
Creating Marks, Images, and Library Data

It is possible to create customized characters and symbols called "marks" and display them on the screen.

Marks can be treated in the same way as wide font characters: they can be displayed at various scales of enlargement and attributes can be set for them.

They can also be used in the creation of image data and library data for display on the screen.

5-1   Marks

This section describes how to create customized characters and symbols and display them on the screen.

Marks can be created in three sizes: 16x16, 32x32, or 64x64 dots.

5-1-1   Mark Creation Procedure

The procedure for creating marks is as follows.

Procedure 1. Press the [F9] (Mark) key on the "Screen Selection" screen.

2. Specify the size of the mark to be created.

   Three sizes are available: 16x16, 32x32, and 64x64 dots.

▶ An existing mark can be copied by pressing the [F1] (Copy) key, specifying the range for the copy source by inputting a start point and end point, and then specifying the position of the copy destination.

An existing mark can be moved by pressing the [F2] (Move) key, specifying the range for the move source by inputting a start point and end point, and then specifying the position of the move destination.

An existing mark can be deleted by pressing the [F3] (Delete) key and specifying the range by inputting a start point and end point.

3. Move the cursor to specify the position at which the mark is to be registered once it has been created.

4. Create the mark graphic in the creation area.

5. Press the [F8] key to register the created mark.

6. Press the [Esc] key to quit mark creation.

5-1-2   Mark Creation Screen

Marks are created on the mark creation screen.

Up to 224 marks of the 16x16 dot size can be registered.

Since the same registration area is used for each mark size, 32x32 dot marks occupy four times the area that 16x16 dot marks do, and 64x64 dot marks occupy sixteen times the area that 16x16 dot marks do.

<Example: 16x16 dot screen>
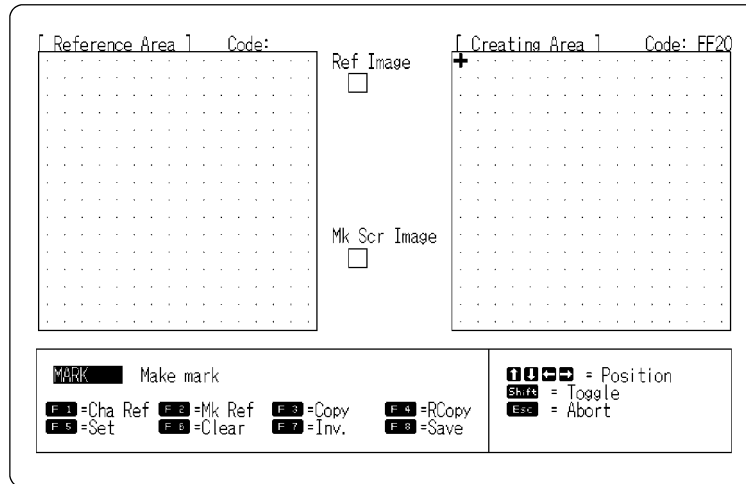
- Reference Area: Area used to display other marks for reference during mark creation.
- Creating Area: Area used for creating marks with dot data.

5-1-3   Mark Creation Functions

Dot Operations

- Dot display/deletion

When the [Shift] key is pressed, a dot is displayed at the cursor position.

If the [Shift] key is pressed while the cursor is located over a displayed dot, the dot will be deleted.

When using a mouse, click with the left button to display dots and click with the right button to delete them.

- Continuous display or deletion of dots

To display or delete a continuous line of dots, move the cursor by pressing one of the arrow keys while holding down the [Shift] key.

- Screen rotation

Each time the [←] or [→] key is pressed while holding down the [Alt] key and [Shift] key, the mark displayed on the screen will be rotated by 90.
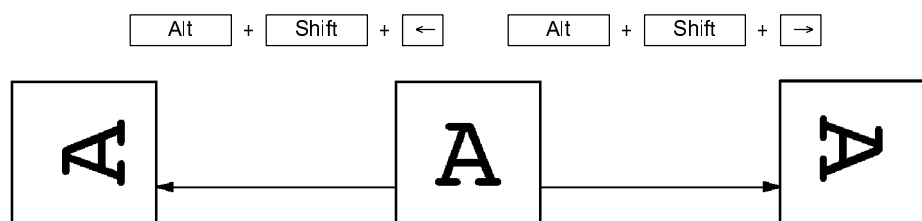
• Moving the screen

Pressing one of the arrow keys while holding down the [Alt] key will move the mark displayed on the screen.
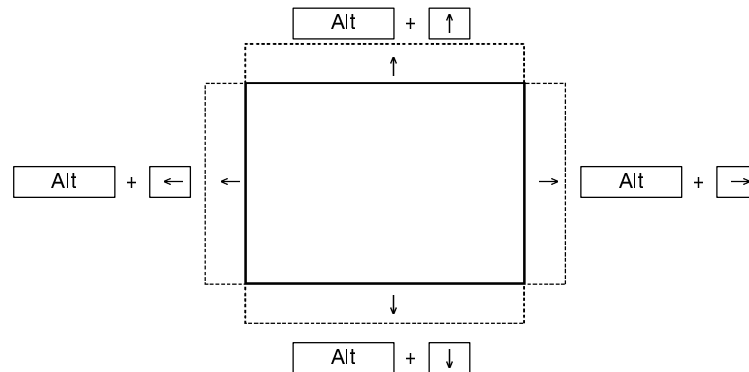
Functions of the Function Keys

[Cha Ref]   [F1] . . . Character reference

Used to display an input character in the reference area.

(1) Press the [F1] (Cha Ref) key.

(2) Input the character to be used for reference (one wide font character or a maximum of two normal font characters).

(3) Press the ⏎ key: the character will be displayed.

[Mk Ref]   [F2] . . . Mark reference

Used to display an existing mark in the reference area.

(1) Press the [F2] (Mk Ref) key.

(2) Locate the cursor on the mark in the mark list window that is to be displayed.

(3) Press the ⏎ key: the character will be displayed.

[Copy]   [F3] . . . Area copy

Used to copy the dots in a specified area into the creating area.

(1) Press the [F3] (Copy) key.

(2) Specify the start point and end point of the area to be copied.

(3) Move the area to the copy destination and press the ⏎ key: the dots will be copied.

[RCopy]   [F4] . . . Copy from the reference area

Used to copy the dots in a specified area of the reference area to the creating area.

(1) Press the [F4] (RCopy) key.

(2) Specify the start point and end point of the area within the reference area that is to be copied. Specify diagonally opposite points to specify a rectangular area.

(3) Move the area to the copy destination within the creating area and press the ⏎ key: the dots will be copied.

[Set]   [F5] . . . Set dots in a specified area

Used to set (display) all the dots within a specified area.

(1) Press the [F5] (Set) key.

(2) Specify the start point and end point of the area in which the dots are to be set.

Specify diagonally opposite points to specify a rectangular area.

(3) Press the ⏎ key: the dots inside the specified area will be set.

[Clear]   [F6] . . . Reset dots in a specified area

Used to reset (clear) all the dots within a specified area.

(1) Press the [F6] (Clear) key.

(2) Specify the start point and end point of the area in which the dots are to be cleared.

Specify diagonally opposite points to specify a rectangular area.

(3) Press the ⏎ key: the dots inside the specified area will be cleared.

[Inv.]   [F7] . . . Invert dots

Used to invert the display of all the dots within a specified area: displayed dots are cleared and cleared dots are displayed.

(1) Press the [F7] (Inv.) key.

(2) Specify the start point and end point of the area in which the dots are to be cleared.

Specify diagonally opposite points to specify a rectangular area.

(3) Press the ⏎ key: the dots inside the specified area will be inverted.

[Save]   [F8] . . . Register a mark

Used to register a mark that has been created.

Displaying Marks   Marks can be displayed in either of the two following ways.

(1) Specification during character input

If the [F3] (Mark) key is pressed when inputting characters or a label, a mark can be selected from the mark selection screen.

It is possible to use marks in combination with characters.

Mark data is displayed as data in the character input field. On the "Edit" screen, the actual mark is displayed, taking the left bottom extremity of the mark as the origin.

(2) Specification from the Fixed Display Menu

On selecting "Mark" from the fixed display menu and specifying a size, a mark can be selected from the mark selection screen.

For details on the operating procedure, see "Inputting Marks" (p.60).

5-2   Images

Image data is created in dot units and can be displayed on the screen. Marks and symbols can be created and registered.

Images are handled in the same way as characters and marks.

Illustrations and figures can be read with an image scanner.

Reference: The sizes of images that are not reduced are as follows, depending on the width and height of the image area.

NT612G : {(width + 7)$8} x height + 558 bytes

NT610C : [{(width + 7)$8} x height + 48] x 3 + 510 bytes

("$" indicates a division operation in which decimal fractions are discarded.)

When an image is reduced, the size will be smaller that indicated above. The reduction scale will differ according to the nature of the image data.

5-2-1   Procedure for Image Creation

Image data is created on the screen in dot units using mouse and key operations, then the required area is specified and the image registered. Up to 224 images can be registered.

Procedure   1.   Select "Image & Lib" on the "Screen Selection" screen.

2.   Locate the cursor at the code (from FE20 to FEFF) of the image to be created and press the ⏎ key.

▶ Use [Shift] + [↑] or [Shift] + [↓] to move the bar cursor to the previous or next code for which there is data.

Press the [Tab] key to display the code input field.

The data of a code for which data already exists can be deleted by pressing the [F1] (Delete) key and then specifying that code.

The data of a code can be copied by pressing the [F2] (Copy) key and then specifying the copy source code and the copy destination code.

3.   Draw image data on the screen using the mouse and keys (see "Image Editing Operations" on the next page).

4.   Press the [Esc] key to quit image creation.

On quitting, specify "Confirm".

5.   Select whether or not to reduce the saved data.

▶ Displaying reduced image data takes more time than displaying image data that is not reduced.

6.   Specify the area that is to be saved as the image data.

locate the cross-hair cursor at the start point and end point of the area and press the ⏎ key at each.

7.   Input a comment.

This is a memo that indicates the nature of the image data.

5-2-2　Image Editing Operations

On selecting an image code, the image editing screen shown below is displayed.

(a)

(b)

```
POINT    LINE     LOCUS    CIR/ELLI SQUARE      ⬆⬇⬅➡ = Select
LOUPE    SCANNER  READING  READ FIL COL MODE    ⏎   = Confirm
                                                Esc  = Abort
GUIDE:   Able to draw point                     Code[FE20]Fre:  65524Byte
```

(c)　　(d)
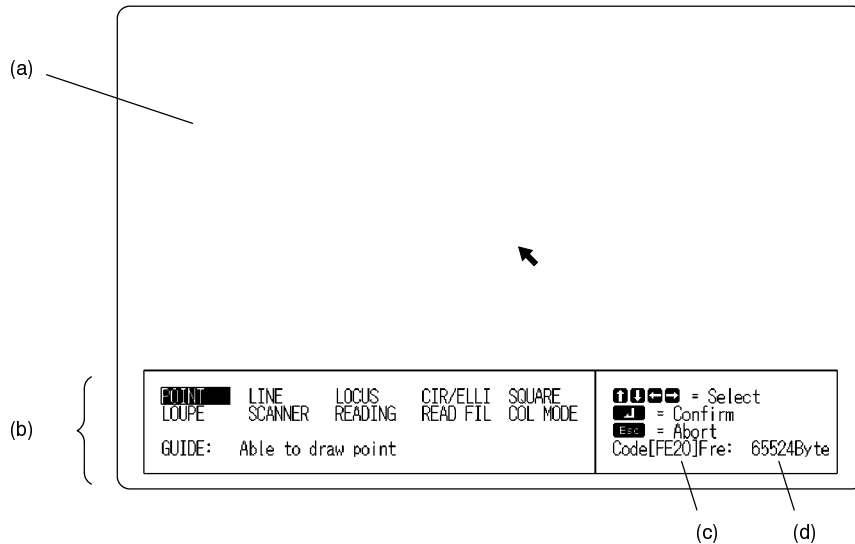
(a) Image editing screen: This is the screen on which images are created. No grid is displayed.

(b) Image editing menu: This is the menu for editing images.

(c) Code: This is the code of the image that is currently being edited.

(d) Remaining capacity: The data size (number of bytes) that can still be used for image creation.

• Color Mode

If using an NT610C, the color mode (2 colors or 8 colors) can be changed by selecting "COL MODE" from the image editing menu.

Enlarged Display   A part of the image display screen can be displayed enlarged by selecting
                                  "LOUPE" from the image editing menu: this allows editing in dot units.
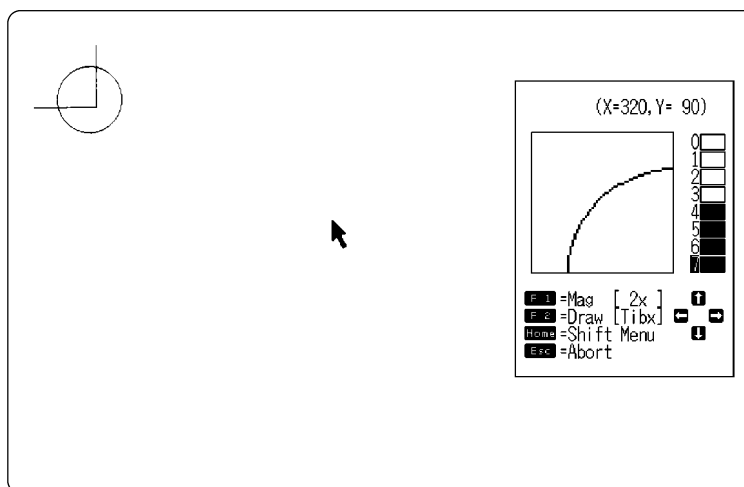
• Key Operations

[Home] key: Used to shift the help message window.

Arrow keys: Used to move the cursor (the cursor can be moved
                                  more quickly by pressing an arrow key while holding
                                  down the [Shift] key, but this operation can only be used
                                  in the box tiling mode).

[Ctrl] + arrow keys: Used to shift the enlarged display window (it can be
                                  moved faster by pressing the [Shift] key also).

[F1] key: Used to change the enlargement scale (2x, 4x, 8x)

[F2] key: Used to change the drawing mode (locus, box tiling)

The enlarged display window can also be moved by locating the cursor inside it,
pressing the ⏎ key, then moving the cursor and pressing the ⏎ key again.

• Drawing method

On this screen, images are drawn with dots in the manner described below. If us-
ing an NT610C, the color used for the help message window has to be selected
(this selection can be made using the numeric keys).

[Locus mode]

Key operation: Dots are drawn by moving the cursor while holding down
                                  the [Shift] key.

Mouse operation: Dots are drawn by dragging the mouse while holding down
                                  the left mouse button.

[Box tiling mode]

Key operation: Press the ⏎ key at the diagonally opposed corners of the
                                  area (rectangle) to be tiled.

Mouse operation: Click the left mouse button at the diagonally opposed cor-
                                  ners of the area (rectangle) to be tiled.

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Procedure **1.** Select "LOUPE" from the image editing menu.

2. Carry out drawing in dot units.

3. Press the [Esc] key to quit the enlarged display.

Drawing Operations Using the Image Editing Menu

Functions are selected from the image editing menu in order to carry out drawing.

The following graphic elements can be used:

Points, lines, locus, circles, ellipses, squares

In the case of circles, ellipses and squares, it is also possible to select normal or inverted displays.

- Points

Key operation: Press the ⏎ key.

Mouse operation: Click the left mouse button.

- Lines

Key operation: Press the ⏎ key at the start point and end point.

Mouse operation: Click at the start point and end point.

- Locus

Key operation: Locus drawing is not possible with key operations.

Mouse operation: Drag the mouse while holding down the left mouse button.

- Circles/ellipses

Key operation: Press the ⏎ key at diagonally opposed points to draw a circle or ellipse that just makes contact with the inside of the rectangle defined by these points.

Mouse operation: Click at diagonally opposed points to draw a circle or ellipse that just makes contact with the inside of the rectangle defined by these points.

- Squares

Key operation: Press the ⏎ key at the diagonally opposed points.

Mouse operation: Click at the diagonally opposed points.

If using an NT610C, it will also be necessary to make a color specification.

Reading Existing Image Data

Existing image data can be read onto the image editing screen.

Procedure 1. Select "READ FIL" from the image editing menu.

2. Locate the bar cursor on the code of the image to be read and press the ⏎ key.

Reading Bit map Files (.BMP)

Bit map files can be read as image data.

However, only bit map files that comply with the following conditions can be read:

• The bit map must be monochrome, 16-color, or 256-color.

• The data must not be compressed.

Note 1. PCX format bit map files cannot be read.

2. When 16-color and 256-color bit map files are read, the number of colors is reduced to eight. This means that the rendition of color will not be the same as in the original file.

Procedure 1. Press the [F7] (Image & Lib) key on the "Screen Selection" screen.

2. Select the image code (range: FE20 to FEFF).

3. Select "READ FIL" (read file) from the image editing menu.

4. A prompt requesting the file name of the bit map file will appear: specify the path and enter the file name (see the example below). There is no need to enter an extension.

Example

C:\WIN\PUPPY<ENTER>

5. After reading, the data can be edited as image data.

Storing Screen Data in Files

Existing screen data can be converted to the bit map file format and stored as a file.

Procedure 1. Locate the bar cursor on the screen to be converted to bit map data, press the [F10] key, then press the [F3] (Co File) key.

2. Follow the screen messages to create a file for the screen data. The file name will be registered in the format shown below.

NT612G: NTG□□□□.BMP

NT610C: NTC□□□□.BMP

* The screen number is entered in the section represented as □□□□.

Displaying Images   Images can be displayed in either of the following two ways.

(1)   Specification during character input

If the [F4] (Image) key is pressed when inputting characters or a label, an image can be selected from the image selection screen.

It is possible to use images in combination with characters and marks.

Image data in a character input field is displayed as a [I] mark. In image editing, the real image is displayed, taking the left bottom extremity of the image as the origin.

Image   :

Character input field   :   A B [I] D E   ➡   A B   D E
                                            Display on Edit screen:
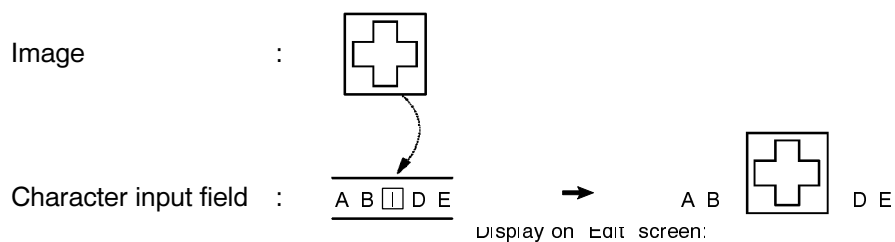
WARNING   The following specifications are not valid for image displays:

Scales, smoothing, display attributes

(2)   Specification on the initial editing screen

Selecting "Image & Lib" from the initial editing screen enables selection of images from the image/library selection screen (the image codes are FE20 to FEFF).

For details on the procedure, see 4-11 "Inputting Image and Library Data" (p.107).

Images can also be set for the ON and OFF codes of image/library lamps. For details, see "Setting Image/Library Lamps" (p.77).

5-3   Library Data

Two or more graphics can be registered together as library data. Complex graphics need only be created once, after which they can be used repeatedly.

WARNING The following codes can be used for library data:

FA20 to FAFF, FB20 to FBFF, FC20 to FCFF, FD20 to FDFF (896 items).

5-3-1   Procedure for Library Data Creation

Library data is created by registering two or more graphics created on the library editing screen collectively under one code. Up to 896 library data can be registered.

Procedure **1.** Select "Image & Lib" on the "Screen Selection" screen.

2. Locate the cursor at the code of the library data to be created and press the ⏎ key.

▶ Use [Shift] + [↑] or [Shift] + [↓] to move the bar cursor to the previous or next code for which there is data.

Press the [Tab] key to display the code input field.

The data in a code for which data already exists can be deleted by pressing the [F1] (Delete) key and then specifying that code.

The data in a code can be copied by pressing the [F2] (Copy) key and then specifying the copy source code and the copy destination code.

3. Draw the library data on the screen using the mouse and keys (see "Library Editing Operations" on the next page).

4. Press the [Esc] key to quit library data creation.

On quitting, specify "Confirm".

5. Specify the area that is to be saved as the library data.

Regardless of the environmental settings (tool settings for the "Edit" screen), only graphics that are completely contained within the specified area will be registered.

Locate the cross-hair cursor at the start point and end point of the area and press the ⏎ key at each.

6. Input a comment.

This is a memo that indicates the nature of the library data.

5-3-2   Library Editing Operations

On selecting a library code, the library editing screen shown below is displayed.

(a)

(b)

```
STR IN   MARK      POLYLINE SQUARE    POLYGON   ◻◻◖◗ = Select
CIRC/ARC FAN       TILING   EDIT      READ SCR  ◻ = Confirm
SET ENV                                         Esc = Abort
GUIDE:   Define string                          Code[FD22]Fre:  65524Byte
```

(c)
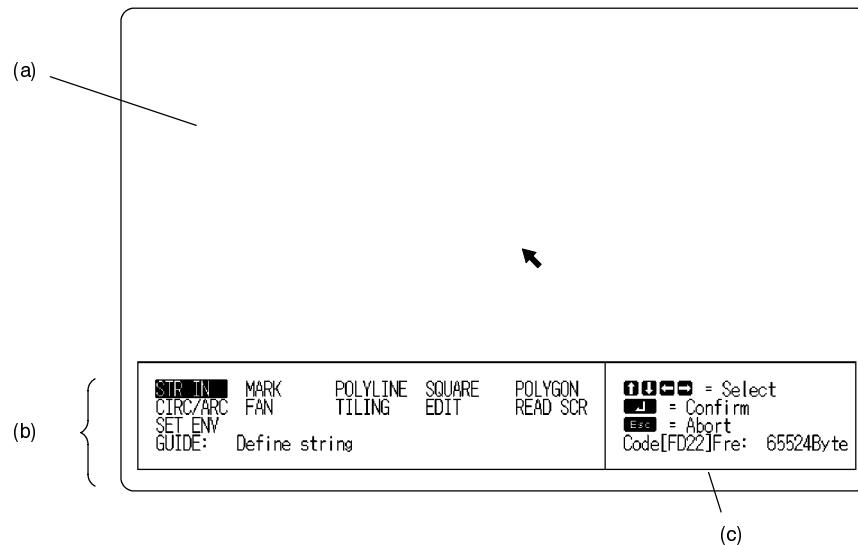
(a) Library editing screen: This is the screen on which library data is created.

(b) Library editing menu: This is the menu for editing library data.

(c) Code: This is the code of the library data that is currently being edited.

Drawing Operations in the Library Editing Menu

Functions are selected from the library editing menu in order to carry out drawing.

The following graphic elements can be used. All of them are fixed display graphics. For details on the drawing methods, see the relevant pages of 4-3 "Creating Fixed Displays".

Character input (fixed display) (p.58)

Marks (display) (p.60)

Continuous lines (p.61)

Squares (p.62)

Polygons (p.63)

Circles/Arcs (p.65)

Fans (p.67)

Tiling (p.68)

Also see the relevant pages of 4-14 "Editing Screen Data" for details on editing (p.115) and environmental settings (p.47).

Reading From Existing Screen Data

Existing screen data can be read onto the library editing screen.

WARNING The only data that can be read is fixed displays on the specified screen.

Reference: Read graphics are overlapped with any graphics that are already present on the library editing screen, leaving these existing graphics in place.

Procedure 1. Select "READ SCR" from the library editing menu.

2. Locate the bar cursor on the code of the screen from which the graphic is to be read and press the ⏎ key.

Displaying Library Data Use the following method to display library data.

Select "Image & Lib" from the initial editing screen to allow select of library data from the image/library selection screen (the library codes are FA20 to FAFF, FB20 to FBFF, FC20 to FCFF, and FD20 to FDFF).

For details on the procedure, see 4-11 "Inputting Image and Library Data" (p.107).

Library data can also be set for the ON and OFF codes of image/library lamps. For details, see "Setting Image/Library Lamps" (p.77).

SECTION 6
Printing Data

Various types of data can be printed in file units or in screen data units.

6-1-1   Things that can be Done Using the Data Printing Function

Various data relating to the support tool, such as screen data and the conditions of use of memory tables, can be printed out at a printer and checked.

Printing can be initiated in one of two ways: by selecting "Print" on the "File Selection" screen or by selecting "Print" on the "Screen Selection" screen. The data that can be printed differs according to the method used.

- When "Print" is selected on the "File Selection" screen

(1)   Print out of the file list

(2)   Print out of the screen list

(3)   Print out of screen images

(4)   Print out of cross-references (the conditions of use of memory tables)

(5)   Print out of display history records received from the PT

(6)   Print out of the mark list

(7)   Print out of image/library data

(8)   Printout of direct connection information

- When "Print" is selected on the "Screen Selection" screen

The following information can be specified, in single screen units.

(1)   Screen images

(2)   Color printing (NT610C only)

(3)   Detailed information

Before attempting printing, make sure that the printer is connected and that there is paper in the printer.

Reference: • The environmental settings (tool settings for the "Edit" screen) determine whether or not lamp/touch switch numbers and memory table numbers are printed or not.

- The type of printer and the presence or absence of a sheet feeder are set in the "Tool Settings" (see p.20).

6-1-2   Printing from the "File Selection" Screen

Use the following method to specify printing from the "File Selection" screen.

Procedure   1.   Locate the bar cursor on the file to be printed.

2.   Press the [F3] (Print) key.

3.   Locate the bar cursor on the data to be printed.

Further specifications may have to be made, depending on the type of data selected here.

```
 File List      NT610C-V3-0 1024KB          --------   Print File   --------

FileName|      Title                        --------  Help Message  --------

NEW_FILE|Creation of New File                  Printing selected file
PROC_CTL|For process A
PROC_B   |Process control backup                Select type of printing
PROC_C   |Production Qty Check               Print File List
INPT_SCR|For Line Input                      Print Screen List
                                             Print Screen
                                             Print Cross-References
                                             Print Display History File
                                             Print Mark List
                                             Print Image/Library List
                                             Print Direct Access Info.

                                             ↑↓ = Select  Esc = Abort
                                             ↵ = Confirm
```

• Print File List: Select to print the set memory, memory used, etc., for all files.

• Print Screen List: Select to print the screen numbers, comments in screens, etc.

• Print Screen: Select to print images or other data in the screen in a file.

Set the following settings:

• Printing/non-printing of screen images

• Method for printing color (NT610C only) ... No / Imitation / 8 colors

("Imitation" is printing in monochrome with 8 greyscale levels).

• Printing/non-printing of detailed information

• Print Cross-References: Select to print numeral tables, character-string memory tables, and the conditions of use of bits.

Set the following settings:

• Memory Table
Print the conditions of use of memory tables.

• Bit
Print the conditions of use of bits.

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- All
  Print the conditions of use of all memory tables.

- Use Data only
  Print only the part of the file used for screen data.

- Print Display History File: Select to print the display history record data received from the PT.

  Input the file whose display history record data is to be printed.

- Print Mark List: Select to print a list of marks.

- Print Image/Library List: Select to print a list of image data and library data.

- Print Direct Access Info.: Select to print the direct connection information.

  Set the following settings:

  - All
    Print all direct connection information.

  - Use Data only
    Print only the specified direct connection information.

(4) Check the printer and press the ⏎ key.

The data will be printed.

Press the [Esc] key to stop printing.

6-1-3   Printing from the "Screen Selection" Screen

Use the following method to specify printing from the "Screen Selection" screen.

Procedure 1. Locate the bar cursor on the screen number whose data is to be printed.

If the screen data of more than one screen is to be printed, "mark" each of the relevant screen numbers.

▶ For details on using the mark function, see 3-5 "Screen Selection" Screen (p.26).

2. Press the [F3] (Print) key.

Specify the printing format.

```
-------- Help Message --------

        Select the print format

Scr Image    Yes    No
Col Print    No    Imitat 8 Colr
Detl Info    Yes    No



        ⬆⬇⬅➡ = Select
        ⏎       = Confirm
        Esc     = Abort
```
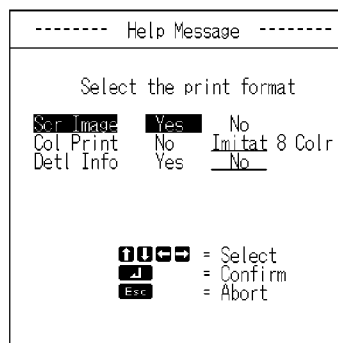
- Scr Image: Specify whether or not the screen image is to be printed as it is.

- Col Print: If using an NT610C, specify the method that will be used to print color ("Imitat" means printing in monochrome with 8 greyscale levels).

- Detl Info: Specify whether or not to print detailed information relating to the screen.

3. Check the printer and press the ⏎ key.

The data will be printed.

Press the [Esc] key to stop printing.

<Restrictions on data printing>

- If there is no data for an item, nothing will be printed.

- Up to 62 lines can be printed on one page.

- Up to 32 character data can be printed.

- If continuous screens or overlapping screens are printed with "No" set in the detailed information printing settings, only the child screen numbers will be printed.

- If continuous screens are printed with "Yes" set in the detailed information printing settings, the screen image and child screen number of the child screen specified as number one will be printed.

- If overlapping screens are printed with "Yes" set in the detailed information printing settings, the screen image and child screen numbers will be printed.

NT610C Screen Data Printing Example

Shown here is an example of screen data printing with an NT610C.

In this example, the screen includes black characters on a white background, and squares colored with all the available colors: the results of printing with "Imitat" and "No" selected for "Col Print" are shown below.

Col Print: Imitat
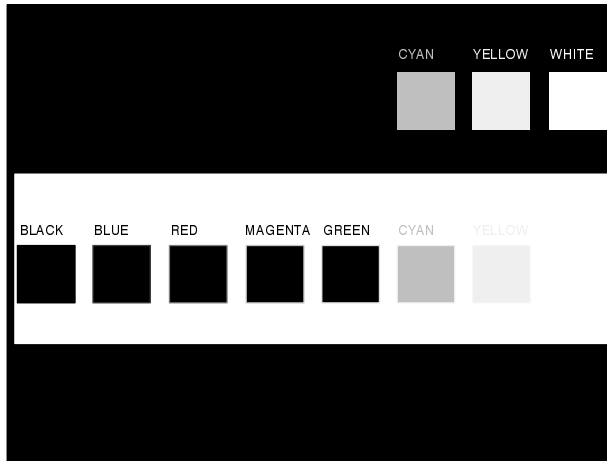
Col Print: No
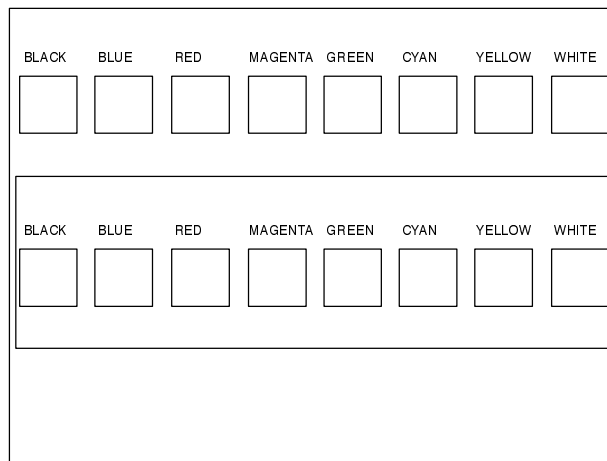
When "No" is selected, neither the tiling nor the inversion of the graphics are shown and only the outlines are printed.

SECTION 7
Data Communication

This chapter describes how screen data created using the support tool can be sent to the PT or written to a memory board, and how data such as screens and display histories received from the PT can be communicated.

7-1   Preparation and Procedure for Data Communication with the PT

Screen data created using the support tool, and mark and memory table information, etc., can be transferred to the PT data memory. It is also possible to receive various types of data and display history records from the PT and save them.

Caution: Data is communicated in file units. Communication in screen units is not possible.

Connection to the PT   Connect the PT and personal computer with an RS-232C connecting cable.

Connect this cable to the tool interface at the PT side and to the RS-232C interface at the personal computer side. Note that this connection with the PT is established only for data communication; it is not usually necessary to make this connection.

• Connection method

Make the connection with the RS-232C cable in the manner shown below.

Connection to an NT612G
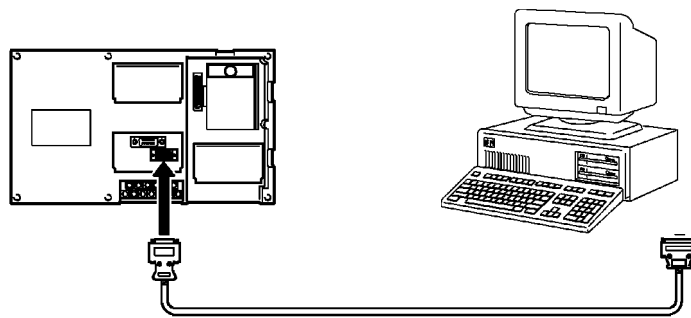
Connection to an NT610C
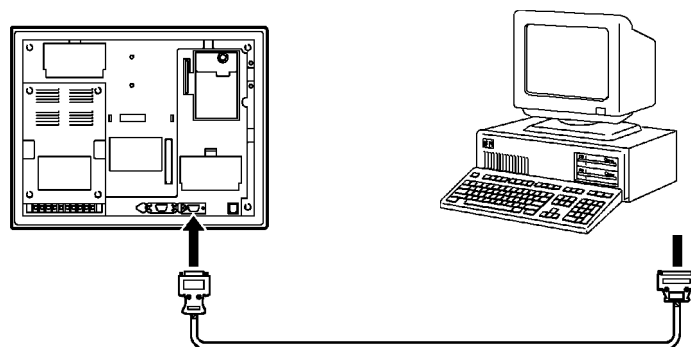
• Connecting cable

Make the connecting cable by referring to Appendix A "Connecting Cable Specifications".

Communication Speed

Select the communication speed for communication with the PT by setting "Communication Mode" on the "Tool Settings" screen.

Setting "Hspeed" for this setting will enable high-speed data transfer.

If the communication environment is unfavorable or communication errors occur, set "Stndrd" for low-speed communication so that the data will be communicated reliably.

Reference: Presented below are OMRON's measurements of the time taken to transfer the entire capacity of the image memory when transfer is in the "Hspeed" mode. Use these as a guide to data communication times.

• When using a capacity of 512 Kbytes: 5 min. 5 sec.

• When using a capacity of 1 Mbyte: 9 min. 30 sec.

Communication in the "Stndrd" mode takes approximately twice as long as communication in the "Hspeed" mode.

Procedure for Data Communication

Use the following procedure to make preparations at the PT and support tool sides and execute data communication.
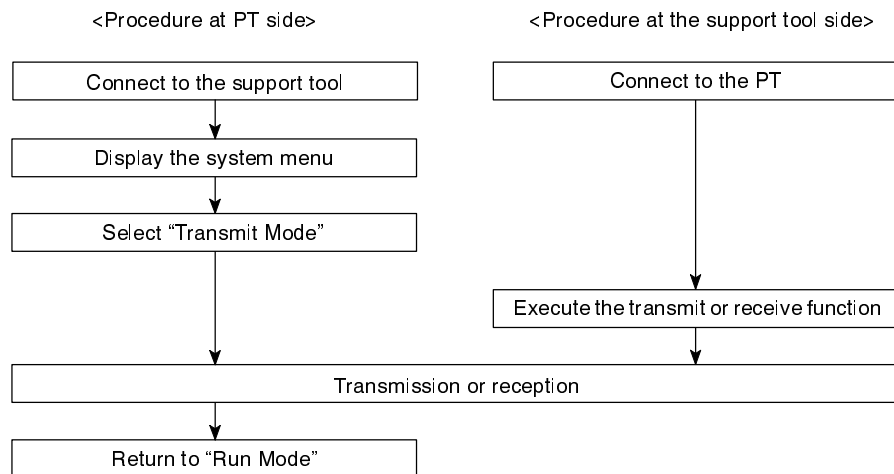
Reference: For details on the operations at the PT side, refer to the user's manual for the PT.

7-2   Transmitting Data

This is the procedure for transmitting data such as image data or memory table data to the PT, and writing it into the flash memory type data memory of the PT.

Select a file from the "File Selection" screen and transmit it to the PT.

Procedure   **1.**   Set the PT to the "Transmit Mode".

▶ Check that the write switch of the screen data memory board is released.

2.   Locate the bar cursor on the file to be sent on the "File Selection" screen.

3.   Press the [F6] (Tmx.) key.

4.   A message will be displayed for the purpose of confirmation.

Check the message and press the ⏎ key.

▶ Press the [Esc] key to abort data transmission.

5.   Data transmission will start.

On completion of the transmission, the message "Data successfully transmitted." will be displayed.

Reference: When data transmission has been aborted part way through, initialize the image data memory: do this by using the DIP switch on the PT.

For details, refer to the user's manual for the PT.

Also initialize the image data memory by this means if data transmission is stopped due to trouble.

7-3   Receiving Data

This is the procedure for receiving screen data, memory table data, display histories, etc., from the PT and storing this data as support tool files.

7-3-1   Data Reception

Use the following procedure to receive all the data in the data memory and write it to a file.

Procedure 1. Set the PT to the "Transmit Mode".

2. Display the "File Selection" screen.

   It does not matter where the bar cursor is.

3. Press the [F7] (Rcv.) key.

   A message will be displayed for the purpose of confirmation.

4. Input the file name of the file to which the received data is to be written.

5. Press the ⏎ key.

   File reception will start.

▶ If a file that already exists is specified, a message asking whether or not the file is to be overwritten will be displayed.

   Press the ⏎ key to start reception. To abort reception, press the [Esc] key.

   On completion of reception, the message "Data successfully transmitted" will be displayed.

7-3-2   Reception of Display History Records

When a screen for which the "History" screen attribute is set is displayed during PT operation, the PT records this display in the display history record.

This display history record can be read using the support tool in order to analyze how the screen is used or its frequency of display, for example.

Received files are saved in the DOS text format in the set data directory, and the extension ".G6L" is automatically assigned to them. The data directory is set in the "Tool Settings".

The received data is stored in the order of the order of occurrence record and the order of frequency record.

Reference: Received display history data can be printed out by selecting "Print" on the "File Selection" screen.

Procedure   **1.**   Set the PT to the "Transmit Mode".

2.   Display the "File Selection" screen.

It does not matter where the bar cursor is.

3.   Press the [F5] (Hist.) key.

4.   Input the file name of the file in which the received display history record is to be saved.

Specify a file name no longer than eight characters. Do not specify an extension: the support tool will automatically assign the extension ".G6L" to the file.

5.   Press the ⏎ key to start file reception.

▶ If a file that already exists is specified, a message asking whether or not the file is to be overwritten will be displayed.

Press the ⏎ key to start reception. To abort reception, press the [Esc] key.

On completion of reception, the message "Data completely received" will be displayed.

APPENDIX A

Connecting Cable Specifications

Tool Interface Connector Specifications

The following specifications apply to the connection between the PT and the support tool (personal computer).

Pin No.	Signal Name	Meaning
1	FG	Frame ground
2	SD	Send data
3	RD	Receive data
4	RS	Request to send
5	CS	Clear to send
9	SG	Signal ground

Assembly of Connecting Cables

Wiring should be carried out in one of the following ways, depending on the type of RS-232C connector.

25-pin Connector
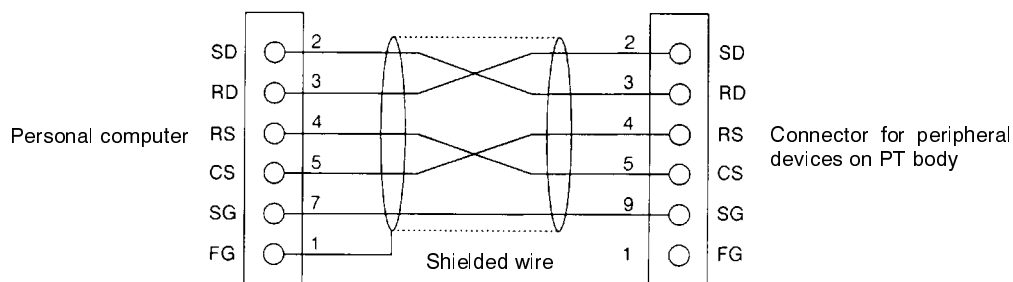
Use the following recommended products when making the connecting cable.

Name	Model	Remarks
Connector	XM2D-2501	25-pin Made by OMRON
	XM2A-0901	9-pin Made by OMRON
Connector hood	XM2S-2511	25-pin Made by OMRON
	XM2S-0911	9-pin Made by OMRON
Cable	AWG28 × 5P IFVV-SB	Multi-core shielded cable Made by Fujikura, Ltd.
	CO-MA-VV-SB 5P × 28AWG	Multi-core shielded cable Made by Hitachi, Ltd.

9-pin Connector
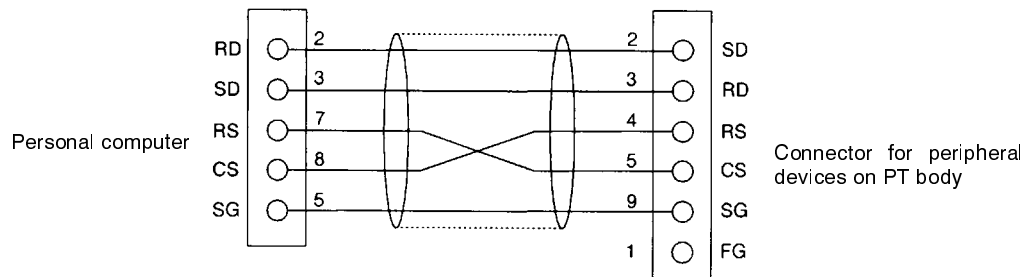
Use the following recommended products when making the connecting cable.

Name	Model	Remarks
Connector	XM2D-0901	9-pin Made by OMRON
	XM2A-0901	9-pin Made by OMRON
Connector hood	XM2S-0911	9-pin Made by OMRON (Two)
Cable	AWG28 × 5P IFVV-SB	Multi-core shielded cable Made by Fujikura, Ltd.
	CO-MA-VV-SB 5P × 28AWG	Multi-core shielded cable Made by Hitachi, Ltd.

APPENDIX B

Error Messages

The error messages that may be displayed while using the support tool, and the action to take in response to them, are shown below.

Error Message	Corrective Action
Floppy disk is write protected	Try again after releasing the disk's write-protection.
Disk not ready	Either there is no disk set in the specified drive, or the disk is not set correctly. Set the disk correctly and try again.
Write failed (Confirm)	Check the connection between the support tool and PT and the settings, then try again.
Seek error occurs (Confirm)	The disk may be damaged. Check the disk.
Destination file not found (Confirm)	Check the file name and directory name, then try again.
Not find sector (Confirm)	The disk has not been formatted, or it may be damaged. Check the condition of the disk.
Disk error ocuurs (Confirm)	The disk has not been formatted, or it may be damaged. Check the condition of the disk.
CRC error occurrs in data (Confirm)	Part of the data has been destroyed. If there is backup data, use this data.
Unable to overwrite (Confirm)	A "Read-only file" attribute has been set for the file. Either cancel the read-only file attribute or save the data under another file name.
The number of file is maximum (Confirm)	The number of files in the data directory has exceeded the maximum number that can be handled by the support tool (254). Either delete unneeded files or save the file in another directory.
Read failed (Confirm)	Check the connection between the support tool and the other device (the PT, image scanner, etc.), then try again.
Unknown function information exitst in NT host	When data is transferred from the support tool to the PT, this error message is displayed if the version of the support tool is lower than that handled by the PT's system ROM. There is no fault in data transfer itself.

APPENDIX C

Special Characters

English Character Codes

Pin 3 of SW1 must be ON to enable English language messages to use the following codes.

Example

Hex code is represented by 30, decimal code by 48, and character by 0.

30	0
48	

Code 20 and 32 in the table represents a space, as indicated by "SP".

Hex Digits 1st → 2nd ↓	2-		3-		4-		5-		6-		7-		8-		9-	
-0	20	SP	30	0	40	@	50	P	60	`	70	p	80	Ç	90	É
	32		48		64		80		96		112		128		144	
-1	21	!	31	1	41	A	51	Q	61	a	71	q	81	ü	91	æ
	33		49		65		81		97		113		129		145	
-2	22	"	32	2	42	B	52	R	62	b	72	r	82	é	92	Æ
	34		50		66		82		98		114		130		146	
-3	23	#	33	3	43	C	53	S	63	c	73	s	83	â	93	ô
	35		51		67		83		99		115		131		147	
-4	24	$	34	4	44	D	54	T	64	d	74	t	84	ä	94	ö
	36		52		68		84		100		116		132		148	
-5	25	%	35	5	45	E	55	U	65	e	75	u	85	à	95	ò
	37		53		69		85		101		117		133		149	
-6	26	&	36	6	46	F	56	V	66	f	76	v	86	å	96	û
	38		54		70		86		102		118		134		150	
-7	27	'	37	7	47	G	57	W	67	g	77	w	87	ç	97	ù
	39		55		71		87		103		119		135		151	
-8	28	(	38	8	48	H	58	X	68	h	78	x	88	ê	98	ÿ
	40		56		72		88		104		120		136		152	
-9	29	)	39	9	49	I	59	Y	69	i	79	y	89	ë	99	Ö
	41		57		73		89		105		121		137		153	
-A	2A	*	3A	:	4A	J	5A	Z	6A	j	7A	z	8A	è	9A	Ü
	42		58		74		90		106		122		138		154	
-B	2B	+	3B	;	4B	K	5B	[	6B	k	7B	{	8B	ï	9B	¢
	43		59		75		91		107		123		139		155	
-C	2C	,	3C	<	4C	L	5C	\	6C	l	7C	|	8C	î	9C	£
	44		60		76		92		108		124		140		156	
-D	2D	-	3D	=	4D	M	5D	]	6D	m	7D	}	8D	ì	9D	¥
	45		61		77		93		109		125		141		157	
-E	2E	.	3E	>	4E	N	5E	^	6E	n	7E	~	8E	Ä	9E	Pt
	46		62		78		94		110		126		142		158	
-F	2F	/	3F	?	4F	O	5F	_	6F	o	7F	⌢	8F	Å	9F	ƒ
	47		63		79		95		111		127		143		159	

Hex Digits 1st → / 2nd ↓	A-		B-		C-		D-		E-		F-	
-0	A0 / 160	á	B0 / 176	··	C0 / 192	└	D0 / 208	⊥	E0 / 224	α	F0 / 240	≡
-1	A1 / 161	í	B1 / 177		C1 / 193	⊥	D1 / 209	⊤	E1 / 225	β	F1 / 241	±
-2	A2 / 162	ó	B2 / 178	‖‖	C2 / 194	⊤	D2 / 210	⊤	E2 / 226	Γ	F2 / 242	≥
-3	A3 / 163	ú	B3 / 179	│	C3 / 195	—	D3 / 211	⊥	E3 / 227	π	F3 / 243	≤
-4	A4 / 164	ñ	B4 / 180	┤	C4 / 196	—	D4 / 212	⊨	E4 / 228	Σ	F4 / 244	⌠
-5	A5 / 165	Ñ	B5 / 181	╡	C5 / 197	+	D5 / 213	╒	E5 / 229	σ	F5 / 245	⌡
-6	A6 / 166	ª	B6 / 182	╢	C6 / 198	=	D6 / 214	╓	E6 / 230	μ	F6 / 246	÷
-7	A7 / 167	º	B7 / 183	╖	C7 / 199	╟	D7 / 215	╫	E7 / 231	τ	F7 / 247	≈
-8	A8 / 168	¿	B8 / 184	╕	C8 / 200	╚	D8 / 216	╪	E8 / 232	Φ	F8 / 248	°
-9	A9 / 169	⌐	B9 / 185	╣	C9 / 201	╔	D9 / 217	┘	E9 / 233	Θ	F9 / 249	
-A	AA / 170	¬	BA / 186	║	CA / 202	╩	DA / 218	┌	EA / 234	Ω	FA / 250	*1
-B	AB / 171	½	BB / 187	╗	CB / 203	╦	DB / 219	■	EB / 235	δ	FB / 251	*1
-C	AC / 172	¼	BC / 188	╝	CC / 204	╠	DC / 220	▄	EC / 236	∞	FC / 252	*1
-D	AD / 173	¡	BD / 189	╜	CD / 205	—	DD / 221	▌	ED / 237	φ	FD / 253	*1
-E	AE / 174	«	BE / 190	╛	CE / 206	╬	DE / 222	▐	EE / 238	ε	FE / 254	*2
-F	AF / 175	»	BF / 191	┐	CF / 207	╧	DF / 223	▀	EF / 239	∩	FF / 255	*3

*1 Used as the prefix for library data codes (2 bytes).

*2 Used as the prefix for image data codes (2 bytes).

*3 Used as the prefix for mark data codes (2 bytes).

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