

Exercises in Macro

M	acro	CONVERSION
MOVEMENT	ADDITION	
	TRANSMIT	

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Chapter 1 Interval Timer

This is an example of using an interval timer function.

When creating a screen that uses the timer function, using the interval timer makes macro commands easier.

This chapter explains how to use the interval timer and macro commands.

Chapter 2 Repeat of ON/OFF Display on Lamp

When using Macro Mode

When using Interval Timer

This is an example of how to change the lamp ON/OFF display by a fixed time.

This example uses the Macro mode or the Interval Timer. In case of V4, the Interval Timer cannot be used. Refer to the section, "When using Macro Mode."

Chapter 3 Clock

This is an example to show the analog clock on the V series.

This function makes it possible to change the clock drawing of Graphic Relay by using OPEN macro and CYCLE macro of a screen.

Chapter 4 Animation Screen

This is an example of creating the animation function in V608 and V610 (640 X 480 dots).

This function makes it possible to create the animation screen by only using macro commands which reduces the PLC program load.

The graphics for animation is made by Pattern editing.

Chapter 5 Password Entry Screen

This is an example of entering a password before screen change to prohibit changing a screen freely.

Chapter 6 Multi Key Screen

This gives an example of how to avoid writing the wrong values when using entry mode for writing values to the specified addresses.

When the entry key is pressed, the confirmation window is displayed to determine whether the entered value is to be written or not.

Chapter 7 Digital Switches

(Switch ON Macro)

This gives an example of creating the digital switches.

This chapter explains how to create the digital switches by using ON macros on each switch.

Chapter 8 Video Display Screen

This example explains how to display the video window when using the video interface function in the optional V612T, V610S or V610T type.

Channel change, brightness adjustment, contrast adjustment and color adjustment are possible by using the command setting and the memory setting.

Chapter 9 Sampling Screen

[GET_SMPL], [GET_SCUR]

This example explains how to store the sample data for the displayed cursor point of sampling mode into the internal user memory by using [GET_SMPL] and [GET_SCUR] commands.

Chapter 10 I/O Monitoring (Word/Bit) Screen

(Indirect Memory)

This gives an example of monitoring ten words of D registers in the MITSUBISHI PLC, 'A2USH.'

This chapter explains the possibilities of simple macro commands by using 'Indirect Memory,' as well as the way to specify the indirect memory of macro commands.

This example uses D registers in the MITSUBISHI PLC. It is also possible to use other PLCs.

Preface

Thank you for using the MONITOUCH V series.

This manual leads to easy understanding of “Macro” commands (which are the original program commands of MONITOUCH V series), by giving the examples.

Also, it explains how to copy sample data files to actual user data files.

For more information about the MONITOUCH V series, refer to the “MONITOUCH V series Reference Manual.”

Inscriptions of Manual

<Operation>/<Action>	-> Explains how to operate sample data files as well as the actions of sample data files.
Creation of Screens	-> Explains how to create screens.
<Used Memory>	-> Shows the list of memory used on a sample data file.
<Used Modes>	-> Shows the list and the setting of the used modes, if modes are used on a sample data file.
<Execution Macros>	-> Explains the areas of the macros which are executed on a sample data file.
<Description of Macros>	-> Explains the details of the macros on a sample data file.
Changing Points	-> Explains how to change sample data files.
Points on Copying Files	-> Explains how to copy sample data files into the user data files.
<Copy Target Items>	-> Shows the items used on a sample data file.
<Notes>	-> Explains how to copy sample data files.
Advice	-> Gives other information about macros or useful functions.

About Sample Data Files

<Titles of Sample Data Files>

Name of Sample File	Corresponding Chapter	Corresponding Type of V Series*
Timer.V6	Chapter 1 Interval Timer	V6
Lamp_blink.V6	Chapter 2 Repeat of ON/OFF Display on Lamp	V6/V4
Clock.V6	Chapter 3 Clock	(except V606/V4S)
Animation.V6	Chapter 4 Animation Screen	only V610T and V608
Password.V6	Chapter 5 Password Entry Screen	V6/V4
Multi_key.V6	Chapter 6 Multi Key Screen	V6/V4
Digital_sw.V6	Chapter 7 Digital Switches	V6/V4
Video.V6	Chapter 8 Video Display Screen	only V612T, V610S and V610T corresponding to video function
Sampling.V6	Chapter 9 Sampling Screen	V6/V4
IO_monitor.V6	Chapter 10 I/O Monitoring (Word/Bit) Screen	V6/V4

* V4 can only use internal memory from \$u0 to \$u4095. If you use V4, the sample data files are recommended for use as references.

<Common Memory on Each Sample Data File>

Some memory devices are used on a screen data file of the V series as default.

In this case, the above memory devices on each sample data file are set with the same addresses.

* The [PLC Type] on each sample data file is specified as [MITSUBISHI AnA/N/U series].

[Comm. Parameter]	Read Area	: D00000 (~D00002)
	Write Area	: D00050 (~D00052)
	Calendar	: \$u16330
[Buffering Area Setting]	Info. Output Mem.	: \$u16340
[Memory Card Setting]	I/F Memory	: \$u16330
[Others]	Global Macro Memory	: \$u16330
	DIO Input Mem.	: \$u16330
	DIO Output Mem.	: \$u16340

Changing Used Memory

It is necessary to change the range of the used memory on one file to avoid duplicating memory settings if the range of the used memory on both the sample data files and the user files is duplicated when copying the sample data files into the user files.

Each chapter shows the memory used on the sample data file.

When changing the addresses of the used memory, refer to <Used Memory> in each chapter.

The “Change All Memory” function on V-SFTE is useful for changing memory.

- * The addresses specified as the constant in the indirect memory of macro commands, like “Chapter 10 I/O Monitor Screen,” cannot be changed automatically with the “Change All Memory” function.

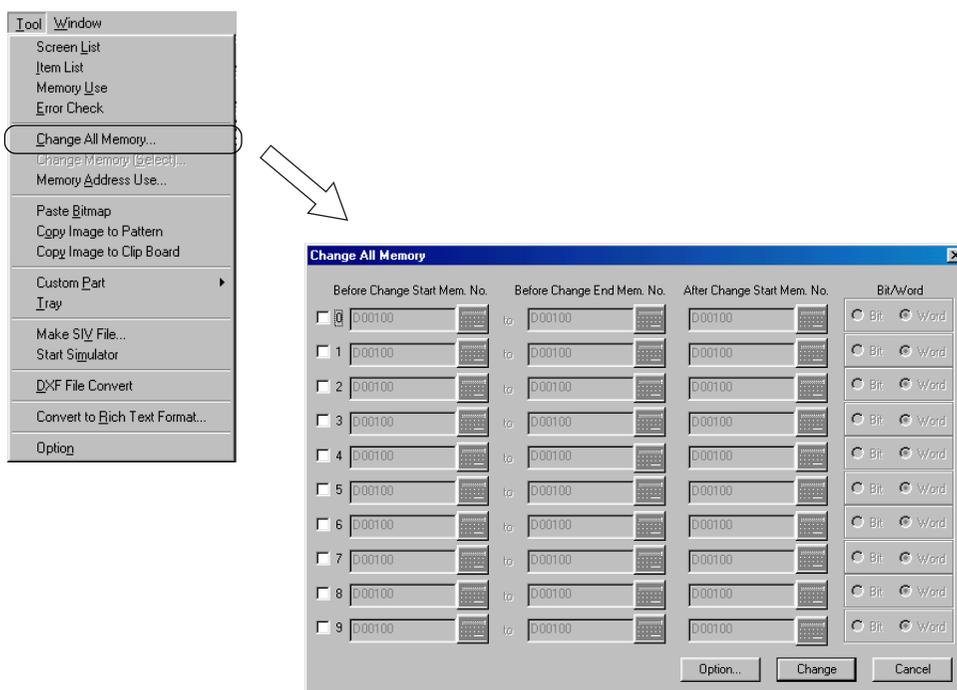
It is recommend that you change the memory addresses manually after checking them.

<How to Change All Memory>

The method for changing the memory addresses is as follows;

1. Open the screen data file to change the specified memory.
2. Click [Change All Memory] on the [Tool] menu.

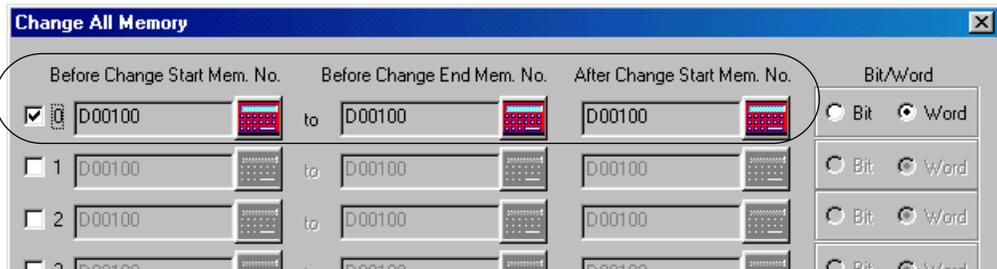
The [Change All Memory] dialog is displayed.



3. Check box [0]. The setting menu becomes available.

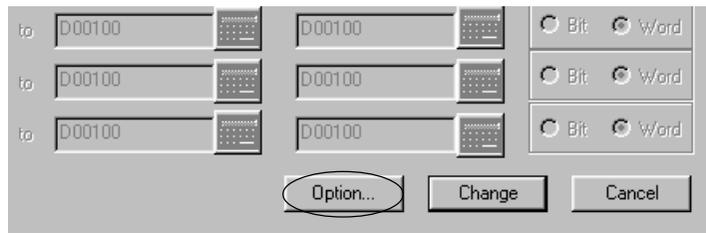
The [Before Change Start Mem. No.] and the [Before Change End Mem. No.] specify the range of the memory addresses to be changed.

The [After Change Start Mem. No.] specifies the top memory address after change is complete.



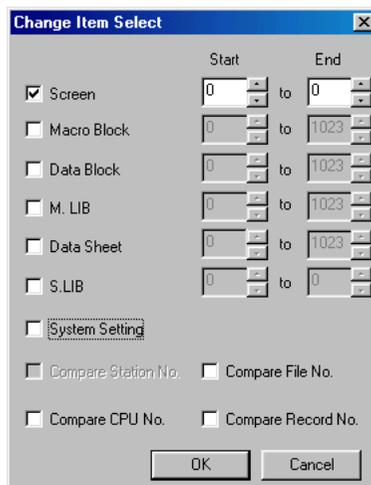
4. Click the [Option] button. The [Change Item Select] dialog is displayed.

This is useful for specifying certain items when changing memory addresses.



E.g.)

When changing the memory addresses in screen No. 0 only, check [Screen], and set both [Start] and [End] to [0].



5. Click the [Change] button on the [Change All Memory] dialog. The specified memory addresses are changed.

How to Copy the Sample Data File

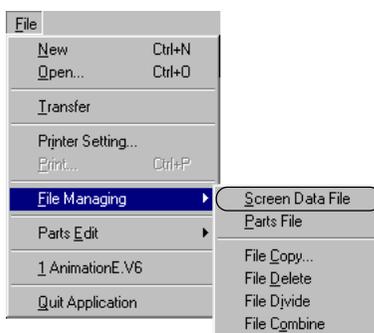
The “File Managing” function on V-SFTE is useful for copying a sample data file to another screen data file.

Each chapter explains the editing areas used, the used items and notes on copying data in detail. Be sure to check the notes in each chapter.

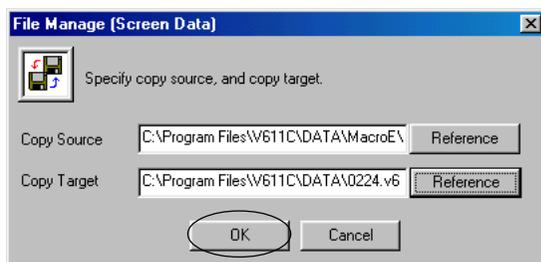
<How to Use File Managing>

The basic method for copying screen data is as follows;

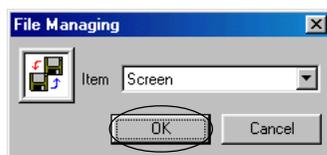
1. Click [File Managing] on the [File] menu, and then click [Screen Data File].



2. The [File Manage (Screen Data)] dialog is displayed. Specify the desired file for [Copy Source] and [Copy Target], and click [OK].

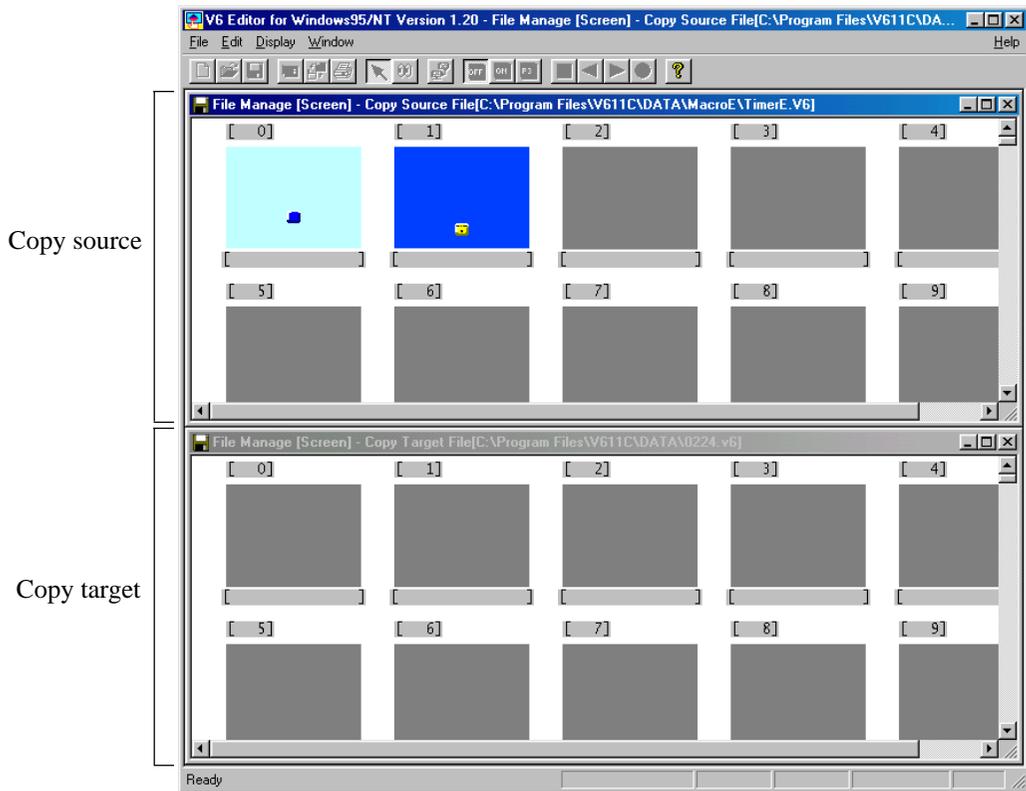


3. The following [File Managing] dialog is displayed. Select [Screen] from [Item], and click [OK].

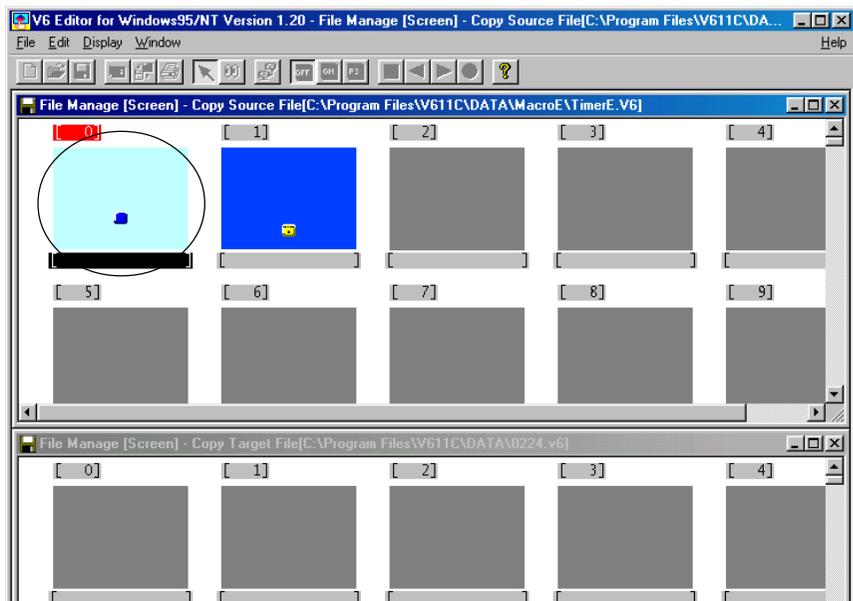


* Copying is executed between the same editing items. It is necessary to specify the editing item, such as macro block or graphic library.

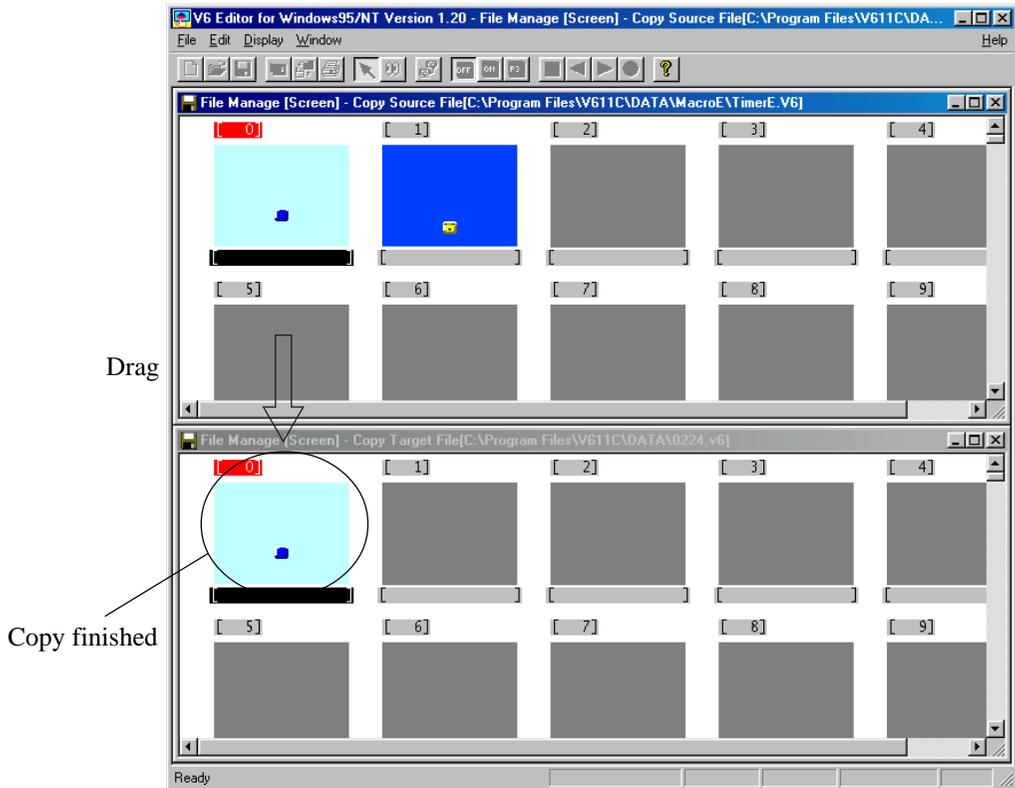
- On the editing software, the copy source file window is shown above, and the copy target file window is shown below.



- Select the screen from the copy source file.

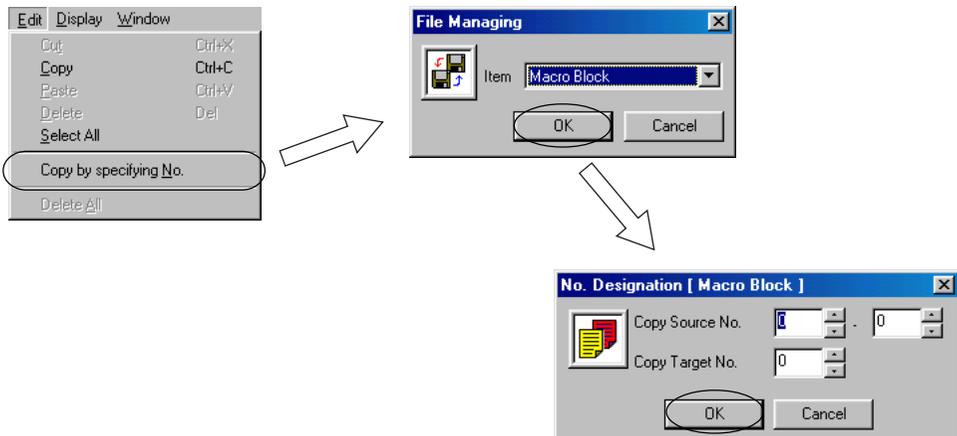


6. Drag the selected screen to the desired target area. The screen is copied.



- * If you want to copy multiple screens at one time, click the start and end screens while holding down the SHIFT key.

7. When copying graphic libraries or macro blocks, click [Change Display] on the [Display] menu, or [Copy by specifying No.] on the [Edit] menu. Select the item to copy, and click [OK].

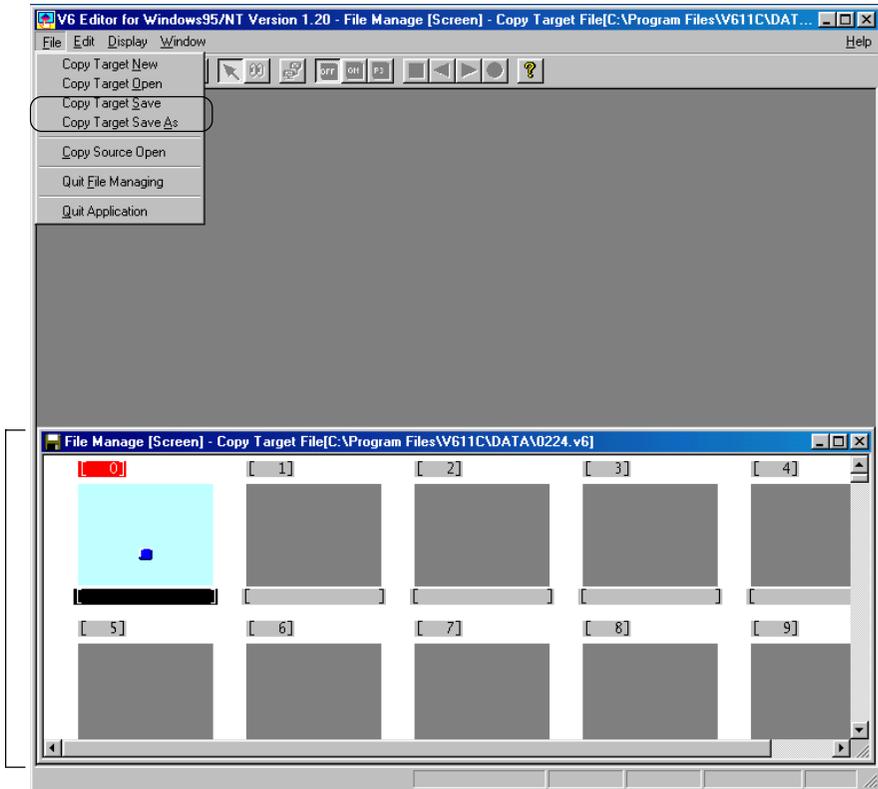


8. When copying is finished, close the opened screen data file.

Close the copy source file without saving it.

Close the copy target file after saving it.

* If the copy target file is not saved, the contents of copying will be garbled.



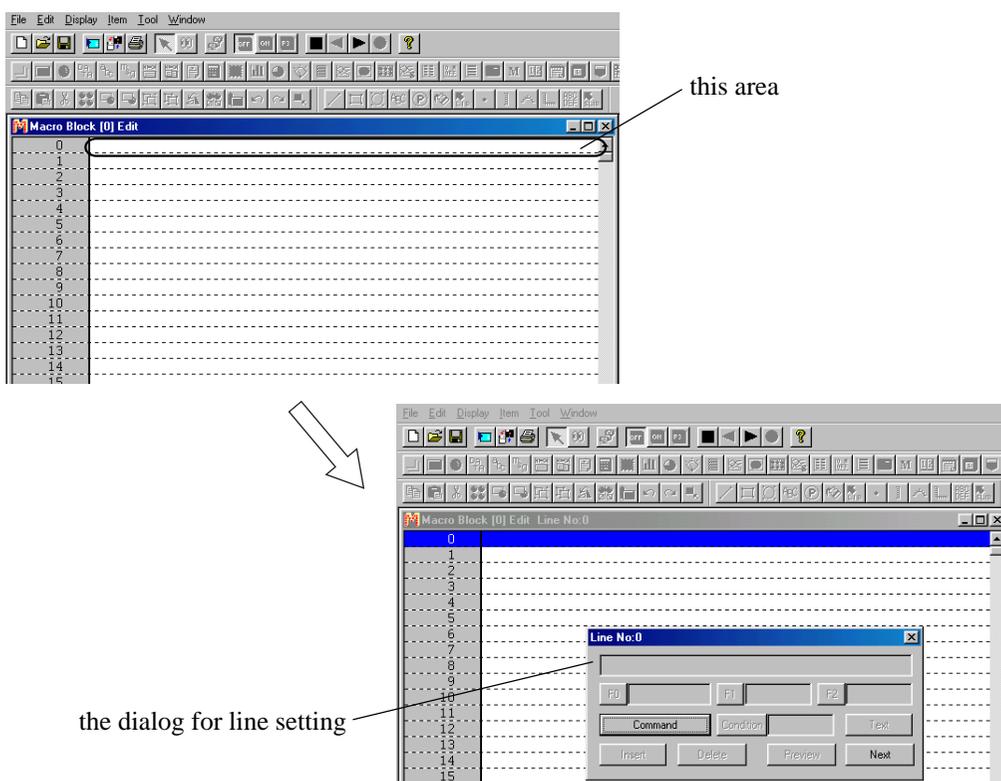
How to Set Macro Commands (for first time users)

There are some editing areas where the macro commands can be set, for example, “Macro Block” editing, “Cycle Macro Editing” on a screen or “ON/OFF Macro Editing” on a switch. The menus and the method of setting macros is basically the same. The macro command setting method is explained below.

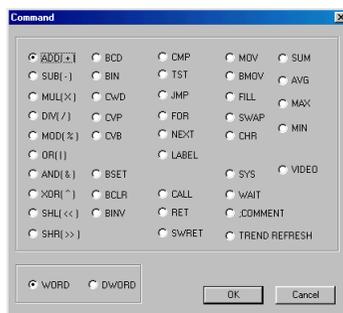
<Basic Method for Setting Macro Commands>

1. Open the macro editing window. (E.g. the [Macro Block Edit] window)
2. Click the white area of a line on the window.

The dialog for line setting is displayed.



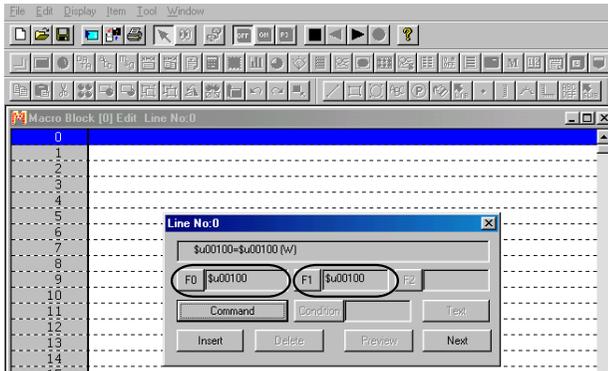
3. Click the [Command] button. The [Command] dialog is displayed.



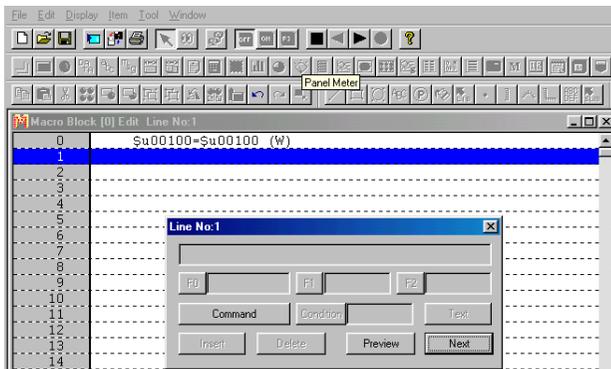
4. Select the desired command, and click [OK].

◇◇◇◇E.g. : In case [MOV] is selected◇◇◇◇

5. The menu buttons necessary for the selected command become valid.
In this case, [F0] and [F1] are valid.



6. After setting is finished, click [Next].
The next dialog for line setting is displayed.



◇◇◇◇E.g. : In case [SYS] is selected◇◇◇◇

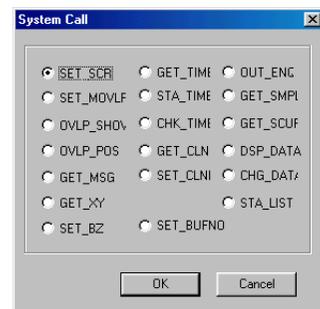
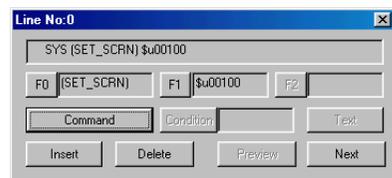
7. The menu buttons necessary for the selected command become valid.

In this case, [F0] and [F1] are valid.

8. When the [F0] button is clicked, the [System Call] dialog is displayed.

Select the desired commands, and click [OK].

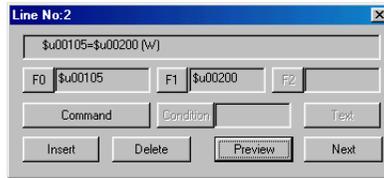
9. In [F1], specify the top address of the internal memory to define the contents of the commands specified to [F0].



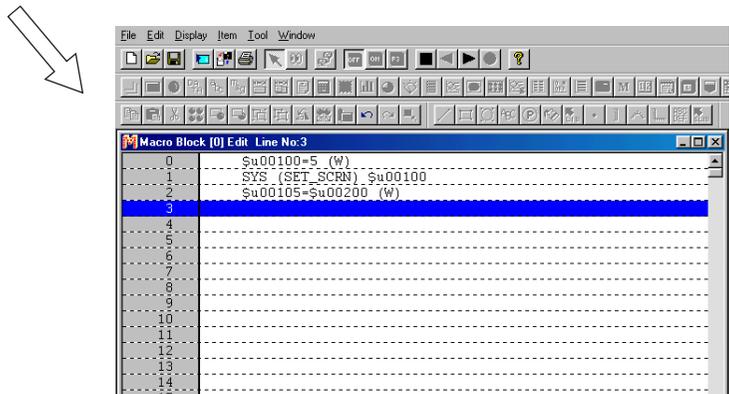
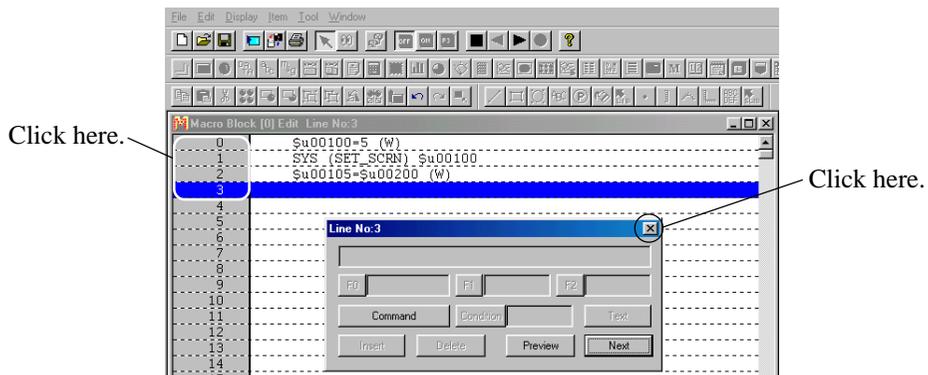
Set each command as described above.

For more detailed information about each command, refer to the “MONITOUCH V Series Reference Manual.”

10. If you want to cancel the macro command that was set, click the [Delete] button.
To add the macro command that was set between the existing macro commands, click the [Insert] button.



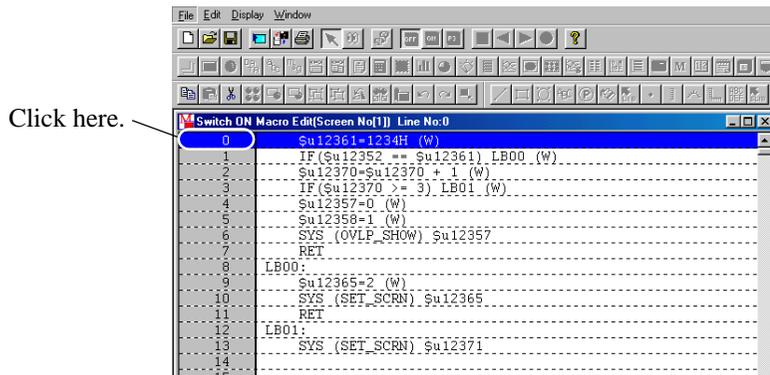
11. If you want to delete the dialog for line setting, click the [X] button on the upper right corner on the dialog, or click the area of the line number on the macro window as below.



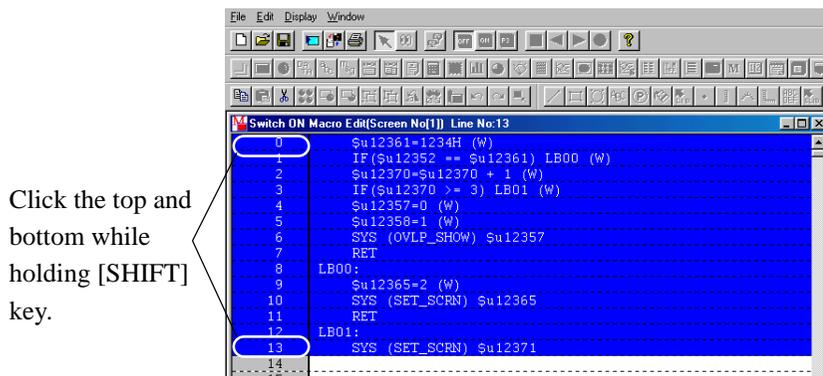
<Useful Operation>——Copying the Macro Commands——

This makes it easy to copy the present macro commands on the ON macro editing of a switch to the Cycle macro editing of a screen.

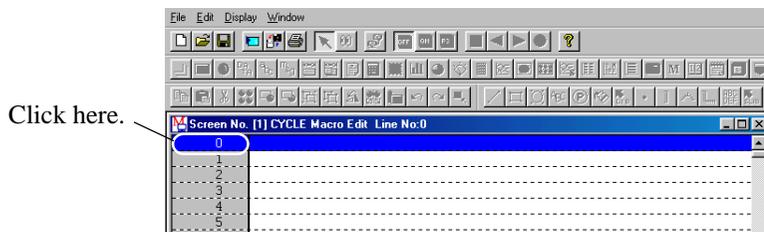
1. Open the macro window of a switch.
2. Click the top line number of the macro commands to copy.



If there are multiple lines of macro commands to copy, click the top and bottom line number while holding the [SHIFT] key.



3. Click the [Copy] icon (or [Copy] on the [Edit] menu).
4. Next, open the Cycle macro editing window on the screen.
5. Click the target line number to copy.



6. Click the [Paste] icon (or [Paste] on the [Edit] menu).
The macro commands are copied.

Interval Timer

Before Reading This Chapter

This is an example of using an interval timer function.

When creating a screen that uses the timer function, using the interval timer makes macro commands easier.

This chapter explains how to use the interval timer and macro commands.

1. A switch that causes the screen to change when it is held down for 5 seconds

<Operation>

1. Display screen No. 0.
2. Hold down the switch shown on the right for 5 seconds.
3. The screen changes from No. 0 to No. 1.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
\$u12302-00	Switch Output Memory Switch Lamp Memory Timer Start Memory (Interval Timer)
\$u12303	SET_SCRN (Macro Block No. 930)

<Used Modes>

Interval Timer

Division No.	0
Macro Block No.	930
Time-up Time	50 (*100 msec)
<input checked="" type="checkbox"/> Start Mem. Designation	\$u12302-00
<input type="checkbox"/> Stop timer after execution of macro	
<input type="checkbox"/> ON Macro Block No.	
<input type="checkbox"/> OFF Macro Block No.	
Process Cycle	Low Speed

<Execution Macros>

Macro Block Edit No. 930

<Description of Macros>

◎Macro Block Edit No. 930

\$u12303 = 1 (W)

: Specify the screen No. to display.

SYS (SET_SCRN) \$u12303

: Display the screen which number is specified by \$u12303.

Changing Points

◎Interval Timer

Time-up Time 50 * 100 msec

If you want to change the time for screen change, change this value.
<E.g.> In case of 10 sec 100

◎Macro Block Edit No. 930

\$u12303 = 1 (W)

If you want to change the number of the screen that is displayed, change this value.
<E.g.> When displaying screen No. 20 20

SYS (SET_SCRN) \$u12303

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 0

Macro Block No. : 930

* If the screen and the macro block are copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

◎Interval Timer

Macro Block No. 930

If the macro block number is different, change this value.
<E.g.> When the macro block No. is 30 30

◎Macro Block Edit No. 930

\$u12303 = 1 (W)

If the screen number is changed after copying to the target file, change this value.
<E.g.> When the screen No. for screen change is 5 5

SYS (SET_SCRN) \$u12303

Advice

It is also possible to execute functions other than screen change by changing the macro commands on the macro blocks.

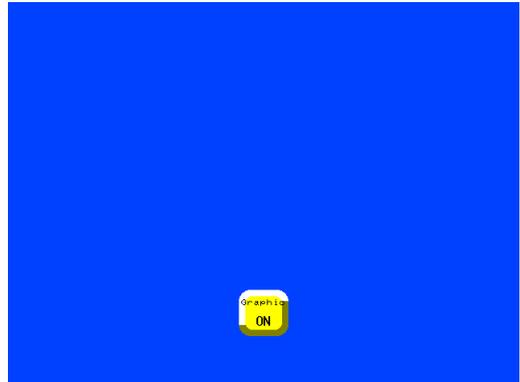
<E.g.>For the switch which must be held down for 5 seconds to set a memory address (e.g.: \$u12303-00), change the macro block edit No. 930 as follows;

\$u12303-00 (ON)

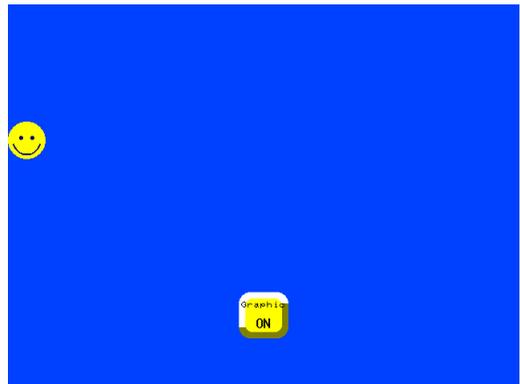
2. Screen with the graphic moving every second

<Operation>

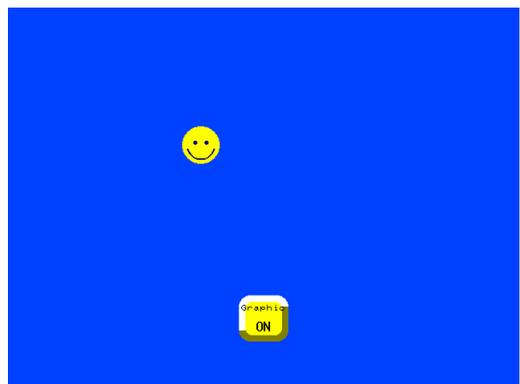
1. Display screen No. 1.
2. Press the switch shown on the right.



3. The graphic is displayed.



4. The graphic moves 10 dots to the right every second.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
\$u12300-00	Graphic Relay Timer Start Memory (Interval Timer)
\$u12301	Parameter 1 (stores the X coordinates of the graphic)

<Used Modes>

Interval Timer

Division No.	0
Macro Block No.	930
Time-up Time	10 (* 100 msec)
<input checked="" type="checkbox"/> Start Mem. Designation	\$u12300-00
<input type="checkbox"/> Stop timer after execution of macro	
<input type="checkbox"/> ON Macro Block No.	
<input type="checkbox"/> OFF Macro Block No.	
Process Cycle	Low Speed

Graphic Relay (setting details are omitted)

<Execution Macros>

Macro Block No.: 931

<Description of Macros>

©Macro Block Edit No. 931

\$u12301 = \$u12301 + 10 (W) : The value of the memory \$u12301 for parameter 1 increases by ten.

(The value of the X coordinate of the graphic increases by ten.)

IF(\$u12301 == 600) LB00 (W) : When the graphic reaches the right of the screen (600), jump to label 0.

RET

LB00: : Label 0

\$u12301 = 0 (W) : Set \$u12301 to 0. (Move the graphic to the left.)

Changing Points

◎Interval Timer
 Time-up Time 10 (*100 msec)

If you want to change the time for graphic movement, change this value.
<E.g.> In case of every 5 seconds 50

◎Macro Block Edit No. 931
 $\$u12301 = \$u12301 + \text{10}$
 $\text{IF } (\$u12301 == \text{600}) \text{LB00 (W)}$
 LB00 :
 $\$u12301 = 0 \text{ (W)}$

If you want to change the distance for graphic movement, change this value.
<E.g.> In case of the increment by one dot 1

When the X size of the edit model is different from one of the sample data files like V612 or V606, change the value of the X coordinates to correspond to the target model.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 1
 Graphic Library : Group No. 1 Graphic No. 0
 Macro Block No. : 931

* If the graphic library and the macro block are copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

◎Interval Timer
 Macro Block 931

If the macro block number is different, change this value.

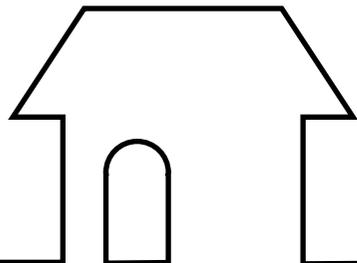
◎Graphic Relay
 Start Graphic GNo & No

If the graphic number is different, change this value.

1 & 0

MEMO

Please use this page freely.



Repeat of ON/OFF Display on Lamp

[Macro Mode, Interval Timer]

Before Reading This Chapter

This is an example of how to change the lamp ON/OFF display by a fixed time.

This example uses the Macro mode or the Interval Timer. In case of V4, the Interval Timer cannot be used. Refer to the section, "When using Macro Mode."

This example uses the M register of MITSUBISHI's PLC, but it is also possible to use other makers' PLCs.

<Action>

Both screen No. 0 and No. 1 execute the same action.

When the memory, M20, is set ON, M10 turns ON and OFF in one second intervals while M20 is ON.

When using Macro Mode

Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
M00010	Lamp Memory for ON/OFF
M00020	Memory to start the repeat of ON/OFF
\$u12100	A flag which shows the execution of macro mode
\$u12110	Time-up interval flag
\$u12111	Timer type
\$u12112	Time-up time

<Used Modes>

Macro Mode

Division No.	0
Memory	M00020
No. of Relays	1
<input type="checkbox"/> Execute OFF macro in start	
ON macro	1
OFF macro	1
Process Cycle	Low Speed

<Execution Macros>

- ◇Cycle Macro Edit on Screen
- ◇Macro Block Edit No. 920
- ◇ON Macro Edit on Macro Mode
- ◇OFF Macro Edit on Macro Mode

<Description of Macros>

◎Cycle Macro Edit on Screen

CALL 920 : Call macro block No. 920.

◎Macro Block Edit No.: 920

IF (\$u12100 == 1) LB00 (W) : When the macro mode is executed, jump to label 0.

RET : Quit macro commands.

LB00: : Label 0

SYS (CHK_TIME) \$u12110 : Check whether time is up or not.

IF (\$u12110 == 1) LB01 (W) : When time is up, jump to label 1.

RET : Quit macro commands.

LB01: : Label 1

M00010 (INV) : Invert M10.

◎ON Macro Edit on Macro Mode

\$u12100 = 1 (W) : The memory which shows the execution of macro mode.

\$u12111 = 1 (W) : Set the timer type to 1.

\$u12112 = 100 (W) : Set the time-up time to 1. (Unit : 10 msec)

SYS (STA_TIME) \$u12110 : Executes the timer.

◎OFF Macro Edit on Macro Mode

\$u12100 = 0 (W) : The memory which shows the completion of macro mode.

M00010 (OFF) : Set M10 to OFF.

* When the timer type is set to "1," MONITOUCH turns the timer bit ON, and the timer start time will change to count the new time.

(The Interval Timer can be used in the same way.)

Changing Points

◎Macro Block No. 920

IF (\$u12100 == 1) LB00 (W)

RET

LB00:

SYS (CHK_TIME) \$u12110

IF (\$u12110 == 1) LB01 (W)

RET

LB01:

M00010 (INV)

If you want to change the memory address for repeat of ON/OFF, change this command.

◎ON Macro Edit on Macro Mode

\$u12100 = 1 (W)

\$u12111 = 1 (W)

\$u12112 = 100 (W)

SYS (STA_TIME) \$u12110

If you want to change the interval between ON and OFF, change this line. (Unit : 10 msec)

◎OFF Macro Edit on Macro Mode

\$u12100 = 0 (W)

M00010 (OFF)

If you want to change the memory address for repeat of ON/OFF, change this command.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the "Preface."

<Copy Target Items>

Screen No.: 0

Macro Block No.: 920

* If the macro block is copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

◎Cycle Macro Edit on Screen

CALL 920

If the macro block number is different, change this value.

When using Interval Timer

Creation of Screens

<Used Memory>

Memory	Contents
M00010	Lamp Memory for ON/OFF
M00020	Memory to start ON/OFF action

<Used Modes>

Interval Timer

Division No.	0
Macro Block No	921
Time-up Time	10 (* 100 msec)
<input checked="" type="checkbox"/> Start Mem. Designation	M00020
<input type="checkbox"/> Stop timer after execution of macro	
<input type="checkbox"/> ON Macro Block No.	
<input checked="" type="checkbox"/> OFF Macro Block No.	922
Process Cycle	Low Speed

<Execution Macros>

Macro Block Edit No. 921, 922

<Description of Macros>

◎Macro Block Edit No. 921

M00010 (INV) : Invert M10.

◎Macro Block Edit No. 922

M00010 (OFF) : Set M10 OFF.

Changing Points

◎Interval Timer

Division No.

0

If you want to change the interval between ON and OFF, change this line.

Macro Block No.

921

Time-up Time

10 (* 100 msec)

Start Mem. Designation

M00020

If you want to change the memory address to start ON/OFF action, change this value.

Stop timer after execution of macro

ON Macro Block No.

OFF Macro Block No.

922

Process Cycle

Low Speed

◎Macro Block Edit No. 921

M00010 (INV)

If you want to change the memory address for repeat of ON/OFF, change this command.

◎Macro Block Edit No. 922

M00010 (OFF)

If you want to change the memory address for repeat of ON/OFF, change this command.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 1

Macro Block No. : 921 to 922

* If the macro block is copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

Interval Timer

Macro Block No.

921

OFF Macro Block No.

922

If the macro block number is different, change this value.

Clock

Before Reading This Chapter

This is an example to show the analog clock on the V series.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents	Memory	Contents
\$u12500	Graphic Relay	\$u12531	Hour hand Radius
\$u12501	Parameter 1	\$u12531	Hour hand Angle
\$u12502	Parameter 2	\$u12532	Hour hand X coordinate of center
\$u12503	Parameter 3	\$u12533	Hour hand Y coordinate of center
\$u12504	Parameter 4	\$u12534	Operation result X coordinate
\$u12505	Parameter 5	\$u12535	Operation result Y coordinate
\$u12506	Parameter 6	\$u12540	Angle operation 2 of hour hand
\$u12510	Second hand Radius	\$u12543	Angle operation 1 of hour hand
\$u12511	Second hand Angle	\$u12544	Angle operation of minute hand
\$u12512	Second hand X coordinate of center	\$u12545	Angle operation of second hand
\$u12513	Second hand Y coordinate of center		
\$u12514	Operation result X coordinate	\$s00163	System memory Calender hour
\$u12515	Operation result Y coordinate	\$s00164	System memory Calender minute
		\$s00165	System memory Calender second
\$u12520	Minute hand Radius		
\$u12521	Minute hand Angle		
\$u12522	Minute hand X coordinate of center		
\$u12523	Minute hand Y coordinate of center		
\$u12524	Operation result X coordinate		
\$u12525	Operation result Y coordinate		

<Used Modes>

Graphic Relay (setting details omitted)

<Execution Macros>

Open Macro Edit on Screen

Cycle Macro Edit on Screen

<Description of Macros>

©Open Macro

\$u12500-00 (ON) : Graphic Relay ON

©Cycle Macro

;Second hand

\$u12545 = \$s0165 X -60 (W) : Angle operation (Refer to next page.)

\$u12545 = \$u12545 + 4500 (W) :

;

\$u12510 = 100 (W) : Radius

\$u12511 = \$u12545 : Angle

\$u12512 = 320 (W) : X coordinate of center

\$u12513 = 240 (W) : Y coordinate of center

SYS (GET_XY) \$u12510 : Get X/Y coordinate.

;

;Minute hand

\$u12544 = \$s0164 X -60 (W) : Angle operation (Refer to next page.)

\$u12544 = \$u12544 + 4500 (W) :

\$u12544 = \$u12544 - \$s0165 (W) :

;

\$u12520 = 100 (W) : Radius

\$u12521 = \$u12544 : Angle

\$u12522 = 320 (W) : X coordinate of center

\$u12523 = 240 (W) : Y coordinate of center

SYS (GET_XY) \$u12520 : Get X/Y coordinate.

;

;Hour hand

\$u12543 = \$s0163 % 12 (W) : Angle operation (Refer to next page.)

\$u12543 = \$u12543 X -300 (W) :

\$u12543 = \$u12543 + 4500 :

\$u12540 = \$s0164 X 5 (W) :

\$u12543 = \$u12543 - \$u12540 (W) :

;

\$u12530 = 80 (W) : Radius

\$u12531 = \$u12543 : Angle

\$u12532 = 320 (W) : X coordinate of center

\$u12533 = 240 (W) : Y coordinate of center

SYS (GET_XY) \$u12530 : Get X/Y coordinate.

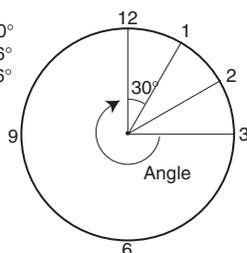
;

\$u12501 = \$u12514 (W)	: Second hand X coordinate
\$u12502 = \$u12515 (W)	: Second hand Y coordinate
\$u12503 = \$u12524 (W)	: Minute hand X coordinate
\$u12504 = \$u12525 (W)	: Minute hand Y coordinate
\$u12505 = \$u12534 (W)	: Hour hand X coordinate
\$u12506 = \$u12535 (W)	: Hour hand Y coordinate

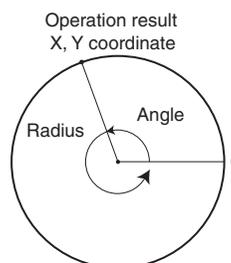
◎Operation method for the angle of each hand

Clock

One hour.....30°
 One minute.....6°
 One second.....6°



GET_XY



Operation method for the angle of the time : A° B' C"

A.....\$s00163
 B.....\$s00164
 C.....\$s00165

<Angle of second hand>

1. the angle of C seconds (60C)°
 Because the unit of the angles using the macro command (GET_XY) in the V series is 0.1°.
2. Because the direction of the hand is reverse. (-60C)°
3. Because the standard position (12 hours) of the clock is 90° off the point. (-60C + 900)°
4. The angle, 360° is added because the angle becomes the minus value when the C value is more than 15. (-60C + 4500)°

<Angle of minute hand>

1. the angle of B minutes (-60B + 4500)°
 the same operation as the angle of the second hand
2. And furthermore, the minute hand moves 6° every 60 seconds.
 In case of C seconds, {(60° / 60 seconds) X C seconds}° = C°
3. According to the result of 1 and 2, the angle of the minute hand is{(-60B + 4500) - C}°

<Angle of hour hand>

As the display of A hours is 24-hour display, it is changed into 12-hour display. A / 12 = (), and the remainder is A'.

1. the angle of A' hours (-300A' + 4500)°
 It moves 30° every hour.
2. And furthermore, the hour hand moves 30° every 60 hours.
 In case of B minutes, {(300° / 60 minutes) X C minutes}° = (5 X B)°
3. According to the result of 1 and 2, the angle of the hour hand is{(-300A' + 4500) - 5 X B}°

Changing Points

©When changing the display position of the clock

- Move the position of the face of the clock.
- Change both X and Y coordinates of center in the Cycle macro edit.

\$u12510 = 100 (W)
 \$u12511 = \$u12545 (W)
 \$u12512 = 320 (W)
 \$u12513 = 240 (W)
 SYS (GET_XY) \$u12510

\$u12520 = 100 (W)
 \$u12521 = \$u12544 (W)
 \$u12522 = 320 (W)
 \$u12523 = 240 (W)
 SYS (GET_XY) \$u12520

\$u12530 = 80 (W)
 \$u12531 = \$u12543 (W)
 \$u12532 = 320 (W)
 \$u12533 = 240 (W)
 SYS (GET_XY) \$u12530

If you want to change the length of each hand, change this value.

<E.g.> If you change the length of the second hand from 100 dots to 20 dots20

Change the X coordinate to make the edge of each hand the center of the clock.
 The X coordinates of all the hands are the same values.

Change the Y coordinate to make the edge of each hand center of the clock.
 The Y coordinates of all the hands are the same values.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the "Preface."

<Copy Target Items>

Screen No. : 0
 Graphic Library : Group No. 0 Graphic No. 6

<Notices>

©Graphic Relay

Start Graphic GNo. & No



If the graphic library number is different, change this value.

Animation Screen

Before Reading This Chapter

This is an example of creating the animation function in V608 and V610 (640 X 480 dots). This function makes it possible to create the animation screen by only using macro commands, which reduces the PLC program load.

<Action>

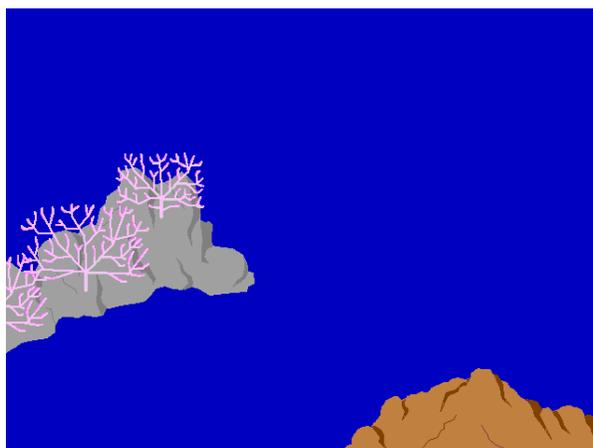
Display screen No. 0. While screen No. 0 is opened, the animation runs on the V6.



Screen No. 0

Creation of Screens

◇ Draw the background on the base screen by using drawing tools (mainly using patterns).



Screen No. 0

- ◇ The fishes, bubbles, and seaweed etc., which are the subjects of animation, are created in pattern edit and placed in the graphic library (group No. 0 and graphic No. 0). The parameter necessary for the animation function is specified on each pattern placed in the graphic library.

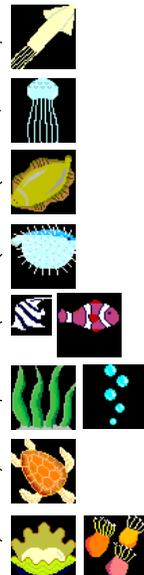
Graphic library
Group No. 0 and graphic No. 0 All drawn on pattern edit (48 X 48 dots)



- ◇ Specify “Graphic Relay” mode on the screen to make the registered graphic move on the screen. Also, specify “Interval Timer” on the screen to execute the original programs for animation (= macro commands).

<Used Memory>

Memory	Contents
\$u12000	Graphic Relay (1-graphic) For ON/OFF
\$u12001	Parameter 1 Cuttlefish X direction
\$u12002	Parameter 2 Cuttlefish Y direction
\$u12003	Parameter 3 Cuttlefish For changing pattern No.
\$u12004	Parameter 4 Jellyfish Y direction
\$u12005	Parameter 5 Jellyfish For changing pattern No.
\$u12006	Parameter 6 Flatfish X direction
\$u12007	Parameter 7 Flatfish Y direction
\$u12008	Parameter 8 Flatfish For changing pattern No.
\$u12009	Parameter 9 Globefish X direction
\$u12010	Parameter 10 Globefish and tropical fish For changing pattern No.
\$u12011	Parameter 11 Small tropical fish & anemonefish X direction
\$u12012	Parameter 12 Small tropical fish & anemonefish For changing pattern No.
\$u12013	Parameter 13 Bubbles and seaweed For changing pattern No.
\$u12014	Parameter 14 Turtle X direction
\$u12015	Parameter 15 Turtle Y direction
\$u12016	Parameter 16 Turtle For changing pattern No.
\$u12017	Parameter 17 Shellfish and sea anemone For changing pattern No.





Parameter No.	Parameter Name	Element and sea anemone	For changing pattern No.
\$u12018	Parameter 18	Tropical fish	X direction
\$u12019	Parameter 19	Bubble A	Y direction
\$u12020	Parameter 20	Anemonefish	For changing pattern No.
\$u12021	Parameter 21	Bubble B	Y direction
\$u12030	For screen change		
\$u12040			
\$u12041			
\$u12042	For operation of \$u12014, \$u12015		
\$u12043	(Parameter 14, 15)		
\$u12044			
\$u12045			
\$u12050	For operation of \$u12041		
\$u12060	For operation of \$u12004		
\$u12061	"		
\$u12070	For operation of \$u12011		
\$u12071	"		

Refer to the graphic on the previous page.

Refer to the graphic on the previous page.

<Used Modes>

Graphic Relay (setting details omitted)

Interval Timer (total: 13 modes, setting details omitted)

<Execution of Macros>

Open Macro Edit on Screen

Macros on Macro Blocks

<Description of Macros>

◎Open Macro Edit on Screen

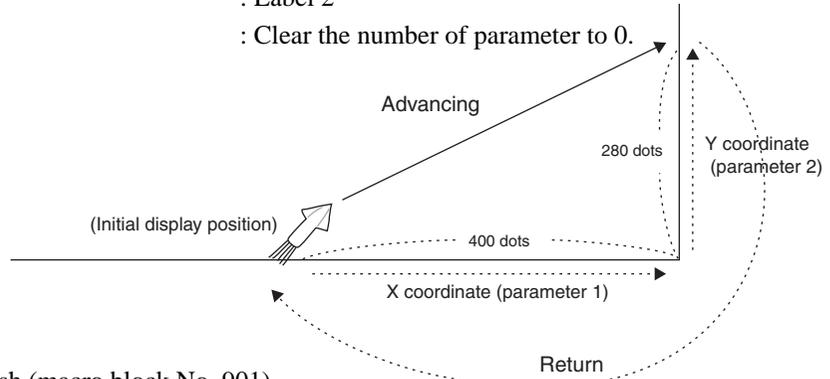
- \$u12000 = 0001H (W) : To set the bit of graphic relay mode to ON (= graphic display).
- \$u12009 = 0 (W) : For specifying the initial position of globefish
- \$u12018 = 380 (W) : For specifying the initial position of tropical fish
- \$u12050 = 1800 (W) : For specifying the initial position of turtle

◎Macro Block Edit (Gives two examples of displaying each graphic.)

——In case of Cuttlefish (macro block No. 900)——

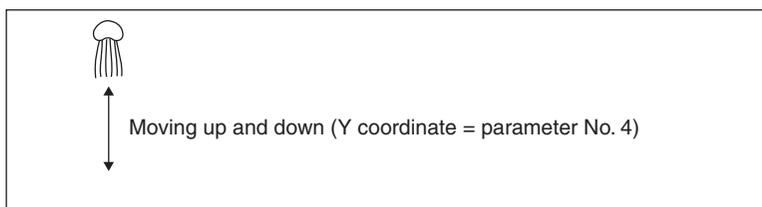
- \$u12001 = \$u12001 + 10 (W) : For changing parameter 1 = the X coordinate
- \$u12002 = \$u12002 + 4 (W) : For changing parameter 2 = the Y coordinate
- \$u12003 = \$u12003 + 1 (W) : For changing parameter 3 = pattern No.
- IF (\$u12001 >= 400) LB00 (W) : Jump to label 0 when the X coordinate is more than 400 dots.
- IF (\$u12002 >= 280) LB01 (W) : Jump to label 1 when the Y coordinate is more than 280 dots.
- IF (\$u12003 == 2) LB02 (W) : Jump to label 2 when the pattern No. becomes 2.
- RET : Macro finished.

LB00 : Label 0
 \$u12001 = 0 (W) : Clear the X coordinate to 0 dot.
 LB01: : Label 1
 \$u12002 = 0 (W) : Clear the X\Y coordinate to 0 dot.
 LB02: : Label 2
 \$u12003 = 0 (W) : Clear the number of parameter to 0.



——In case of Jellyfish (macro block No. 901)——

\$u12005 = \$u12005 + 1 (W) : For changing parameter 5 = pattern No.
 IF (\$u12005 == 2) LB01 (W) : Jump to label 1 when the value of the parameter for specifying the parameter number becomes 2.
 IF (\$u12060 >= 70) LB00 (W) : Jump to label 0 when the value of \$u12060 is more than 70 (dots).
 \$u12060 = \$u12060 + 2 (W) : Operation of \$u12060
 \$u12004 = \$u12060 (W) : Move the value of \$u12060 to \$u12004 (parameter 4 = Y).
 \$u12061 = \$u12060 (W) : Move the value of \$u12060 to \$u12061 (memory for operation).
 RET : Macro finished.
 LB00: : Label 0
 IF (\$u12061 <= 2) LB02 (W) : Jump to label 2 when the value of \$u12061 is less than 0 (dot).
 \$u12061 = \$u12061 - 2 (W) : Operation of \$u12061
 \$u12004 = \$u12061 (W) : Move the value of \$u12061 to \$u12004 (parameter 4 = Y).
 RET : Macro finished.
 LB02: : Label 2
 \$u12060 = 0 (W) : Clear \$u12060 to 0 dot.
 LB01: : Label 1
 \$u12005 = 0 (W) : Clear \$u12005 to 0 (= to display pattern No. 2).



Changing Points

- ◎When changing the speed of the animation
Change the setting of the interval timer.

For example, the macro block No. 901 for moving jellyfish is executed by interval timer, division No. 2. The setting is as follows;

Division No.	2
Macro Block No.	901
Time-up Time	
<input checked="" type="checkbox"/> Start Mem. Designation	\$u12000-00
<input type="checkbox"/> Stop timer after execution of macro	
<input type="checkbox"/> ON Macro Block No.	
<input type="checkbox"/> OFF Macro Block No.	
Process Cycle	Low Speed

To make the speed of the jellyfish faster, reduce this value. Conversely, to make it slower, increase this value.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No.	0
Graphic Library	Group No. 0, Graphic No. 0~5
Pattern No.	0~45, 47~56, 60~63
Macro Block No.	900~913

- * If the graphic libraries are copied to another number in the target file, be sure to read the <Notes> below.
- * Be sure to copy the patterns and the macro blocks to the same number in the target file. If not, normal animation may not be assured.

<Notes>

- ◎Graphic Relay
Start Graphic GNo & No



If the graphic library number is different, change this value.

Advice

<About animation of patterns>

In the MONITOUCH V6, it is possible to move graphics in the original background color without XOR display by using pattern graphics. However, this is active only when the pattern size does not exceed 4,088 dots, and the used patterns are set as “transparent.”

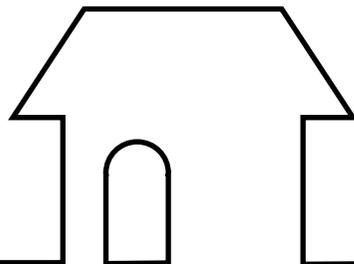
(In this example, all the pattern sizes are ‘X size’ X ‘Y size’ = ‘48’ X ‘48’ = ‘2304.’)

If the above conditions are not met, the colors of animation are XORed.

In addition, if the “transparent” patterns overlap each other, the original colors cannot be displayed.

MEMO

Please use this page freely.



Password Entry Screen

Before Reading This Chapter

This is an example of entering a password before screen change to prohibit changing a screen freely.

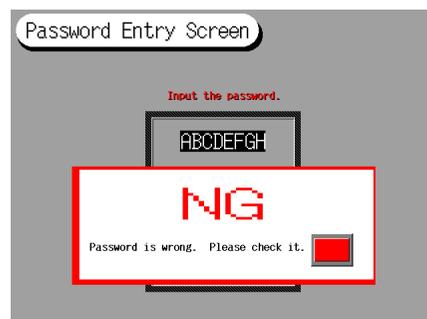
<Operation>

1. Display screen No. 0.
2. Press the “Password Entry” switch. The password entry screen is displayed.
3. Enter the password with the key pad, and press the [ENT] key.

(In this example, the password is “1234.”)

4. If the password is correct, the next screen is displayed. Pressing the switch at the center of the screen displays the screen in item 2 above.

If the password is wrong, the window to the right is displayed. If you enter the password again, press the switch at the bottom right of the window. Entering wrong password three times displays the original screen.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
D00052	Display screen No. (Write Area n+2)
\$u12350	Entered value
\$u12351	Count
\$u12352	Entered password
\$u12353	Shift the entered value four times to the left.
\$u12355	Character display
\$u12357	Overlap setting
\$u12358	
\$u12361	Right password
\$u12365	Screen setting
\$u12370	Count
\$u12371	Screen No. before changing to the “Password Entry Screen”
\$u12380	Define D00052 as internal memory.

◎ON Macro Edit of the [CLR] key

CALL 941

: Execute the macro block No. 941.

◎Macro Block Edit No. 940

IF (\$u12351 == 1) LB00

: Jump to label 0 when the second character of the password is entered.

IF (\$u12351 == 2) LB01

: Jump to label 1 when the third character of the password is entered.

IF (\$u12351 == 3) LB02

: Jump to label 2 when the fourth character of the password is entered.

IF (\$u12351 >= 4) LB03

: Jump to label 3 when the fifth or greater character of the password is entered.

\$u12355 = '*'

: Display '*' on the character display part.

JMP LB04

: Jump to label 4.

LB00:

: Label 0

\$u12355 = '***'

: Display '***' on the character display part.

JMP LB04

: Jump to label 4.

LB01:

: Label 1

\$u12355 = '****'

: Display '****' on the character display part.

JMP LB04

: Jump to label 4.

LB02:

: Label 2

\$u12355 = '*****'

: Display '*****' on the character display part.

JMP LB04

: Jump to label 4.

LB03:

: Label 3

\$u12352 = 0000H

: Clear the entered value.

RET

: Macro finished.

LB04:

: Label 4

\$u12353 = \$u12352 << 4

: Shift the entered value four times to the left, and move to \$u12353.

\$u12352 = \$u12353 | \$u12350

: Add the entered value to \$u12353, and move the total value to \$u12352.

\$u12351 = \$u12351 + 1

: Count the data.

RET

: Macro finished.

<E.g.> If 1234 is entered as the password :

	\$u12353	\$u12352
Enter [1].	0000 0000 0000 0000 (0000H)	0000 0000 0000 0001 (0001H)
↓		
Enter [2].	0000 0000 0001 0000 (0010H)	0000 0000 0001 0002 (0012H)
↓		
Enter [3].	0000 0001 0002 0000 (0120H)	0000 0001 0002 0003 (0123H)
↓		
Enter [4].	0001 0002 0003 0000 (1230H)	0001 0002 0003 0004 (1234H)

◎ON Macro Edit of the numerical entry keys (E.g.: the [0] key)

For information about other keys, refer to the following section, “Changing Points.”

\$u12350 = 0000H

: Set \$u12350 to 0.

CALL 940

: Execute the macro block No. 940.

◎Macro Block Edit No. 941

\$u12355 = 0000H

: Clear the counts.

\$u12351 = 0000H

: Clear the entered value.

\$u12352 = 0000H

: Clear the character display (*).

Changing Points

◎ON Macro Edit of the switch for “password entry” (= screen change)

\$u12380 = **D00052**

\$u12371 = \$u12380 & 1FFFFH

When the address of the write area is changed, change this address. (Specify the address of the write area + 2.)

<E.g.> When the write area is D100:

n + 2 = D102

◎ON Macro Edit of the [ENT] key

\$u12361 = **1234**H

IF (\$u12352 == \$u12361) LB00

To define the correct password, change this value.

\$u12370 = \$u12370 + 1

IF (\$u12370 >= **3**) LB01

To specify the number of times for re-entering the password, change this value.

\$u12357 = **0**

\$u12358 = 1

If you want to change the overlap No. to display when the password is wrong, change this value.

SYS (OVLN_SHOW) \$u12357

RET

LB00 :

\$u12365 = **2**

Specify the screen No. to change to when the password is correct in this line.

SYS (SET_SCRN) \$u12365

RET

LB01 :

SYS (SET_SCRN) \$u12371

◎ON Macro Edit of the numerical entry keys

\$u12350 = **0000**H

CALL 940

If you want to change the character for the keypad, change this line.

<E.g.> In case of the key, ‘A’:

Change this value into 000A.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

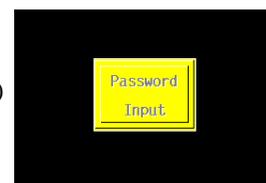
Screen No. : 0~2
Macro Block No. : 940, 941

* If the screen and the macro block are copied to another number in the target file, be sure to read the <Notes> below.

<Notes> (Take notice of the marked area in particular.)

◎ON Macro Edit of the switch for “Password Input” (= screen change)

---> Function Screen : 



◎ON Macro Edit of the [ENT] key (Line No. 9)

---> \$u12365 =  Screen No. displayed when the password is correct

◎ON Macro Edit of the [0]~[9] key

---> CALL 



ON Macro Edit of the [CLR] key

Open Macro Edit

ON Macro Edit of the switch on the overlap

---> CALL 



◎Switch

---> Function Screen : 



Advice

<Screen Change>

The macro commands for returning to the original screen (which has the switch for screen change) when the entered password is wrong, are specified to the switch on screen No. 0.

When you only use the password entry screen (screen No. 1), set the screen No. to change to when the password is wrong in the ON macro edit (LB01) of the [ENT] key on the screen No. 1.

For example, when changing the screen into screen No. 3 when the entered password is wrong, set the macro commands as follows:

LB01:

\$u12371 = 3

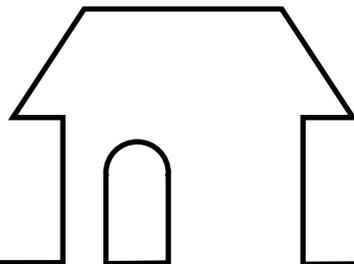
SYS (SET_SCRN) \$u12371



Screen No. 0

MEMO

Please use this page freely.



Multi Key Screen

Before Reading This Chapter

This gives an example of how to avoid writing the wrong values when using entry mode for writing values to the specified addresses.

When the entry key is pressed, the confirmation window is displayed to determine whether the entered value is to be written or not.

<Operation>

1. Display screen No. 0.
2. Press the area where you wish to change the value.
3. The keypad is displayed.
4. Enter the desired value.
5. The confirmation window is displayed.
To write the value, press the [YES] key.
If you do not want to write the value, press the [NO] key.



Entry target

Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
\$u12550	Command memory
\$u12560	Info. output memory (Entered value)
\$u12561	
\$u12562	
\$u12564	Indirect memory
\$u12565	Definition of *\$u12564
\$u12570	Overlap setting
\$u12571	
\$u12573	Multi-overlap setting
\$u12574	
\$u12575	
\$u12576	

Memory	Contents
\$u12590	Entry target of entry mode
\$u12591	
\$u12592	
\$u12593	
\$u12594	
\$u12595	
\$s00076	Overlap for keypad AUTO OFF prohibited

<Execution Macros>

Cycle Macro Edit on Screen

Open Macro Edit on Multi-overlap No. 1002

ON Macro Edit on Switch (the [ENT] key, the [YES] key and the [NO] key)

Macro Block Edit

<Description of Macros>

©Cycle Macro Edit on Screen

$\$u12565 = \$u12560 \& 03FFH$: Write the order No. of Info. output memory into $\$u12565$.

$\$u12565 = \$u12565 + 12590$: Write the desired address used for indirect memory into $\$u12565$.

©Open Macro Edit on Multi-overlap (No. 1002)

$\$u12550-15$ (ON) : Set bit 15 of the command memory in Entry mode to ON (keypad enabled).

$\$s00076-00$ (ON) : Prohibit the overlap for keypad AUTO OFF.

©ON Macro Edit on Switch

<the [ENT] key>

$\$u12573 = 1$: Displayed overlap No. 1

$\$u12574 = 1003$: Multi-overlap No. 1

$\$u12575 = 300$: X coordinate to place the overlap

$\$u12576 = 250$: Y coordinate to place the overlap

SYS (SET_MOVLP) $\$u12573$: Set the multi-overlap.

<the [YES] key>

$\$u12564 = 0000H$: Definition of $*\$u12564$ (internal memories used)

$*\$u12564 = \$u12562$: Transfer the value of $\$u12562$ (entered value) to the specified memory by the indirect memory.
(The memory address is set on Cycle macro edit.)

CALL 960 : Execute the macro block No. 960.

<the [NO] key>

CALL 960 : Execute the macro block No. 960.

©Macro Block No. 960

$\$u12570 = 0$: Displayed overlap No. 0

$\$u12571 = 0$: Set the overlap OFF.

SYS (OVLV_SHOW) $\$u12570$: Set the overlap.

$\$u12570 = 1$: Displayed overlap No. 1

$\$u12571 = 0$: Set the overlap OFF.

SYS (OVLV_SHOW) $\$u12570$: Set the overlap.

Changing Points

◎Open Macro Edit on Multi-overlap No. 1002

\$u12550-15 (ON)

\$s00076-00 (ON)

If you want to erase the keypad window when the entered value confirmation window is displayed, delete this command.

◎ON Macro Edit on Switch

<the [ENT] key>

\$u12573 = 1

\$u12574 = 1003

\$u12575 = 0300

\$u12576 = 0250

If you change the display overlap No., change this value.

If you change the display multi-overlap No., change this value.

If you change the X coordinate to place the overlap, change this value.

If you change the Y coordinate to place the overlap, change this value.

SYS (SET_MOVL) \$u12573

<the [YES] key>

\$u12564 = 0000H

*\$u12564 = \$u12562

CALL 960

When changing the address of the data display (entry target):
<E.g.> When the addresses of the data displays are from D200~:
\$u12564 = 0100H
\$u12565 = \$u12565 + 200

◎Cycle Macro Edit on Screen

\$u12565 = \$u12560 & 03FFH

\$u12565 = \$u12565 + 12590

◎Macro Block No. 960

\$u12570 = 0

\$u12571 = 0

SYS (OVLP_SHOW) \$u12570

\$u12570 = 1

\$u12571 = 0

SYS (OVLP_SHOW) \$u12570

If you change the number of the multi-overlap including Entry mode, change this value.

If you change the number of the multi-overlap including the checking window, change this value.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 0
 Multi-overlap No. : 1002, 1003
 Macro Block No. : 960

* If the multi-overlap and the macro block are copied to another number in the target file, be sure to read the <Notes> below.



<Notes>

◎Switch to call the multi-overlap

---> Function Multi-overlap : O : M :

◎ON Macro Edit on the [ENT] key in Multi-overlap Edit (Line No. 1)

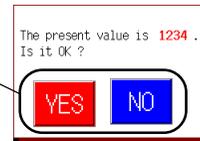
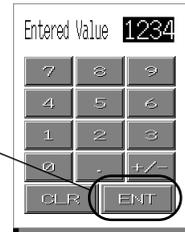
\$u12573 = 1

\$u12574 =

the display multi-overlap No.

◎ON Macro Edit on the [YES]/[NO] key in Multi-overlap Edit

CALL



Digital Switches

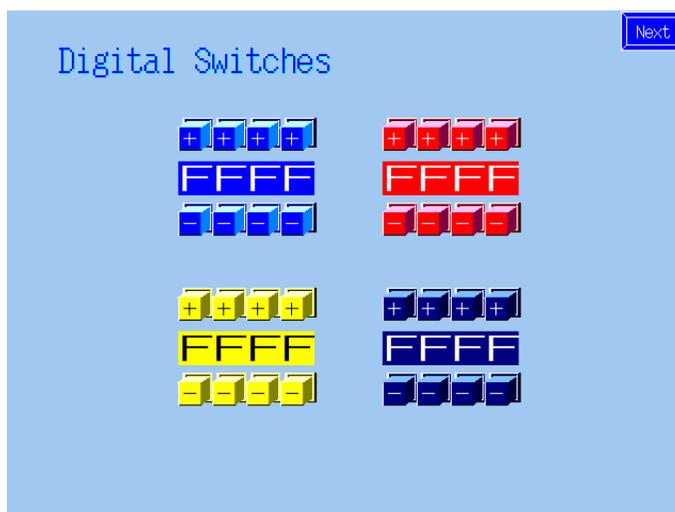
Before Reading This Chapter

This gives an example of creating the digital switches.

This chapter explains how to create the digital switches by using ON macros on each switch.

<Operation> (Screen No. 0)

1. Display screen No. 0.
2. Add one to each digit by pressing the [+] switch, and subtract one from each digit by pressing the [-] switch.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
D00100	Data memory to change
\$u12600	Address to store data memory
\$u12610	Address for each digit
\$u12611	Address for each digit

<Execution Macros>

ON Macro Edit on Switch

Macro Block Edit No. 980, 981

<Description of Macros>

◎ON Macro Edit on the [+] switch (switches for the first to the third digit)

CALL 980	: Jump to macro block No. 980.
\$u12610 = \$u12600 & 000FH (W)	: Get the values of the first digit.
\$u12611 = \$u12600 & FFF0H (W)	: Get all values except for the first digit.
\$u12610 = \$u12610 + 0001H (W)	: Increment of the first digit.
IF (\$u12610 > 0009H) LB00 (W)	: Judge whether the added value exceeds 9 or not.
JMP LB01	: Jump to label No. 1.
LB00:	: Label 0
\$u12610 = 0000H (W)	: Clear the first line.
LB01:	: Label 1
\$u12600 = \$u12610 + \$u12611 (W)	: Add the value of the first digit to the values of the other digits except the first digit.
CALL 981	: Jump to macro block No. 981.

◎ON Macro Edit on the [-] switch (switches for the first to the third digit)

CALL 980	: Jump to macro block No. 980.
\$u12610 = \$u12600 & 000FH (W)	: Get the value of the first digit.
\$u12611 = \$u12600 & FFF0H (W)	: Get all values except for the first digit.
\$u12610 = \$u12610 - 0001H (W)	: Decrement of the first digit.
IF (\$u12610 < 0000H) LB00 (W)	: Judge whether the subtracted value is less than 0.
JMP LB01	: Jump to label No. 1.
LB00:	: Label 0
\$u12610 = 0009H (W)	: Set the first digit to 9.
LB01:	: Label 1
\$u12600 = \$u12610 + \$u12611 (W)	: Add the value of the first digit to the values of the other digits except the first digit.
CALL 981	: Jump to macro block No. 981.

◎ON Macro Edit on the [+] switch (for the fourth digit)

CALL 980	: Jump to macro block No. 980.
\$u12610 = \$u12600 & F000H (W)	: Get the value of the first digit.
\$u12611 = \$u12600 & 0FFFH (W)	: Get all values except for the first digit.
\$u12610 = \$u12600 >>>4 (W)	: Shift four times to the right.
\$u12610 = \$u12610 + 0100H (W)	: Increment of the first digit
IF (\$u12610 > 0009H) LB00 (W)	: Judge whether the added value exceeds 9 or not.
\$u12610 = \$u0110 <<<4 (W)	: Shift four times to the left.
JMP LB01	: Jump to label 1.
LB00:	: Label 0
\$u12610 = 0000H (W)	: Set the value of the first digit to 0.
LB01:	: Label 1
\$u12600 = \$u12610 + \$u12611 (W)	: Add the value of the first digit to the values of the other digits except the first digit.
CALL 981	: Jump to macro block No. 981.

◎ON Macro Edit on the [-] switch (for the fourth digit)

CALL 980	: Jump to macro block No. 980.
\$u12610 = \$u12600 & 000FH (W)	: Get the value of the first digit.
\$u12611 = \$u12600 & FFF0H (W)	: Get the value except the first digit.
\$u12610 = \$u12600>>4 (W)	: Shift four times to the right.
\$u12610 = \$u12610- 0001H	: Decrement of the first digit.
IF (\$u12610 < 0000H) LB00 (W)	: Judge whether the subtracted value is less than 0.
\$u12610 = \$u12610<<<4 (W)	: Shift four times to the left.
JMP LB01	: Jump to label 1.
LB00:	: Label 0
\$u12610 = 0009H (W)	: Set the first digit to 9.
LB01:	: Label 1
\$u12600 = \$u12610 + \$u12611 (W)	: Add the value of the first digit to the values of the other digits except the first digit.
CALL 981	: Jump to macro block No. 981.

◎Macro Block Edit No. 980

\$u12600 = D00100 (W)	: Store the value of the PLC memory into the internal memory.
-----------------------	---

◎Macro Block Edit No. 981

D00100 = \$u12600 (W)	: Store the value of the internal memory into the PLC memory.
-----------------------	---

Changing Points

◎ON Macro Edit on the [+] switch (switches for the first to the third digits)

CALL 980

\$u12610 = \$u12600 & 000FH (W)

\$u12611 = \$u12600 & FFF0H (W)

\$u12610 = \$u12610 + 0001H (W)

IF (\$u12610 > 0009H) LB00 (W)

JMP LB01

LB00:

\$u12610 = 0000H (W)

LB01:

\$u12600 = \$u12610 + \$u12611 (W)

CALL 981

If you want to change the digits, change this value.

In case of two digits : 00F0

In case of three digits : 0F00

If you want to change the digits, change this value.

In case of two digits : FFOF

In case of three digits : F0FF

◎ON Macro Edit on the [-] switch (switches for the first to the third digits)

CALL 980

\$u12610 = \$u12600 & 000FH (W)

\$u12611 = \$u12600 & FFF0H (W)

\$u12610 = \$u12610 - 0001H (W)

IF (\$u12610 < 0000H) LB00 (W)

JMP LB01

LB00:

\$u12610 = 0009H (W)

LB01:

\$u12600 = \$u12610 + \$u12611 (W)

CALL 981

If you want to change the digits, change this value.

In case of two digits : 00F0

In case of three digits : 0F00

If you want to change the digits, change this value.

In case of two digits : FFOF

In case of three digits : F0FF

◎Macro Block Edit No. 980

\$u12600 = D00100 (W)

If you want to change the memory address to change the data, change this address.

◎Macro Block Edit No. 981

D00100 = \$u12600 (W)

If you want to change the memory address to change the data, change this address.

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the "Preface."

<Copy Target Items>

Screen No. : 0

Marco Block : 980, 981

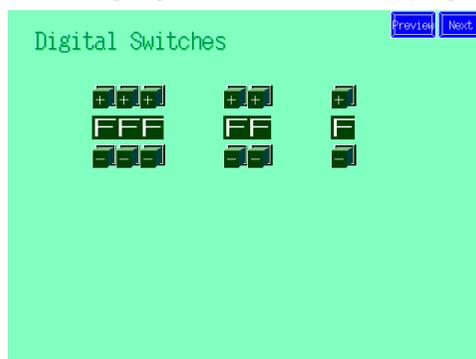
* Be sure to copy the macro blocks to the same number in the target file. If not, normal action may not be assured.

Advice

Screen No. 0 was used as the example for the four digit digital switches. Next, screen No. 1 will be used as the example for using digital switches with varying numbers of the digits. Screen No. 2 is used as the example for converting data into DEC type.

Refer to each example.

<Changing points when creating digital switches with varying numbers of digits>
(Screen No. 1)



◎ON Macro Edit on the [+] switch (switches for the first to the third digits)

```
CALL 980
$u12610 = $u12600 & 000FH (W)
$u12611 = $u12600 & 0000H (W)
$u12610 = $u12610 + 0001H (W)
IF ($u12610 > 0009H) LB00 (W)
JMP LB01
LB00:
  $u12610 = 0000H (W)
LB01:
  $u12600 = $u12610 + $u12611 (W)
CALL 981
```

In case of the switch for the second digit	: 00F0
In case of the switch for the third digit	: 0F00

In case of the two-digit digital switches:	
In case of the switch for the first digit	: 00F0
In case of the switch for the second digit	: 000F
In case of the three-digit digital switches:	
In case of the switch for the first digit	: 0FF0
In case of the switch for the second digit	: 0F0F
In case of the switch for the third digit	: 00FF

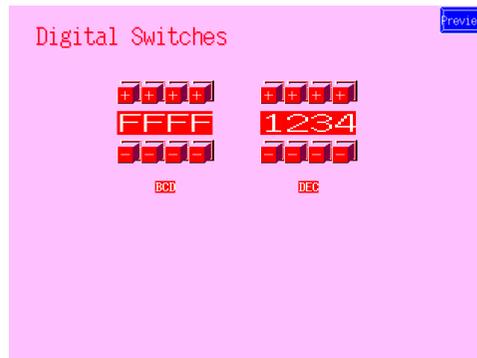
◎ON Macro Edit on the [-] switch (switches for the first to the third digits)

```
CALL 980
$u12610 = $u12600 & 000FH (W)
$u12611 = $u12600 & 0000H (W)
$u12610 = $u12610 - 0001H (W)
IF ($u12610 < 0000H) LB00 (W)
JMP LB01
LB00:
  $u12610 = 0009H (W)
LB01:
  $u12600 = $u12610 + $u12611 (W)
CALL 981
```

In case of the switch for the second digit	: 00F0
In case of the switch for the third digit	: 0F00

In case of two-digit digital switches:	
In case of the switch for the first digit	: 00F0
In case of the switch for the second digit	: 000F
In case of three-digit digital switches:	
In case of the switch for the first digit	: 0FF0
In case of the switch for the second digit	: 0F0F
In case of the switch for the third digit	: 00FF

<Changing points when converting data into DEC type> (Screen No. 2)



©ON Macro Edit on the [+] switch (switches for the first to the third digits)

```

CALL 980
$u12600 = $u12600 (W) BCD      : BCD conversion
$u12610 = $u12600 & 000FH (W)
$u12611 = $u12600 & FFF0H (W)
$u12610 = $u12610 + 0001H (W)
IF ($u12610 > 0009H) LB00 (W)
JMP LB01
LB00:
  $u12610 = 0000H (W)
LB01:
  $u12600 = $u12610 + $u12611 (W)
  $u12600 = $u12600 (W) BIN    : BIN conversion
CALL 981

```

©ON Macro Edit on the [-] switch (switches for the first to the third digits)

```

CALL 980
$u12600 = $u12600 (W) BCD      : BCD conversion
$u12610 = $u12600 & 000FH (W)
$u12611 = $u12600 & FFF0H (W)
$u12610 = $u12610 - 0001H (W)
IF ($u12610 < 0000H) LB00 (W)
JMP LB01
LB00:
  $u12610 = 0009H (W)
LB01:
  $u12600 = $u12610 + $u12611 (W)
  $u12600 = $u12600 (W) BIN    : BIN conversion
CALL 981

```

Insert the above conversion command on each switch for the first to the fourth digits.

Video Display Screen

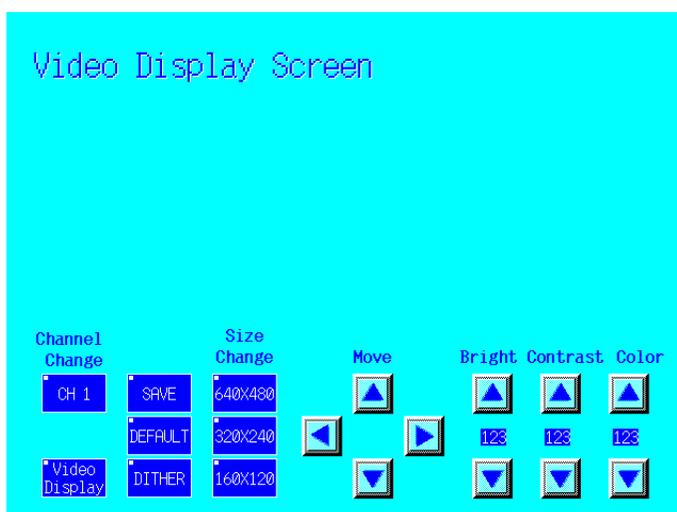
Before Reading This Chapter

This example explains how to display the video window when using the video interface function in the optional V612T, V610S or V610T type.

Channel change, brightness adjustment, contrast adjustment and color adjustment are possible by using the command setting and the memory setting.

<Operation>

1. Display the screen No. 0.
2. Press the [Video Display] switch.
3. The video window is displayed.
4. Press each switch you want to use.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Used Memory>

Memory	Contents
\$u12150	Overlap No. to move
\$u12151	X coordinate
\$u12152	Y coordinate
\$u12160	Command No.
\$u12161	Setting value
\$u12170	Command No.
\$u12171	Setting value
\$s00066	Repeat function of switch
\$s00170	Video select channel number
\$s00171	Video dither 0: OFF 1: ON
\$s00172	Video bright
\$s00173	Video contrast
\$s00174	Video color

<Used Items>

◎ Overlap setting

(Type) : Video

Overlap No. : 0 (In this example, [0] is used.)

Placement : Click the [Placement] button. The cross cursor is displayed. Decide the initial position of the overlap by clicking the cursor in the desired position.

◎ “Video Display” Switch

Function: Overlap: ALT: 0

(In this example, set ‘Overlap No.’ to [0] as ‘Overlap No. 0’ is used.)

◎ Switches for Video Adjustment

“CH1”, “SAVE”, “DEFAULT”, “DITHER”, “LFT”, “RGT”, “UP”, “DWN” etc.

<Execution Macros>

ON Macro Edit on Switch

<Description of Macros>

◎ON Macro on the “640 X 480” switch to set the size of the video window to 640 X 480

Video SIZE 640 * 480 : Execute the command setting.

◎ON Macro on the “320 X 240” switch to set the size of the video window to 320 X 240

Video SIZE 320 * 240 : Execute the command setting.

◎ON Macro on the “160 X 120” switch to set the size of the video window to 160 X 120

Video SIZE 160 * 120 : Execute the command setting.

◎ON Macro on the “SAVE” switch to write the present setting value into the memory

Video INF SAVE : Execute the command setting.

◎ON Macro on the “DEFAULT” switch to return to the default setting

Video INF DEFAULT : Execute the command setting.

◎ON Macro on the “DITHER” switch to adjust image quality of the video window

\$u12170 = 2 (W) : Set command No. to 2 (DITHER).

\$u12171 = \$s00171 (W) : Move the ON/OFF condition of the present dither to \$u12171.

IF (\$u12171 == 1) LB00 (W) : If the dither is ON, jump to the label 0.

\$u12171 = 1 (W) : If the dither is OFF, set it to ON.

JMP LB01 : Jump to label 1.

LB00: : Label 0

\$u12171 = 0 (W) : Set the dither to IFF.

LB01: : Label 1

Video MEMORY \$u12170 : Execute the memory setting.

- ©ON Macro on the “LFT” switch to shift the position of the video window to the left
- $\$u12150 = 0$ (W) : Specify the overlap No. to move. (In this case, set to [0].)
- IF ($\$u12151 <= 0$) LB00 (W) : If the X coordinate is less than 0, jump to label 0.
- $\$u12151 = \$u12151 - 1$ (W) : If the X coordinate is more than 0, subtract one from the value of the coordinate.
- LB00: : Label 0
- SYS (OVLP_POS) $\$u12150$: Specify the position of the overlap.
- $\$s00066 = 1$ (W) : Use the switch repeat function.
- ©ON Macro on the “RGT” switch to shift the position of the video window to the right
- $\$u12150 = 0$ (W) : Specify the overlap No. to move. (In this case, set to [0].)
- IF ($\$u12151 >= 640$) LB00 (W) : If the X coordinate is more than 640, jump to label 0.
- $\$u12151 = \$u12151 + 1$ (W) : If the X coordinate is less than 640, add the value of the coordinate to one.
- LB00: : Label 0
- SYS (OVLP_POS) $\$u12150$: Specify the position of the overlap.
- $\$s00066 = 1$ (W) : Use the switch repeat function.
- ©ON Macro on the “UP” switch to shift the position of the video window to the top
- $\$u12150 = 0$ (W) : Specify the overlap No. to move. (In this case, set to [0].)
- IF ($\$u12152 <= 0$) LB00 (W) : If the Y coordinate is less than 0, jump to label 0.
- $\$u12152 = \$u12152 - 1$ (W) : If the Y coordinate is more than 0, subtract one from the value of the coordinate.
- LB00: : Label 0
- SYS (OVLP_POS) $\$u12150$: Specify the position of the overlap.
- $\$s00066 = 1$ (W) : Use the switch repeat function.
- ©ON Macro on the “DWN” switch to shift the position of the video window to the bottom
- $\$u12150 = 0$ (W) : Specify the overlap No. to move. (In this case, set to [0].)
- IF ($\$u12152 >= 480$) LB00 (W) : If the X coordinate is more than 480, jump to label 0.
- $\$u12152 = \$u12152 + 1$ (W) : If the X coordinate is less than 480, add the value of the coordinate to one.
- LB00: : Label 0
- SYS (OVLP_POS) $\$u12150$: Specify the position of the overlap.
- $\$s00066 = 1$ (W) : Use the switch repeat function.

©ON Macro on the “CH1” switch to change the channel of the video window

\$u12160 = 1 (W) : Set the used command No. to 1 (SEL_CH).
 \$u12161 = \$u12161 + 1 (W) : Change the channel by adding the number of the present displayed channel to one.
 IF (\$u12161 <= 4) LB00 (W) : If the channel No. to be displayed is less than 4, jump to label No. 0.
 \$u12161 = 1 (W) : If the channel No. to be displayed is more than 4, set the channel to 1.
 LB00: : Label 0
 Video MEMORY \$u12160 : Execute the memory setting.

©ON Macro on the “UP” switch to add 3 to the brightness of the video image quality

\$u12170 = 3 (W) : Set the command No. to 3 (BRIGHT).
 \$u12171 = \$s00172 (W) : Move the value of the present brightness to \$u12171.
 \$u12171 = \$u12171 + 3 (W) : Add 3 to the value of the present brightness.
 IF (\$u12171 <= 255) LB00 (W) : If the value of the brightness is less than 255, jump to label 0.
 \$u12171 = 0 (W) : If the value of the brightness is more than 255, set it to 0.
 LB00: : Label 0
 Video MEMORY \$u12170 : Execute the memory setting.
 \$s00066 = 1 (W) : Use the switch repeat function.

©ON Macro on the “DWN” switch to subtract 3 from the brightness of the video image quality

\$u12170 = 3 (W) : Set the command No. to 3 (BRIGHT).
 \$u12171 = \$s00172 (W) : Move the value of the present brightness to \$u12171.
 \$u12171 = \$u12171 - 3 (W) : Subtract 3 from the value of the present brightness.
 IF (\$u12171 >= 0) LB00 (W) : If the value of the brightness is more than 0, jump to label 0.
 \$u12171 = 255 (W) : If the value of the brightness is less than 0, set it to 255.
 LB00: : Label 0
 Video MEMORY \$u12170 : Execute the memory setting.
 \$s00066 = 1 (W) : Use the switch repeat function.

- ©ON Macro on the “UP” switch to add 3 to the contrast of the video image quality
- \$u12170 = 4 (W) : Set the command No. to 4 (CONTRAST).
 - \$u12171 = \$s00173 (W) : Move the value of the present contrast to \$u12171.
 - \$u12171 = \$u12171 + 3 (W) : Add 3 to the value of the present contrast.
 - IF (\$u12171 <= 255) LB00 (W) : If the value of the contrast is less than 255, jump to label 0.
 - \$u12171 = 0 (W) : If the value of the contrast is more than 255, set it to 0.
- LB00: : Label 0
- Video MEMORY \$u12170 : Execute the memory setting.
 - \$s00066 = 1 (W) : Use the switch repeat function.
- ©ON Macro on the “DWN” switch to subtract 3 from the contrast of the video image quality
- \$u12170 = 4 (W) : Set the command No. to 4 (CONTRAST).
 - \$u12171 = \$s00173 (W) : Move the value of the present contrast to \$u12171.
 - \$u12171 = \$u12171 - 3 (W) : Subtract 3 from the value of the present contrast.
 - IF (\$u12171 >= 0) LB00 (W) : If the value of the contrast is more than 0, jump to label 0.
 - \$u12171 = 255 (W) : If the value of the contrast is less than 0, set it to 255.
- LB00: : Label 0
- Video MEMORY \$u12170 : Execute the memory setting.
 - \$s00066 = 1 (W) : Use the switch repeat function.
- ©ON Macro on the “UP” switch to add 3 to color in the video image quality
- \$u12170 = 5 (W) : Set the command No. to 5 (COLOR).
 - \$u12171 = \$s00174 (W) : Move the value of the present color to \$u12171.
 - \$u12171 = \$u12171 + 3 (W) : Add 3 to the value of the present color.
 - IF (\$u12171 <= 255) LB00 (W) : If the value of the color is less than 255, jump to label 0.
 - \$u12171 = 0 (W) : If the value of the color is more than 255, set it to 0.
- LB00: : Label 0
- Video MEMORY \$u12170 : Execute the memory setting.
 - \$s00066 = 1 (W) : Use the switch repeat function.

- ©ON Macro on the “DWN” switch to subtract 3 from the color of the video image quality
- | | |
|-----------------------------|--|
| \$u12170 = 5 (W) | : Set the command No. to 5 (COLOR). |
| \$u12171 = \$s00174 (W) | : Move the value of the present color to \$u12171. |
| \$u12171 = \$u12171 - 3 (W) | : Subtract 3 from the value of the present color. |
| IF (\$u12171 >= 0) LB00 (W) | : If the value of the color is more than 0, jump to label 0. |
|
 | |
| \$u12171 = 255 (W) | : If the value of the color is less than 0, set it to 255. |
| LB00: | : Label 0 |
| Video MEMORY \$u12170 | : Execute the memory setting. |
| \$s00066 = 1 (W) | : Use the switch repeat function. |

Changing Points

- ©ON Macro on the “RGT” switch to shift the position of the video window to the right
- | | |
|-------------------------------|---|
| \$u12150 = 0 (W) | |
| IF (\$u12151 >= 640) LB00 (W) | |
| \$u12151 = \$u12151 + 1 (W) | ————— (When using V612T or V610S, set this value to 800.) |
| LB00: | |
| SYS (OVLP_POS) \$u12150 | |
| \$s00066 = 1 (W) | |
- ©ON Macro on the “DWN” switch to shift the position of the video window to the bottom
- | | |
|-------------------------------|---|
| \$u12150 = 0 (W) | |
| IF (\$u12152 >= 480) LB00 (W) | |
| \$u12152 = \$u12152 + 1 (W) | ————— (When using V612T or V610S, set this value to 600.) |
| LB00: | |
| SYS (OVLP_POS) \$u12150 | |
| \$s00066 = 1 (W) | |

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No.: 0

Sampling Screen [GET_SMPL], [GET_SCUR]

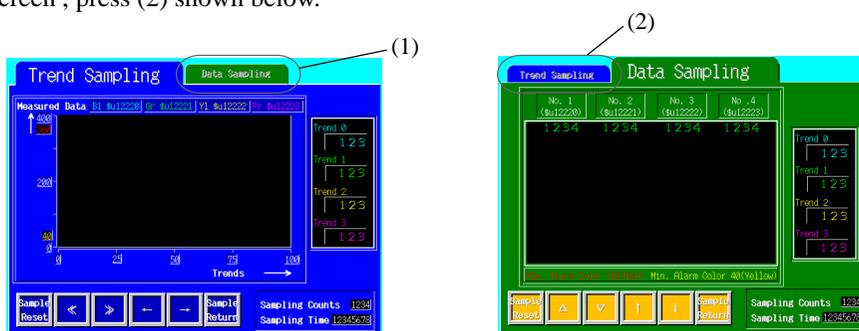
Before Reading This Chapter

This example explains how to store the sample data for the displayed cursor point of sampling mode into the internal user memory by using [GET_SMPL] and [GET_SCUR] commands.

In this example, sampling is simulated with the macros. Refer only to the section that apply.

<Operation>

1. Display screen No. 0.
2. To display the data sampling screen, press (1) shown below. To display the trend sampling screen, press (2) shown below.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

The explanations for the simulation of the macros to run the sampling mode is omitted because the purpose of this example is only to understand the way to use [GET_SMPL] and [GET_SCUR].

<Used Memory>

Memory	Contents
\$u12200	[GET_SCUR]
\$u12201	Definition of \$u12200
\$u12202	Store target for the cursor point
\$u12203	
\$u12204	
\$u12210	[GET_SMPL]
\$u12211	Definition of \$u12210
\$u12212	
\$u12218	Store target for the special data
\$u12219	
\$u12220	
\$u12221	Store target for the sample data
\$u12222	
\$u12223	

Memory	Contents
\$u12250	Memory to run the sampling mode
\$u12251	
\$u12252	
\$u12253	
\$u12254	
\$u12255	
\$u12256	
\$u12257	
\$u12262	Memory for setting the timer to run the sampling mode
\$u12263	
\$u12264	
\$u12271	Memory to run the sampling mode
\$u12272	
\$u12273	
\$u12274	

<Execution of Macros>

- Open Macro Edit on Screen
- Cycle Macro Edit on Screen
- Macro Block Edit No. 970

<Description of Macros>

Ⓞ Open Macro Edit on Screen

```

$u12271 = 0 C : 4 (FILL)
$u12250 = 0
$u12252 = 0
$u12254 = 0
$u12256 = 0
$u12263 = 1
$u12264 = 100
SYS (STA_TIME) $u12262
    
```

Macros to simulate sampling

```

$u12200 = 0
$u12201 = 0
$u12210 = 0
$u12212 = 12218
    
```

- : Window No. (definition of GET_SCUR)
- : Division No. (definition of GET_SCUR)
- : Sample buffer No. (definition of GET_SMPL)
- : Store \$u12218 as the top address. (definition of GET_SMPL)

Ⓞ Cycle Macro Edit on Screen

```

SYS (CHK_TIME) $u12262
IFZ ($u12262 & 0001H) LB00
CALL 970
    
```

Macros to simulate sampling

LB00:

```

SYS (GET_SCUR) $u12200
$u12211 = $u12203
SYS (GET_SMPL) $u12210
    
```

- : Store the cursor point specified to \$u12200 and \$u12201.
- : Move the value of the cursor point retrieved by [GET_SCUR] to the sample No. (definition of GET_SMPL)
- : Get the sample data.

The commands marked by the area on both the above and next pages are the macros that simulate sampling.

©Macro Block No. 970

```

IF($u12250 >= 400) LB00
$u12250 = $u12250 + 4
$u12271 = $u12250
$u12251 = $u12250
JMP LB02
LB00:
IF($u11251 <= 300) LB01
$u12251 = $u12251-4
$u12271 = $u12251
JMP LB02
LB01:
$u12250=300
LB02:
IF($u12252 >= 300) LB03
$u12252 = $u12252+1
$u12272 = $u12252
$u12253 = $u12252
JMP LB05
LB03:
IF($u12253 <= 200) LB04
$u12253 = $u12253-1
$u12272 = $u12253
JMP LB05
LB04:
$u12252 = 200
LB05:
IF($u12254 >= 200) LB06
$u12254 = $u12254+10
$u12273 = $u12254
$u12255 = $u12254
JMP LB08
LB06:
IF($u12255 <= 100) LB07
$u12255 = $u12255-10
$u12273 = $u12255
JMP LB08
LB07:
$u12254 = 100
LB08:
IF($u12256 >= 100) LB09
$u12256 = $u12256+2
$u12274 = $u12256
$u12257 = $u12256
RET
LB09:
IF($u12257 <= 0) LB10
$u12257 = $u12257-2
$u12274 = $u12257
RET
LB10:
$u12256 = 0

```

Macros to simulate sampling

Changing Points

◎ Open Macro Edit on Screen

\$u12200 = 0

\$u12201 = 0

\$u12210 = 0

\$u12212 = 12218

When changing the window No. of the sampling mode
 About the window No., refer to “Reference Manual” chapter 14, the section of [GET_SCUR].
 <E.g.> In case the sampling mode is specified in overlap No. 0 : 1

When changing the division No. of the sampling mode
 <E.g.> In case the sampling mode is specified in division No. 2 : 2

When changing the buffer No. of the sampling mode
 <E.g.> In case the sampling mode is specified in the buffer No. 3 : 3

When changing the target memory to store the sampling data
 (About the above memory, refer to the section, ‘Advice.’)
 <E.g.> In case the sampling data is stored into \$u500 : 498

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 0, 1

Macro Block No. : 970

[Buffering Area Setting] in [Others]

* If the screen and the macro block are copied to another number in the target file, be sure to read the <Notes> below.

<Notes> (about the marked area in particular)

- ◎ Screen No. 0

Screen change switch

Function: Screen 1

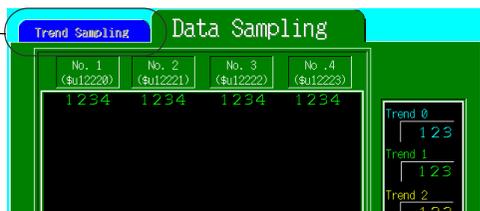
- ◎ Screen No. 1

Screen change switch

Function: Screen 0

- ◎ Cycle Macro Edit (Line No. 2)

CALL 970



Advice

Move the value stored in the 'Cursor point' (F1 + 3) of [GET_SCUR] to the 'Sampling No.' (F1 + 1) of [GET_SMPL].

The sampling data of the cursor point stored in the sampling No. of [GET_SMPL] is stored in the n + 2 address or later of the target memory No. specified by [GET_SMPL].

◎[GET_SMPL]

Store the one sampling data in the user memory.

(GET_SMPL) F1

F1 + 0	Sampling buffer No.
F1 + 1	Sampling No.
F1 + 2	Target memory No. to store

Target memory No. n to store

Invalid data
the data for buffer number
of the specified sampling No.

n + 0	Special data
n + 1	Special data
n + 2	Sampling data
n + m	Sampling data

◎[GET_SCUR]

Store the cursor point displayed in the sampling mode.

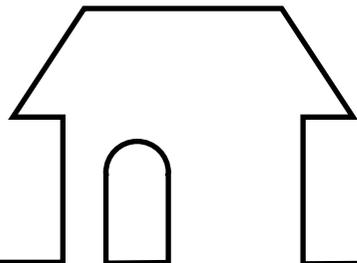
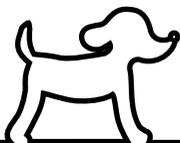
When the cursor is not displayed, store the newest sampling point.

(GET_SCUR) F1

F1 + 0	Window No.
F1 + 1	DIV No. 0~255
F1 + 2	Cursor status (<- V)
F1 + 3	Cursor point (<- V)
F1 + 4	Cursor address (<- V)

MEMO

Please use this page freely.



I/O Monitoring (Word) Screen (Indirect Memory)

Before Reading This Chapter

This gives an example of monitoring ten words of D registers in the MITSUBISHI PLC, 'A2USH.'

This chapter explains the possibilities of simple macro commands by using 'Indirect Memory,' as well as the way to specify the indirect memory of macro commands.

This example uses D registers in the MITSUBISHI PLC. It is also possible to use other PLCs.

<Operation>

1. Display screen No. 0.
2. Press 'Address D0100' as shown to the right.
3. The keypad is displayed.
4. Input the top address to monitor.
The values for ten words of D registers are displayed.
5. If the values of the displayed addresses are changed by the PLC, the changed values are displayed simultaneously.

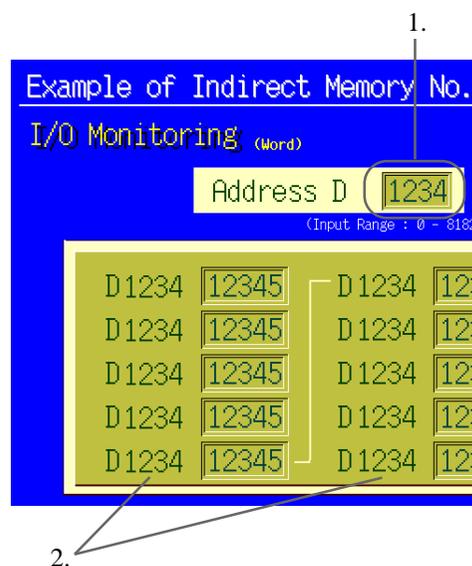


Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Points on Creating Screens>

1. The range of D registers in the MITSUBISHI PLC, 'A2USH' is from 0 to 8191. When inputting the addresses, inputting values outside of the range causes errors. Specify [Alarm: checked], [Max.: 8182] (8191-9 = 8182) and [Min.: 0] in the [Detail] setting of numerical display (Display Function: Entry Target, Memory: \$u12421).
2. For the address No. display, specify [Use Operation: checked] and the operation setting in the [Detail] setting of numerical display except the top number display. Note that the operation setting is different according to each number display.



<Used Memory>

Memory	Contents
\$u12400	Indirect memory
\$u12401	Definition of *\$u12400
\$u12402	
\$u12420	Writing enabled
\$u12421	Entry target of Entry mode
\$u12430	PLC memories
\$u12431	
\$u12432	
\$u12433	
\$u12434	
\$u12435	
\$u12436	
\$u12437	
\$u12438	
\$u12439	

<Execution of Macros>

Cycle Macro Edit on Screen

Open Macro Edit on Multi-overlap No. 1000

Close Macro Edit on Multi-overlap No. 1000

<Description of Macros>

©Open Macro Edit on Multi-overlap No. 1000

\$u12420 = 8000H : Set bit No. 15 of the [Command Memory] in Entry mode to ON. (Writing enabled.)

©Close Macro Edit on Multi-overlap No. 1000

\$u12420 = 0000H : Set bit No. 15 of the [Command Memory] in Entry mode to OFF. (Writing disabled.)

©Cycle Macro Edit on Screen No. 0

\$u12400 = 0100H : Definition of *\$u12400 (D devices of PLC used.)

\$u12401 = \$u12421 : Definition of *\$u12400 (The value of \$u12421 is the address.)

\$u12402 = 0000H : Definition of *\$u12400 (Expansion code not used.)

; : Comment

\$u12430 = *\$u12400 C : 10 (BMOV) : Move ten words from the memory specified by indirect memory to \$u12430.

* For the definition of *\$u12400, refer to P4/12, 'Advice.'

Changing Points

◎Cycle Macro Edit on Screen No. 0

```

$u12400 = 0100H
$u12401 = $u12421
$u12402 = 0000H
;
$u12430 = *$u12400 C : 10 (BMOV)
    
```

When changing the memory to monitor
 <E.g.> When monitoring R devices, the type of R devices is 02.
 Change '00' into '02.'
 For each type, refer to the chapter on "V6 Hardware Specifications" for each PLC.

When changing the memory of entry target, change this address.

If you want to change the number of D devices to monitor, change this value.
 <E.g.> When monitoring 20 words, change '10' into '20.'

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the "Preface."

<Copy Target Items>

Screen No. : 0, 1
 Multi-overlap No. : 1000

* If the screen and the multi-overlap are copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

◎Switch shown to the right

Function Multi-overlap
 Overlap No. Multi No.



If the multi-overlap No. is different, change this value.

◎Switch shown to the right

Function Screen :



If the screen No. is different, change this value.

Advice

<Advice 1>

Indirect Memory is the way to specify the desired address, not by setting the desired address directly in the macro commands, but by defining the memory type (internal, PLC, memory-card) and memory address.

For example, if you use the MOVE command:

◇\$u100 = 100 : Write 100 into \$u100.

◇\$u100 = \$u120 : Write the value of \$u120 into \$u100.
If the value of \$u120 is '5555,' '5555' is written into \$u100.

◇\$u100 = *\$u200 : Write the value of the address defined by indirect memory \$u200 into \$u100.
If the definition is as follows (refer to the example on the next page):

\$u200 = 0100H

\$u201 = 165

\$u202 = 0000H

The value '333' is written into \$100 if the value of D165 is '333.'

Also, if the definition is as follows:

\$u200 = 0100H

\$u201 = 265

\$u202 = 0000H

The value of D265 is written into \$100.

◇\$u100 = *\$u200 : Write the value of the address defined by indirect memory \$u200 into \$u100.

If the definition is as follows:

\$u200 = 0100H

\$u201 = \$u165

\$u202 = 0

The value of D444 is written into \$100 if the value of \$u165 is '444.'

If the value of D444 is '200,' the value '200' is written into \$u100.

For information about the indirect memory when accessing the word devices of PLC memory, extract the section on Indirect Memory from the “Reference Manual.”

Indirect Designation Memory

◎ The internal user memory should be used for indirect designation memory.

◎ Indirect designation memory setting

◇ Internal Memory

PLC address (within 16 bits)

	15	MSB	8	7	LSB	0
n + 0	Model				Memory Type	
n + 1	Memory Number (Address)					
n + 2	Expansion Code			Bit Designation		
n + 3				Station Number		

◇ Model

01: PLC memory within 16 bits

◇ Memory Type

PLC Memory

Memory type varies depending on which PLC type you use.

Set the usable memory TYPE number for each PLC. Refer to “Hardware Specifications.”

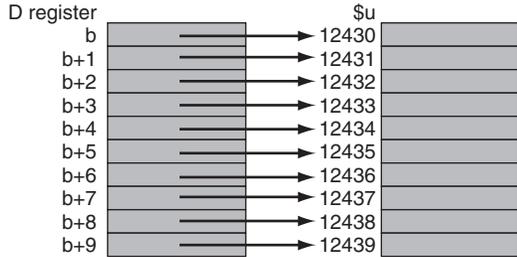
◎ When accessing a word from the PLC memory, the word in n + 2 is usually “0” even for memory that doesn’t use an expansion code.

<Example> Accessing a MITSUBISHI PLC D165

n	Model: 1 (PLC memory)	Memory type: 0	[100H]
n + 1	Memory No.:165		[165]
n + 2	Expansion code: None	Bit Designation: None	[0]

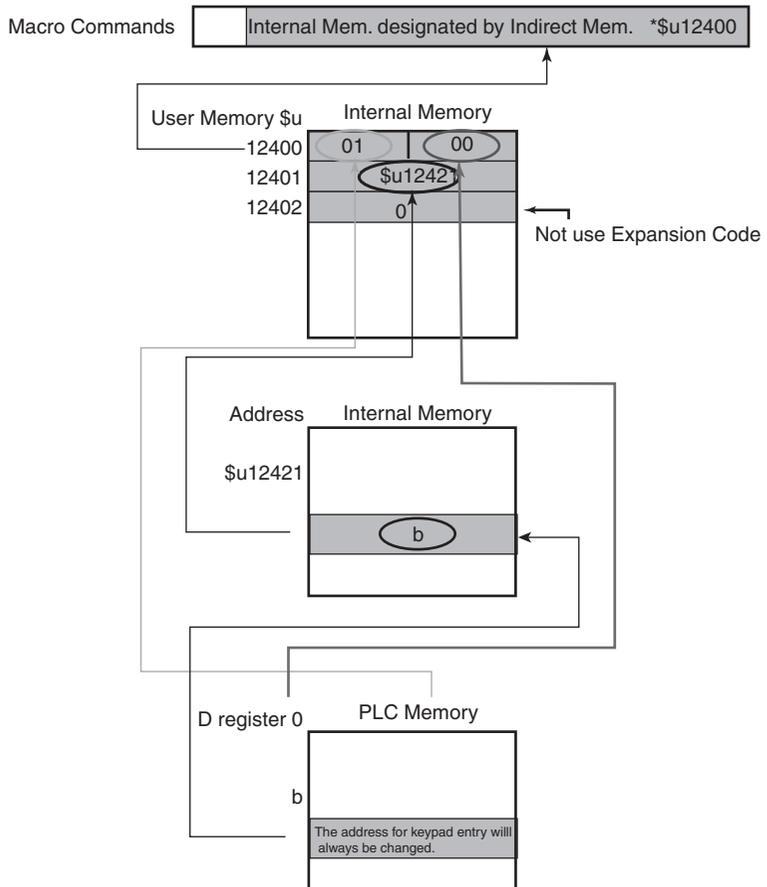
The definition of \$u12400 in this example (Screen No. 0, Cycle Macro) is as follows;

1. This example monitors ten words from the address specified by inputting with the keypad. The address specified by the keypad is variable.
Thus, the indirect memory is used for F1 of the macro command, Block Move, which is F0 = F1 C; F2 (BMOV).



\$u12430 = *\$u12400 C; 10 (BMOV)

2. The value of the internal memory \$u12421, 'b,' is the address of the D device in PLC memory. This example shows transfer of the ten words from the 'b' address (which is entered into \$u12421) with ten words from \$u12430.
3. Define the indirect memory, *\$u12400. Set the target address to store the data to \$u12400, \$u12401 and \$u12402.

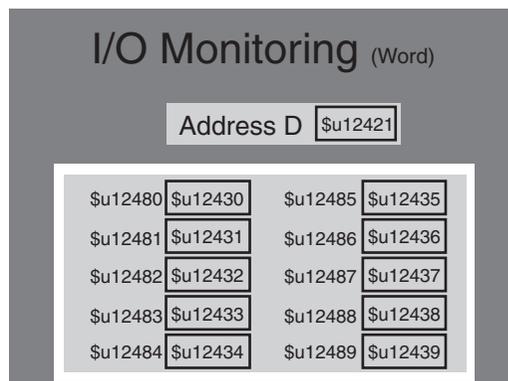


<Advice 2>

This example displays the addresses by using the numerical data display (\$u12421) with [Use Operation: checked]. But, it is also possible to display the above address by using only the indirect memory.

1. Add the following memory.

Memory	Contents
\$u12410	Indirect memory
\$u12411	Definition of *\$u12410
\$u12412	
\$u12460	Value of \$u12421
\$u12480	Address display
\$u12481	
\$u12482	
\$u12483	
\$u12484	
\$u12485	
\$u12486	
\$u12487	
\$u12488	
\$u12489	



2. Uncheck [Use Operation] in each numerical data display, and set the memory address on each address display.

from \$u12480 to \$u12489

3. Add the following macro commands to Cycle macro on the screen.

```

$u12410 = 0000H           : Definition of *$12410 (internal memory)
$u12411 = 12480   Note 1) : Definition of *$12410 ($u12480 is the address.)
$u12412 = 0000H           : Definition of *$12410 (Expansion code not used.)
;                             : Comment
$u12460 = $u12421         : Transfer the value for the address entered into
                             $u12421 to $u12460.

;
FOR 10                        : Loop by 10 times between FOR and NEXT.
*$u12410 = $u12460           : Transfer the value of $u12460 to *$u12410. In
                             other words, transfer the value of the address
                             entered into $u12421 to $u12480.

$u12411 = $u12411 + 1     : Count the address.
$u12460 = $u12460 + 1     : Count the address entered into $u12421, and
                             transfer the value of counting.

NEXT                          : NEXT command

```

Note 1) If you change all the memories used in this example with the [Change All Memory] command of the [Tool] menu, it is impossible to change the fixed constant address in the indirect memory automatically. Manual change is necessary.

I/O Monitoring (Bit) Screen (Indirect Memory)

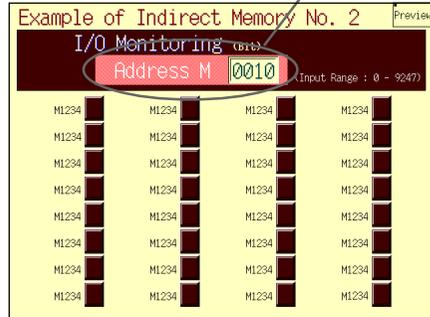
Before Reading This Chapter

This is the example of monitoring two words of M registers in MITSUBISHI PLC.
 The condition of ON/OFF for M devices is shown with the lamp displays. (If the bit is ON, the lamp turns red.)

<Operation>

1. Display screen No. 1.
 (Pressing the [Next] switch on screen No. 0 changes the screen into No. 1.)
2. Press 'Address M 0010' shown to the right.
3. The keypad window is displayed.
4. Enter the desired address to monitor.
 The lamps show the ON/OFF condition for two words including the above address.
5. Pressing the lamps reverses the display. The information concerning the status is written to the PLC.

Press this area.



Creation of Screens

This section mainly explains how to create macro commands, and omits an explanation of how to create screens.

<Points on Creating Screens>

To display the switch lamps simultaneously, set [Lamp Memory] and [ON Macro] on each switch. Note that each ON macro is different depending on the switch.

<Used Memory>

Memory	Contents
\$u12410	Indirect memory
\$u12411	Definition of *\$u12410
\$u12412	
\$u12420	Writing enabled
\$u12440	Entry target of Entry mode
\$u12441	Memory No. address (necessary for definition of indirect memory)
\$u12442	Bit designation (necessary for definition of indirect memory)
\$u12447	Lamp memory on switch
\$u12448	
\$u12450	Display address
\$u12470	Indirect memory
\$u12471	Definition of *\$u12470
\$u12472	

<Execution Macros>

Cycle Macro Edit on Screen (No. 1)
 Open Macro Edit on Multi-overlap No. 1001
 Close Macro Edit on Multi-overlap No. 1001
 ON Macro Edit on Each Switch
 Macro Block Edit No. 950

<Description of Macros>

◎Open Macro Edit on Multi-overlap No. 1001

\$u12420 = 8000H : Set bit No. 15 of the [Command Memory] in Entry mode to ON. (Writing enabled.)

◎Close Macro Edit on Multi-overlap No. 1000

\$u12420 = 0000H : Set bit No. 15 of the [Command Memory] in Entry mode to OFF. (Writing disabled.)

◎Cycle Macro Edit on Screen No. 1

\$u12441 = \$u12440 / 16 (W) : Find the memory number (address).
 \$u12442 = \$u12440 % 16 (W) : Find the bit designation.
 ; : Comment
 \$u12410 = 0106H : Definition of *\$u12410 (M devices of PLC used.)
 \$u12411 = \$u12441 : Definition of *\$u12410 (Transfer the memory No. address.)
 \$u12412 = \$u12442 : Definition of *\$u12410 (Expansion code not used. Transfer the bit designation.)
 ; : Comment
 \$u12447 = *\$u12410 C: 2 (BMOV) : Transfer two words including the memory specified in the indirect memory to \$u12447.
 \$u12450 = \$u12441 X 16 (W) : Find the value of the displayed address.

◎ON Macro Edit on Each Switch (e.g. the switch shown to the right)

\$u12471 = \$u12441 : Definition of *\$u12470 (Transfer the memory No. address.)
 \$u12472 = 0 : Definition of *\$u12470 (Expansion code not used. Transfer the bit designation.)
 CALL 950 : Execute macro block No. 950.



◎Macro Block Edit No. 950

\$u12470 = 0106H : Definition of *\$u12470 (M devices of PLC used.)
 *\$u12470 (INV) : Reverse the bit.

For information about the indirect memory for the bit devices, refer to P11/12, 'Advice.'

Points on Copying Files

For information about the procedure for copying this sample data file to another screen data file, refer to the “Preface.”

<Copy Target Items>

Screen No. : 1
 Multi-overlap No. : 1001
 Macro Block No. : 950

* If the screen, the multi-overlap and the macro block are copied to another number in the target file, be sure to read the <Notes> below.

<Notes>

◎Switch shown to the right

Function Multi-overlap
 Overlap No. Multi No.

If the multi-overlap No. is different, change this value.



◎Switch shown to the right

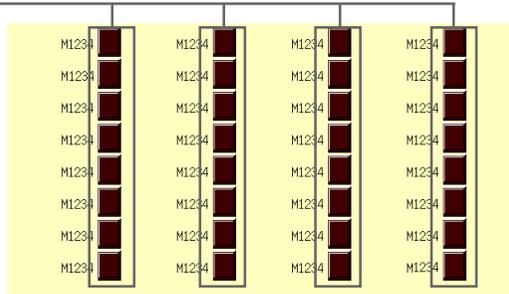
Function Screen :

If the screen No. is different, change this value.



◎ON Macro Edit on Each Switch

\$u12471 = \$u12441
 \$u12472 = 0
 CALL



Advice

For information about the indirect memory when accessing the bit devices, extract the section of Indirect Memory from the “Reference Manual.”

Indirect Designation Memory

◎ The internal user memory should be used for indirect designation memory.

◎ Indirect designation memory setting

◇ Internal Memory

PLC address (within 16 bits)

	15	MSB	8	7	LSB	0
n + 0	Model			Memory Type		
n + 1	Memory Number (Address)					
n + 2	Expansion Code			Bit Designation		
n + 3				Station Number		

◇ Model

01: PLC memory within 16 bits

◇ Memory Type

PLC Memory

Memory type varies depending on which PLC type you use.

Set the usable memory TYPE number for each PLC. Refer to “Hardware Specifications.”

◎ The word in n + 2 is usually “0,” even for memory that doesn’t use an expansion code.

◎ When accessing the bit-writable memory, such as the MITSUBISHI M Relay, the following setting is necessary.

Word access : M Relay/16 for memory address, bit designation: 0

Bit access : M Relay/16 for memory address
Bit designation: M Relay % remainder 16

<Ex.> Accessing an M Relay 20

$20/16 = 1 \dots 4$ (remainder)

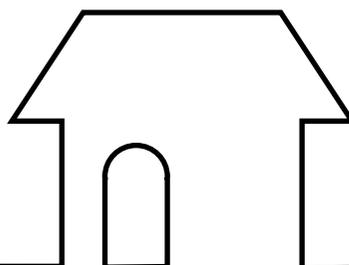
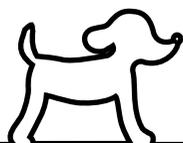
n Model: 1 (PLC memory) Memory type: 6 [106H]

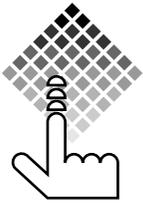
n + 1 Memory No.: 1 [1]

n + 2 Expansion code: None Bit designation: 4 [4]

MEMO

Please use this page freely.





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