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Noritake

RoHS Compliant

TFT LCD Module with
Metallized Projective Capacitive Touch Panel

GT-SP series
(GUI control type)
Basic Function Software Specification

Model: GTxxxxxSxxxxP

Specification No: DS-2154-0003-00

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This product complies with RoHS Directive
Please contact our sales consultant for details and to confirm the current status.

Contents

1 Overview

1.1 Scope of application

These specifications relate to Noritake Ise Electronics TFT-LCD module GT-SP series (GUI control type) software and function with a projection-type touch panel.

Please use the provided Noritake's PC design tool “GT Design Studio” (abbreviated as “GTDS”) when developing products using this module.

Related specifications:
- Hardware specifications: Refer to the variations using the part numbers below.

Variations by part number (Only representative part numbers are listed.)

Part number	Display size	Number of pixels	Number of display colors	Hardware specifications
GTWV070S3A00P	7.0 inch equivalent	800×480	32K colors 15bit RGB:555 + A:1 (transparent) 65K colors 16bit RGB:555 + I:1(brightness)	DS-2154-0000-**

1.2 Functions

The module enables GUI control in which display and touch are linked by placing display parts [OBJECT] on the display screen [PAGE].
Each object can perform arbitrary event processing by touch operation. "Interactions between objects," "page switching," and "data transmission" are possible.

GUI control functions
- GUI operation control
- Page control
- Object control
- Event control

Registration/readout functions
- Page/object registration and storage
- Image registration
- Font registration
- Memory SW setting

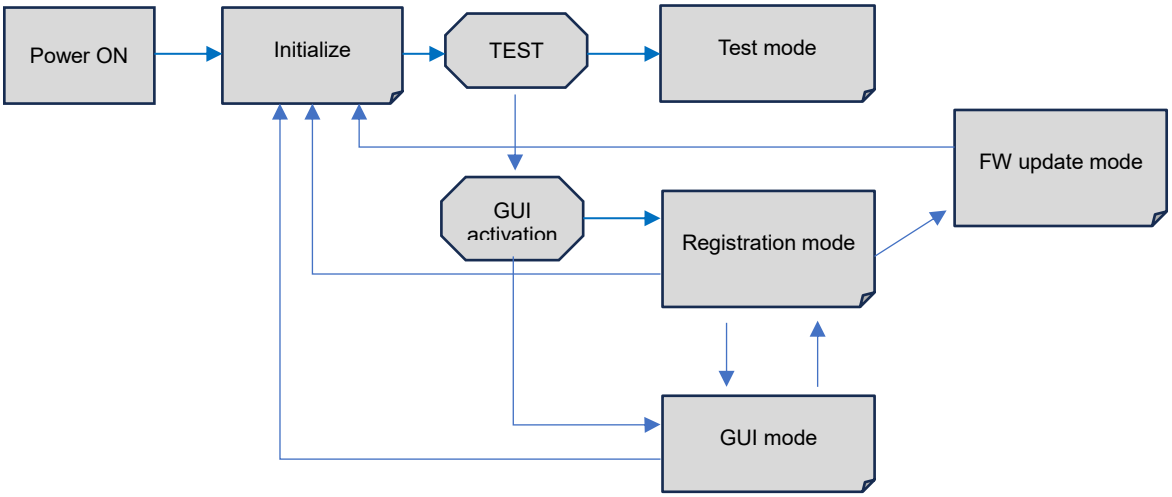
Touch panel control function
Overall control function
Other functions

1.3 Basic specifications

Functional classification	Item	Description	Remarks
Display specifications	Number of pixels	800 x 480 pixels	-
	Display colors	32 K colors, 64 K colors	-
GUI control specifications	Touch-enabled GUI display control	GUI information registered in FROM Automatic start-up on power-on is possible	-
	Number of pages	Maximum: 50 pages	-
	Number of objects in a page	Maximum: 200 objects	-
	Number of objects	Maximum: 500 objects	-
	Object types	11 types	-
	Event processing	Can be set for each touch-related object	-
Image display specifications	Supported formats	The tool allows image registration for the following formats: ARGB1555 RGB565 RGB888 ARGB8888 LCD display colors: 32K or 64K colors	-
	Memory capacity	Maximum: 192 MB	-
Font specification	Standard fonts	8 tables in total	-
	Table type	ASCII (20h to 7Eh)	-
	Dot size	8/16/24/32 dots	-
	Style	Normal / Bold	-
	User fonts	Can be registered by tool Up to 16 tables	-
	Table type.	ASCII (Unicode:20h – 7Eh) Euro (Unicode:20h – 0FFFh) JIS (Unicode:20h – FFFFh)	-
	Dot size	8 to 128 dots	-
	Style	The following styles are supported by the tool Normal / Italic / Bold	-
	Memory capacity	Maximum: 8MB	-
Various settings	Initial values can be set by the memory SW (MSW) function	GUI-related settings	-
		Touch-related settings	-
		Display orientation setting	-
		Brightness setting	-
		Other settings	-
Interface	USB	USB 2.0 HS (480Mbps)/FS (12Mbps)	-
	Asynchronous serial	4,800/ 9,600/ 19,200/ 38,400/ 115,200 bps No parity/ even/ odd Flow control DTR/ DSR	-
	GPIO	Input/output switchable 26 ports	-

2 Operating modes

The module has the following operation modes, selected by commands or jumpers.



2.1 Registration mode

This mode is used for GUI registration and various types of registration.

2.2 GUI mode

Mode for GUI operation, where changes to object properties are reflected in the display.

2.3 FW update mode

This mode is used to rewrite firmware and install font data. It is not used in usual operations.

2.4 Test mode

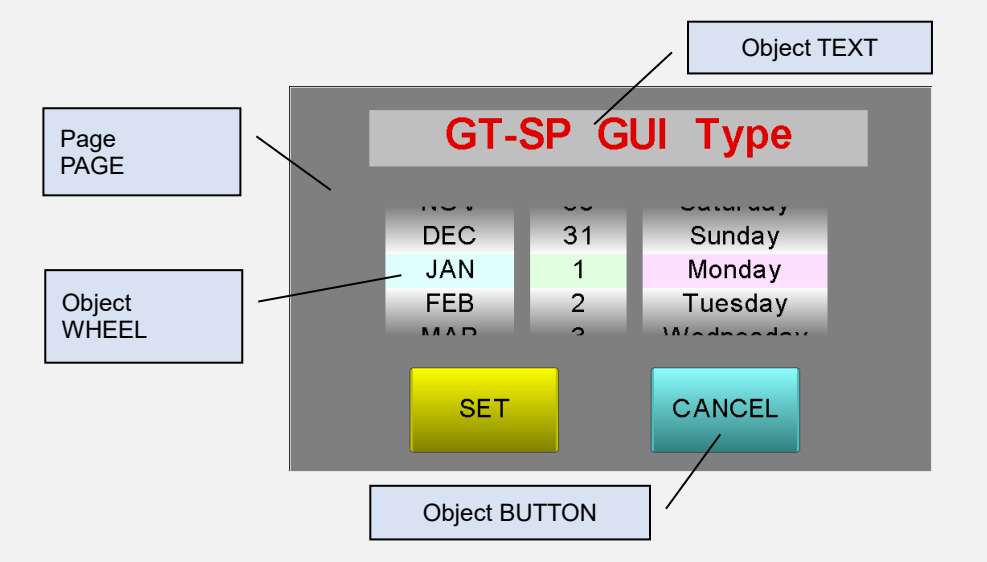
Mode for testing the display and internal operations. Used for factory testing.

2.5 Start-up settings

The settings at display start-up are the default values for each setting or the memory SW settings.
If the GUI start-up setting is enabled, the set page is started.

3 GUI functions

3.1 Overview



This module has a GUI control function whereby objects are placed on the page, and the display effects of objects are automatically performed in response to touch operation. Also, by setting up event processing, "Interactions between objects," "Page switching," and "Data transmission" are possible.

3.2 Pages/objects

3.2.1 Overview

Pages and objects are as follows:

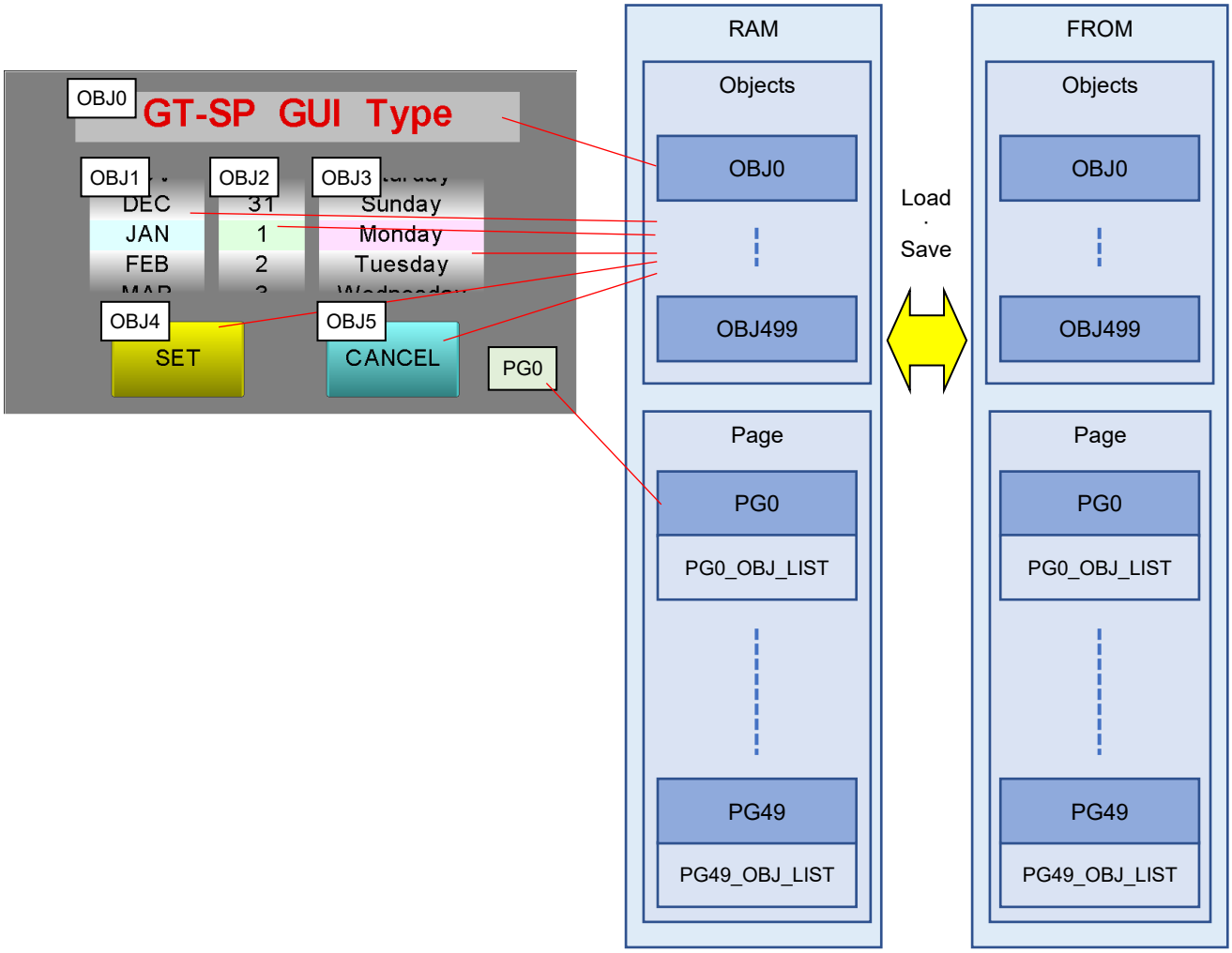
Item	Overview	Display control	Event processing
Objects (OBJ)	Components placed on the page. Property setting/reading is possible.	The content is displayed according to the display content and various property settings. If the same object is placed on multiple pages, it is displayed in the same position on each page.	Events are enabled by activating the event permission settings. Event processing enables data transmission and data transfer to other objects and other inter-object operations.
PAGE (PG)	Screen display background. Property setting/readout available.	Object and equivalent	Events are enabled by activating the event permission setting. Timer events and GPIO events are supported.

The available quantities of pages and objects are as follows:

Item	Content	Capacity
Page definition data (RAM)	Background display control, definition data for events, etc. Object list: 200 per page (maximum)	50 pages
Object definition data (RAM)	Definition data for display controls, events, etc.	500 objects
FROM page definition data	Page definition data stored in FROM	50 pages
FROM object definition data	Object definition data stored in FROM	500 objects

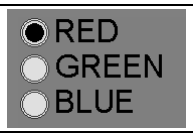
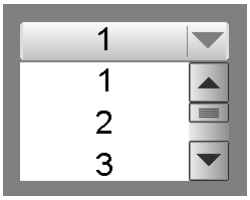
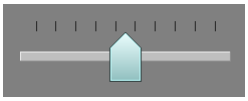
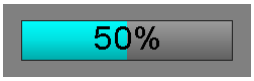
3.2.2 Page/object data references

The display of pages and objects refers to the page/object data in the RAM.
The definition of pages/objects in FROM is performed by the FROM save command (RAM -> FROM), and the FROM define command while reading from FROM is performed by the MSW start-up settings and the FROM read command.



3.3 Object types

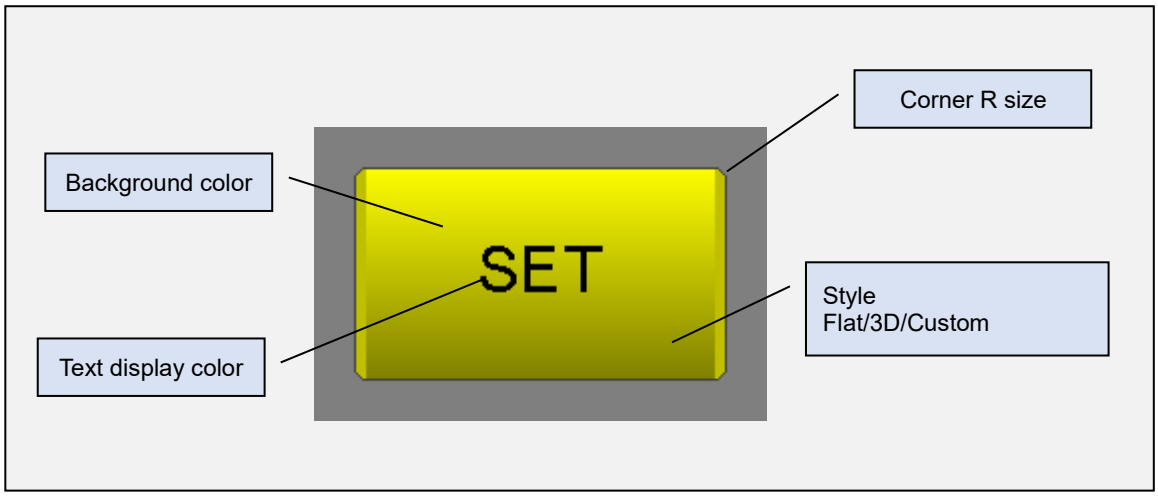
Objects can be of the following types

Type TYP	Name	Display image	Basic specifications	Event trigger
0	PAGE PG	-	Background setting for each page	Timer
1	BUTTON BTN		Touch button operation	When clicked
2	TEXT TXT		Text display	N/A
3	EDIT EDT		Text input Touch to display the numeric keypad and keyboard and enter	N/A
4	CHECK CHK		Check selection	When value changes
5	RADIO RAD		Select by switching	On selection change
6	LIST LST		List selection	On selection change
7	WHEEL WHL		Wheel list selection	On selection change
8	DROP-DOWN DRP		Drop-down list selection	On selection change
9	SLIDER SLD		Slider value setting	When slider value changes
10	BAR BAR		Progress bar and bar chart display	N/A
11	IMAGE IMG		image display	N/A

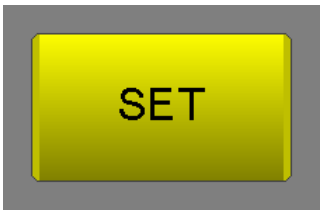
3.4 Properties

Each object has its own properties, which determines the object type, shape, color, or other factors. These can be changed by setting the values of these properties. The color properties of objects linked to touch operations can be set to produce various display effects.

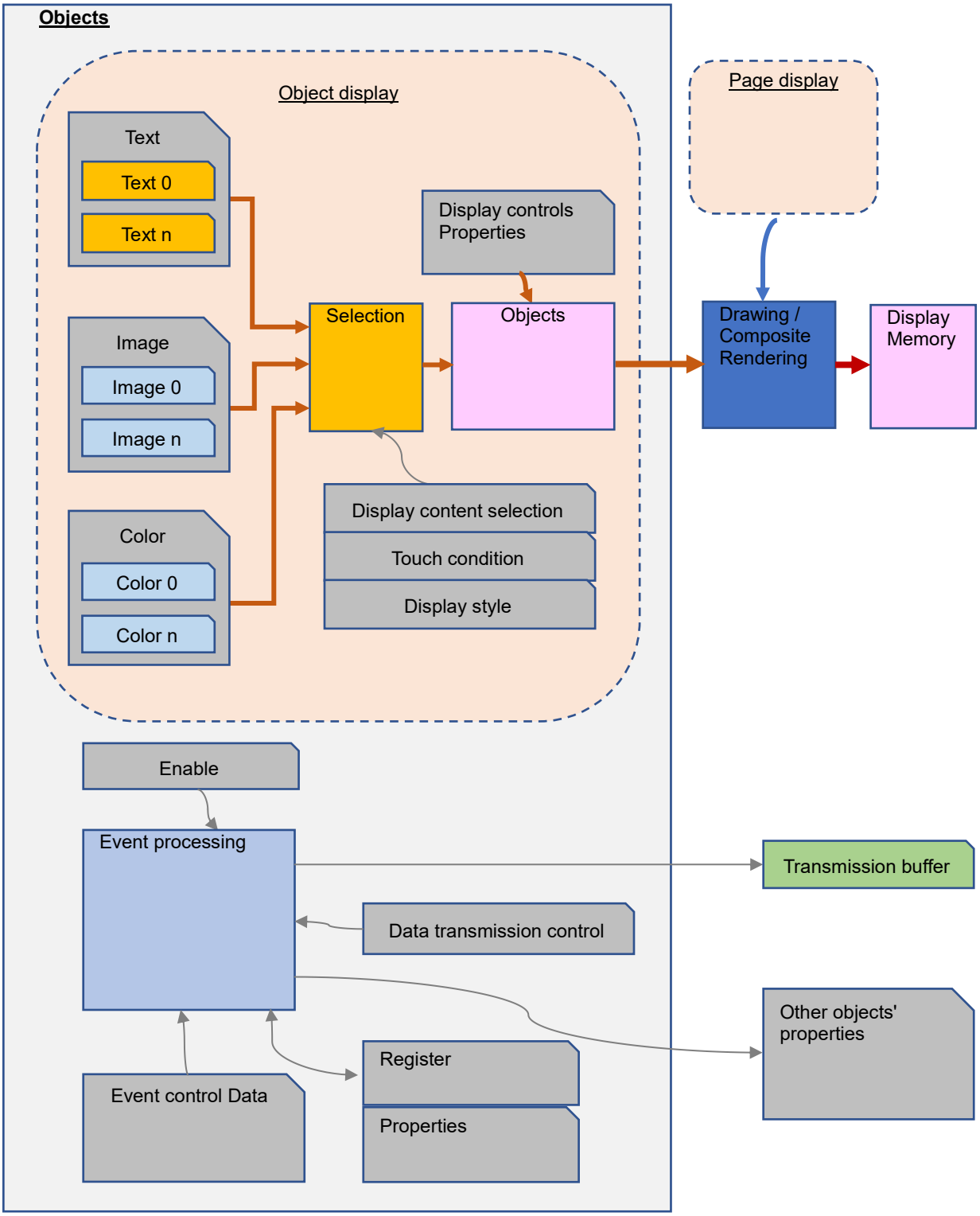
[Example] Display properties for BUTTON



[Example] Display effects depending on the touch status of BUTTON

		
Display when touch is OFF	Display when touch is ON	Display when touch is DISABLED

3.5 Object operation image



4 Image display

Images are displayed registering the image data in the module's FROM, using the design tool, and setting the image properties of objects such as IMAGE or BUTTON.

The image formats ARGB1555, RGB565, RGB888, ARGB8888, and others are supported. Images are converted to the format for this module by the design tool when the image data is registered.
*If using a 24-bit color image, it is converted to a 16-bit color image.

Image format	Display color					
	Number of colors	R (Red)	G (Green)	B (Blue)	I (brightness)	
ARGB1555	32K	5 bits	5 bits	5 bits	0 bits	-
RGB565	65K	5 bits	5 bits	5 bits	1 bit	Lowest G bits
ARGB8888	65K	Upper 5 bits	Upper 5 bits	Upper 5 bits	1 bit	Determined by the total value of the lower 3 RGB bits
RGB888	65K	Upper 5 bits	Upper 5 bits	Upper 5 bits	1 bit	Determined by the total value of the lower 3 RGB bits

The actual display of LCD is shown with the following weighted RGB.

Color	bit7	bit 6	bit 5	bit 4	bit 3	bit 2
R (Red)	R7	R6	R5	R4	R3	I
G (Green)	G7	G6	G5	G4	G3	I
B (Blue)	B7	B6	B5	B4	B3	I

5 Fonts

5.1 Font tables

Eight standard font tables and up to 16 user font tables can be registered in this module, enabling display of user-specified fonts.
To create and register user fonts, please use the design tool.

The maximum font data capacity is 8 MB, and the number of font tables that can be registered will be reduced if the font size is large or if a table type with a large number of characters is selected.

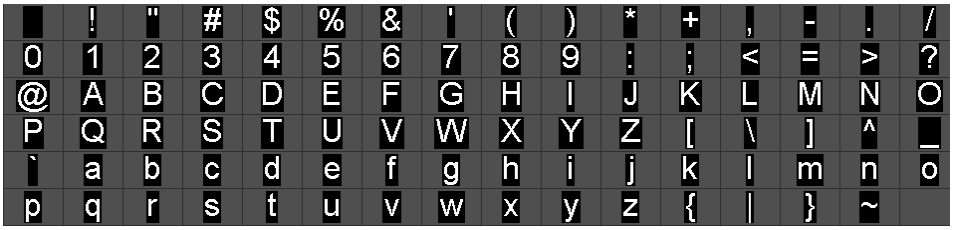
Font Number.	Sorting	Table Type	Font size		Font symbols	
			W	h	Normal	Bold
1	Standard Font	ASCII	Propotional	8	STD_0	STD_1
2		ASCII	Propotional	16	STD_2	STD_3
3		ASCII	Propotional	24	STD_4	STD_5
4		ASCII	Propotional	32	STD_6	STD_7
5	User Font	User-specified	User-specified	User-specified	USER_0	
6		User-specified	User-specified	User-specified	USER_1	
7		User-specified	User-specified	User-specified	USER_2	
8		User-specified	User-specified	User-specified	USER_3	
9		User-specified	User-specified	User-specified	USER_4	
10		User-specified	User-specified	User-specified	USER_5	
11		User-specified	User-specified	User-specified	USER_6	
12		User-specified	User-specified	User-specified	USER_7	
13		User-specified	User-specified	User-specified	USER_8	
14		User-specified	User-specified	User-specified	USER_9	
15		User-specified	User-specified	User-specified	USER_10	
16		User-specified	User-specified	User-specified	USER_11	
17		User-specified	User-specified	User-specified	USER_12	
18		User-specified	User-specified	User-specified	USER_13	
19		User-specified	User-specified	User-specified	USER_14	
20		User-specified	User-specified	User-specified	USER_15	

5.2 Table types

The following types of font tables are available for data creation and registration in the design tool.

Table type	Font type	Code range Unicode
ASCII	Symbol + number + alphabet	20h – 7Eh
EURO	ASCII + EURO + other	20h – 0FFFh
JIS	JIS Japanese	20h – FFFFh

[Example] ASCII type



5.3 Font style

For standard fonts, you can choose between normal and bold.
For user fonts, the style option is disabled. When creating a font in the design tool, it is possible to set "bold" and/or "italic" to generate a font with the desired effect.

5.4 Creating fonts with the design tool

The design tool can edit font dots and convert PC fonts.
If using a PC font, please check the license agreement before using it.

6 Command and control

6.1 Commands

The module is equipped with the commands shown in the 6.3 List of commands.
The command format is as follows.
The data length of the parameters (pm) depends on the command type (cmd).
The order of data such as parameters and data is little endian (lower byte, upper byte).

Format

Header hd			Command cmd	Parameter pm
"C" 43h	"M" 4Dh	"D" 44h	00h – FFh	00h – FFh
3 bytes			1 byte	0 to n bytes

Command reception in this module waits in a loop for a valid 4-byte command header sequence. Invalid bytes received prior to a valid command header sequence are discarded.

Example

"C" 43h	"M" 4Dh	"C" 43h	"M" 4Dh	"D" 44h	00h
1st byte valid	2nd byte valid	3rd byte not valid			
		1st byte valid	2nd byte valid	4th byte valid	4th byte valid

6.2 Response

Responses such as "response to command," "event information transmission," and "data transmission in an event" are stored in the transmission buffer and transmitted in the format shown below.
Data transmission is paused by DSR=MARK (host BUSY), during which transmission data accumulates in the transmission buffer and, if there is no remaining buffer capacity, command processing and GUI display pause until there is free space. Data should therefore be read promptly by the host in order to avoid this situation.

The format of the response type (typ) and data (dat) is as follows:

Format

Header hd			Type typ	Data dat
"R" 52h	"E" 45h	"S" 53h	00h – FFh	00h – FFh
3 bytes			1 byte	0 – n bytes

Response type

typ
"0" 30h "1" 31h
Command response

Binary type

typ	dat	
"b" 62h	dl (4 bytes)	d (dl bytes)
Binary data	Data length 00000000h – FFFFFFFFh	Data 00h – FFh

Event type

typ	dat				
"e" 65h	dl (4 bytes)	cnt (2 bytes)	pg (2 bytes)	obj (2 bytes)	val (4 bytes)
Event data	Data length 00000000h – FFFFFFFFh	Packet counter 0000h – FFFFh	Page number 0000h – 0031h	Object number 0000h – 01F3h	Property Value 00000000h – FFFFFFFFh

6.3 List of commands

6.3.1 Overall control commands

<table>
<tr><th rowspan="2">Command name</th><th colspan="2">Command</th><th rowspan="2">Function</th><th rowspan="2">GUI mode</th><th rowspan="2">Registration mode</th></tr>
<tr><th>hd + cmd</th><th>pm</th></tr>
<tr><td>Connection response</td><td>“CMD” 00h</td><td>-</td><td>Send a response to the connection.
[Response] typ = response.

"RES1".</td><td>√</td><td>√</td></tr>
<tr><td>Display brightness setting</td><td>“CMD” 58h</td><td>br (1 byte)</td><td>Set the LCD backlight brightness.

[Parameters]
br: Brightness setting
00h: 0% to FFh: 100%.</td><td>√</td><td>√</td></tr>
<tr><td>Various information readout (data transmission)</td><td>“CMD” 49h</td><td>a (1 byte),
[b (1 byte),
c (1 byte)]</td><td>Data transmission of display information.

[Parameters]
a: type
02h: Firmware version
30h: Product name (series name)
40h: LCD/X direction pixels
41h: LCD/Y direction pixels

[Response] typ = binary
“RESb” + dl + d</td><td>√</td><td>√</td></tr>
<tr><td>Initialization</td><td>“CMD” 52h</td><td>-</td><td>Initialise the display status</td><td>√</td><td>√</td></tr>
<tr><td>Power saving mode</td><td>“CMD” 53h</td><td>md (1 byte),
wk (1 byte)</td><td>Switch to power saving mode.
The device returns from power saving mode when the wakeup condition is met.

[Parameter]
md: mode
01h: sleep
wk: wakeup condition
Bit assignment is as follows:
<table><tr><th>b6</th><th>b5</th><th>b4</th><th>GPIO15 wakeup condition</th></tr><tr><td>-</td><td>-</td><td>0</td><td>No wakeup</td></tr><tr><td>0</td><td>0</td><td>1</td><td>Low level</td></tr><tr><td>0</td><td>1</td><td>1</td><td>High level</td></tr><tr><td>1</td><td>0</td><td>1</td><td>Falling edge</td></tr><tr><td>1</td><td>1</td><td>1</td><td>Rising edge</td></tr></table><table><tr><th>b0</th><th>Touch wakeup</th></tr><tr><td>0</td><td>No wakeup on touch</td></tr><tr><td>1</td><td>Wakeup on touch</td></tr></table></td><td>√</td><td>√</td></tr>
<tr><td>Firmware update</td><td>“CMD” 0Fh</td><td>fs (10 bytes),
dat
(4,194,308 bytes)</td><td>Perform firmware update. After finishing, reboot.

[Parameters]
fs: command sequence
dat: firmware data</td><td>-</td><td>√</td></tr>
</table>

6.3.2 GUI control commands

Command name	Command		Function description	GUI mode	Registration mode
	hd + cmd	pm			
GUI start/end	“CMD” FCh	pg (2 bytes)	Start GUI operation from a specified page. (Shift to GUI mode). If this command with page No. = FFFFFh is input during GUI operation, GUI operation stops, and the unit shifts to normal mode. [Parameters] pg Page number 0000h – 0031h: page 0 – Page 49 FFFFh: End	√	√
GUI information readout (data transmission)	“CMD” 40h	typ (1 byte), dl (4 bytes)	Transmit data with specific information on the operating status of the GUI. [Parameters] typ: Type 00h: GUI project name (max. 18 bytes) 01h: Current page number (max. 2 bytes) 02h: Current pop-up page number (Max. 2 bytes) [Response] typ = binary "RESb" + dl + d	√	√
GUI event information data transmission control	“CMD” 45h	md (1 byte)	Set the data transmission format when an event occurs. [Default] MSW47 (Event information transmission mode) [Parameters] md Mode 00h: Disable 01h: Enable/event type	√	√
GUI update mode selection	“CMD” 55h	md (1 byte)	Specify the update mode of the GUI display screen. When changing multiple properties of the same object simultaneously, select 00h: GUI update execution to prevent display flickering. [Parameters] md: Mode 00h: GUI update execution 01h: During page/object update 02h: 100 ms cycle and at page/object update	√	√
GUI update execution	“CMD” 56h	-	Update the GUI display. When the GUI update mode selection is "00h: Execute GUI update", executing this command causes all pending property updates to be reflected simultaneously in the display.	√	-
GUI page control/POPUP control	“CMD” FBh	typ (1 byte), pg (2 bytes)	Control page switching and popups. [Parameters] typ: Control type 10h: Page switching 20h: POPUP open 21h: POPUP closed pg: Page No. 0000h – 0031h: page 0 – Page 49	-	√

6.3.3 Page control commands

Command name	Command		Function Description	GUI mode	Registration mode
	hd + cmd	pm			
Delete	“CMD” C0h	pg (2 bytes)	Delete a page. [Parameters] pg: Page number	-	√
Copy	“CMD” C2h	pgs (2 bytes), pgd (2 bytes)	Copy a page. The object list is also copied. [Parameters] pgs: Copy source page number pgd: Destination page number	-	√
Property setting	“CMD” C3h	pg (2 bytes), prp (2 bytes), dl (4 bytes), d (dl bytes)	Set the properties of the page. [Parameters] pg: Page number prp: Property number dl: Data length d: Setup data	√	√
Property readout (data transmission)	“CMD” C4h	pg (2 bytes), prp (2 bytes), dl (4 bytes)	Data transmission of page properties. [Parameters] pg: Page number prp: Property number dl: Data length [Response] typ = binary "RESb" + dl + d	√	√
Object list deletion	“CMD” C8h	pg (2 bytes), obj (2 bytes)	Delete an object from the object list. [Parameters] pg: Page number obj: Object number	-	√
Object list registration	“CMD” C9h	pg (2 bytes), obj (2 bytes)	Add an object to the object list. [Parameters] pg: Page number obj: Object number	-	√
Object list readout (data transmission)	“CMD” CAh	pg (2 bytes)	Data transmission of object list. [Parameters] pg: Page number [Response] typ = binary "RESb" + dl + d(obj_n, obj(1)...obj(n)) obj_n: Number of objects obj(x): object number	√	√

6.3.4 Object control commands

Command name	Command		Function description	GUI mode	Registration mode
	hd + cmd	pm			
Delete	“CMD” D0h	obj (2 bytes)	Deleting an object [Parameters] obj: Object number	-	√
Copy	“CMD” D2h	objs (2 bytes), objd (2 bytes)	Object copying [Parameters] objs: Copy source object number objd: Copy destination object number	-	√
Property setting	“CMD” D3h	obj (2 bytes), prp (2 bytes), dl (4 bytes), d (dl bytes)	Set the properties of an object. [Parameters] obj: Object number prp: Property number dl: Data length d: Set the data.	√	√
Property readout (data transmission)	“CMD” D4h	obj (2 bytes), prp (2 bytes), dl (4 bytes)	Data transmission of object properties. [Parameters] obj: Object number prp: Property number dl: Data length [Response] typ = binary "RESb" + dl + d	√	√

6.3.5 Memory control commands

Command name	Command		Function description	GUI mode	Registration mode
	hd + cmd	pm			
Page definition (command -> RAM)	“CMD” F3h	dl (4 bytes), d (dl bytes)	Define all pages [Parameters] dl: data length d: Definition data	-	√
Object definition (Command -> RAM)	“CMD” F4h	dl (4 bytes), d (dl bytes)	Define all objects [Parameters] dl: data length d: definition data	-	√
Page/object saving (RAM to FROM)	“CMD” FDh	-	Saves the defined data of all pages and objects in FROM.	-	√
Page/object reading (FROM -> RAM)	“CMD” FEh	-	Loads the page and object definition data stored in FROM.	-	√
MSW settings	“CMD” F2h	dl (4 bytes), d (dl bytes)	All memory SW (MSW) settings [Parameters] dl: data length d: Definition data	-	√
MSW readout (Data transmission)	“CMD” E2h	dl (4 bytes)	Data transmission of all memory SW (MSW) values. [Parameters] dl: data length [Response] typ = binary. "RESb" + dl + d	√	√
Image storage	“CMD” F5h	dl (4 bytes), d (dl bytes)	Store image data in FROM [Parameters] dl: data length d: image definition data	-	√
Image readout (data transmission)	“CMD” F6h	dl (4 bytes)	Data transmission of images stored in FROM. [Parameters] dl: data length [Response] typ = binary. "RESb" + dl + d	√	√

6.3.6 Touch control commands

Command name	Command		Function description	GUI mode	Registration mode
	hd + cmd	pm			
Sensitivity setting	“CMD” 54h	00h, thr (1 byte)	Setting the sensitivity (threshold value) of the touch panel. To enable at start-up, set the memory SW value. [Parameters] thr: Threshold value 01h – FFh	√	√
Gain settings	“CMD” 54h	04h, g (1 byte)	Setting the sensor gain value for the touch panel. To enable at start-up, set the memory SW value. [Parameters] g: Gain value 00h – 0Fh	√	√
Calibration setting	“CMD” 54h	20h	Execute touch calibration. Please do not touch the touch panel for approximately 3 seconds after entering this command.	√	√
Package registration	“CMD” 54h	1Ch, pk (1 byte), d (1024 bytes)	Register the touch package. The registered data is stored in FROM. [Parameters] pk: Package number d: Definition data	-	√
Package selection	“CMD” 54h	10h, pk (1 byte)	Selecting the registered touch package. To enable at start-up, set the memory SW value. [Parameters] pk: Package number	√	√

6.3.7 GPIO control commands

Command name	Command		Function description	GUI mode	Registration mode
	hd + cmd	pm			
GPIO input/output settings	“CMD” 50h	01h, dir (4 byte)	GPIO input/output settings [Parameters] dir: Input/output setting Bit value = 0: Input, 1: Output Port0 (GPIO_7 - 0): b7...b0 Port1 (GPIO_15 - 8): b15...b8 Port2 (GPIO_23 - 16): b23...b16 Port3 (GPIO_25 - 24): b25, b24	√	√
GPIO input (Data readout)	“CMD” 50h	20h	Data transmission of GPIO input status. [Response] typ = binary "RESb" + dl + d dl: Data length dl = 00000004h fixed d: GPIO input data Bit value = 0: L input, 1: H input Port0 (GPIO_7 - 0): b7...b0 Port1 (GPIO_15 - 8): b15...b8 Port2 (GPIO_23 - 16): b23...b16 Port3 (GPIO_25 - 24): b25, b24	√	√
JP input (Data readout)	“CMD” 50h	21h	Transmitting data on the status of the JP terminal. [Response] typ = binary. "RESb" + dl + d dl: Data length dl = 00000004h fixed d: JP input data Bit value = 0: L input, 1: H input JP (J10 - J0): b10 – b0	√	√
GPIO output	“CMD” 50h	10h, out (4 byte)	Setting the output state of the GPIO. [Parameters] out: GPIO output data Bit: value = 0: L output, 1: H output Port0 (GPIO_7 - 0): b7...b0 Port1 (GPIO_15 - 8): b15...b8 Port2 (GPIO_23 - 16): b23...b16 Port3 (GPIO_25 - 24): b25, b24	√	√

6.4 Page/object property information

6.4.1 Common properties

Properties common to pages and objects are as follows.

Group.	Function name	Property number	Symbol	Data length
General	Type	00h	TYP	1
	Name	01h	NM	16
	Position X	02h	PX	2
	Position Y	03h	PY	2
	Size X	04h	SX	2
	Size Y	05h	SY	2
	Enable	08h	EN_MD	1
	Display Mode	0Ch	DP_MD	1
Register	Value	10h	VAL	4
	REG	11h	REG	4
	TREG	12h	TREG	4

Note: Objects with no touch events are effectively unresponsive in operation.

6.4.2 PAGE (PG)

The page properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Frame Width	53h	PG_FRM_WD	4
Image	Image	48h	PG_IMG	4
	Image Offset X	49h	PG_IMG_OX	4
	Image Offset Y	4Ah	PG_IMG_OY	4
Color	Back Color	51h	PG_BK_CLR	4
	Frame Color	52h	PG_FRM_CLR	4
	DISABLE Back Color	B1h	PG_DIS_BK_CLR	4
	DISABLE Frame Color	B2h	PG_DIS_FRM_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Timer Enable	C2h	EVENT_TMR_EN_MD	4
	Event Timer Period Value	C3h	EVENT_TMR_PERD_VAL	4
	Event Timer Count Value	C4h	EVENT_TMR_CNT_VAL	4
	Event GPIO Enable	C5h	EVENT_IO_EN_MD	4
	Event GPIO Port	C6h	EVENT_IO_PORT	4
	Event GPIO Condition	C7h	EVENT_IO_COND	4
	Event Timer Control Data	C8h	EVENT_DATA	512
	Event GPIO Control Data2	C9h	EVENT_DATA2	512

6.4.3 BUTTON (BTN)

The button properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Radius	27h	BTN_RAD	4
Text0	Text0	40h	BTN_TXT0	200
	Text0 Offset X	42h	BTN_TXT0_OX	2
	Text0 Offset Y	43h	BTN_TXT0_OY	2
	Text0 Align X	44h	BTN_TXT0_AX	2
	Text0 Align Y	45h	BTN_TXT0_AY	2
	Text0 Size	46h	BTN_TXT0_SZ	1
	Text0 Style	47h	BTN_TXT0_STL	1
Text1	Text1	60h	BTN_TXT1	200
	Text1 Offset X	62h	BTN_TXT1_OX	2
	Text1 Offset Y	63h	BTN_TXT1_OY	2
	Text1 Align X	64h	BTN_TXT1_AX	2
	Text1 Align Y	65h	BTN_TXT1_AY	2
	Text1 Size	66h	BTN_TXT1_SZ	1
	Text1 Style	67h	BTN_TXT1_STL	1
Image OFF	OFF Image	48h	BTN_OFF_IMG	4
	OFF Image Offset X	49h	BTN_OFF_IMG_OX	2
	OFF Image Offset Y	4Ah	BTN_OFF_IMG_OY	2
Image ON	ON Image	68h	BTN_ON_IMG	4
	ON Image Offset X	69h	BTN_ON_IMG_OX	2
	ON Image Offset Y	6Ah	BTN_ON_IMG_OY	2
Image DISABLE	DISABLE Image	A8h	BTN_DIS_IMG	4
	DISABLE Image Offset X	A9h	BTN_DIS_IMG_OX	2
	DISABLE Image Offset Y	AAh	BTN_DIS_IMG_OY	2
Color OFF	OFF Text Color	50h	BTN_OFF_TXT_CLR	4
	OFF Back Color	51h	BTN_OFF_BK_CLR	4
	OFF Frame Color	52h	BTN_OFF_FRM_CLR	4
	OFF Back Gradation1 Color	54h	BTN_OFF_BK_G1_CLR	4
	OFF Back Gradation2 Color	55h	BTN_OFF_BK_G2_CLR	4
Color ON	ON Text Color	70h	BTN_ON_TXT_CLR	4
	ON Back Color	71h	BTN_ON_BK_CLR	4
	ON Frame Color	72h	BTN_ON_FRM_CLR	4
	ON Back Gradation1 Color	74h	BTN_ON_BK_G1_CLR	4
	ON Back Gradation2 Color	75h	BTN_ON_BK_G2_CLR	4
Color DISABLE	DISABLE Text Color	B0h	BTN_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	BTN_DIS_BK_CLR	4
	DISABLE Frame Color	B2h	BTN_DIS_FRM_CLR	4
	DISABLE Back Gradation1 Color	B4h	BTN_DIS_BK_G1_CLR	4
	DISABLE Back Gradation2 Color	B5h	BTN_DIS_BK_G2_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.4 TEXT (TXT)

The text properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Text Wrap Mode	1Bh	TXT_WRP	4
Text0	Text0	40h	TXT_TXT0	200
	Text0 Align X	44h	TXT_TXT0_AX	2
	Text0 Align Y	45h	TXT_TXT0_AY	2
	Text0 Size	46h	TXT_TXT0_SZ	1
	Text0 Style	47h	TXT_TXT0_STL	1
Text1	Text1	60h	TXT_TXT1	200
	Text1 Align X	64h	TXT_TXT1_AX	2
	Text1 Align Y	65h	TXT_TXT1_AY	2
	Text1 Size	66h	TXT_TXT1_SZ	1
	Text1 Style	67h	TXT_TXT1_STL	1
Color	Text Color	50h	TXT_NML_TXT_CLR	4
	Back Color	51h	TXT_NML_BK_CLR	4
	Frame Color	52h	TXT_NML_FRM_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.5 EDIT (EDT)

The edit properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Text0	Text0	40h	EDT_TXT0	200
	Text0 Align X	44h	EDT_TXT0_AX	2
	Text0 Align Y	45h	EDT_TXT0_AY	2
	Text0 Size	46h	EDT_TXT0_SZ	1
	Text0 Style	47h	EDT_TXT0_STL	1
Text EMPTY	Text at Empty	80h	EDT_EMP_TXT_DATA	200
	Text Align X at Empty	84h	EDT_EMP_TXT_AX	2
	Text Align Y at Empty	85h	EDT_EMP_TXT_AY	2
	Text Size at Empty	86h	EDT_EMP_TXT_SZ	1
	Text Style at Empty	87h	EDT_EMP_TXT_STL	1
Color KeyPad	Keypad Panel Color	28h	EDT_PAD_PANL_CLR	4
	Keypad Button Color	29h	EDT_PAD_BTN_CLR	4
	Keypad Button Text Color	2Ah	EDT_PAD_BTN_TXT_CLR	4
	Keypad Edit Back Color	2Bh	EDT_PAD_EDT_BK_CLR	4
	Keypad Edit Text Color	2Ch	EDT_PAD_EDT_TXT_CLR	4
Color	Text Color	50h	EDT_NML_TXT_CLR	4
	Back Color	51h	EDT_NML_CLR	4
	Editing Back Color	71h	EDT_EDT_BK_CLR	4
Color EMPTY	Text Color at Empty	90h	EDT_EMP_TXT_CLR	4
	Back Color at Empty	91h	EDT_EMP_BK_CLR	4
Color DISABLE	DISABLE Text Color	B0h	EDT_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	EDT_DIS_BK_CLR	4
Style KeyPad	Max Length	18h	EDT_LEN	4
	Pad Mode	19h	EDT_PAD	4
	Insert	1Ah	EDT_INS	4
	Keypad Size	1Bh	EDT_PAD_SZ	4
	Keypad Align	1Ch	EDT_PAD_ALGN	4
	Keypad Style	1Dh	EDT_PAD_STL	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.6 CHECKBOX (CHK)

The checkbox properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Check Size	20h	CHK_SZ	4
Text0	Text0	40h	CHK_TXT0	200
	Text0 Size	46h	CHK_TXT0_SZ	1
	Text0 Style	47h	CHK_TXT0_STL	1
Text1	Text1	60h	CHK_TXT1	200
	Text1 Size	66h	CHK_TXT1_SZ	1
	Text1 Style	67h	CHK_TXT1_STL	1
Image	Unchecked Image	48h	CHK_UNCHK_IMG	4
	Checked Image	68h	CHK_CHK_IMG	4
	DISABLE Unchecked Image	88h	CHK_DIS_UNCHK_IMG	4
	DISABLE Checked Image	A8h	CHK_DIS_CHK_IMG	4
Color	Text Color	50h	CHK_NML_TXT_CLR	4
	Back Color	51h	CHK_NML_BK_CLR	4
	Frame Color	52h	CHK_NML_FRM_CLR	4
	BOX Color	57h	CHK_NML_BOX_CLR	4
	BOX Gradation2 Color	58h	CHK_NML_BOX_G2_CLR	4
	Check Color	59h	CHK_NML_CHK_CLR	4
DISABLE Color	DISABLE Text Color	B0h	CHK_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	CHK_DIS_BK_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.7 RADIO BUTTON (RAD)

The radio button properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Button Size	20h	SZ_BTN	4
	Pitch of Item	34h	PCH_ITMS	4
Text0	Text0	40h	RAD_TXT0	200
	Text0 Size	46h	RAD_TXT0_SZ	1
	Text0 Style	47h	RAD_TXT0_STL	1
Text1	Text1	60h	RAD_TXT1	200
	Text1 Size	66h	RAD_TXT1_SZ	1
	Text1 Style	67h	RAD_TXT1_STL	1
Image	OFF Button Image	48h	RAD_OFF_IMG	4
	ON Button Image	68h	RAD_ON_IMG	4
	DISABLE Button Image	A8h	RAD_DIS_IMG	4
Color	Text Color	50h	RAD_OFF_TXT_CLR	4
	Back Color	51h	RAD_OFF_BK_CLR	4
	Frame Color	52h	RAD_OFF_FRM_CLR	4
	BUTTON Color	57h	RAD_OFF_BTN_CLR	4
	Select Color	59h	RAD_OFF_SEL_CLR	4
	DISABLE Text Color	B0h	RAD_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	RAD_DIS_BK_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.8 LISTBOX (LST)

The listbox properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Scroll Bar Width	20h	LST_SCR_WD	4
	Gap of Item	34h	GAP_ITMS	4
Text0	Text0	40h	LST_TXT0	200
	Text0 Align X	44h	LST_TXT0_AX	2
	Text0 Align Y	45h	LST_TXT0_AY	2
	Text0 Size	46h	LST_TXT0_SZ	1
	Text0 Style	47h	LST_TXT0_STL	1
Text1	Text1	60h	LST_TXT1	200
	Text1 Align X	64h	LST_TXT1_AX	2
	Text1 Align Y	65h	LST_TXT1_AY	2
	Text1 Size	66h	LST_TXT1_SZ	1
	Text1 Style	67h	LST_TXT1_STL	1
Color	Text Color	50h	LST_OFF_TXT_CLR	4
	Back Color	51h	LST_OFF_BK_CLR	4
	Scroll Bar Back Color	54h	LST_OFF_SCR_BAR_BK_CLR	4
	Scroll Bar Color	57h	LST_OFF_SCR_BAR_CLR	4
	Arrow Color	5Bh	LST_OFF_ARW_CLR	4
	Text Color	70h	LST_SEL_TXT_CLR	4
	Back Color	71h	LST_SEL_BK_CLR	4
	Select Handle Color	77h	LST_SEL_HDL_CLR	4
	DISABLE Text Color	B0h	LST_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	LST_DIS_BK_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.9 WHEEL LIST BOX (WHL)

The wheel list box properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Gap of Item	34h	GAP_ITMS	4
Text0	Text0	40h	WHL_TXT0	200
	Text0 Align X	44h	WHL_TXT0_AX	2
	Text0 Align Y	45h	WHL_TXT0_AY	2
	Text0 Size	46h	WHL_TXT0_SZ	1
	Text0 Style	47h	WHL_TXT0_STL	1
Text1	Text1	60h	WHL_TXT1	200
	Text1 Align X	64h	WHL_TXT1_AX	2
	Text1 Align Y	65h	WHL_TXT1_AY	2
	Text1 Size	66h	WHL_TXT1_SZ	1
	Text1 Style	67h	WHL_TXT1_STL	1
Color	Text Color	50h	WHL_NML_TXT_CLR	4
	Back Color	51h	WHL_NML_BK_CLR	4
	Top Gradation1 Color	54h	WHL_NML_BK_TP_G1_CLR	4
	Top Gradation2 Color	55h	WHL_NML_BK_TP_G2_CLR	4
	Buttom Gradation1 Color	56h	WHL_NML_BK_BT_G1_CLR	4
	Buttom Gradation2 Color	57h	WHL_NML_BK_BT_G2_CLR	4
	Text Color	70h	WHL_NML_SEL_TXT_CLR	4
	Back Color	71h	WHL_NML_SEL_BK_CLR	4
	DISABLE Text Color	B0h	WHL_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	WHL_DIS_BK_CLR	4
	Top Gradation1 Color	B4h	WHL_DIS_BK_TP_G1_CLR	4
	Top Gradation2 Color	B5h	WHL_DIS_BK_TP_G2_CLR	4
	Buttom Gradation1 Color	B6h	WHL_DIS_BK_BT_G1_CLR	4
	Buttom Gradation2 Color	B7h	WHL_DIS_BK_BT_G2_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.10 DROP-DOWN LIST BOX (DRP)

The drop-down list box properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Scroll Bar Width	20h	DRP_SCR_WD	4
	Dropdown Size	21h	DRP_DROP_SZ	4
	Raduis	27h	DRP_RAD	4
	Gap of Item	34h	GAP_ITMS	4
Text0	Text0	40h	DRP_TXT0	200
	Text0 Align X	44h	DRP_TXT0_AX	2
	Text0 Align Y	45h	DRP_TXT0_AY	2
	Text0 Size	46h	DRP_TXT0_SZ	1
	Text0 Style	47h	DRP_TXT0_STL	1
Text1	Text1	60h	DRP_TXT1	200
	Text1 Align X	64h	DRP_TXT1_AX	2
	Text1 Align Y	65h	DRP_TXT1_AY	2
	Text1 Size	66h	DRP_TXT1_SZ	1
	Text1 Style	67h	DRP_TXT1_STL	1
Color	Text Color	50h	DRP_NML_TXT_CLR	4
	Back Color	51h	DRP_NML_BK_CLR	4
	Scroll Bar Color	54h	DRP_NML_SCR_CLR	4
	Handle Color	57h	DRP_NML_HDL_CLR	4
	Arrow Color	5Bh	DRP_NML_ARW_CLR	4
	Text Color	70h	DRP_SEL_TXT_CLR	4
	Back Color	71h	DRP_SEL_BK_CLR	4
	Select Handle Color	77h	DRP_SEL_HDL_CLR	4
	DISABLE Text Color	B0h	DRP_DIS_TXT_CLR	4
	DISABLE Back Color	B1h	DRP_DIS_BK_CLR	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.11 SLIDER (SLD)

The slider properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Style	15h	CNTS_STL	1
	Handle Size	20h	HDL_SZ	4
	Shaft Width	21h	SHFT_WD	4
	Tick Size	22h	TCK_SZ	4
	Tick Number	23h	TCK_NUM	4
	Angle	24h	ANGL	4
Image	Handle Image	48h	SLD_NML_HDL_IMG	4
	Handle Image	A8h	SLD_DIS_HDL_IMG	4
Color	Shaft Color	54h	SLD_NML_SHFT_CLR	4
	Handle Color	57h	SLD_NML_HDL_CLR	4
	Tick Color	5Bh	SLD_NML_TCK_CLR	4
	Shaft Color	B4h	SLD_DIS_SHFT_CLR	4
	DISABLE Handle Color	B7h	SLD_DIS_HDL_CLR	4
	Tick Color	BBh	SLD_DIS_TCK_CLR	4
Option	Min. Value	1Eh	MIN	4
	Max. Value	1Fh	MAX	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.12 BAR (BAR)

The bar properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
	Contents Style	15h	CNTS_STL	1
	Text Format	18h	TXT_FMT	4
	Angle	24h	ANGL	4
Text	Text0	40h	BAR_TXT0	200
	Text0 Align X	44h	BAR_TXT0_AX	2
	Text0 Size	46h	BAR_TXT0_SZ	1
	Text0 Style	47h	BAR_TXT0_STL	1
	Text1	60h	BAR_TXT1	200
	Text1 Align X	64h	BAR_TXT1_AX	2
	Text1 Size	66h	BAR_TXT1_SZ	1
	Text1 Style	67h	BAR_TXT1_STL	1
	Header Text	80h	BAR_HD_TXT	200
	Footer Text	A0h	BAR_FT_TXT	200
Color	Text Color	50h	BAR_NML_TXT_CLR	4
	Frame Color	52h	BAR_NML_FRM_CLR	4
	BAR Value Color	54h	BAR_NML_BAR_VAL_CLR	4
	BAR Value Gradation2 Color	55h	BAR_NML_BAR_VAL_G2_CLR	4
	BAR Back Color	56h	BAR_NML_BAR_BK_CLR	4
	BAR Back Gradation2 Color	57h	BAR_NML_BAR_BK_G2_CLR	4
	DISABLE Text Color	B0h	BAR_DIS_TXT_CLR	4
	DISABLE BAR0 Color	B5h	BAR_DIS_BAR0_CLR	4
Option	Min. Value	1Eh	MIN	4
	Max. Value	1Fh	MAX	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.4.13 IMAGE (IMG)

The image properties are as follows.

Group.	Function name	Property number	Symbol	Data length
Style	Contents Select	14h	CNTS_SEL	1
Image	Image0	48h	IMG_IMG0	4
	Image1	68h	IMG_IMG1	4
	Image2	88h	IMG_IMG2	4
	Image3	A8h	IMG_IMG3	4
Event	Event Control Mode	C0h	EVENT_EN_MD	1
	Event TX Control Mode	C1h	EVENT_TX_MD	1
	Event Control Data	C8h	EVENT_DATA	512

6.5 Page/object property values

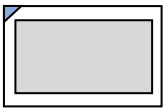
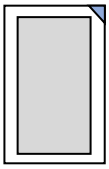
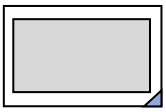
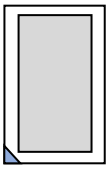
The values of each property are as follows.

Function name	Symbol	Property value
Type	TYP	00h: PAGE 01h: BUTTON 02h: TEXT 03h: EDIT 04h: CHECK 05h: RADIO 06h: LIST 07h: WHEEL 08h: DROP 09h: SLIDER 0Ah: BAR 0Bh: IMAGE
Name	NM	20h – 7Eh
Position X	PX	0 – 799
Position Y	PY	0 – 799
Size X	SX	10 – 800
Size Y	SY	10 – 800
Enable	EN_MD	00h: Prohibited 01h: Permitted
Display Mode	DP_MD	00h: Display OFF 01h: Display ON
Value	VAL	00000000h – FFFFFFFFh
REG	REG	00000000h – FFFFFFFFh
Contents Select	CNTS_SEL	00h – 01h or 00h – 03h
Contents Style	CNTS_STL	00h: FLAT 01h: 3D_LOW 02h: 3D_NORMAL 03h: 3D_HIGH 04h: 3D_CUSTOM 05h: OFF *only for buttons
Text Data	TXT_DATA	20h – FFh UTF-8
Text Offset X	TXT_OX	0 to (object X size -1)
Text Offset Y	TXT_OY	0 to (object Y size -1)
Text Align X	TXT_AX	00h: LEFT 01h: CENTER 02h: RIGHT
Text Align Y	TXT_AY	00h: TOP 01h: MIDDLE 02h: BOTTOM
Text Size	TXT_SZ	01h – 04h: Standard fonts 01h: 8 dots 02h: 16 dots 03h: 24 dots 04h: 32 dots 05h – 14h: User fonts
Text Style	TXT_STL	00h: NORMAL 01h: BOLD
Image Data Address	IMG_AD	00000000h – FFFFFFFFh Generated by design tool
Image Offset X	IMG_OX	0 to (object X size -1)
Image Offset Y	IMG_OY	0 to (object Y size -1)
Color	TXT_CLR BK_CLR, xxx_CLR	00000000h – FFFFFFFF A: bit31 – 24 FFh: transparent 00h: not transparent R: bit23 – 16 G: bit15 – 8 B: bit7 – 0

6.6 Additional functions

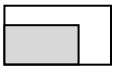
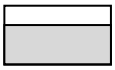
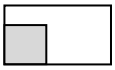
6.6.1 Display direction (orientation) setting

The display direction (orientation) can be set using the memory SW.
It cannot be switched during operation.

00h: 0° (Default)	01h: 90°	02h: 180°	03h: 270°
			

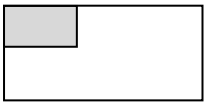
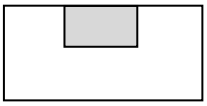
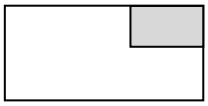
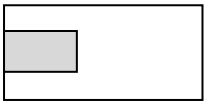
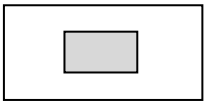
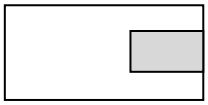
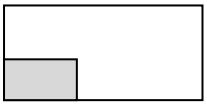
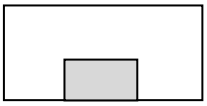
6.6.2 KEYPAD display size setting

The KEYPAD's KEYBOARD/TENKEY display size can be specified using the property and Memory SW.

KEYPAD Type	00h: SMALL	01h: MEDIUM	02h: LARGE (Default)	03h: FULL-SCREEN
KEYBOARD				
TENKEY				

6.6.3 KEYPAD display position setting

The KEYPAD's KEYBOARD/TENKEY display position can be set using the property and Memory SW.

00h: Upper left	01h: Top center	02h: Upper right
		
03h: Middle left	**04h: Middle center**	**05h: Middle right**
		
06h: Lower left	**07h: Lower center**	**08h: Lower right**
		

6.6.4 Display styles setting

The display color can be set by adjusting the property preferences.

00h: FLAT. Monochrome	01h: 3D_LOW. Low monochrome gradient	02h: 3D_NORMAL. Mid-level monochrome gradient	03h: 3D_HIGH. High monochrome gradient	04h: 3D_CUSTOM 2-color gradient
				

7 Event control

7.1 Overview.

Touch-related objects and pages have event functions. Event processing is executed when event conditions are met.
Data for event processing is created using the design tool, and arbitrary processing is possible by adding "actions."
Event data is stored as properties of each page. Separate object and event data can be created.

7.2 Event execution control

When an event occurs, if the Event Control Mode property of the applicable object is set to 01h (ENABLE), the action in the event data is executed.

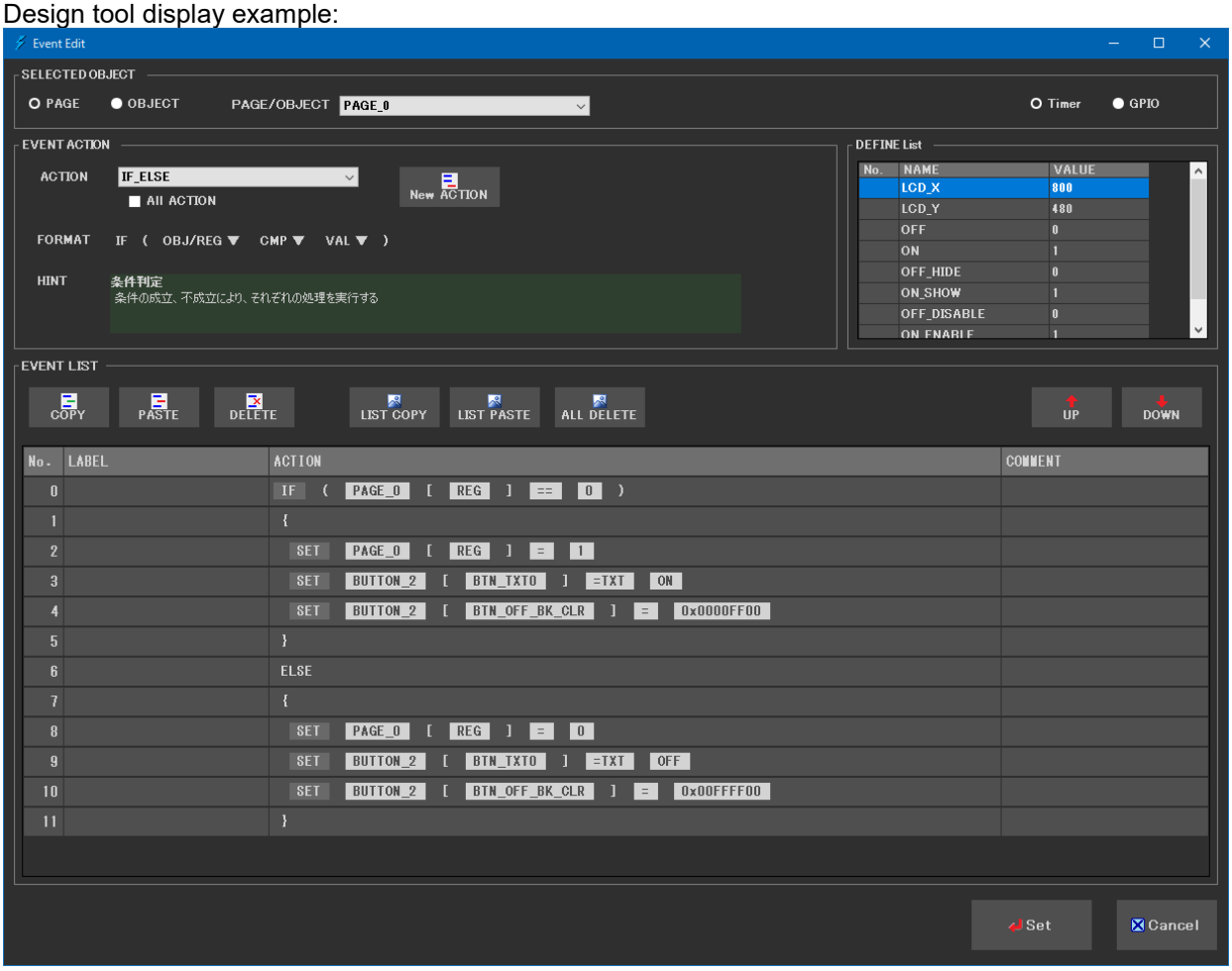
7.3 Event information data transmission

When an event occurs, event information is sent if the Event TX Control Mode property of the applicable object is set to 01h (ON) or GUI event information data transmission control = enabled.
The transmission (response) format is Event type format.

7.4 Actions

Actions are defined by the design tool and added to the “EVENT LIST.”
Action types are listed in the 7.5 Action list.

Design tool display example:



7.5 Action list

7.5.1 SET (register/object set)

Format	SET OBJ/REG ▼ CAL ▼ VAL ▼ — OBJ/REG ▼ : Assignment target, page object property/register, etc. — CAL ▼ : Assignment, operator — VAL ▼ : Assignment source, constant, test, page object property/register, etc.
Contents	Assign values and perform operations on object properties and registers. Used to change object properties and perform operations using registers.
Examples of use	SET TEXT_0 [TXT_TXT0] = TXT ABC Assign the string 'ABC' to the Text0 property of the text object (TEXT_0).

7.5.2 DATA_TX (object/register data transmission)

Format	DATA_TX TX_TYPE ▼ VAL ▼ — TX_TYPE ▼ : Transmission type — VAL ▼ : Data to send (transmission data)
Contents	Data is transmitted for the property values and register values of the object.
Examples of use	DATA_TX = SLIDER_0 [VAL] The current value (Value property value) of the knob of the slider object (SLIDER_0) is transmitted as data.

7.5.3 DISPLAY (object display control)

Format	DISPLAY OBJ ▼ = VISIBLE ▼ — OBJ ▼ : Target object — VISIBLE ▼ : Show/hide setting
Contents	Controls the visibility (Display mode property) of the specified object.
Examples of use	DISPLAY BUTTON_0 = OFF_HIDE Hide the button object (BUTTON_0).

7.5.4 TOUCH EVENT (touch event control)

Format	TOUCH EVENT OBJ ▼ = ENABLE ▼ — OBJ ▼ : Target object — ENABLE ▼ : Enable/Disable setting
Contents	Controls the specified object's events ([Event Control Mode] property).
Examples of use	TOUCH EVENT BUTTON_0 = DISABLE Disables touch events for the button object (BUTTON_0).

7.5.5 PAGE_SELECT (Page selection)

Format	PAGE = PAGE_No ▼ — PAGE_No ▼ : Specify destination page setting
Contents	Moves to the specified page. Switch from the current page to another page.
Examples of use	PAGE = PAGE_1 Moves to PAGE_1.

7.5.6 POPUP_SELECT (page selection)

Format	POPUP = PAGE_No ▼ — PAGE_No ▼ : Popup page setting
Contents	Displays the specified page in a popup window. Used to display alerts or notifications on top of the current page.
Examples of use	POPUP = PAGE_1 PAGE_1 appears in a popup window above the current page.

7.5.7 TOGGLE_TREG (TREG value toggle)

Format	TOGGLE_TREG
Contents	Reverses the TREG value of the page/object where the event occurred. 00h -> 01h, 01h -> 00h
Examples of use	TOGGLE_TREG Inverts the TREG value.

7.5.8 GUI_REFRESH (GUI display update)

Format	GUI_REFRESH
Contents	Refresh the GUI display. Note: If the object position or size changes, the display will not reflect the changes until the page is refreshed.
Examples of use	GUI_REFRESH Refresh the GUI display.

7.5.9 IF (conditional judgment)

Format	IF (OBJ/REG ▼ CMP ▼ VAL ▼) { Operation } — OBJ/REG ▼ : Target element — CMP ▼ : Comparison operator — VAL ▼ : Comparison element
Contents	The processing in brackets is executed if the condition between the target element and the comparison element is met.

Examples of use	IF (CHECK_0 [VAL] == ON)
	{
	POPUP = PAGE_1
	}
	If the checkbox (CHECK_0) is ticked, PAGE_1 pops up.

7.5.10 IF ELSE (conditional judgment)

Format	IF (OBJ/REG ▼ CMP ▼ VAL ▼) { Operation_1 } ELSE { Operation_2 } — OBJ/REG ▼ : Target element — CMP ▼ : Comparison operator — VAL ▼ : Comparison element
Contents	The processing in each bracket is executed if the condition between the target element and the comparison element is met.

Examples of use	IF (SLIDER_0 [VAL] > 50)
	{
	SET TEXT_0 [TXT_TXT_CLR] = 0x00FF0000
	}
	ELSE
	{
	SET TEXT_0 [TXT_TXT_CLR] = 0x00000000
	}
	When the position of the knob of the slider (SLIDER_0) is 50 or more, the display text color (TEXT_0) changes.

7.6 List of event variables

The following variables can be used within an event.

Group	Variable name	Contents	Reading	Writing	Initial value
REG	A – Z	Value of variables A to Z (32-bit length)	√	√	Undefined
SP_REG	GPIO_0 GPIO_1	General purpose port (uses only the lower 8 bits)	√	√	Undefined
	JP	Jumper setting (uses only the lower 11 bits)	√	-	Jumper setting
	GPIO_2	Extended general-purpose port (uses only the lower 10 bits)	√	√	Undefined
	Com	Send/receive buffer	√ Receive buffer	√ Send buffer	-
	LowPower	Power saving mode setting	-	√	-

8 Configuration

8.1 Memory SW

Memory SW is available as a startup setting function when the power is switched on or a hardware reset is performed.
The value of the memory SW is stored in FROM and can be written and read by commands.

SW No.	Function	Valid range	Factory setting
0 – 4	Reserved	-	-
5	System-wide brightness settings	00h – FFh	FFh
6	Display orientation setting 00h: 0° (default) 01h: 90° 02h: 180° 03h: 270°	00h – 03h	00h
7 – 15	Reserved		
16	GUI KEYPAD-KEYBOARD Size 00h: SMALL 01h: NORMAL 02h: LARGE 03h: FULL-SCREEN	00h – 03h	02h
17	GUI KEYPAD-KEYBOARD Display position 00h: Upper left 01h: Top center 02h: Upper right 03h: Middle left 04h: Middle center 05h: Middle right 06h: Lower left 07h: Lower center 08h: Lower right	00h – 08h	07h
18, 19	Reserved	-	-
20	GUI KEYPAD-TENKEY Size 00h: SMALL 01h: MEDIUM 02h: LARGE 03h: FULL-SCREEN	00h – 03h	02h
21	GUI KEYPAD-TENKEYDisplay position 00h: Upper left 01h: Top center 02h: Upper right 03h: Middle left 04h: Middle center 05h: Middle right 06h: Lower left 07h: Lower center 08h: Lower right	00h – 08h	07h
22, 23	Reserved	-	-
24	GUI KEYPAD Display style 00h: FLAT (monochrome) 01h: 3D_LOW (Low-level monochrome gradation) 02h: 3D_NORMAL (Mid-level monochrome gradation) 03h: 3D_HIGH (High-level monochrome gradation) 04h: 3D_CUSTOM (2-color gradation)	00h – 04h	00h
25	GUI KEYPAD Display color 00h: BRIGHT (LIGHT_GRAY) 01h: DARK (DARK_GRAY) 02h: RED 03h: GREEN	00h – 03h	00h
26 – 31	Reserved	-	-
32	GUI Start page setting 00h – 3Bh: Page 0 to page 49 FFh: No activation	00h – 3Bh, FFh	FFh
33	GUI Display update mode 00h: When GUI display update command is entered 01h: At GUI update timing (display change, touch, etc.) 02h: Internal timer cycle + GUI update timing	00h – 02h	02h
34 – 45	Reserved	-	-

SW No.	Function	Valid range	Factory setting
46	Event data transmission format 00h: No header 01h: Binary type "RESb"	00h – 01h	01h
47	Event information transmission mode 00h: No Transmission 01h: Event type "RESe"	00h – 01h	00h
48	RS-232 baud rate setting 00h : 19,200bps (default) 01h : 4,800bps 02h : 9,600bps 03h : 19,200bps 04h : 38,400bps 05h : 57,600bps 06h : 115,200bps	00h – 06h	00h
49	UART parity 00h : None (default) 01h : Even 02h : Odd	00h – 02h	00h
50 – 57	Reserved	-	-
58	Touch sensitivity (signal gain) setting	00h – 0Fh	06h
59	Touch sensitivity (threshold) setting	00h – FFh	50h
60	Reserved	-	-
61	Power saving mode touch-scan cycle setting (ms)	05h (5ms) – FEh (254ms)	20h (32ms)
62	Touch sensitivity setting selection at startup 00h : Apply the set values of MSW58 and MSW59 01h : Apply the set value of the touch settings package	00h – 01h	00h
63	Touch setting package selection at startup 00h : Factory setting (default) 01h : Touch settings package 1 02h : Touch settings package 2 03h : Touch settings package 3 04h : Touch settings package 4	00h – 04h	00h

— If the memory SW content is outside the valid range, the factory setting values are used as the default.

— A Reserved function may be defined in the future. Therefore, when setting the memory SW, rewrite only the necessary parts.

8.2 Jumpers

JP No.	Function	Factory setting
J0	Reserved	OPEN
J1		OPEN
J2	Reserved	OPEN
J3	Baud rate	OPEN
J4		OPEN
J5	Serial interface mode	OPEN
J6		OPEN
J7	GUI start-up setting	OPEN
J8	Reserved	OPEN
J9	Reserved	OPEN
J10	Operation mode	OPEN

8.2.1 Baud rate (UART interface)

J3	J4	Setting details
OPEN	OPEN	38,400bps
SHORT	OPEN	19,200bps
OPEN	SHORT	Memory SW set value (MSW48)
SHORT	SHORT	115,200bps

8.2.2 Serial interface

J5	J6	Setting details
OPEN	OPEN	Reserved
OPEN	SHORT	Reserved
SHORT	OPEN	Reserved
SHORT	SHORT	UART mode

8.2.3 GUI start-up settings

J7	Setting details
OPEN	Memory SW setting value (MSW19)
SHORT	Do not execute

8.2.4 Operation mode

TEST terminal	Setting details
L	Test mode
H (NC)	Normal mode / GUI mode

9 Firmware version history

Firmware version	Revision details
F091	First edition

— For the latest firmware version, please contact one of our sales representatives.

10 Revision history

Edition number	Date	Description of changes
00	July 21, 2023	First edition