

# APPLICATION NOTE

## VACUUM FLUORESCENT DISPLAY MODULE

### GRAPHIC DISPLAY MODULE

#### GP1160A02A

##### GENERAL DESCRIPTION

FUTABA GP1160A02A is a graphic display module using a FUTABA 256×64 VFD.

Consisting of a VFD, display drivers and a control circuit, the module can be driven by connecting to the host system through a simple interface.

## Important Safety Notice

Please read this note carefully before using the product.

### Warning

- The module should be disconnected from the power supply before handling.
- The power supply should be switched off before connecting or disconnecting the power or interface cables.
- The module contains electronic components that generate high voltages (approx. 90V) which may cause an electrical shock when touched.
- Do not touch the electronic components of the module with any metal objects.
- The VFD used on the module is made of glass and should be handled with care. When handling the VFD, it is recommended that cotton gloves be used.
- The module is equipped with a circuit protection fuse.
- Under no circumstances should the module be modified or repaired. Any unauthorized modifications or repairs will invalidate the product warranty.
- The module should be abolished as the factory waste.

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## 1. FEATURES

- 1-1. High quality and long life can be achieved with FUTABA VFD.
- 1-2. Being equipped with CIG VFD, a controller, Kanji character generator ROM, RS-232C interface IC and PSU.
- 1-3. Compact and light weight unit by using packed display drivers and one chip VFD controller.
- 1-4. It realizes displaying a Kanji character by RS-232C serial communication.

## 2. GENERAL SPECIFICATIONS

- 2-1. Outer dimension, Weight, (Refer to FIGURE-1)

Table-1

Item	Specification	Unit
Outer dimension	(W) 220.0±0.2	mm
	(H) 60.0±0.8	
	(T) 23.6 Max.	
Weight	Approx. 250	g

- 2-2. Display specification

Table-2

Item	Specification	Unit
Display area	163.69(W)×38.25(H)	mm
No. of pixels	256(W)×64(H)	dots
Dot size	0.49(W)×0.45(H)	mm
Dot pitch	0.64(W)×0.60(H)	mm
Illumination color	Green( p = 505nm)	—

- 2-3. Environmental conditions

Table-3

Item	Symbol	MIN	MAX	Unit
Operating temperature	Topr	-40	+85	°C
Storage temperature	Tstg	-40	+85	°C
Operating humidity (Note)	Hpr	20	80	%
Storage humidity (Note)	Hsg	20	90	%
Vibration (10~55Hz)	—	—	4	G
Shock	—	—	40	G

Note) Avoid operations and/or storage in moist environmental conditions.

## 2-4. Absolute maximum ratings

Table-4

Item	Symbol	MIN	MAX	Unit
Supply voltage	V <sub>CC</sub>	-0.3	5.5	V <sub>d</sub>
Input signal voltage	V <sub>IS</sub>	-25	25	V

## 2-5. Recommended operating conditions

Table-5

Item	Symbol	MIN	TYP	MAX	Unit
Supply voltage	V <sub>CC</sub>	4.75	5.0	5.25	V <sub>d</sub>
High level input voltage	V <sub>IH</sub>	2.4	-	-	V
Low level input voltage	V <sub>IL</sub>	-	-	0.8	V

## 2-6. Electrical, optical characteristics

Table-6

Item	Symbol	Conditions	MIN	TYP	MAX	Unit
Supply current <sup>(Note1)</sup>	I <sub>CC</sub>	V <sub>CC</sub> =5.0V All dots on	-	1.5	2.0	mA
Power consumption	-		-	7.5	10	W
Luminance <sup>(Note2)</sup>	L		300	600	-	cd/m <sup>2</sup>
High level output voltage	V <sub>OH</sub>	V <sub>CC</sub> =5V I <sub>OH</sub> =-1.5mA	5	-	15	V
Low level output voltage	V <sub>OL</sub>	V <sub>CC</sub> =5V I <sub>OL</sub> =-1.5mA	-15	-	-5	V

Note1)The surge current can be appox.5 times of specified maximum supply current at power on.

Note2)It indicates the value at 100% luminance adjustment level.

### 3. BASIC FUNCTIONS

#### 3-1. Communication

##### 3-1-1. Data reception

A module processes the reception data, assuming the state of reception prohibition by disabled DTR signal, when data is transferred to the module.

After processing the data, the module can be ready to receive next data by enabled DTR signal.

The DTR signal is controlled on the module side.

##### 3-1-2. Communication error

- a) When transferred data can not be received properly at host system by the reason of the transmission failure, the module makes it the transmitted data.
- b) In case of the command reception, when the overrun or the flaming error occurs, the command is ignored.
- c) In case of the display data reception, when the overrun or the flaming error occurs, the display data is ignored.
- d) In case of the command reception, when the parity error occurs, the command is ignored.
- e) In case of the display data reception, when the parity error occurs, the display data is ignored.
- f) When an illegal command is received, the command is ignored.

#### 3-2. Data, command write-in

When a Shift-JIS/ANK character code is received, the data is written from the home position (the most significant digit of the top row) or specified position, which is set by ‘Set virtual cursor’ command. And then the write in position is shifted one digit to the right automatically.

In case the write-in position is on the least significant digit of the row, the write-in position is left on the same position and a next character code is overwritten.

### 3-3. Command

The following are all commands of the module.

Table-7

	Command description	Code	Command code
1	Back Space without deleting	BS (08H)	08H
2	Line Feed	LF (0AH)	0AH
3	Carriage Return	CR (0DH)	0DH
4	Clear display	ESC [2J	1BH,5BH,32H,4AH
5	Set virtual cursor	ESC [Py;PxH	1BH,5BH,Py,3BH,Px,48H
	Home position	ESC [H'	1BH,5BH,48H,27H
6	Delete to end of line	ESC [0K	1BH,5BH,30H,4BH
7	Dimming	ESC ¥?LDPs	1BH,5CH,3FH,4CH,44H,Ps
8	Cursor mode	ESC ¥?LCPs	1BH,5CH,3FH,4CH,43H,Ps
9	Screen Mode	ESC ¥?LSPs	1BH,5CH,3FH,4CH,53H,Ps
10	Single line scroll	ESC ¥?LH Pm;Pl;Pt;Pn;Pd	1BH,5CH,3FH,4CH,48H Pm,3BH,Pl,3BH,Pt,3BH,Pn,3BH,Pd
11	Display mode set for blinking mode	ESC [5m	1BH,5BH,35H,6DH
	Display mode set for reverse mode	ESC [7m	1BH,5BH,37H,6DH
	Reset of display mode set	ESC [0m	1BH,5BH,30H,6DH
12	User definable font set	ESC ¥?LW Pf;Pn;Pc;Pd...Pd	1BH,5CH,3FH,4CH,57H, Pf,3BH,Pn,3BH,Pc,3BH,Pd...Pd
13	Graphic display mode	ESC ¥?LG Px;Py;Ph;Pw;Pd.. .Pd	1BH,5CH,3FH,4CH,47H Px,3BH,Py,3BH,Ph,3BH,Pw,3BH,Pd.. .Pd
14	Double size letter in horizontal	ESC #Ps	1BH,23H,Ps
15	Character code set of Full size letter	XX YY	The following are Display character code (2bytes code)
16	Character code set of Half size letter	XX	The following are Display character code (1bytes code)
17	Horizontal scroll on all lines Scroll mode select command	ESC ¥?LMS	1BH,5CH,3FH,4CH,4DH,53H
	Horizontal scroll on all lines Display mode set	ESC ¥?LM Pm;Pl;Pc;Pn;Pd; ...Pd	1BH,5DH,3FH,4CH,4DH, Pm,3BH,Pl,3BH,Pc,3BH,Pn,3BH,Pd ...Pd
	Horizontal scroll on all lines Scroll start command	ESC ¥?LMG	1BH,5CH3FH,4CH,4DH,47H
	Horizontal scroll on all lines JL Release command of scroll mode	ESC ¥?LME	1BH,5CH3FH,4CH,4DH,45H
18	Descriptor control (Screen Mode 6,7)	ESC ¥?DSPs	1BH,5CH,3FH,44H,53H,Ps
19	Descriptor blink control (Screen Mode 6,7)	ESC ¥?DBPs	1BH,5CH,3FH,44H,42H,Ps
20	Identification code	ESC [c	1BH,5BH,63H
21	Sleep Mode ON	ESC ¥?SS	1BH,5CH,3FH,53H,53H
	Sleep Mode OFF	ESC ¥?SE	1BH,5CH,3FH,53H,45H
22	RESET	ESC ¥?R	1BH,5CH,3FH,52H

Other codes except the above are ignored.

## 1. Back space without deleting (BS)

The write-in position is shifted to the left one digit and displaying screen is not changed.  
This command is ignored when write-in position is on the least significant digit.

## 2. Line Feed (LF)

The write-in position is shifted to the next row on the same digit position.

When the write-in position is on the bottom row, the displayed character is scrolled up to the upper row and all characters on the bottom row are cleared. The write in position is not changed.

The displayed character under the screen mode of the 24×24dot 1row + 16×16dot 2rows is not scrolled up from the row of 16×16 dot format to 24×24 dot.

## 3. Carriage return (CR)

The write-in position is shifted to the most significant digit of the same row.

When the write-in position is on the most significant digit, this is ignored.

## 4. Clear display (ESC [2J)

All the displayed character are erased. The write-in position is not changed.

## 5. Set virtual cursor (ESC [Py;PxH)

Instead of writing the character from the first digit , the write-in start position can be pointed with this command.

The write-in position is shifted with Py, Px.( It is based on the half size letter of the font, which is specified by Screen Mode.)

Py indicates the position of the row and Px the digit.

Py and Px have to be defined under the following conditions.

- 1) In case Py = 0 ⇒ sets Py=1(31H)
- 2) In case Py>bottom row ⇒ Py=bottom row
- 3) In case Px=0 ⇒ Px=1(31H)
- 4) In case Px>least digit ⇒ Px=least digit

When ESC [H' (1BH,5BH,48H,27H) command is input, the write-in position moves to home position (Py=1, Px=1).

## 6. Delete to end of line (ESC [OK)

The displayed characters from the write-in position to the end on the same row are erased.  
The write-in position is not shifted.

## 7. Dimming (ESC ¥?LDPs)

Luminance can be adjusted into six levels by using this function.

The following one byte data, after writing 1BH 5CH 3FH 4CH 44H, is written to change dimming level.

When the module is turned on , it is set to dimming level 5 (100%).

Table-8

Ps	Luminance(%)
0 (30H)	0
1 (31H)	32
2 (32H)	45
3 (33H)	54
4 (34H)	79
5 (35H)	100

## 8. Cursor mode (ESC ¥?LCPs)

This is only available under the screen mode of 5×7dot, 8rows.

The following one-byte data (Ps), after writing 1BH 5CH 3FH 4CH 43H, is written to change the cursor mode. The cursor is always displayed at the write-in position.

The cursor is formed by 5 dots located at the bottom of 5×7 dot matrix character font.

Table -9

Ps	Select mode
0 (30H)	No Lighting
1 (31H)	Blinking
2 (32H)	Lighting

### a) No Lighting mode

The cursor is not displayed on.

When the power is turned on, no lighting mode is selected automatically.

### b) Blinking mode

The cursor is repeated ON and OFF every 0.3 seconds on the blank digit.

### c) Lighting mode

The cursor is displayed on.

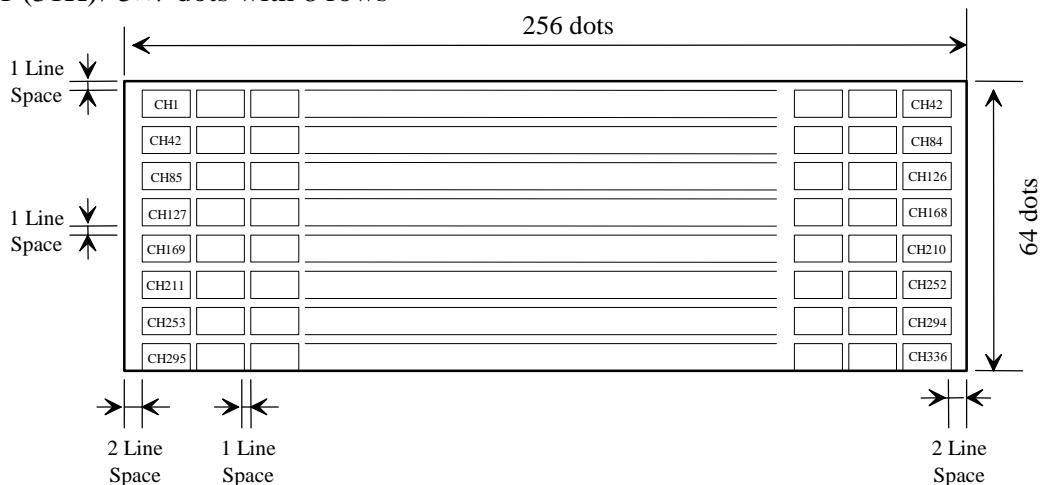
When the write-in position is assigned to the digit on where a character is displayed, the cursor is displayed on, instead of the character displayed.

## 9. Screen mode (ESC ¥?LSPs)

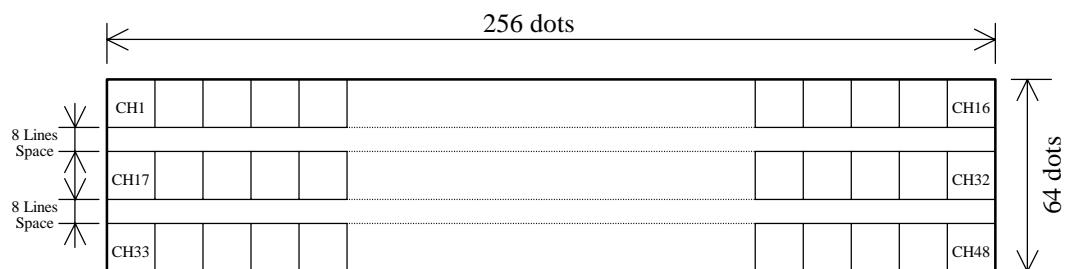
Table -10

Ps	Screen mode	Note
1(31H)	5×7 dots 8rows	
2(32H)	16×16dots, 8×16dots 3rows	default
3(33H)	24×24dots, 12×24dots 2rows	
4(34H)	24×24dots 1row+16×16dots 2rows (12×24dots, 8×16dots)	
5(35H)	16×16dots, 8×16dots 4rows	
6(36H)	4×7(Indicator)+16×16dots 3rows, 8×16dots 3rows	
7(37H)	16×16dots 3rows, 8×16dots 3rows+4×7(Indicator)	

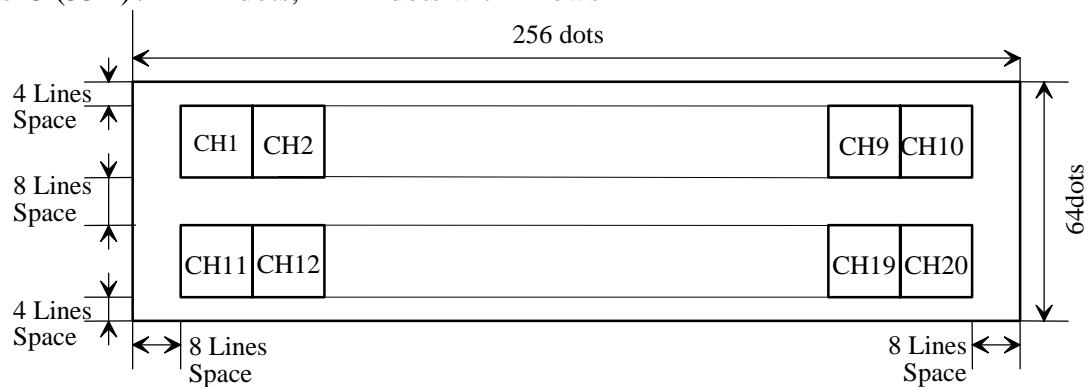
Ps=1 (31H) / 5×7 dots with 8 rows



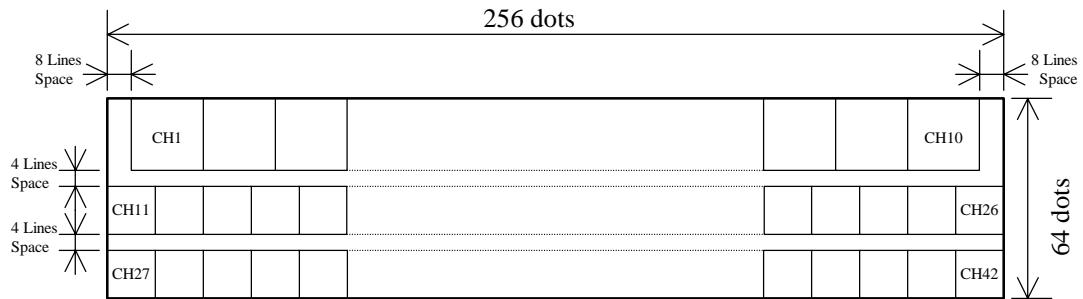
Ps=2 (32H) / 16×16dots, 8×16dots with 3 rows



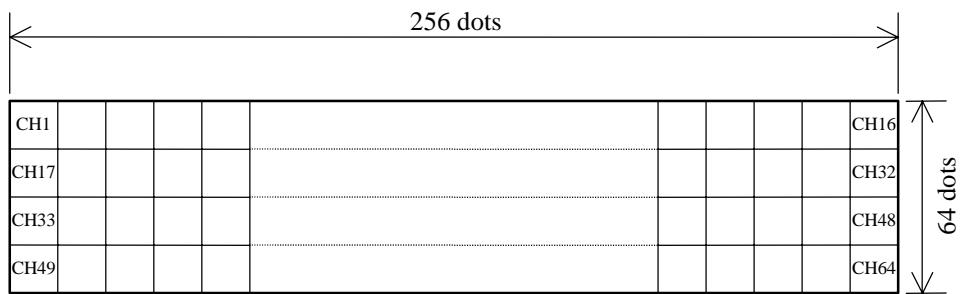
Ps=3 (33H) / 24×24dots, 12×24dots with 2 rows



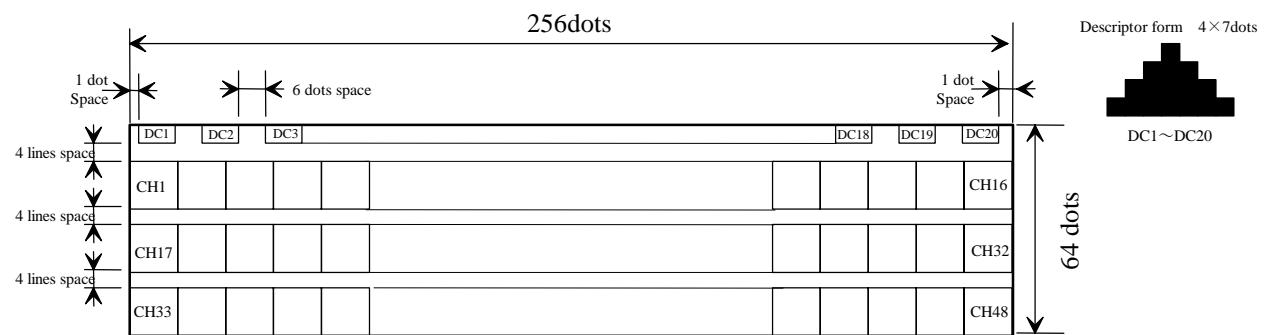
Ps=4 (34H) / 24×24dots with 1 row+16×16dots with 2 rows (12×24dots, 8×16dots)



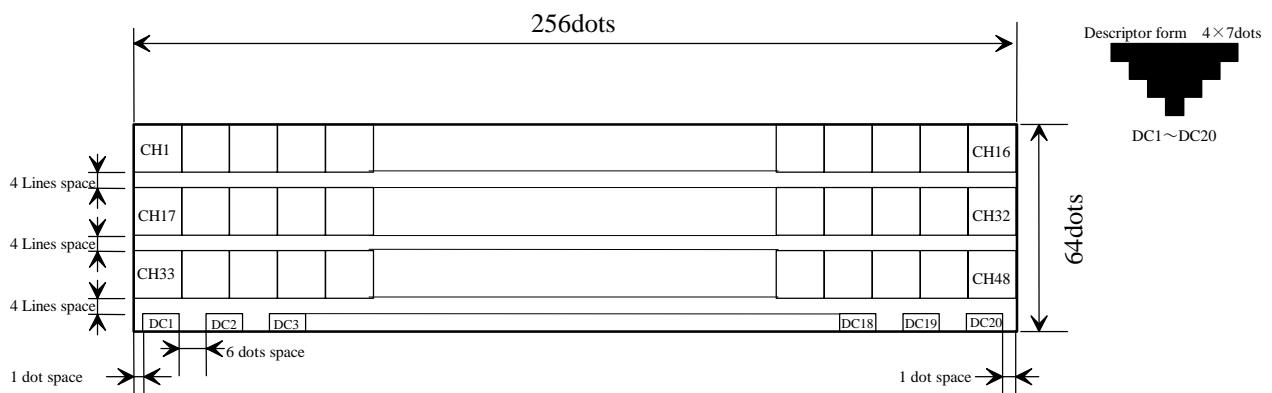
Ps=5 (35H) / 16×16dots, 8×16dots with 4 rows



Ps=6 (36H) / 4×7dots(Descriptor)+16×16dots, 8×16dots with 3 rows



Ps=7 (37H) / 16×16dots, 8×16dots with 3 rows + 4×7dots(Descriptor)



## 10. Single line scroll (ESC ¥?LH Pm;P1;Pt;Pn;Pd...Pd)

Table -11

Pm	1 (31H) : 5×7dots, 8rows 2 (32H) : 16×16dots, 8×16dots, 3rows 3 (33H) : 24×24dots, 12×24dots, 2rows 4 (34H) : 24×24dots, 1row+16×16dots, 2rows 5 (35H) : 16×16dots, 4rows 6 (36H) : Upward descriptor+16×16 8×16 3rows(Descriptor fixation) 7 (37H) : Downward descriptor+16×16 8×16 3rows(Descriptor fixation)
P1	1 ~ 8 (31H~38H) : Pm=1 1 ~ 3 (31H~33H) : Pm=2,4,6,7 1, 2 (31H,32H) : Pm=3 1 ~ 4 (31H~34H) : Pm=5
Pt	0 (30H) : 25.6mS/1 line 1 (31H) : 38.4mS/1 line 2 (32H) : 89.6mS/1 line 3 (33H) : 166.4mS/1 line
Pn	The number of data (The half size letter=1, the full size letter=2) Max.128(80H)bytes
Pd	Character data code

The basic function for scrolling

- 1) When a character is displayed on the line selected for the scroll mode, all displaying characters and the display mode set command are erased.
- 2) A character is scrolled by closed loop until the cancellation command is selected.  
In this case, a same message is scrolled repeatedly with no space.
- 3) A screen is scrolled to the left from the right dot by dot.
- 4) The range of the display of being scrolled is defined according to the screen mode setting.
- 5) The command is canceled, when Pn = 00H  
After canceled, displayed characters are cleared and the write-in position moves to the most significant digit of the row.
- 6) The command can be executed in a single line only.
- 7) A character's display mode set command (reverse/blink mode etc.) can be added with the display data frame.  
In case the command is written twice or more in one scroll data frame, the first command is only valid and others are ignored.
- 8) When a message data are changed, this command has to be set again.  
While scrolling, a user definable font command is not available.

## 11. Display mode set (ESC [Psm)

Ps=0(30H) Reset of Character attribution set (Blinking/Reverse mode)

The displaying mode of characters written in following this code are reset to normal display mode.

Ps=5(35H) Blinking mode set

The displayed characters written in following this code are repeated ON and OFF every 0.36 seconds.

Ps=7(37H) Reverse mode set

The displayed characters written in following this code are reversed.

## 12. User definable font set (ESC ¥?LWPf;Pn;Pc;Pd...Pd)

These fonts are stored in the module as follows.

Table-12

Pf : Font size	1(31H): ANK5×7dots 2(32H): 8×16dots 3(33H): 16×16dots 4(34H): 12×24dots 5(35H): 24×24dots
Pn : Font No.	1~32(31H~33H,32H) (Pf = 1, 2, 4) 1~94(31H~39H,34H) (Pf = 3,5 )
Pc : Registration address	ANK Character code (Pf = 1,2,4 ) EC40~EC7EH,EC80~EC9EH (Pf = 3,5 )
Pd : Font data	(2digits HEX) × 7 (Pf = 1) (2digits HEX) × 16 (Pf = 2) (2digits HEX) × 2 × 16 (Pf = 3) (2digits HEX) × 2 × 24 (Pf = 4) (2digits HEX) × 3 × 24 (Pf = 5)

User definable font set, it displays a character with the code of the Pc.

All data specified are stored into the RAM.

The module has no backup system for the memory so that restore is needed when power on.

The format of the font (Ex.)

① 5×7

	MSB	LSB
1		
2		
3		
4		
5		
6		
7		

■ Data ignore

② 8×16

	MSB	LSB
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

1 Byte	00H
2	00H
3	00H
4	08H
5	14H
6	22H
7	41H
8	41H
9	41H
10	7FH
11	41H
12	41H
13	41H
14	41H
15	00H
16	00H

③ 16×16

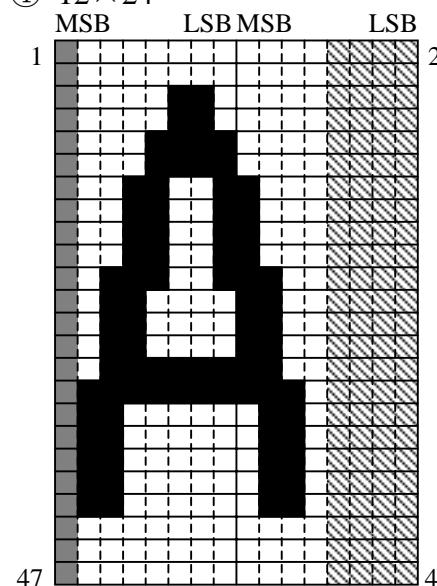
	MSB	LSB	MSB	LSB
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				

2

■ The space  
No space to a next  
character if used the line.

1 Byte	00H	2 Byte	00H
3	3FH	4	FEH
5	02H	6	20H
7	02H	8	20H
9	02H	10	20H
11	1FH	12	FCH
13	12H	14	24H
15	12H	16	24H
17	12H	18	24H
19	12H	20	24H
21	1FH	22	FCH
23	02H	24	20H
25	02H	26	20H
27	02H	28	20H
29	7FH	30	FFH
31	00H	32	00H

④ 12×24



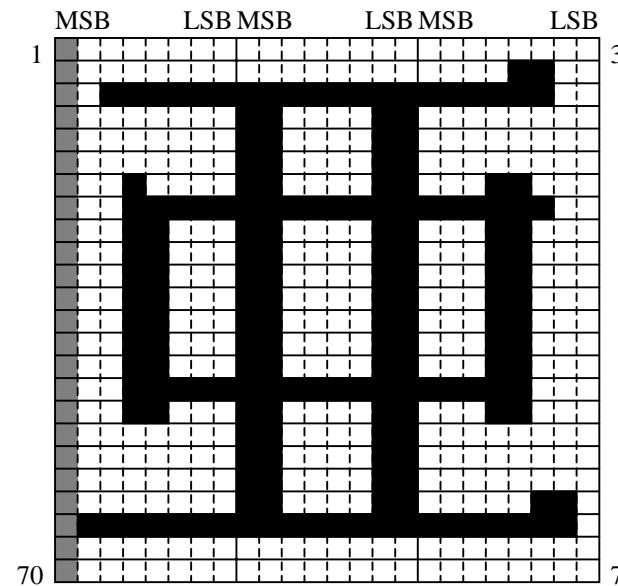
2

1 Byte	00H	2 Byte	00H
3	00H	4	00H
5	06H	6	00H
7	06H	8	00H
9	0FH	10	00H
11	0FH	12	00H
13	19H	14	80H
15	19H	16	80H
17	19H	18	80H
19	19H	20	80H
21	39H	22	C0H
23	30H	24	C0H
25	30H	26	C0H
27	30H	28	C0H
29	3FH	30	C0H
31	7FH	32	E0H
33	60H	34	60H
35	60H	36	60H
37	60H	38	60H
39	60H	40	60H
41	60H	42	60H
43	00H	44	00H
45	00H	46	00H
47	00H	48	00H

■ The space  
No space to a next  
character if used the line.

☒ Data ignore

⑤ 24×24



3

1 Byte	00H	2 Byte	00H	3 Byte	00H
4	00H	5	00H	6	0CH
7	3FH	8	FFH	9	FCH
10	00H	11	C3H	12	00H
13	00H	14	C3H	15	00H
16	00H	17	C3H	18	00H
19	10H	20	C3H	21	18H
22	1FH	23	FFH	24	FCH
25	18H	26	C3H	27	18H
28	18H	29	C3H	30	18H
31	18H	32	C3H	33	18H
34	18H	35	C3H	36	18H
37	18H	38	C3H	39	18H
40	18H	41	C3H	42	18H
43	18H	44	C3H	45	18H
46	1FH	47	FFH	48	F8H
49	18H	50	C3H	51	18H
52	00H	53	C3H	54	00H
55	00H	56	C3H	57	00H
58	00H	59	C3H	60	00H
61	00H	62	C3H	63	06H
64	7FH	65	FFH	66	FEH
67	00H	68	00H	69	00H
70	00H	71	00H	72	00H

### 13. Graphic display mode (ESC ¥?LG Px;Py;Ph;Pw;Pd)

Px = The display position 0 ~ 255 (30H ~ 32H,35H,35H)

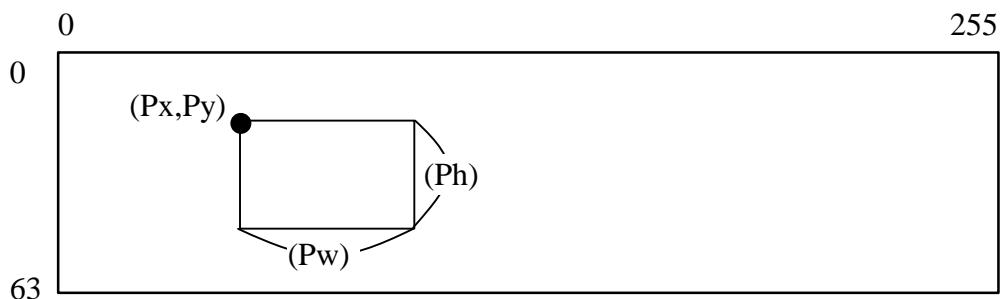
Py = The display position 0 ~ 63 (30H ~ 36H,33H)

Ph = The height 1 ~ 64 (31H ~ 36H,34H)

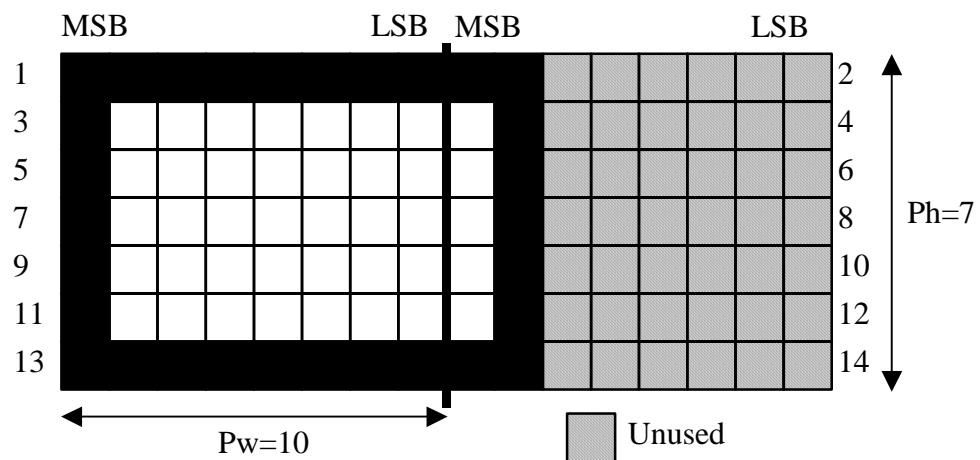
Pw = The width 1 ~ 256 (31H ~ 32H,35H,36H)

Pd = The display data (one byte HEX code)

The display position



The display image (Ex.)



1 byte	(FFH)	2byte	(C0H)
3	(80H)	4	(40H)
5	(80H)	6	(40H)
7	(80H)	8	(40H)
9	(80H)	10	(40H)
11	(80H)	12	(40H)
13	(FFH)	14	(C0H)

note) The data which is in out of specified display area is ignored.

#### 14. Double size letter in horizontal (ESC#Ps)

It can be set a character with double size letter in horizontal.  
(This is available for all of full size letter, half size letter and ANK font.)

Ps = '5'(35H) Normal size letter  
Ps = '6'(36H) Double size letter in horizontal

Example for 'ABC' characters to be set Double size letter in horizontal.  
1BH,23H,36H,41H,42H,43H,1BH,23H,35H

#### 15. Character font data (full size letter)

A character with full size letter can be selected.

#### 16. Character font data (half size letter)

A character with half size letter can be selected.

#### 17. Horizontal scroll on all lines (exclusive mode)

##### 1) Scroll mode select command (ESC¥?LMS)

Horizontal scroll on all lines mode can be selected. It maintains display conditions (e.g. screen mode, cursor position etc.) set before this command is executed.

All commands except the following the release command are ignored.

Scroll start command should be executed, when start scrolling

##### 2) Release command of scroll mode (ESC¥?LME)

To be released Horizontal scroll on all lines mode.

Display conditions set before this command is executed are reset again.

##### 3) Display mode set (ESC¥?LMPm:P1:Pt:Pn:Pd...Pd)

Table-13

Pm	Screen mode set(Other screen modes except the following are invalid) 1(31H) : 5×7dots,8rows 2(32H) : 16×16dots,8×16dots 3rows 3(33H) : 24×24dots,12×24dots,2rows
P1	Select a row to be scrolled 1~8 : (31H~38H) Pm=1 1~3 : (31H~33H) Pm=2 1~2 : (31H~32H) Pm=3
Pt	Scroll speed select 1(31H) : 10mS/1 line 2(32H) : 20mS/1 line
Pn	The number of character data(Half size letter=1byte,Full size letter=2bytes),up to 1024(400H)bytes
Pd	Data code

- a) Other codes except the above are ignored.
- b) The latest display mode set as above becomes effective in one screen scroll setting before scroll start command is executed.

##### 4) Scroll start command (1BH,5CH,3FH,4CH,4DH, 47H)

The screen can be started scrolling.

All commands except the scroll release command are ignored.

note) Space data is written in the other rows except the selected with pl code.

## 18. Descriptor control (ESC ¥?DSPs)

This command is disregarded at the time of Screen mode selection of only for Screen mode 6 and 7 others.

Ps each bit 1: Lighting, 0: putting out lights

Table-14

Ps	b7	b6	b5	b4	b3	b2	b1	b0
1 byte	'1' fixed	'1' fixed	'1' fixed	'1' fixed	DC1	DC2	DC3	DC4
2 byte	'1' fixed	'1' fixed	'1' fixed	'1' fixed	DC5	DC6	DC7	DC8
3 byte	'1' fixed	'1' fixed	'1' fixed	'1' fixed	DC9	DC10	DC11	DC12
4 byte	'1' fixed	'1' fixed	'1' fixed	'1' fixed	DC13	DC14	DC15	DC16
5 byte	'1' fixed	'1' fixed	'1' fixed	'1' fixed	DC17	DC18	DC19	DC20

This command is disregarded when Screen Mode differs.

When you publish a descriptor control command, please be sure to input 5 bytes of data specified by Ps.

## 19. Descriptor blink control (ESC ¥?DBPs)

This command is disregarded at the time of Screen mode selection of only for Screen mode 6 and 7 others.

The turned-on descriptor is blinked, when the descriptor is not on, it is this command disregard. Ps is the same as the above-mentioned descriptor allotment Table-14.

Blink time is the same as display attribute blink time.

Ps each bit 1: Blink, 0:blink release (after release is turned on)

note) When it specifies zero times by the descriptor control command at the time of a descriptor blink, the light is put out and a blink also cancels a display compulsorily. In 1 specification, a blink is canceled and it lights up.

## 20. Identification code (ESC [c)

This command is a request for the Retail Display to return a identifier. The Retail Display returns 7bytes that identifies code.

Table-15

STX 02H	Soft ware version (00.00) 30H,30H,2EH,30H,30H	ETX 03H
------------	--	------------

## 21. Sleep Mode

This state is used to reduce Retail Display power consumption and extend the life of the Retail Display VFD. Power is only removed from the VFD and the display will not be refreshed. Display data can be processed while the display is in Sleep Mode, but it will not appear until Sleep Mode is changed. The displayed character's states are preserved so that upon leaving Sleep Mode the display is restored.

1) .Sleep Mode ON (ESC ¥?SS)

2).Sleep Mode OFF (ESC ¥?SE)

## 22.Reset (ESC ¥?R)

This command is used to initialize the setting of the module; the default. During initializing, tests to be preformed at the time of power's being on will be performed, such as CPU test, items of external RAM test.

### 3-4. The test function

- a) The self memory test: When turned on, the ROM and RAM of a module are tested automatically.
- b) The display test: Test data are displayed on the screen.

#### 3-4-1. The self memory test

The test is automatically started when turned on.

If an error is occurred, DTR signal line of the module becomes disable against a host system to notice the state of reception prohibition.

#### 3-4-2. The display test

The display test starts when one of the following is executed.

- ① When the J6 is short.
- ② When both signal line connections RXD-TXD are connected.

The screen shows the following test patterns.

- 1) All dots is turned on.
- 2) Horizontal lines in every one line are turned on.
- 3) Vertical lines in every four line are turned on.
- 4) All dots is turned on.

#### 3-4-3. The display confirmation

When the module is turned on, all dots are turned on for 500 mS.

## 4. INTERFACE CONNECTION

### 4-1. Interface configuration

Signal level	:	RS-232C serial communication
Data transfer format	:	Un-synchronous and bi-directional communication
Data length	:	8bits (LSB first)
Parity bit	:	Even/Odd/Non(Initial setting:Odd)
Start bit	:	1 bit
Stop bit	:	1 bit
Baud rate	:	38400/19200/9600/4800/2400/1200bps (Initial setting:19200bps)

### 4-2. Connector pin assignment

Connector : SM08B-PASS-1 (JST)  
Socket : PAP-08V-S (JST)

Table-16

Pin	Signal	I/O	Description
1	+5V	-	Supply voltage
2	TXD	0	Output data
3	RXD	I	Input data
4	GND	-	GND
5	CTS	I	RTS connected
6	RTS	0	CTS connected
7	DSR	I	Sleep control(Hard Ware)
8	DTR	0	Busy signal

Note) These are signals of the VFD module.

### 4-3. JAMPER

The following Table-17 indicates the JAMPER setting for baud rate/Parity/self test.

Table-17

JAMPER	Function	Initial setting
J1	Baud rate selection	—
J2		—
J3		○
J4	Parity set	○
J5		○
J6	Self test	—

— : Open

○ : Short

### 4-3-1. Baud rate selection

It is possible to select a baud rate 1200 to 38400bps by the combination of the J1, J2 and J3 as shown below. (Initial setting : 9600bps)

Table-18

J1	○	—	○	—	—	○
J2	○	○	—	—	—	○
J3	—	—	—	—	○	○
Baud rate (bps)	1200	2400	4800	9600	19200	38400

— : Open

○ : Short

### 4-3-2. Parity setting

It is possible to set parity bit by the combination of the J4 and J5 as shown below.  
(Initial setting: ODD)

Table-19

J4		J5	
○	—	○	—
Parity	Non Parity	ODD	EVEN

— : Open

○ : Short

Note) J5 is effective only when J4 is Short.

### 4-3-3. The self-test

Either self test mode or normal mode, the J6 has to be set at power on.

It starts the self-test when the J6 is short, at power on.

To release the test mode, the module has to be turned off and the J6 has to be set Open.  
(Initial setting: Normal)

Table-20

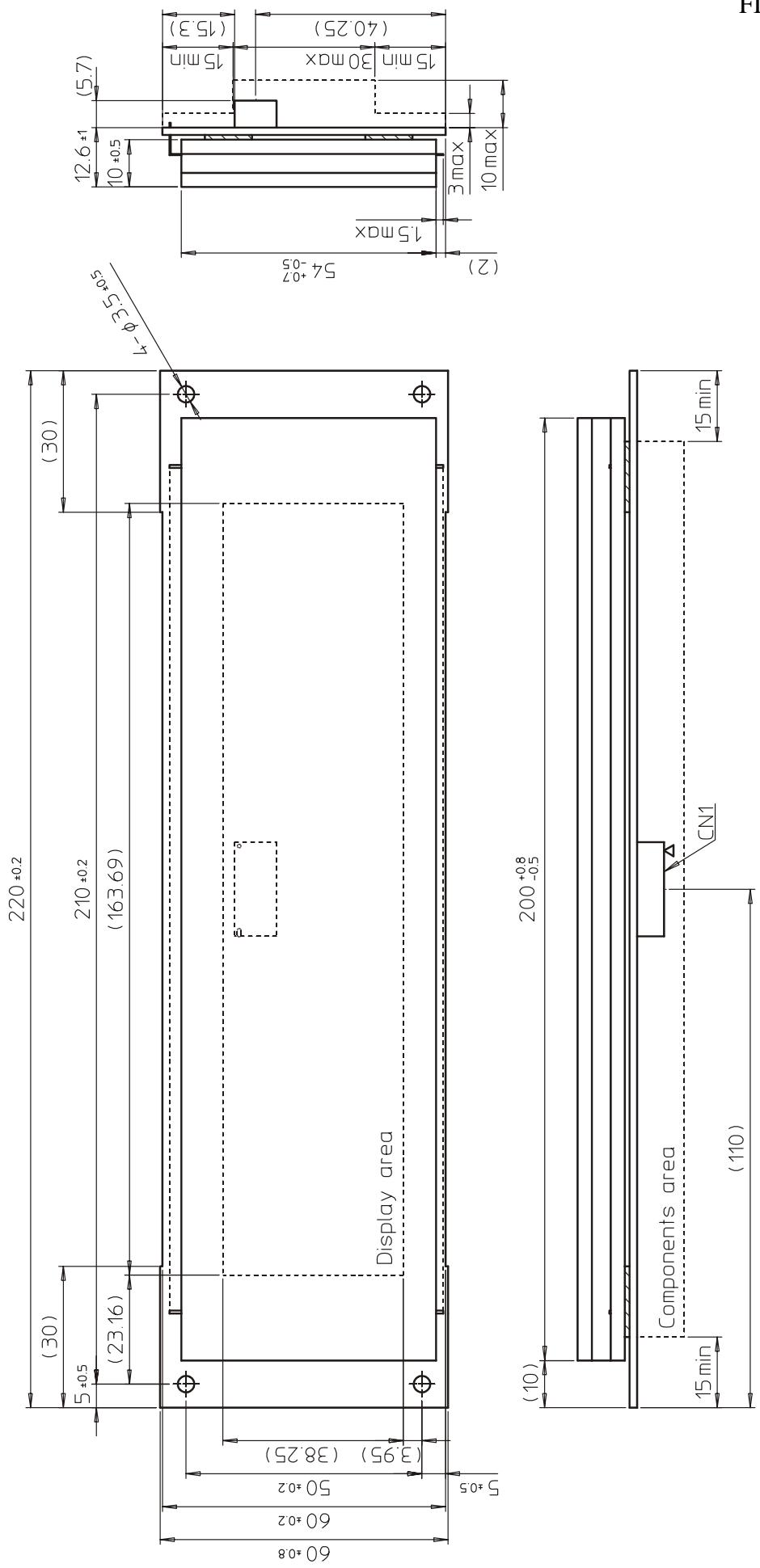
J6	
○	—
Self-test	Normal

— : Open

○ : Short

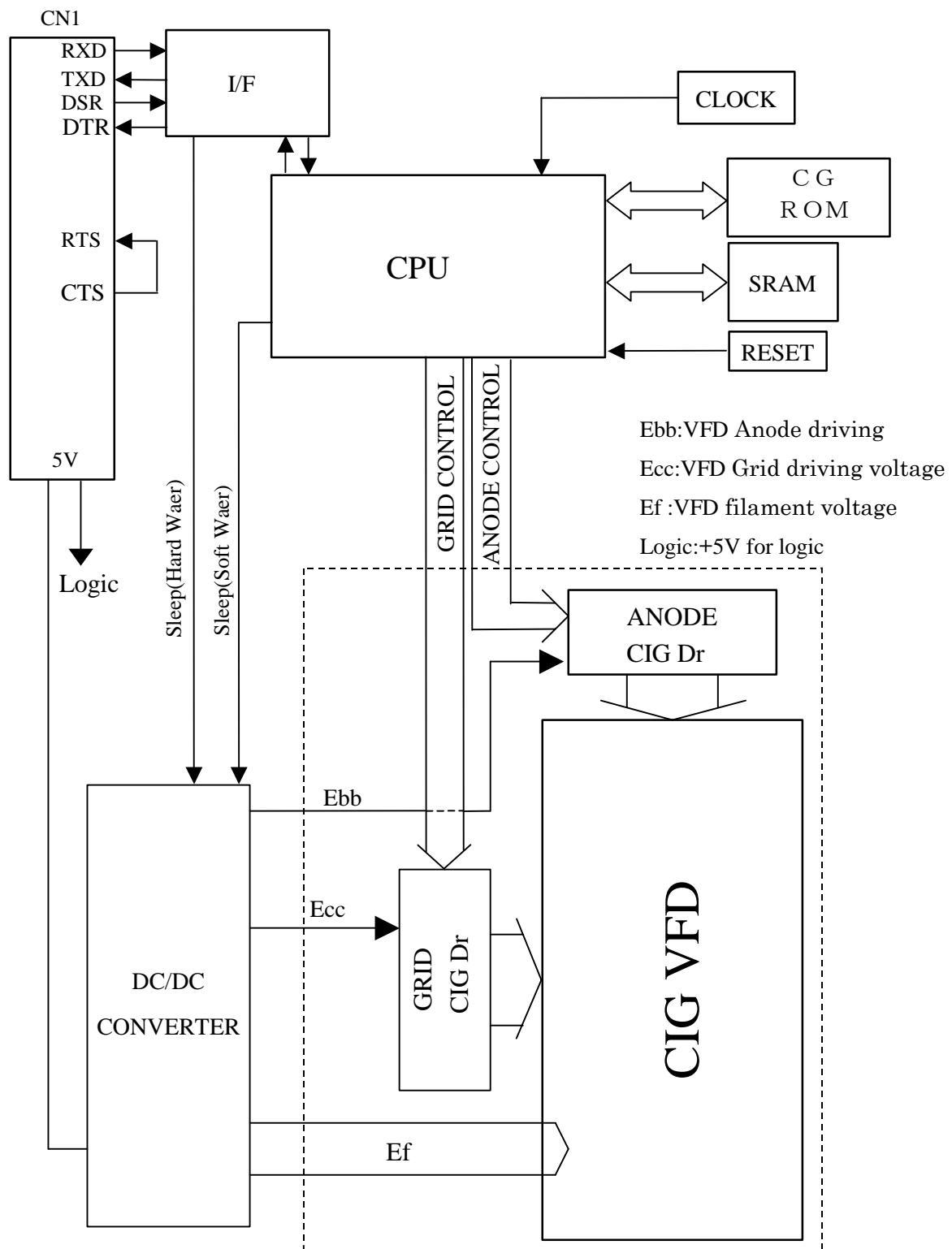
GP1160A02A MECHANICAL DRAWING

FIGURE-1



## GP1160A02A CIRCUIT BLOCK DIAGRAM

## FIGURE-2



## Appendix-1/7

### ANK Character

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	`	p	·	·	一	タ	ミ	·	·	
1			!	1	A	Q	a	q	·	·	。	ア	チ	ム	·	·
2			"	2	B	R	b	r	·	·	「	イ	ツ	メ	·	·
3			#	3	C	S	c	s	·	·	」	ウ	テ	モ	·	·
4			\$	4	D	T	d	t	·	·	、	エ	ト	ヤ	·	·
5			%	5	E	U	e	u	·	·	·	オ	ナ	ユ	·	·
6			&	6	F	V	f	v	·	·	ヲ	カ	ニ	ヨ	·	·
7			,	7	G	W	g	w	·	·	ア	キ	ヌ	ラ	·	·
8			(	8	H	X	h	x	·	·	イ	ク	ネ	リ	·	·
9			)	9	I	Y	i	y	·	·	ウ	ケ	ノ	ル	·	·
A			*	:	J	Z	j	z	·	·	エ	コ	ハ	レ	·	·
B			+	;	K	[	k	{	·	·	オ	サ	ヒ	ロ	·	·
C			,	<	L	¥	l		·	·	ヤ	シ	フ	ワ	·	·
D			-	=	M	]	m	}	·	·	ユ	ス	ヘ	ン	·	·
E			.	>	N	^	n	—	·	·	ヨ	セ	ホ	ゞ	·	·
F			/	?	O	-	o	■	·	·	ツ	ソ	マ	。	·	·

### FONT for Japan Shift JIS

81	4	5	6	7	8	9	A	B	C	D	E	F				
0		—	~	}	÷	\$	□	·	·	·	÷	Å				
1	,			<	=	¢	■	·	·	·	«	%o				
2	。	、		>	≠	£	△	·	·	·	»	#				
3	,	、	…	«	<	%	▲	·	·	·	√	„				
4	.	、	..	»	>	#	▽	·	·	·	∞	♪				
5	·	、	‘	‘	≤	&	▼	·	·	·	∞	†				
6	:	〃	’	」	≥	*	※	·	·	·	·	‡				
7	;	全	“	『	∞	@	〒	·	·	·	∫	¶				
8	?	々	”	』	..	§	→	∈	∧	·	∫∫	·				
9	!	〆	(	【	♂	☆	←	Ξ	∨	·	·	·				
A	°	○	)	】	♀	★	↑	≤	¬	·	·	·				
B	°	—	[	+	°	○	↓	≥	⇒	⊥	·	·				
C	‘	—	】	—	’	●	=	⊂	↔	^	·	○				
D	‘	-	[	±	”	◎	·	□	∀	∂	·	·				
E	“	/	】	×	°C	◇	·	U	Ξ	∇	·	·				
F	^	＼	{	·	¥	◆	·	∏	·	≡	·	·				

82	4	5	6	7	8	9	A	B	C	D	E	F				
0	·	1	A	Q	·	p	あ	げ	ぢ	ひ	も	を				
1	·	2	B	R	a	q	い	こ	つ	び	や	ん				
2	·	3	C	S	b	r	い	ご	つ	び	や	・				
3	·	4	D	T	c	s	う	さ	づ	ふ	ゆ	・				
4	·	5	E	U	d	t	う	ざ	て	ぶ	ゆ	・				
5	·	6	F	V	e	u	え	し	で	ふ	よ	・				
6	·	7	G	W	f	v	え	じ	と	へ	よ	・				
7	·	8	H	X	g	w	お	す	ど	べ	ら	・				
8	·	9	I	Y	h	x	お	づ	な	ペ	り	・				
9	·	·	J	Z	i	y	か	せ	に	ほ	る	・				
A	·	·	K	·	j	z	が	ぜ	ぬ	ぼ	れ	・				
B	·	·	L	·	k	·	き	そ	ね	ぼ	ろ	・				
C	·	·	M	·	l	·	ぎ	ぞ	の	ま	わ	・				
D	·	·	N	·	m	·	く	た	は	み	わ	・				
E	·	·	O	·	n	·	ぐ	だ	ば	む	ゐ	・				
F	0	·	P	·	o	あ	け	ち	ぱ	め	ゑ	・				

83	4	5	6	7	8	9	A	B	C	D	E	F				
0	ア	ケ	チ	パ	ム	ヰ	ヰ	Σ	β	σ	·	·				
1	ア	ゲ	ヂ	ヒ	メ	ヰ	ヰ	Γ	Τ	γ	τ	·	·			
2	イ	コ	ッ	ビ	モ	ヰ	ヰ	Δ	Τ	δ	v	·	·			
3	イ	ゴ	ツ	ビ	ヤ	ン	ヰ	ヰ	Φ	ε	φ	·	·			
4	ウ	サ	ヅ	フ	ヤ	ヴ	Z	ヰ	ヰ	ζ	χ	·	·			
5	ウ	ザ	テ	ブ	ユ	カ	ヰ	ヰ	Ψ	η	φ	·	·			
6	エ	シ	デ	ブ	ユ	ケ	ヰ	ヰ	Ω	θ	ω	·	·			
7	エ	ジ	ト	ヘ	ヨ	・	I	・	ι	·	·	·	·			
8	オ	ス	ド	ベ	ヨ	・	K	・	κ	·	·	·	·			
9	オ	ズ	ナ	ペ	ラ	・	Λ	・	λ	·	·	·	·			
A	カ	セ	ニ	ホ	リ	・	M	・	μ	·	·	·	·			
B	ガ	ゼ	ヌ	ボ	ル	・	N	・	ν	·	·	·	·			
C	キ	ソ	ネ	ボ	レ	・	Ξ	・	ξ	·	·	·	·			
D	ギ	ゾ	ノ	マ	ロ	・	O	・	o	·	·	·	·			
E	ク	タ	ハ	ミ	ワ	・	Π	・	π	·	·	·	·			
F	グ	ダ	バ	・	ワ	A	P	α	ρ	·	·	·	·			

84	4	5	6	7	8	9	A	B	C	D	E	F				
0	А	П	Я	а	о	ю		Т	·	·	·	·				
1	Б	Р	·	б	п	я	г	Т	·	·	·	·				
2	В	С	·	в	р	·	г	·	г	·	·	·				
3	Г	Т	·	г	с	·	·	·	·	·	·	·				
4	Д	У	·	д	т	·	·	·	·	·	·	·				
5	Е	Ф	·	е	у	·	·	·	·	·	·	·				
6	Ё	Х	·	ё	ф	·	·	·	·	·	·	·				
7	Ж	Ц	·	ж	х	·	·	·	·	·	·	·				
8	З	Ч	·	з	ц	·	·	·	·	·	·	·				
9	И	Ш	·	и	ч	·	·	·	·	·	·	·				
А	Й	Щ	·	й	ш	·	·	·	·	·	·	·				
В	К	ъ	·	к	щ	·	·	·	·	·	·	·				
С	Л	Ы	·	л	ъ	·	·	·	·	·	·	·				
Д	М	Ь	·	м	ы	·	·	·	·	·	·	·				
Е	Н	Э	·	н	ь	·	·	·	·	·	·	·				
Ф	О	Ю	·	·	э	—	·	·	·	·	·	·				

## Appendix-2/7

87	4	5	6	7	8	9	A	B	C	D	E	F
0	.	.	.	.	.	.	.	.	.	.	.	.
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
A	.	.	.	.	.	.	.	.	.	.	.	.
B	.	.	.	.	.	.	.	.	.	.	.	.
C	.	.	.	.	.	.	.	.	.	.	.	.
D	.	.	.	.	.	.	.	.	.	.	.	.
E	.	.	.	.	.	.	.	.	.	.	.	.
F	.	.	.	.	.	.	.	.	.	.	.	.

88	4	5	6	7	8	9	A	B	C	D	E	F
0	.	.	.	.	.	.	啞	芦	安	威	謂	芋
1	.	.	.	.	.	.	娃	鯈	庵	尉	違	鰯
2	.	.	.	.	.	.	阿	梓	按	惟	遺	允
3	.	.	.	.	.	.	哀	圧	暗	意	医	印
4	.	.	.	.	.	.	愛	斡	案	慰	井	咽
5	.	.	.	.	.	.	挨	扠	闇	易	亥	員
6	.	.	.	.	.	.	始	宛	鞍	椅	域	因
7	.	.	.	.	.	.	逢	姐	杏	為	育	姻
8	.	.	.	.	.	.	葵	虻	以	畏	郁	引
9	.	.	.	.	.	.	茜	飴	伊	異	磯	飲
A	.	.	.	.	.	.	穉	絢	位	移	一	淫
B	.	.	.	.	.	.	惡	綾	依	維	壘	胤
C	.	.	.	.	.	.	握	鮎	偉	緯	溢	蔭
D	.	.	.	.	.	.	渥	或	閔	胃	逸	·
E	.	.	.	.	.	.	旭	栗	夷	萎	稻	·
F	.	.	.	.	.	.	亞	葦	裕	委	衣	茨

89	4	5	6	7	8	9	A	B	C	D	E	F
0	院	臼	荏	英	園	艷	旺	臘	佳	禍	霞	解
1	陰	渦	餌	衛	堰	苑	橫	桶	加	禾	蚊	回
2	隱	噓	叡	詠	奄	蘭	欧	牡	可	稼	俄	塊
3	韻	唄	嘗	銳	宴	遠	歿	乙	嘉	箇	峨	壞
4	時	薌	嬰	液	延	鉛	王	俺	夏	花	我	廻
5	右	蔚	影	疫	怨	鴛	翁	卸	嫁	苛	牙	快
6	宇	鰻	映	益	掩	塙	襖	恩	家	茄	画	怪
7	烏	姥	曳	駛	援	於	鶯	溫	寡	荷	臥	悔
8	羽	廸	榮	悅	沿	汚	鷗	穩	科	華	芽	恢
9	迂	浦	永	謁	演	甥	黃	音	暇	菓	蛾	懷
A	雨	瓜	泳	越	炎	回	岡	下	果	蝦	賀	戒
B	卯	閏	洩	閔	焰	央	沖	化	架	課	雅	拐
C	鶴	噂	瑛	榎	煙	奥	荻	仮	歌	嘩	餓	改
D	窺	云	盈	厭	燕	往	億	何	河	貨	駕	·
E	丑	運	穎	円	猿	応	屋	伽	火	迦	介	·
F	碓	雲	穎	·	縁	押	憶	価	珂	過	会	·

8A	4	5	6	7	8	9	A	B	C	D	E	F
0	魁	咳	柿	角	檻	叶	刈	寬	澗	諫	癌	嬉
1	晦	害	蛎	赫	棍	杔	荔	干	淮	貫	眼	寄
2	械	崖	鈎	較	鯀	樺	瓦	幹	環	還	岩	岐
3	海	慨	劃	郭	鴻	鞞	乾	患	甘	鑑	翫	希
4	灰	概	嚇	閣	割	株	侃	感	監	間	贗	幾
5	界	涯	各	隔	喝	兜	冠	慣	看	閑	雁	忌
6	皆	碍	廓	革	恰	竈	寒	憾	竿	閔	頑	揮
7	絵	蓋	拏	学	括	蒲	刊	換	管	陷	顏	机
8	芥	街	攬	岳	活	釜	勘	敢	簡	韓	願	旗
9	蟹	該	格	樂	渴	鎌	勸	柑	緩	館	企	既
A	開	鎧	核	額	滑	噙	卷	桓	缶	鎔	伎	期
B	階	骸	殼	顎	葛	鴨	喚	棺	翰	丸	危	棋
C	貝	涅	獲	掛	褐	栢	堪	款	肝	含	喜	棄
D	凱	馨	確	笠	轄	茅	姦	歛	艦	岸	器	·
E	効	蛙	穫	櫻	且	萱	完	汗	莞	巖	基	·
F	外	垣	覺	·	鰹	粥	官	漢	觀	玩	奇	·

8B	4	5	6	7	8	9	A	B	C	D	E	F
0	機	輝	義	却	朽	巨	俠	恐	饗	巾	金	愚
1	帰	飢	蟻	客	求	拒	僑	恭	驚	錦	吟	虞
2	毅	騎	誼	脚	汲	拏	兇	挾	仰	斤	銀	喰
3	氣	鬼	議	虐	泣	挙	競	教	凝	欣	九	空
4	汽	亀	掬	逆	灸	渠	共	橋	堯	欽	俱	偶
5	畿	偽	菊	丘	球	虛	凶	況	曉	琴	句	寓
6	祈	儀	鞠	久	究	許	協	狂	業	禁	区	遇
7	季	妓	吉	仇	窮	距	匡	狹	局	禽	狗	隅
8	稀	宜	吃	休	笈	鋸	卿	矯	曲	筋	玖	串
9	紀	戯	喫	及	級	漁	叫	胸	極	緊	矩	櫛
A	徽	技	桔	吸	糾	禦	喬	脅	玉	芹	苦	釤
B	規	擬	橘	宮	給	魚	境	興	桐	菌	軀	屑
C	記	欺	詰	弓	旧	亨	峽	蒿	糸	衿	驅	屈
D	貴	犧	砧	急	牛	享	強	鄉	僅	襟	駢	·
E	起	疑	杵	救	去	京	彊	鏡	勤	謹	駒	·
F	軌	祇	黍	·	居	供	怯	響	均	近	具	·

8C	4	5	6	7	8	9	A	B	C	D	E	F
0	掘	訓	形	繼	劇	僕	權	顚	限	糊	吳	交
1	窟	群	徑	繫	載	倦	牽	驗	乎	袴	吾	校
2	沓	軍	惠	郢	擊	健	犬	鹹	個	股	娛	侯
3	靴	郡	慶	蒼	激	兼	獻	元	古	胡	後	候
4	轡	卦	慧	荊	隙	券	研	原	呼	菰	御	倖
5	窪	袈	憩	蛩	桁	劍	硯	巖	固	虎	悟	光
6	熊	祁	揭	計	傑	喧	絹	幻	姑	誇	梧	公
7	隈	係	携	詣	欠	圈	県	弦	孤	跨	檜	功
8	籴	傾	敬	警	決	堅	肩	減	己	鈸	瑚	効
9	栗	刑	景	輕	潔	嫌	見	源	庫	雇	碁	勾
A	繅	兄	桂	頸	穴	建	謙	玄	弧	顧	語	厚
B	桑	啓	溪	鷄	結	憲	賢	現	戶	鼓	誤	口
C	鍬	圭	畦	芸	血	懸	軒	絃	故	五	護	向
D	勲	珪	稽	迎	訣	拳	遣	舷	枯	互	酬	·
E	君	型	系	鯨	月	捲	鍵	言	湖	伍	乞	·
F	薰	契	絰	·	件	檢	陥	諺	狐	午	鯉	·

### Appendix-3/7

8D	4	5	6	7	8	9	A	B	C	D	E	F
0	后	恒	港	膏	项	告	頃	魂	座	災	財	昨
1	喉	慌	溝	航	香	国	今	些	挫	采	汎	朔
2	坑	抗	甲	荒	高	穀	困	佐	債	犀	坂	柵
3	垢	拘	皇	行	鴻	酷	坤	叉	催	碎	阪	窄
4	好	控	硬	衡	剛	鵠	墾	唆	再	砦	堦	策
5	孔	攻	稿	講	劫	黑	婚	嗟	最	祭	榦	索
6	孝	昂	糠	貢	号	獄	恨	左	哉	斎	肴	錯
7	宏	晃	紅	購	合	漑	懇	差	塞	細	咲	桜
8	工	更	紜	郊	壞	腰	昏	查	妻	菜	崎	鮭
9	巧	杭	絞	酵	拷	甌	昆	沙	宰	裁	埼	筐
A	巷	校	綱	鉛	濠	忽	根	瑳	彩	載	崎	匙
B	幸	梗	耕	礎	豪	惚	樞	砂	才	際	鷺	冊
C	広	構	考	鋼	轟	骨	混	詐	採	劑	作	刷
D	庚	江	肯	閻	麴	猶	痕	鎖	栽	在	削	・
E	康	洪	肱	降	克	込	紺	裟	歲	材	昨	・
F	弘	浩	腔	・	刻	此	艮	坐	濟	罪	搘	・

8E	4	5	6	7	8	9	A	B	C	D	E	F
0	察	傘	餐	姿	死	諮	滋	鳴	寔	社	錫	酒
1	拶	參	斬	子	氏	資	治	竺	蔀	紗	若	首
2	撮	山	暫	屍	獅	賜	爾	軸	篠	者	寂	儒
3	擦	慘	殘	市	祉	雌	璽	宍	偲	謝	弱	受
4	札	撒	仕	師	私	飼	痔	零	柴	車	惹	呪
5	殺	散	仔	志	糸	齒	磁	七	芝	遮	主	寿
6	薩	棧	伺	思	紙	事	示	叱	屢	蛇	取	授
7	雜	燦	使	指	紫	似	而	執	蕊	邪	守	樹
8	臯	珊瑚	刺	支	肢	侍	耳	失	縞	借	手	綏
9	鯖	產	司	孜	脂	兒	自	嫉	舍	勺	朱	需
A	捌	算	史	斯	至	字	蒔	室	写	尺	殊	囚
B	鑄	纂	嗣	施	視	寺	辭	悉	射	杓	狩	収
C	鮫	蚕	四	旨	詞	慈	汐	湿	捨	灼	珠	周
D	皿	讚	士	枝	詩	持	鹿	漆	赦	爵	種	・
E	晒	贊	始	止	試	時	式	疾	斜	酌	腫	・
F	三	酸	姊	・	誌	次	識	質	煮	釁	趣	・

8F	4	5	6	7	8	9	A	B	C	D	E	F
0	宗	襲	汁	術	準	署	匠	床	沼	紹	鐘	条
1	就	讐	渢	述	潤	書	升	廠	消	肖	障	杖
2	州	蹴	獸	俊	盾	薯	召	彰	涉	菖	鞘	淨
3	修	輯	縱	峻	純	諸	哨	承	湘	蔣	上	状
4	愁	週	重	春	巡	諸	商	抄	燒	蕉	丈	疊
5	拾	酉	銃	瞬	遵	助	唱	招	焦	衝	丞	穰
6	洲	酬	叔	竣	醇	叙	嘗	掌	照	裳	乘	蒸
7	秀	集	夙	舜	順	女	奐	捷	症	訟	冗	讓
8	秋	醜	宿	駿	处	序	妾	昇	省	証	剩	釀
9	終	什	淑	准	初	徐	娼	昌	硝	詔	城	鋌
A	繡	住	祝	循	所	恕	宵	昭	礁	詳	場	囑
B	習	充	縮	旬	暑	鋤	將	晶	祥	象	壤	埴
C	臭	十	肅	楯	曙	除	小	松	称	賞	嬾	飾
D	舟	從	塾	殉	渚	傷	少	梢	章	醬	常	・
E	蒐	戎	熟	淳	庶	償	尚	樟	笑	鉢	情	・
F	衆	柔	出	・	緒	勝	庄	樵	粧	鍾	擾	・

90	4	5	6	7	8	9	A	B	C	D	E	F
0	拭	娠	秦	壬	逗	瑞	摺	晴	逝	籍	說	栓
1	植	寢	紳	尋	吹	鼈	寸	棲	醒	績	雪	梅
2	殖	審	臣	甚	垂	崇	世	栖	青	脊	絕	泉
3	燭	心	芯	尽	帥	嵩	瀨	正	靜	責	舌	淺
4	織	慎	薪	推	數	畝	清	斎	赤	蟬	洗	・
5	職	振	親	訊	水	枢	是	牲	稅	跡	仙	染
6	色	新	診	迅	炊	趨	淒	生	脆	蹟	先	潛
7	触	晋	身	陣	睡	雛	制	盛	隻	碩	千	煎
8	食	森	辛	鞠	粹	据	勢	精	席	切	占	燭
9	蝕	榛	進	筍	翠	杉	姓	聖	惜	拙	宣	旋
A	辱	漫	針	諷	衰	楣	征	声	戚	接	專	穿
B	尻	深	震	須	遂	菅	性	製	斥	摄	尖	箭
C	伸	申	人	酢	頗	成	西	昔	折	川	線	・
D	信	疹	仁	図	錐	雀	政	誠	析	設	戰	・
E	侵	真	刃	厨	錘	裾	整	誓	石	窃	扇	・
F	唇	神	塵	・	隨	澄	星	請	積	節	撰	・

91	4	5	6	7	8	9	A	B	C	D	E	F
0	纖	善	疏	叢	操	草	藏	族	訖	岱	隊	抯
1	羨	漸	疎	倉	早	莊	贈	繞	唾	帶	黛	拓
2	腺	然	礎	喪	曹	葬	造	卒	墮	待	鯛	沵
3	舛	全	祖	壯	巢	蒼	促	袖	妥	怠	代	濯
4	船	禪	租	奏	槍	藻	側	其	惰	態	台	琢
5	薦	繕	粗	爽	櫓	裝	則	揜	打	戴	大	託
6	詮	膳	素	宋	漕	走	即	存	柁	替	第	鐸
7	賤	糧	組	層	燥	送	息	孫	舵	泰	醍	濁
8	踐	噌	蘇	匝	爭	遭	捉	尊	櫓	滯	題	諾
9	選	塑	訴	惄	瘦	鎗	束	損	陀	胎	鷹	葺
A	遷	岨	阻	想	相	霜	測	村	駄	腿	淹	廩
B	錢	措	遡	搜	窓	騷	足	遜	驛	苔	瀧	蛸
C	銑	曾	鼠	掃	糟	像	速	他	体	袋	卓	只
D	閃	曾	僧	挿	總	增	俗	多	堆	貸	啄	・
E	鮮	楚	創	搔	綜	憎	屬	太	対	退	宅	・
F	前	狙	双	・	聰	臓	賊	汰	耐	逮	托	・

92	4	5	6	7	8	9	A	B	C	D	E	F
0	叩	单	蛋	恥	逐	註	帳	腸	賃	漬	亭	挺
1	但	嘆	誕	智	秩	耐	疔	疔	蝶	鎮	柘	低
2	達	坦	鍛	池	窒	鑄	弔	弔	調	陳	辻	停
3	辰	担	団	痴	茶	駐	張	諜	津	薦	偵	汀
4	奪	探	壇	稚	嫡	樗	彫	彫	超	墜	綴	剃
5	脫	旦	彈	置	着	瀦	徵	跳	椎	鐸	貞	禎
6	巽	歎	斷	致	中	猪	懲	銚	槌	椿	呈	程
7	堅	淡	暖	蜘	仲	苧	挑	長	追	潰	堤	締
8	迺	湛	檀	遲	宙	著	暢	頂	鎔	坪	定	艇
9	棚	炭	段	馳	忠	貯	貯	鳥	痛	壺	帝	訂
A	谷	短	男	築	抽	丁	潮	勅	通	嫿	底	諦
B	狸	端	談	畜	昼	兆	牒	摶	塚	紬	庭	蹄
C	鱈	簞	值	竹	柱	凋	町	直	梅	爪	廷	遁
D	樽	綻	知	筑	注	喋	眺	朕	掘	吊	弟	・
E	誰	耽	地	蓄	虫	寵	聰	沈	槐	釣	悌	・
F	丹	胆	弛	・	衷	帖	脹	珍	佃	鶴	抵	・

## Appendix-4/7

93	4	5	6	7	8	9	A	B	C	D	E	F
0	邸	撤	伝	菟	凍	盜	蕩	堂	澆	寅	内	汝
1	鄭	轍	殿	賭	刀	淘	藤	導	特	酉	乍	二
2	釘	迭	澱	途	唐	湯	討	憧	督	滯	凪	尼
3	鼎	鉄	田	都	塔	濤	膳	撞	禿	頓	薙	武
4	泥	典	電	鍍	塘	灯	豆	洞	篤	屯	謎	迹
5	摘	填	兎	砥	套	燈	踏	瞳	毒	惇	灘	匱
6	擢	天	吐	砾	宕	當	逃	童	独	敦	捺	賑
7	敵	展	堵	努	島	痘	透	胴	諱	沌	鍋	肉
8	滴	店	塗	度	嶠	禱	鐙	萄	柵	豚	楂	虹
9	的	添	妬	土	悼	等	陶	道	橡	遁	馴	廿
A	笛	纏	屠	奴	投	答	頭	銅	凸	頓	繩	日
B	適	甜	徒	怒	搭	箇	騰	峠	突	吞	啜	乳
C	鐸	貼	斗	倒	東	糖	闘	鵠	榦	曇	南	入
D	溺	転	杜	党	桃	統	働	匿	屆	鈍	楠	・
E	哲	顛	渡	冬	榜	到	動	得	鳶	奈	軟	・
F	徹	点	登	・	棟	董	同	德	苦	那	難	・

94	4	5	6	7	8	9	A	B	C	D	E	F
0	如	捻	覩	廕	楨	楨	柏	箱	伐	搬	頒	扉
1	尿	撚	蚤	拝	煤	泊	硃	罰	斑	飯	批	非
2	蕙	燃	巴	排	狼	白	箸	拔	板	挽	披	飛
3	任	粘	把	敗	賈	箔	肇	筏	汜	晚	斐	樞
4	妊	乃	播	杯	壳	粕	筭	闕	汎	番	比	簸
5	忍	迺	霸	盃	賠	舶	櫨	鳩	版	盤	泌	備
6	認	之	杷	牌	陪	薄	幡	嘶	犯	磐	疲	尾
7	濡	埶	波	背	這	迫	肌	墻	班	蕃	皮	微
8	禰	囊	派	肺	蠅	曝	烟	蛤	畔	蛮	碑	批
9	祢	惱	琶	畫	秤	漠	畠	隼	繁	匪	秘	毘
A	寧	濃	破	配	矧	爆	八	伴	般	卑	緋	琵
B	葱	納	婆	倍	萩	縛	鉢	判	藩	否	罷	眉
C	猫	能	罵	培	伯	莫	澆	半	販	妃	肥	美
D	熱	腦	芭	媒	剥	駁	發	反	範	庇	被	・
E	年	膾	馬	梅	博	麦	醸	叛	采	彼	誹	・
F	念	農	俳	・	拍	函	髮	帆	煩	悲	費	・

95	4	5	6	7	8	9	A	B	C	D	E	F
0	鼻	姬	描	頻	斧	武	腹	焚	並	片	步	呆
1	格	媛	病	敏	普	舞	複	奮	蔽	篇	甫	報
2	稗	紐	秒	瓶	浮	葡	覆	粉	閉	編	補	奉
3	匹	百	苗	不	父	蕪	淵	糞	陞	辺	輔	宝
4	疋	謬	錨	付	符	部	弗	紛	米	返	穗	峰
5	髦	俵	鋤	埠	腐	封	払	霧	貢	遍	募	峯
6	彥	彪	蒜	夫	膚	楓	沸	文	僻	便	墓	崩
7	膝	標	蛭	婦	芙	風	仏	聞	壁	勉	慕	庖
8	菱	冰	鰐	富	譜	葺	物	丙	癱	婉	戌	抱
9	肘	漂	品	富	負	躉	鮒	併	碧	弁	暮	捧
A	弼	瓢	彬	布	賦	伏	分	兵	別	鞭	母	放
B	必	票	斌	府	赴	副	吻	墀	瞽	保	簿	方
C	畢	表	浜	怖	阜	復	噴	幣	蔑	舡	菩	朋
D	筆	評	瀨	扶	附	幅	墳	平	籠	鋪	倣	・
E	逼	豹	貧	數	侮	服	憤	弊	偏	圃	俸	・
F	桧	廟	賓	・	撫	福	扮	柄	変	捕	包	・

96	4	5	6	7	8	9	A	B	C	D	E	F
0	法	鳳	冒	朴	摩	鱈	蔓	眠	迷	孟	糴	役
1	泡	鵬	紡	牧	磨	柂	味	務	銘	毛	貰	約
2	烹	乏	肪	睦	魔	亦	未	夢	鳴	猛	問	藥
3	砲	亡	膨	穆	麻	侯	魅	無	姪	盲	悶	訛
4	縫	傍	謀	釦	埋	又	已	牟	牝	網	紋	躍
5	胞	剖	貌	勃	妹	抹	箕	矛	滅	耗	門	靖
6	芳	坊	貿	沒	昧	末	岬	霧	免	蒙	夕	柳
7	萌	妨	鋒	殆	枚	沫	密	鵠	棉	儲	也	藪
8	蓬	帽	防	堦	毎	迄	蜜	椋	綿	木	治	鑛
9	蜂	忘	吠	幌	哩	併	湊	婿	繩	默	夜	愉
A	褒	忙	頰	奔	楨	繭	蓑	娘	面	目	爺	愈
B	訪	房	北	本	幕	曆	稔	冥	麵	空	耶	油
C	豐	暴	僕	翻	膜	万	脈	名	摸	勿	野	癒
D	邦	望	卜	凡	枕	慢	妙	命	模	餅	弥	・
E	鋒	某	墨	盆	鮪	滿	耗	明	茂	尤	矢	・
F	飽	棒	撲	・	枉	漫	民	盟	妄	戾	厄	・

97	4	5	6	7	8	9	A	B	C	D	E	F
0	諭	猶	輿	用	沃	亂	裏	硫	梁	厘	伶	歷
1	輸	猷	預	窯	浴	卵	裡	粒	涼	林	例	列
2	唯	由	傭	羊	翌	嵐	里	隆	獵	淋	冷	劣
3	佑	幼	耀	翼	欄	離	竈	療	燐	励	烈	裂
4	優	裕	妖	葉	淀	濫	陸	龍	瞭	琳	嶺	裂
5	勇	誘	容	蓉	蘿	藍	律	侶	稜	臨	怜	廉
6	友	遊	庸	要	螺	蘭	率	慮	糧	輪	玲	恋
7	宥	邑	揚	謠	裸	覽	立	旅	良	隣	札	憐
8	幽	郵	搖	踊	來	利	葎	虧	鱗	苓	漣	漣
9	悠	雄	擁	遙	萊	吏	掠	了	遼	麟	鈴	煉
A	憂	融	曜	陽	賴	履	略	亮	量	瑠	隸	簾
B	揖	夕	楊	養	雷	李	劉	僚	陵	壘	零	練
C	有	予	様	慾	洛	梨	流	丂	領	淚	靈	聯
D	柚	余	洋	抑	絡	理	溜	凌	力	累	麗	・
E	湧	与	溶	欲	落	璃	琉	寮	綠	類	齡	・
F	涌	誉	熔	・	酩	痢	留	料	倫	令	曆	・

98	4	5	6	7	8	9	A	B	C	D	E	F
0	蓮	榔	倭	湾	・	・	丐	于	仟	侑	倨	會
1	連	浪	和	碗	・	・	丕	亞	价	佯	倔	偕
2	鍊	漏	話	腕	・	・	个	亟	仇	來	倪	修
3	呂	牢	歪	・	・	・	卯	一	佚	侖	倥	偈
4	魯	狼	賄	・	・	・	丂	亢	估	儘	倅	做
5	櫓	竈	脇	・	・	・	丂	京	佛	倪	倅	儲
6	炉	老	惑	・	・	・	丂	毫	尙	俟	惄	惄
7	賂	聾	杵	・	・	・	又	亶	佗	俎	倡	偷
8	路	蛹	鷺	・	・	・	乖	从	佇	俘	倩	傀
9	露	郎	瓦	・	・	・	乘	仍	佶	俛	倬	儻
A	勞	六	亘	・	・	・	亂	仄	侈	俑	俾	傅
B	妻	麓	鷁	・	・	・	丂	仆	侏	俚	俯	𠂇
C	廊	祿	詶	・	・	・	豫	仂	侘	俐	們	傲
D	弄	肋	藁	・	・	・	爭	仗	佻	悌	倆	・
E	朗	錄	蕨	・	・	・	舒	仞	佩	倖	偃	・
F	樓	論	椀	・	・	式	式	𠂇	𠂇	𠂇	𠂇	・

## Appendix-5/7

99	4	5	6	7	8	9	A	B	C	D	E	F
0	僉	儕	兪	幕	凰	剗	劬	勿	卅	廠	吭	𠵼
1	僂	儕	兪	𠂔	𠂔	剗	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
2	傳	儕	冀	決	𠂔	剪	剗	𠂔	𠂔	參	𠂔	𠂔
3	僂	儕	𠂔	𠂔	𠂔	剗	券	匍	準	簾	𠂔	𠂔
4	僖	儕	𠂔	𠂔	𠂔	剗	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
5	僂	儕	冊	冰	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
6	僂	儕	冉	況	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
7	僂	儕	𠂔	𠂔	𠂔	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
8	僂	𠂔	𠂔	𠂔	𠂔	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
9	僂	兀	𠂔	𠂔	𠂔	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
A	價	兒	冕	凜	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
B	僵	兌	𠂔	𠂔	𠂔	剗	剗	剗	剗	剗	剗	剗
C	儂	兔	冤	處	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
D	僂	兢	寇	𠂔	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
E	僂	競	冢	𠂔	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔
F	僂	兩	寫	𠂔	剗	剗	剗	𠂔	𠂔	𠂔	𠂔	𠂔

9A	4	5	6	7	8	9	A	B	C	D	E	F
0	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
1	晒	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗
2	咤	咤	咤	咤	咤	咤	咤	咤	咤	咤	咤	咤
3	暎	售	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗
4	曷	啜	單	暎	暎	暎	暎	暎	暎	暎	暎	暎
5	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
6	哥	啖	喃	暎	暎	暎	暎	暎	暎	暎	暎	暎
7	哦	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗
8	唏	唸	唸	唸	唸	唸	唸	唸	唸	唸	唸	唸
9	唔	唳	唳	唳	唳	唳	唳	唳	唳	唳	唳	唳
A	哽	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗	啗
B	哮	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙	喙
C	哭	喀	嗟	嘶	嚮	囝	囝	囝	囝	囝	囝	囝
D	哺	咯	嘎	嘲	嚮	囝	囝	囝	囝	囝	囝	囝
E	哢	喊	嗜	嘸	嚴	囝	囝	囝	囝	囝	囝	囝
F	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔

9B	4	5	6	7	8	9	A	B	C	D	E	F
0	奸	娜	嫗	嫗	它	寶	屏	𠂔	崑	崑	𠂔	𠂔
1	𠂔	娉	嫗	嫗	宦	冠	𠂔	𠂔	崔	嶝	𠂔	𠂔
2	妝	嫗	嫗	子	宸	將	屬	𠂔	𠂔	𠂔	𠂔	𠂔
3	𠂔	嫗	嫗	孕	寃	專	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
4	𠂔	嫗	嫗	孕	寃	對	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
5	妣	婉	嫗	李	雀	尗	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
6	姐	嫗	嫗	孥	寃	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
7	姆	娶	嬌	孩	寐	尤	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
8	嫗	婢	嬪	孰	寃	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
9	姜	嫗	嬖	擎	實	尸	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
A	妍	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗
B	姪	嫗	嫗	學	寃	屁	岫	𠂔	𠂔	𠂔	𠂔	𠂔
C	姚	媾	嬪	李	寥	屆	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
D	娥	嫗	嫗	孺	寫	屎	𠂔	𠂔	𠂔	𠂔	𠂔	𠂔
E	娟	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗
F	娑	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗	嫗

9C	4	5	6	7	8	9	A	B	C	D	E	F
0	廖	弃	彖	徘徊	怙	恊	恊	恊	恊	恊	恊	恊
1	廣	嬖	彗	徠	拘	恊	恊	恊	恊	恊	恊	恊
2	廝	彝	彙	徨	昵	恍	恍	恍	恍	恍	恍	恍
3	廝	彝	彙	徠	怎	恣	悒	悒	悒	悒	悒	悒
4	廝	弋	彭	微	忽	恃	惻	惻	惻	惻	惻	惻
5	廢	弑	𠂔	付	怛	恤	愴	愴	愴	愴	愴	愴
6	廝	豆	彷	忻	怕	恂	惻	惻	惻	惻	惻	惻
7	懈	哿	徃	忤	佛	恬	惺	惺	惺	惺	惺	惺
8	廝	彊	徂	忸	忼	惠	愴	愴	愴	愴	愴	愴
9	廝	廝	彊	徃	快	恙	惻	惻	惻	惻	惻	惻
A	廝	彊	彊	徃	徃	徃	惻	惻	惻	惻	惻	惻
B	廝	彈	很	惠	恚	惻	惻	惻	惻	惻	惻	惻
C	廝	彊	徑	忿	惻	惻	惻	惻	惻	惻	惻	惻
D	𠂔	彎	徇	怡	恪	惻	惻	惻	惻	惻	惻	惻
E	廝	弯	從	惻	惻	惻	惻	惻	惻	惻	惻	惻
F	升	𠂔	徙	・	恂	惻	惻	惻	惻	惻	惻	惻

9D	4	5	6	7	8	9	A	B	C	D	E	F
0	裏	抉	拜	挾	捩	攝	擒	擴	畋	斷	杳	晰
1	戠	找	拌	捍	掾	搗	擅	擲	效	旃	昵	昴
2	截	抒	拊	搜	揩	搗	擲	擺	敖	旆	昶	暭
3	戮	抓	拂	捏	揅	搏	撻	攀	敕	旁	昂	暭
4	戰	抖	拇	掖	揆	搗	搗	敍	旄	旄	易	暭
5	戠	拔	抛	掎	揣	摶	搗	攢	敍	旄	暭	暭
6	截	扑	拉	掀	揉	搏	擲	擲	敞	旄	暭	暭
7	扁	抔	格	搊	插	摶	擲	擲	敞	旄	晉	暭
8	扎	拗	拮	捶	揶	攬	舉	攢	敲	燔	暭	暭
9	扞	扞	拱	掣	揄	撕	擠	攀	數	无	暭	暭
A	扣	抻	掬	掏	搊	搊	搊	搊	斂	𠂔	晉	暭
B	扛	擎	挂	掉	搴	撥	抬	支	斂	𠂔	暭	暭
C	扠	拿	挈	捷	搊	撩	搊	搊	變	𠂔	暭	暭
D	扠	拆	拯	掄	撈	擲	擲	攢	斛	𠂔	暭	暭
E	扠	擔	揔	搊	搊	搊	搊	搊	攢	𠂔	暭	暭
F	扠	拈	捐	・	捨	據	搊	攸	研	𠂔	暭	暭

9E	4	5	6	7	8	9	A	B	C	D	E	F
0	曠	霸	杼	柵	梳	梵	棧	榆	棟	樞	樞	樞
1	瞭	朮	杪	柢	栴	栴	棕	檻	樞	樞	樞	樞
2	曠	朮	杪	柢	栴	栴	栴	栴	栴	栴	栴	栴
3	曠	朮	杪	栴	栴	栴	栴	栴	栴	栴	栴	栴
4	曠	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
5	曠	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
6	曠	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
7	曠	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
8	曰	杞	柯	栢	榦	榦	榦	榦	榦	榦	榦	榦
9	曳	杠	枮	樞	樞	樞	樞	樞	樞	樞	樞	樞
A	曷	杙	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
B	膄	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
C	膄	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
D	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
E	朦	杰	朮	朮	朮	朮	朮	朮	朮	朮	朮	朮
F	朮	朮	朮	朮	朮							

## Appendix-6/7

9F	4	5	6	7	8	9	A	B	C	D	E	F
0	嬖	蘖	歛	殫	靡	汾	泛	涓	涓	渙	游	溟
1	夔	檻	歛	殮	氈	汨	泯	浹	淬	湲	渢	穎
2	檻	欒	歛	殮	氓	汎	泙	浚	淞	湟	溪	溉
3	檻	欒	歛	殮	气	沒	汨	浹	淌	渢	溢	灌
4	櫂	鬱	歸	殳	氛	沐	渢	浙	淨	渣	滉	滬
5	櫂	櫛	歹	殷	氤	泄	衍	涎	淒	湫	溷	滸
6	檳	欸	歛	殮	氣	渢	洶	涙	淅	渫	滢	漿
7	欒	欒	歛	殮	永	泓	洫	濤	淺	涒	涒	漿
8	欒	盜	殄	母	汕	沽	洽	涒	淙	湍	溯	滲
9	檻	欒	殃	毓	汎	泗	洮	涒	淤	渟	滄	漱
A	櫂	飲	歛	𡊔	汪	泗	洙	涒	涒	涒	涒	滯
B	櫂	歇	歛	𡊔	沂	泝	洵	涒	渝	渺	滔	漲
C	檻	欒	陪	毫	汎	沮	洳	涵	淮	涵	滌	滌
D	櫂	歛	殮	𡊔	汎	沱	洒	淇	渭	渤	塘	・
E	櫂	歐	殮	𡊔	沁	沾	涒	涒	涒	涒	涒	涒
F	櫂	歛	殮	・	沛	沺	澗	澗	澗	澗	澗	・

E0	4	5	6	7	8	9	A	B	C	D	E	F
0	漾	澑	濮	瀾	烙	煩	燿	祗	貉	獎	珥	瑩
1	漓	濂	濛	激	焉	熨	燦	牿	狼	摸	珮	瑰
2	滷	潦	瀉	灑	烽	熬	爐	犂	狡	默	珞	瑣
3	澆	澳	瀋	灣	焜	燶	爛	犂	狹	獮	瑠	瑪
4	澣	澣	澣	炙	焙	烹	爨	犇	狷	猶	琅	瑤
5	澣	澣	澣	炒	煥	熑	爭	犒	倏	獨	瑯	瑩
6	澣	澤	瀉	炯	熙	燒	爬	犖	猗	琥	瑩	瑩
7	澣	澣	澣	熑	熙	燉	爰	犖	猊	獸	珸	璞
8	澣	澣	澣	炬	煦	燔	爲	犧	猜	獵	琲	璧
9	潛	澪	瀛	炸	熑	燎	爻	犹	猖	獻	玷	瓊
A	潛	濟	瀚	炳	煌	燠	俎	犔	猝	獺	瑕	瓏
B	潭	濕	瀆	炮	煖	燬	爿	狃	猴	珈	瑩	瓔
C	激	瀆	瀆	烟	煬	燧	牀	狹	瑞	玳	瑟	琰
D	漚	瀰	瀰	休	熏	燼	牆	狽	猩	珍	瑙	・
E	潘	濱	瀰	・	熄	燹	牘	狽	猥	玻	瑁	・
F	澎	濱	瀰	・	熄	燹	牘	狽	猾	珀	瑜	・

E1	4	5	6	7	8	9	A	B	C	D	E	F
0	瓠	甕	畫	疳	痼	瘰	兪	皺	昵	睂	碣	碣
1	瓣	嬖	睂	痃	瘁	瘻	癸	孟	眞	瞋	矣	碩
2	趾	嘗	畸	疵	痰	癟	發	盍	眚	矮	礎	礎
3	趾	甦	當	疽	痺	皰	盍	盍	睂	睂	矼	矼
4	瓮	甬	疆	疽	癟	癆	兒	盒	昧	瞞	砌	礎
5	虺	卑	疇	疼	麻	癱	眚	盍	睂	砒	礎	礎
6	畝	畝	疇	庖	瘋	癟	臯	盍	睂	礎	礎	礎
7	庭	畊	疊	瘧	瘍	癟	皎	盟	睂	瞞	砠	砠
8	厔	畊	疊	瘡	瘻	癟	睂	睂	睂	睂	礎	礎
9	瓷	畊	疊	痒	瘧	瘻	皓	盪	睂	瞞	矚	矚
A	甄	畛	疔	瘻	瘻	瘻	𦥑	盍	睂	碎	磅	磅
B	甃	甃	疚	瘻	瘻	瘻	睂	睂	睂	矚	磊	磊
C	迺	迺	疝	瘻	瘻	瘻	炮	睂	睂	矚	礎	礎
D	甃	迺	疥	瘻	瘻	瘻	睂	睂	睂	瞞	矚	矚
E	甃	畤	畤	瘻	瘻	瘻	睂	睂	睂	瞞	矚	矚
F	甃	畊	瘻	・	瘻	瘻	睂	睂	睂	矚	矚	矚

E2	4	5	6	7	8	9	A	B	C	D	E	F
0	磧	祓	祓	穡	穡	穡	竦	筭	筭	筭	糲	糲
1	磚	祺	稊	穡	穡	穡	竭	筭	筭	筭	粃	粃
2	礲	祿	稈	穡	穡	穡	竄	筭	筭	筭	粃	粃
3	礲	禊	稍	穡	穡	穡	窿	筭	筭	筭	粃	粃
4	礲	禊	祺	穡	穡	穡	邃	筭	筭	筭	粃	粃
5	礲	禧	植	穹	竇	竇	筭	筭	筭	筭	粃	粃
6	礲	齋	稠	竇	竇	竇	竇	筭	筭	筭	粃	粃
7	礲	禪	稟	竇	竇	竇	筭	筭	筭	筭	粃	粃
8	礲	禮	稟	窗	竇	竇	筭	筭	筭	筭	粃	粃
9	礲	禳	稱	竇	竇	竇	筭	筭	筭	筭	粃	粃
A	祀	禹	稻	奢	跔	跔	筭	筭	筭	筭	粃	粃
B	祠	禹	稟	窖	站	站	筭	筭	筭	筭	粃	粃
C	祇	秉	稷	窩	跔	跔	筭	筭	筭	筭	粃	粃
D	崇	秕	稈	竈	竈	竈	筭	筭	筭	筭	粃	粃
E	祚	秧	穗	窖	跔	跔	筭	筭	筭	筭	粃	粃
F	祕	秬	穉	・	竇	竇	筭	筭	筭	筭	粃	粃

E3	4	5	6	7	8	9	A	B	C	D	E	F
0	紂	絮	總	縣	縲	辯	罿	翫	翅	耙	聰	胙
1	紂	紗	綢	緯	綰	纏	纏	羈	翫	耜	𦥑	𦥑
2	紂	紂	緝	緝	纏	纏	纏	羈	翫	𦥑	𦥑	𦥑
3	紊	經	緜	縱	緝	纏	纏	羈	翫	𦥑	𦥑	𦥑
4	絅	紡	綸	縲	繖	繖	网	羔	翔	耿	𦥑	𦥑
5	紂	條	緝	緝	纏	纏	罕	羞	翡	耻	肄	脉
6	紂	綏	綰	綰	纏	纏	罔	羝	翦	聊	肆	膀
7	紂	紂	緘	緘	纏	纏	衆	羚	翫	聆	肅	胱
8	紂	紂	緝	緝	纏	纏	罟	羣	翫	睂	肛	脰
9	紂	綺	縷	縷	纏	纏	羈	翫	翫	聘	盲	脩
A	紂	綮	緂	緂	繩	繩	罿	義	翫	聚	肚	脣
B	絅	緂	緂	緂	繩	繩	罿	義	翫	聚	肺	脯
C	紂	綵	縷	縷	纏	纏	罿	羹	耆	聳	脣	脣
D	紂	緂	緂	緂	纏	纏	缸	爵	羈	羈	聳	・
E	絲	綽	緘	緘	緂	緂	罿	羈	羈	聳	脣	・
F	絅	綫	緂	緂	・	緂	緂	罿	羈	聲	胥	・

E4	4	5	6	7	8	9	A	B	C	D	E	F
0	隋	膠	臍	舊	𦥑	𦥑	𦥑	𦥑	𦥑	𦥑	𦥑	𦥑
1	腴	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
2	脾	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
3	腓	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
4	腑	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
5	胼	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
6	膾	膾	膾	膾	膾	膾	膾	𦥑	𦥑	𦥑	𦥑	𦥑
7	膶	膶	膶	膶	膶	膶	膶	𦥑	𦥑	𦥑	𦥑	𦥑
8	腥	膶	膶	膶	膶	膶	膶	艾	苻	茯	蕘	蕘
9	腦	膶	膶	膶	膶	膶	膶	芍	萃	茫	葱	菲
A	腴	膶	膶	膶	膶	膶	膶	芑	芑	芑	芑	芑
B	膶	膶	膶	膶	膶	膶	膶	芑	芑	芑	芑	芑
C	膈	膶	膶	膶	膶	膶	膶	芟	芟	芟	芟	芟
D	膶	膶	膶	膶	膶	膶	膶	芻	芻	芻	芻	芻
E	膶	膶	膶	膶	膶	膶	膶	芻	芻	芻	芻	芻
F	膶	膶	膶	膶	膶	膶	膶	芻	芻	芻	芻	芻

## Appendix-7/7

E5	4	5	6	7	8	9	A	B	C	D	E	F
0	萼	蕡	蘆	𧔗	蛟	𧔗	𧔗	𧔗	蠡	𧔗	𧔗	𧔗
1	蘂	蘂	蘭	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
2	蘚	蘚	蘆	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
3	蘚	蘚	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
4	蘊	蘊	蘚	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
5	蘊	蘊	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
6	薈	薈	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
7	薈	蘊	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
8	薈	蘊	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
9	薈	蘊	蘿	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
A	蕭	蕭	藥	號	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
B	薈	蘊	蘿	虧	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
C	薛	蘆	虧	虧	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
D	薈	蘊	虧	虧	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
E	薇	蘆	虧	虧	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗
F	薛	蘆	虧	虧	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗	𧔗

E6	4	5	6	7	8	9	A	B	C	D	E	F
0	襦	覩	訌	誅	諤	謳	譬	𧔗	貘	𦵃	赴	蹠
1	襪	覩	訌	誨	諤	諤	𧔗	豎	貶	贅	趁	踐
2	襪	覩	訌	誠	諤	諤	豎	質	贅	趙	踐	踐
3	襪	覩	訌	訌	諤	諤	豕	貪	贊	跂	踐	踐
4	襪	覩	訌	訌	諤	諤	豕	貪	贊	趾	蹠	蹠
5	襪	覩	訌	誦	諤	諤	豕	貲	贏	趺	蹠	蹠
6	襪	覩	訌	誦	諤	諤	豸	貳	贍	蹠	蹠	蹠
7	𧔗	𧔗	𧔗	誨	諤	諤	豸	貳	贍	蹠	蹠	蹠
8	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
9	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
A	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
B	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
C	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
D	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
E	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠
F	𧔗	𧔗	𧔗	諤	諤	諤	𧔗	𧔗	𧔗	蹠	蹠	蹠

E7	4	5	6	7	8	9	A	B	C	D	E	F
0	蹇	躡	躰	轎	轎	轎	邁	鄆	醪	鈞	銜	銜
1	躡	躡	軋	轎	轎	轎	邁	鄰	釀	鋤	銖	銖
2	躡	躡	軋	輒	輒	輒	迺	迺	醴	鈔	銓	銓
3	躡	躡	軋	轎	轎	轎	迺	迺	釀	釀	銓	銓
4	躡	躡	軋	輒	輒	輒	迺	迺	釀	釀	銓	銓
5	躡	躡	軋	輒	輒	輒	迺	迺	釀	釀	銓	銓
6	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
7	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
8	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
9	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
A	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
B	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
C	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
D	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
E	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓
F	躡	躡	軃	轎	轎	轎	迺	迺	釀	釀	銓	銓

E8	4	5	6	7	8	9	A	B	C	D	E	F
0	鎚	鎚	鎚	鎚	閨	閨	𠂇	𠂇	霏	𩶻	韁	韁
1	錢	鑿	鑿	鑿	閨	閨	𠂇	𠂇	霖	覩	鞶	頌
2	錚	錚	錚	錚	鑽	鑽	𠂇	𠂇	霽	𩶻	韁	韁
3	鎔	鎔	鎔	鎔	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
4	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
5	鈎	鈎	鈎	鈎	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
6	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
7	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
8	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
9	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
A	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
B	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
C	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
D	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
E	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁
F	鋤	鋤	鋤	鋤	鑽	鑽	𠂇	𠂇	𩶻	𩶻	韁	韁

E9	4	5	6	7	8	9	A	B	C	D	E	F
0	麌	餘	餽	駟	驟	驟	魏	鯀	鯀	鯀	鯀	鯀
1	麌	餽	餽	驟	驟	驟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
2	麌	餽	餽	驟	驟	驟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
3	麌	餽	餽	驟	驟	驟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
4	麌	餽	餽	驟	驟	驟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
5	麌	餽	餽	駟	駟	駟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
6	麌	餽	餽	駟	駟	駟	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
7	飄	飄	馮	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
8	飄	飄	飄	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
9	飄	飄	飄	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
A	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
B	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
C	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
D	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
E	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
F	飪	飪	駢	駢	駢	駢	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻

EA	4	5	6	7	8	9	A	B	C	D	E	F
0	鵝	鷄	鶴	麌	麌	麌	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
1	鵝	鷄	鶴	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
2	鵝	鷄	鶴	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
3	鵝	鷄	鶴	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
4	鵝	鷄	鶴	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
5	鵝	鷄	鷄	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
6	鵝	鷄	鷄	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
7	鵝	鷄	鷄	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
8	鵝	鷄	鷄	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻	𩶻
9	鵝	鷄	鷄	𩶻	𩶻	𩶻	𩶻	𩶻				

## 5. WARRANTY

This display module is guaranteed for 1 year after the shipment from FUTABA.

## 6. CAUTIONS FOR DETERMINING AND EXPORTING REGULATED GOODS OR SERVICES

This product does not correspond to the goods or services regulated by Japan's Foreign Exchange and Foreign Trade Law. If this product is combined with other products in order to make equipment, whether this product is regulated or not is judged by such newly made equipment. We ask you to determine by yourself whether the equipment corresponds to the regulated goods when this product is incorporated in the equipment.

We also ask you to confirm that this product will not be incorporated in any weapon or used for manufacturing any weapon.

If you export or re-export this product, we recommend you to adopt measures for appropriate export procedures, if any.

## 7. CAUTIONS FOR OPERATION

7-1. Applying lower voltage than the specified may cause non activation for selected pixels.

Conversely, higher voltage may cause non-selected pixel to be activated. If such a phenomenon is observed, check the voltage level of the power supply.

7-2. DC/DC converter is equipped on the module, the surge current may be approximately 5 times the specified supply current at the power on.

7-3. Avoid using the module where excessive noise interface is expected.

Noise affects the interface signal and causes improper operation.

Keep the length of the interface cable less than 30cm.

(When the longer cable is required, please confirm there is no noise affection.)

7-4. When power is turned off, the capacitor will not discharge immediately. Avoid touching IC and others.

The shorting of the mounted components within 30 sec., after power off, may cause damage.

7-5. When fixed pattern is displayed for a long time, you may see uneven luminance.

It is recommended to change the display patterns sometimes in order to keep best display quality.