EYA-03969

OPEN POS

S/W REFERENCE MANUAL

Product Name : LIUST-5X Display Module

Model Name : Display

Solution by TEC

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No.

TEC

EYA-03969

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S/W REFERENCE MANUAL

LIUST-5X Display Module

Display

1998,2 2nd Edition

Specification No. : EYA-03969

Product Name : LIUST-5X Display Module

Model Name : Display

Specifications : LIUST-5X Display Module Controller Reference Manual

Specifications

2nd Edition : Feb. 03, 1998

Confirmation	[Eng.]	(Eng. Group)		
	App.by	App.by	Ckd.by	Drf.by
		Yamamoto	Uematsu	Matsui
	3.3.'98	3.2.'98	3.2.'98	Feb.03,'98

TEC Corporation

Change Sheet

EYA-03969 Name : LIUST-5X Display Module Controller Reference Manual Section Name : Eng. Group

Rev.No	Date	Page&Line	Changes and Reasons	In chg.	Ckd.by	App.by
1st	Sep.30,'97	All pages	Newly issued	Matsui	Uematsu	yamamoto
2nd	Feb.03,'98	2.1-6 3.1-2,6-10 3.12,15 3.17-19 4.1 A2.1-7	Add LIUST-53	Matsui	Uematsu	yamamoto
		A4.1	Add Attentions on WindowsNT			

Delivered to:

CONTENTS

1. Introduction

This document describes the overview, the function, the interface and so on of LIU controller for POS and is the specification of the display module used to directly control the display module for POS.

Note: LIU--DOT fluorescent display device

2. Specification

2.1. Function

Controls the dot display by commands and data received through serial interface from the host.

2.1.1. Display mode and fonts

Displays characters.
Also displays to the descripter (only LIUST-51).

Display Mode	LIUST -50	LIUST -51	LIUST -52	LIUST -53
ANK 5x7 Font 20 digits 2 columns	*	-	-	-
ANK 5x7 Font 20 digits 2 columns With triangle mark	-	*	-	-
ANK 5x7 Font 20 digits 4 columns	-	-	*	-
ANK 5x7 Font 20 digits 5 columns	-	-	*	-
JIS 1·2 16x16(8x16)Font 10(20) digits 2 columns	-	-	*	-
ANK 5x7 Font 42 digits 8 columns	-	-	-	*
JIS 1·2 16x16(8x16)Font 16(32) digits 3 columns	-	-	-	*
JIS 1·2 24x24(12x24)Font 10(20) digits 2 columns	-	-	-	*
JIS 1·2 24x24(12x24)Font 10(20) digits 1 columns JIS 1·2 16x16(8x16)Font 16(32) digits 2 columns	-	-	-	*
JIS 1·2 16x16(8x16)Font 16(32) digits 4 columns	-	-	-	*

*Valid / -Invalid

- See Appendix-A1 and Appendix-A2 for fonts.

2.1.2. Country code

17 kinds of country codes are provided. Codes can be switched by commands.

Contry CODE	LIUST50	LIUST51	L8I5U0SETa5s1t	L8I5U2ST51	LIUST52	LIUST53	
00 USA 01 France 02 Germany 03 UK 04 Denmark 1 05 Sweden 06 Italy 07 Spain 1 08 Japan 09 Norway 0A Denmark 2 0B Spain 2 0C Latin America	*	*	*	*	*	*	
0D 850(East Europe)	-	-	*	-	*	*	
0E 852(Ice Land+Greek)	-	-	-	*	*	*	
63 Japan2	*	*	-	-	*	*	
64 Japan Shift JIS	-	-	-	-	*	*	

Note: Default value is Germany when the power in on. *Valid/ -Invalid

2.1.3. Cursor (Valid only for ANK display mode)

Selectable from light-up, flashing and light-off.

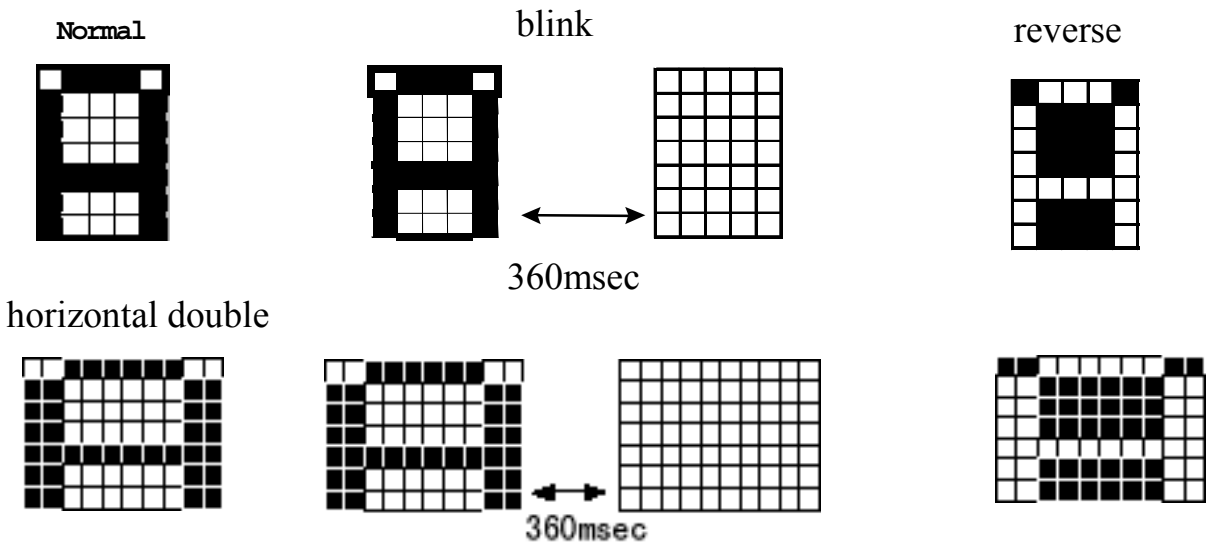
Note: Default value is light-off when the power in on.

2.1.4. Brightness

Display device	Selectable brightness(%)					
LIUST-50	Brightness setting is not allowed.					
LIUST-51	0	20	40	60	80	100
LIUST-52	0	35.7	42.9	57.1	78.6	100
LIUST-53	0	31.6	45.0	58.8	79.4	100

Note: The default value is 100% when the power is on.

2.1.5. Character attributes (Valid only for LIUST-52/LIUST-53)

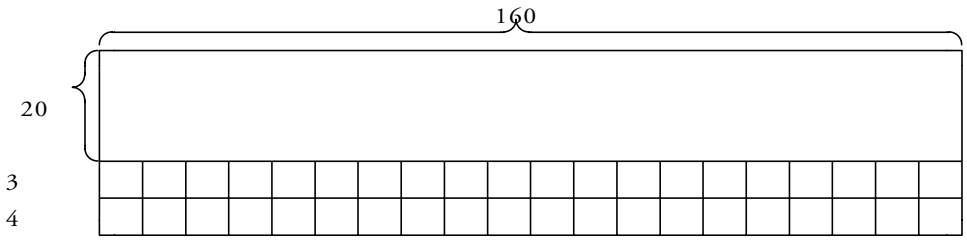


2.1.6. External character setting (Valid only for LIUST-52/LIUST-53)

Specify the following external character setting and setting codes
(ANK character/20H-FFH for half-size character).
Priority is given to external setting when displayed.
Full size(16x16) 16
Half size(8x16) 32
ANK character(5x7) 32
Full size(24x24) 16 (Valid only for LIUST-53)
Half size(12x24) 32 (Valid only for LIUST-53)

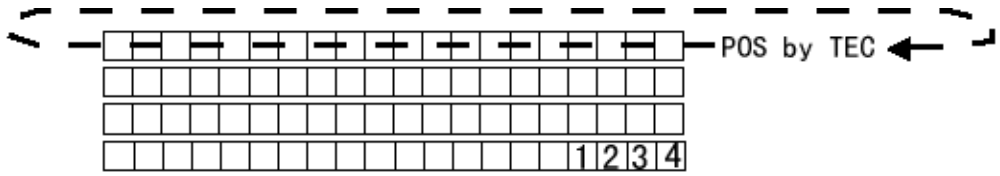
2.1.7. Graphic display (Valid only for LIUST-52/LIUST-53)

Can be displayed with text (maximum 40x160 LIUST-52). (No overlapping is allowed.)



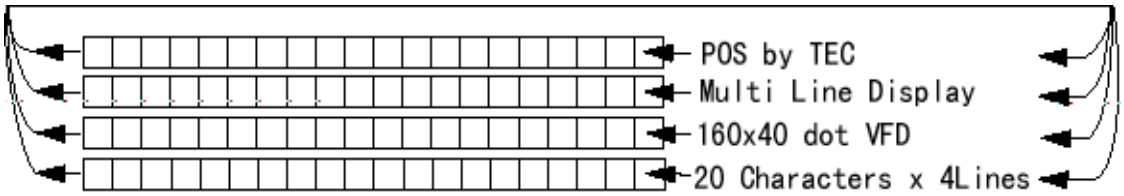
2.1.8. One line horizontal scroll (Valid only for LIUST-52/LIUST-53)

(Specified maximum characters are 128 (64 for full size characters)
Smooth scroll by dots. Specifying multiple lines is not allowed.
Row specification is allowed.
The speed of scrolling can be specified. (10ms/dot 20ms/dot)
Other commands can be executed at the same time. (Smooth scrolling is avaible.)



2.1.9. All lines horizontal scroll (Valid only for LIUST-52/LIUST-53)

(Specified maximum characters are 128 (64 for full size characters)
Smooth scroll by dots. Specifying multiple lines is allowed.
The speed of scrolling can be specified. (10ms/dot 20ms/dot)
Other commands can not be executed at the same time. (Smooth scrolling is avaible.)



2.2. Host interface

2.2.1. Interface

Communication method : RS232C compliant
Mode : asynchronous Full duplex
Start bit : 1bit
Data length : 8bit
Stop bit : 1bit
Baud rate : 1200 /2400 /4800 /9600 (/19200 only for LIUST-52/LIUST-53) bit/s
Default value is 9600bps. (Selectable by dip switch)
Parity : EVEN /ODD /NONE Default value is odd. (Selectable by dip switch)
Signal : TXD,RXD,CTS,RTS
Flow control : Hand-shake method by CTS/RTS signal.

2.2.2. Connector wiring

PIN No.	Signal name	in/out
1	RTS: Request To Send Used by the controller as the status to inform the host whether data receiving is enabled or disabled. Mark: Receiving disabled/Space:receiving enabled	out
2	CTS: Clear To Send Used by the host as the status to inform the controller whether data receiving is enabled or disabled. Mark: Receiving disabled/Space: receiving enabled	in
3	GND	-
4	RXD: Receive Data Data input line fron the host to the controller. Equilibrium is “Mark”.	in
5	TXD: Transmit Data Data output line fron the controller to the host. Equilibrium is “Mark”.	out
6	12V	-

2.2.3. Dip switch

• LIUST-50/LIUST-51

SW No.	Function							
1	ON	1200	OFF	2400	ON	4800	OFF	9600
2	ON	BPS	ON	BPS	OFF	BPS	OFF	BPS
3	Parity ON:ENABLE OFF:DISABLE							
4	Select ON:ODD OFF:EVEN							
5	Self test ON:TEST OFF:NORMAL							
6	Reserved OFF							

• LIUST-52

SW No.	Function									
1	ON	1200	OFF	2400	ON	4800	OFF	9600	OFF	19200
2	ON	BPS	ON	BPS	OFF	BPS	OFF	BPS	OFF	BPS
3	OFF		OFF		OFF		OFF		ON	
4	Parity ON:ENABLE OFF:DISABLE									
5	Select ON:ODD OFF:EVEN									
6	Self test ON:TEST OFF:NORMAL									

• LIUST-53

SW No.	Function									
1	ON	1200	OFF	2400	ON	4800	OFF	9600	OFF	19200
2	ON	BPS	ON	BPS	OFF	BPS	OFF	BPS	OFF	BPS
3	OFF		OFF		OFF		OFF		ON	
4	Parity ON:ENABLE OFF:DISABLE									
5	Select ON:ODD OFF:EVEN									
6	Self test ON:TEST OFF:NORMAL									
7	Module Select ON:Secondary OFF:NORMAL(Primary)									
8	Display Mode ON: ANK 5x7 Font OFF: JIS 1·2 16x16(8x16)Font 42 Colum 8 Line 16(32) Colum 3 Line									

2.2.4. Transmission sequence

• RTS/CTS Hand-shake method

1) Receiving by RTS signal (Host -> controller)

The controller sets RTS signal to Space when receiving from the host is enabled and sets the signal to Mark when the receiving is disabled. Therefore, the host checks RTS signal before sending a character and sends one character after verifying that the status is Space.

2) Sending by CTS signal (Controller -> host)

The controller sends data to the host after verifying that CTS signal is Space. Therefore, the host controls receiving from the controller by setting CTS signal to Space when receiving is enabled and by setting the signal to Mark when receiving is disabled.

2.2.5. Transmission abnormal processing

1) Even if the data sent from the controller is not received by the host due to transmission trouble, the controller regards the data as transmitted.

2) When the command is received from the host and overrun and framing error occurred,the command is ignored.

3) When the data is received from the host and overrun and framing error occurred, the data is ignored.

4) When the command is received from the host and parity error occurred, the command is ignored.

5) When the data is received from the host and parity error occurred, the data is ignored.

6) An illegal command received from the host is ignored.

3. Command

3.1. Command list

NO.	Command	Code	Code(Hex)	LIUST-xx			
				50	51	52	53
1	Back space without Deleting	BS	08	*	*	*	*
2	Line feed	LF	0A	*	*	*	*
3	Carriage return	CR	0D	*	*	*	*
4	Clear display	ESC[2J	1B 5B 32 4A	*	*	*	*
5	Set virtual cursor	ESC[Py;PxH	1B 5B Py 3B Px 48	*	*	*	*
6	Delete to end of line	ESC[0K	1B 5B 30 4B	*	*	*	*
7	Set country code	ESCRn	1B 52 n	*	*	*	*
8	Dimming	ESC\?LDPs	1B 5C 3F 4C 44 Ps	-	*	*	*
9	Cursor Mode	ESC\?LCPs	1B 5C 3F 4C 43 Ps	*	*	*	*
10	Triangle Mark	ESC\?LTP4P3P2P1 P0	1B 5C 3F 4C 54 P4 P3 P2 P1 P0	-	*	-	-
11	Identification code	ESC[c or ESC[0c	1B 5B 63 or 1B 5B 30 63	*	*	*	*
12	Screen Mode	ESC\?LSPs	1B 5C 3F 4C 53 Ps	-	-	*	*
13	One line horizontal scroll	ESC\?LH Pm;Pl;Pt;Pn;Pd…Pd	1B 5C 3F 4C 48 Pm 3B Pl 3B Pt 3B Pn 3B Pd…Pd	-	-	*	*
14	Display attribute Blink Reverse Reset Double width display Set Reset	 ESC[5m ESC[7m ESC[0m ESC#6 ESC#5	 1B 5B 35 6D 1B 5B 37 6D 1B 5B 30 6D 1B 23 36 1B 23 35	-	-	*	*
15	External character setting ANK (5x7) Half size(8x16) Full size(16x16) Half size(12x24) Full size(24x24)	ESC\?LW1 ;Pn;Pc;Pd…Pd ESC\?LW2 ;Pn;Pc;Pd…Pd ESC\?LW3 ;Pn;Pc;Pd…Pd ESC\?LW4 ;Pn;Pc;Pd…Pd ESC\?LW5 ;Pn;Pc;Pd…Pd	1B 5C 3F 4C 57 31 3B Pn 3B Pc 3B Pd…Pd 1B 5C 3F 4C 57 32 3B Pn 3B Pc 3B Pd…Pd 1B 5C 3F 4C 57 33 3B Pn 3B Pc 3B Pd…Pd 1B 5C 3F 4C 57 34 3B Pn 3B Pc 3B Pd…Pd 1B 5C 3F 4C 57 35 3B Pn 3B Pc 3B Pd…Pd	-	-	*	*
				-	-	-	*
16	Graphic display	ESC\?LG Px;Py;Ph;Pw;Pd…	1B 5C 3F 4C 47 Px 3B Py 3B Ph 3B Pw 3B Pd…	-	-	*	*
17	Character Font Data ANK	xx	20-FF	*	*	*	*
18	Character Font Data Shift-JIS	xx yy	1st byte(81-9F, E0-EF) 2nd byte(40-7E, 80-FC)	-	-	*	*

*Valid / -Invalid

NO.	Command	Code	Code(Hex)	LIUST-xx			
				50	51	52	53
19	Full screen Start Horizontal scroll End Go Set Line String	ESC\?LMS ESC\?LME ESC\?LMG ESC\?LM Pm;Pl;Pt;Pn;Pd…Pd	1B 5C 3F 4C 4D 53 1B 5C 3F 4C 4D 45 1B 5C 3F 4C 4D 47 1B 5C 3F 4C 4D Pm 3B Pl 3B Pt 3B Pn 3B Pd…Pd	-	-	*	*

*Valid / -Invalid

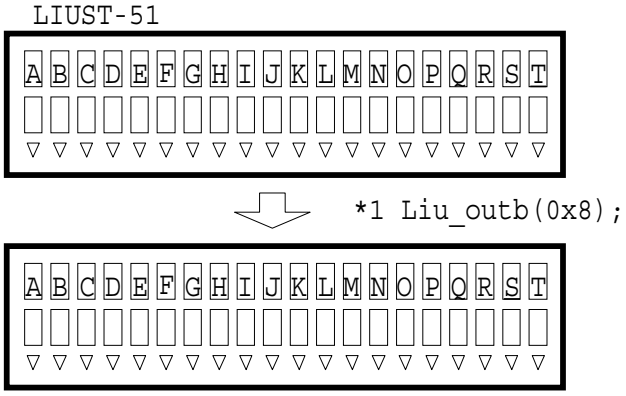
3.2. Command detail

1) Back Space without deleting

Format: BS (08)

Function: Writing position shifts left by one digit. Fonts displayed stay displayed at the time. If writing position is at the leftmost position, nothing happens.

Example)

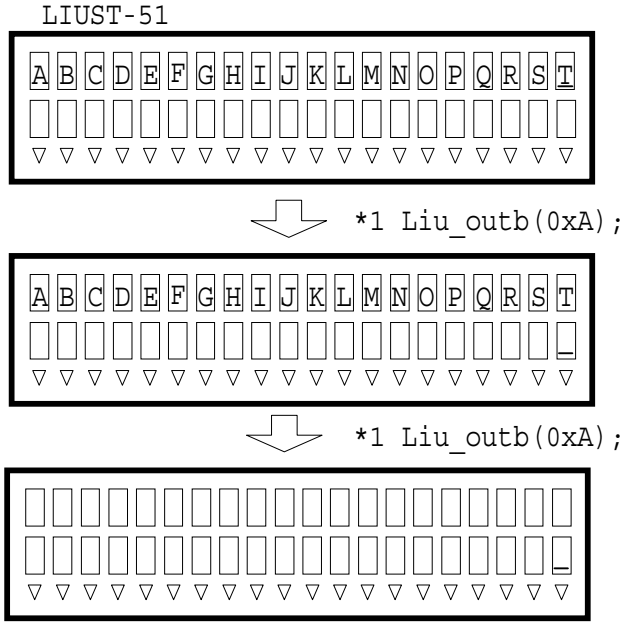


2) Line feed

Format: LF (0Ah)

Function: Writing position shifts left by one digit. Fonts displayed stay displayed at the time. If writing position is at the leftmost position, nothing happens.

Example)



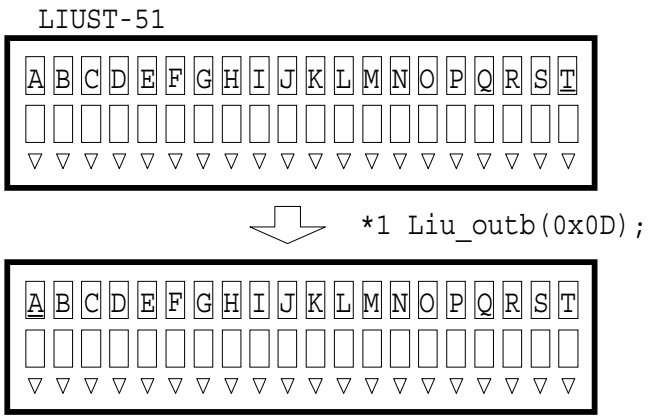
*1 See Appendix-A3.

3) Carriage return

Format: CR (0D)

Function: Writing position shifts to the leftmost position on the same line.
If writing position is at the leftmost position, nothing happens.

Example)

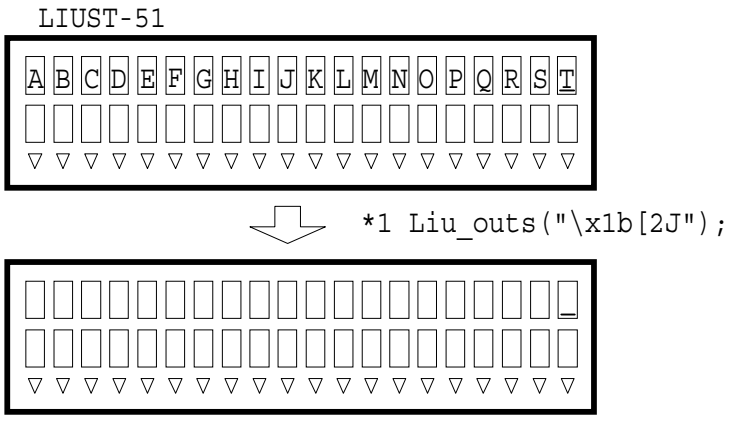


4) Clear display

Format: ESC[2J (1B 5B 32 4A)

Function: All the display Erases on the screen will be erased. Writing position will not move.

Example)



*1 See Appendix-A3.

5) Set virtual cursor

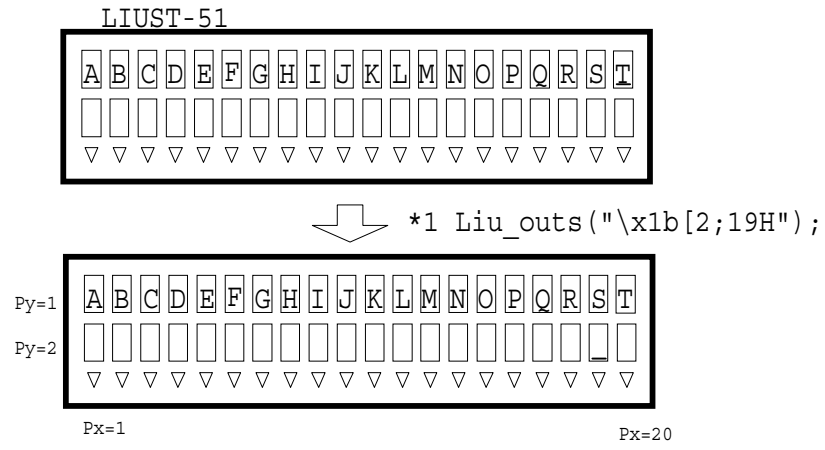
Format: ESC[Py;PxH (1B 5B Py 3B Px 48)

Function: Moves to the writing position of Py(Row) and Px(Column).

Py: If it is 0, 1 is assumed. If it is greater than the maximum line, it is assumed to be the maximum.

Px: If it is 0, 1 is assumed. If it is greater than the maximum column, it is assumed to be the maximum.

Example)

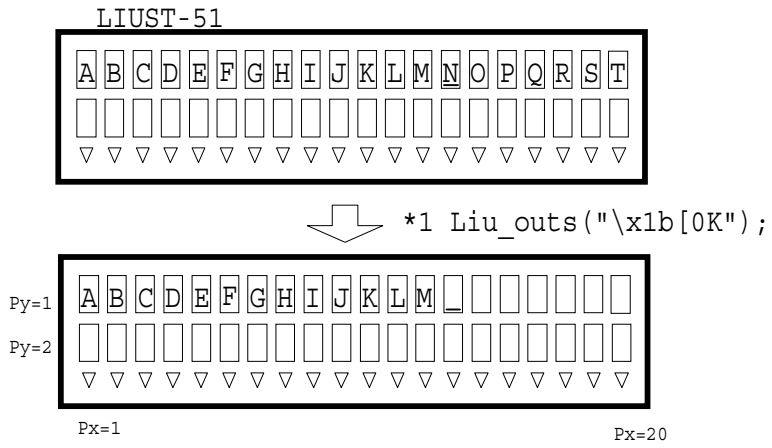


6) Delete to end of line

Format: ESC[0K (1B 5B 30 4B)

Function: Data displayed after the writing position on the same line will be erased. Writing position will not move.

Example)



*1 See Appendix-A3.

7) Set country code

Format: ESCRn (1B 52 n) Only valid for 5x7 font use.

Function: 'n' is one byte parameter signifying country code to switch fonts.
The initial value after power on shall be 02h(Germany).

Parameter: n country code

Contry CODE	LIUST50	LIUST51	L8I5U0SETa5s1t	L8I5U2ST51	LIUST52	LIUST53			
00 USA 01 France 02 Germany 03 UK 04 Denmark 1 05 Sweden 06 Italy 07 Spain 1 08 Japan 09 Norway 0A Denmark 2 0B Spain 2 0C Latin America	*	*	*	*	*	*			
0D 850(East Europe)	-	-	*	-	*	*			
0E 852(Ice Land+Greek)	-	-	-	*	*	*			
63 Japan2	*	*	-	-	*	*			
64 Japan Shift JIS	-	-	-	-	*	*			

Note: The default value after power on is Germany. *Valid / -Invalid

Example)

Set country code USA

*1 Liu_outs("\x1bR"); Liu_outb(0);

*1 See Appendix-A3.

8) Dimming

Format: ESC\?LDPs (1B 5C 3F 4C 44 Ps)

Function: Changes the brightness of the display device.
The default value after power on willbe '5'(100%).

Parameter: Ps Dimming

Display device Ps	0 (30h)	1 (31h)	2 (32h)	3 (33h)	4 (34h)	5 (35h)
	Available brightness (%)					
LIUST-50	Brightness setting is not available.					
LIUST-51	0	20	40	60	80	100
LIUST-52	0	35.7	42.9	57.1	78.6	100
LIUST-53	0	31.6	45.0	58.8	79.4	100

Example)

Set Dimming 100%

*1 Liu_outs("\x1b\\?LD5");

9) Cursor Mode

Format: ESC\?LCPs (1B 5C 3F 4C 43 Ps) Only valid for 5x7 font use.

Function: Changes Cursor Mode.

Parameter: Ps='0' Cursor light off (Default after power on)
'1' Cursor blink
'2' Crsor light up

Example)

To set the cursor to blink

*1 Liu_outs("\x1b\\?LC1");

*1 See Appendix-A3.

10) Triangle Mark (Only for LIUST-51)

Format: ESC\?LTP4P3P2P1P0 (1B 5C 3F 4C 54 P4 P3 P2 P1 P0)

Function: To light up or light off Triangle mark.

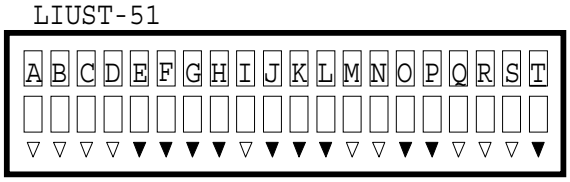
Parameter: P4P3P2P1P0 Data obtained by displaying triangle mark light-up/light-off data in 20-bit mask pattern and converting it to 5 digit hexadecimal ASCII.

Example)

The following is the example to light up the triangle mark as shown below (P4P3P2P1P0).

P4 P3 P2 P1 P0
0000 1111 0111 0011 0001 b
0 F 7 3 1 h

*1 Liu_outs("\x1b\\?LT0F731");



*1 See Appendix-A3.

11) Identification Code

Format: ESC[c or ESC[0c (1B 5B 63 or 1B 5B 30 63)

Function: Reads the characteristics of the display device.

Result: ESC[?R1;R2;R3;R4;R5c (1B 5B 3F R1 32 R2 32 R3 32 R4 32 R5 63)

Parameter: R1='2' (Display Type =VFD)
R2='xx' (ROM Version =xx)
R3='2' (Character Set=IBM)
R4='l' (Line =l)
R5='cc' (Colum =cc)

	Line=l (Hex)	Colum=cc (Hex)
LIUST-50/LIUST-51	'2' (32)	'20' (32 30)
LIUST-52	'4' (34)	'20' (32 30)
LIUST-53	'3' (33)	'16' (31 36)

Example)

LIUST-51 (Module Version 00)

```
unsigned char id[16];
*1 liu_idrd(id, 0);          // send "\x1b[c"  Get Response id[16]
                    id  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15(00)
```

Response: ESC[?2;00;2;2;20c (1B 5B 3F 32 3B 30 30 3B 32 3B 32 3B 32 30 63)

*1 See Appendix-A3.

12) Screen Mode

Format: ESC\?LSPs (1B 5C 3F 4C 53 Ps)

Function: Sets screen mode.

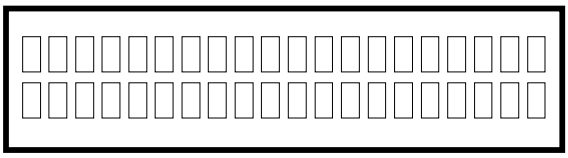
Only sets screen mode and does not erase the screen.

Parameter: Ps Screen Mode

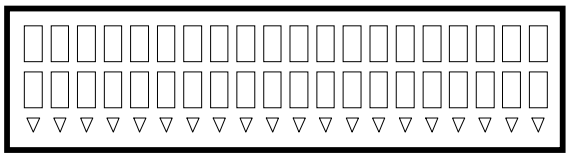
Ps(Hex)	Line x Colum Font	LLIIUUSSTT5501	LIUST52	LIUST53
-	2 Line x 20 Colum ANK 5x7	*	-	-
1 (31)	8 Line x 42 Colum ANK 5x7	-	-	*
2 (32)	3 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	-	-	*
3 (33)	2 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24)	-	-	*
4 (34)	1 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24) +2 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	-	-	*
5 (35)	4 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	-	-	*
6 (36)	4 Line x 20 Colum ANK 5x7	-	*	-
7 (37)	5 Line x 20 Colum ANK 5x7	-	*	-
8 (38)	2 Line x 10(20) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	-	*	-

*Valid / -Invalid

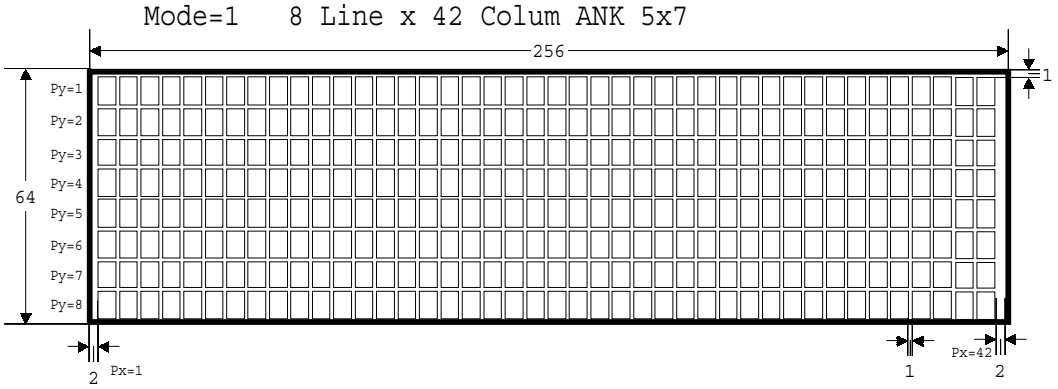
LIUST-50 2Line x 20Colum ANK 5x7



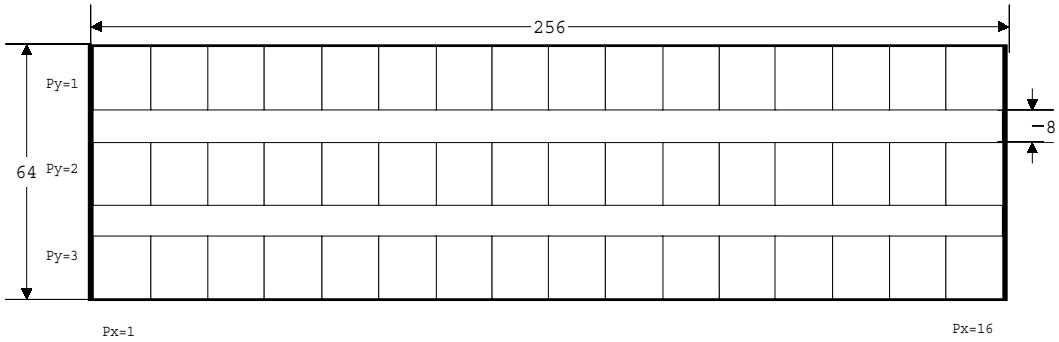
LIUST-51 2Line x 20Colum ANK 5x7



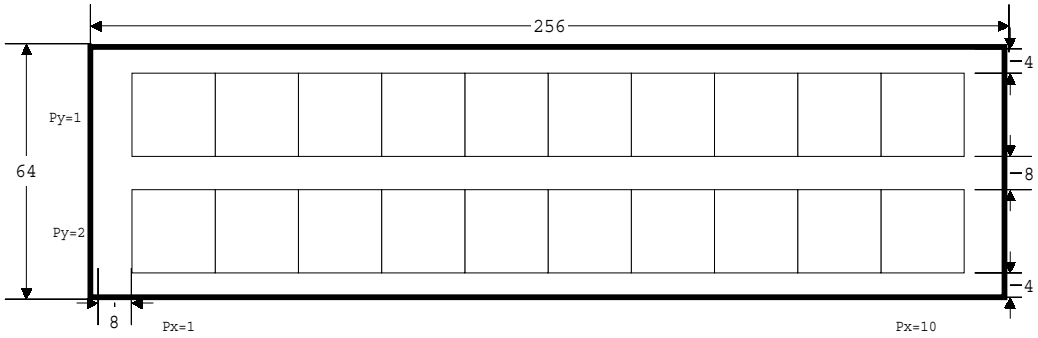
Mode=1 8 Line x 42 Colum ANK 5x7



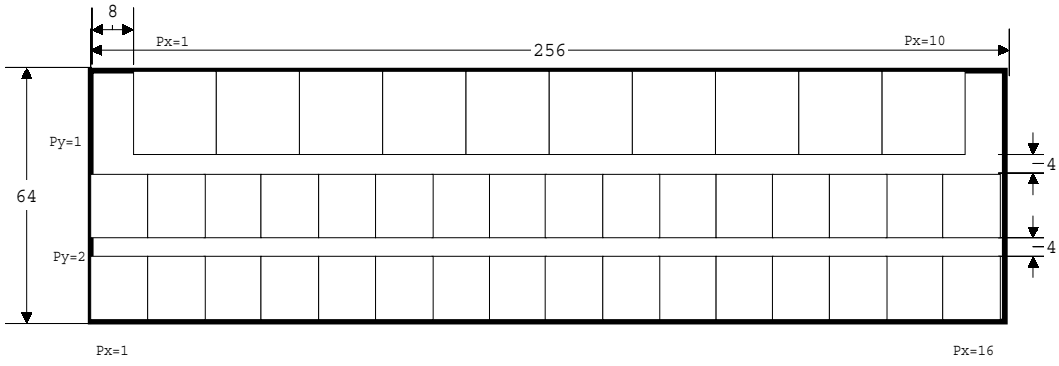
Mode=2 3 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)



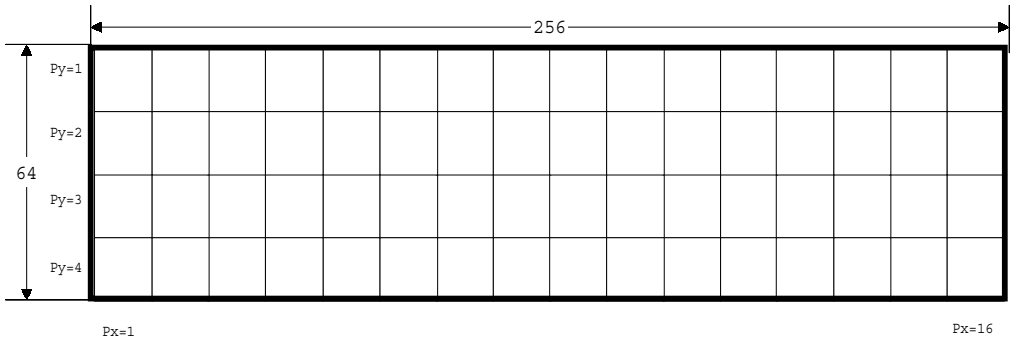
Mode=3 2 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24)



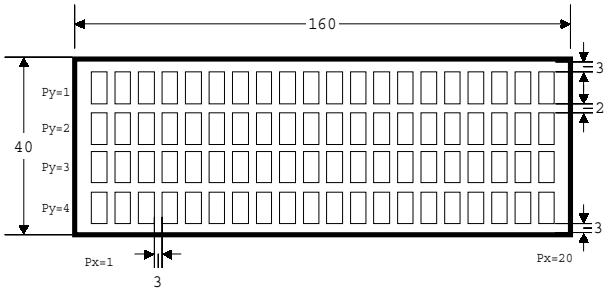
Mode=4 1 Line x 10(20) Colum Shift-JIS KANJI 24x24(ANK 12x24)
2 Line x 16(32) Colum Shift-JIS KANJI 16x16(ANK 8x16)



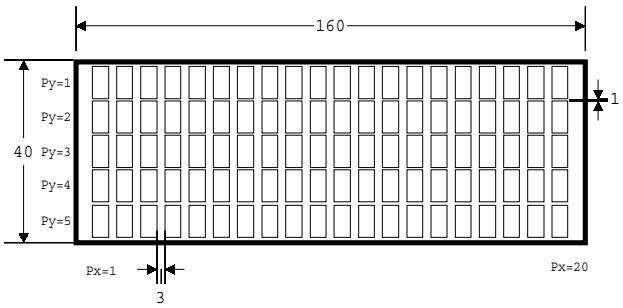
Mode=5 4 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)



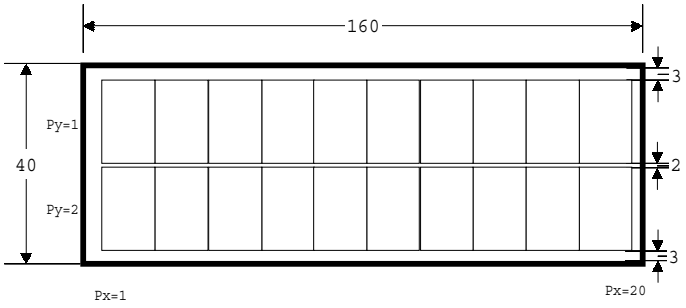
Mode=6 4 Line x 20 Colum ANK 5x7



Mode=7 5 Line x 20 Colum ANK 5x7



Mode=8 2 Line x 10(20) Colum Shift-JIS KANJI 16x16 (ANK 8x16)



Example)

LIUST-52 Set Screen Mode 4 Line x 20 Colum ANK 5x7

*1 Liu_outs("\x1b\\?LS6");

*1 See Appendix-A3.

13) One line horizontal scroll (Valid only for LIUST-52/LIUST-53)

Format: ESC\?LHPm;Pl;Pt;Pn;Pd…Pd
(1B 5C 3F 4C 48 Pm 3B Pl 3B Pt 3B Pn 3B Pd…Pd)

Function: Performs one line horozontal scroll setting.

Parameter: Pm Pl Pt Pn Pd…Pd

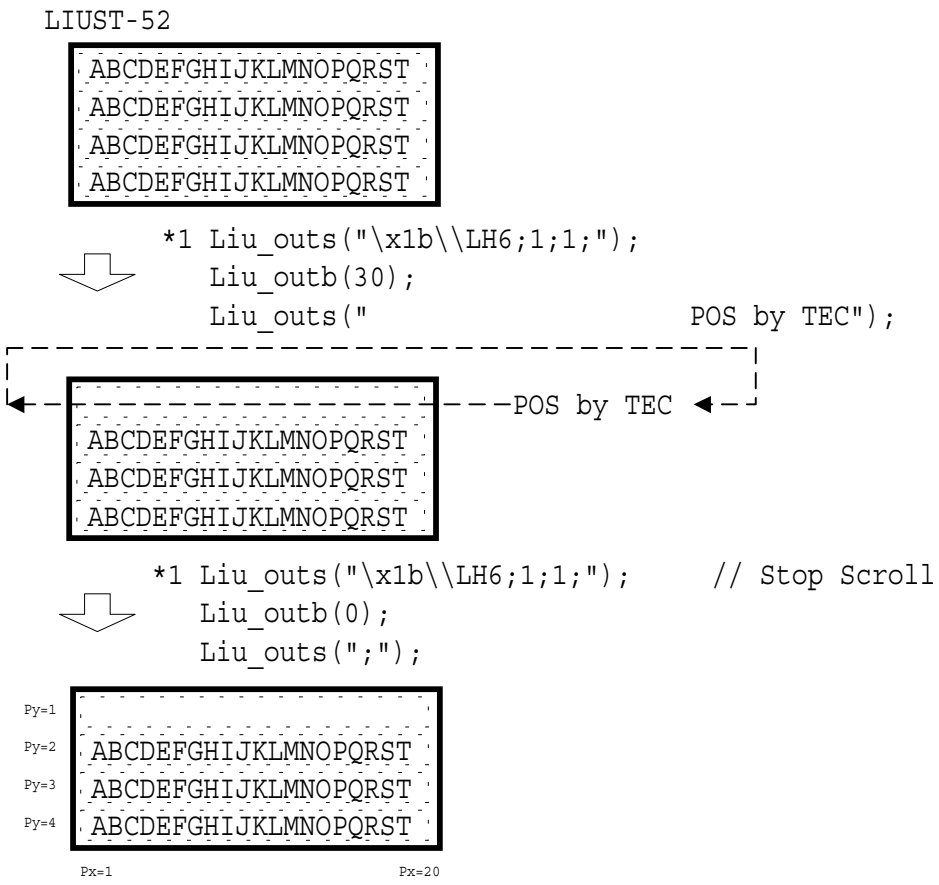
Pm Screen Mode	1 (31): 8 Line x 42 Colum ANK 5x7 2 (32): 3 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16) 3 (33): 2 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24) 4 (34): 1 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24) +2 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16) 5 (35): 4 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	LI5U3ST
	6 (36): 4 Line x 20 Colum ANK 5x7 7 (37): 5 Line x 20 Colum ANK 5x7 8 (38): 2 Line x 10(20) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	LI5U2ST
Pl Scroll Line	1-MAX Line No.	
Pt Scroll Speed	1 (31H): 1 dot/10ms 2 (32H): 1 dot/20ms	
Pn Number of Character	ANK/Shift-JIS ANK 1 Shift-JIS KANJI 2 MAX 128 (80)Bytes	
Pd…Pd Character Code	Character Code The following display attributes are available. 1)Blink 2)Inverse 3)Hrizontal Double	

Basic operations:

(1) If the specified line has some characters when horozontal scroll starts, those characters in the line will be cleared.
(2) Horizontal scroll will scrolls characters in an eternal loop unless reset. Characters are horizontally scrolled so that the beginning and the ending meet.
(3) Scrolling will not start unless the same Pm Screen Mode as the current display screen is specified.
(4) Screen is scrolled from the right to the left in dots.
(5) The range of scroll display depends on the screen mode.
(6) Horizontal scrolling is released by the number of characters Pn=00.
(7) Scrollinf is applicable to one line.
(8) To display the scrolling line by adding display attribute command, enter scroll display data with the display attribute command(Reverse¥Blink¥Horizontal Double). Duplicate specification of the display attributes is not allowed.
(9) To replace characters in a scrolling line, specify the scroll command again on the same line. To specify the command again on the different line, release the specification and perform setting.
(10)Graphic command sent during scrolling will not be executed.

Note: Displaying could be interrupted by sending the long command such as external character registration.

Example)



*1 See Appendix-A3.

14) Dispaly attribte Blink/Reverse/Reset/Double width (Valid only for LIUST-52/LIUST-53)

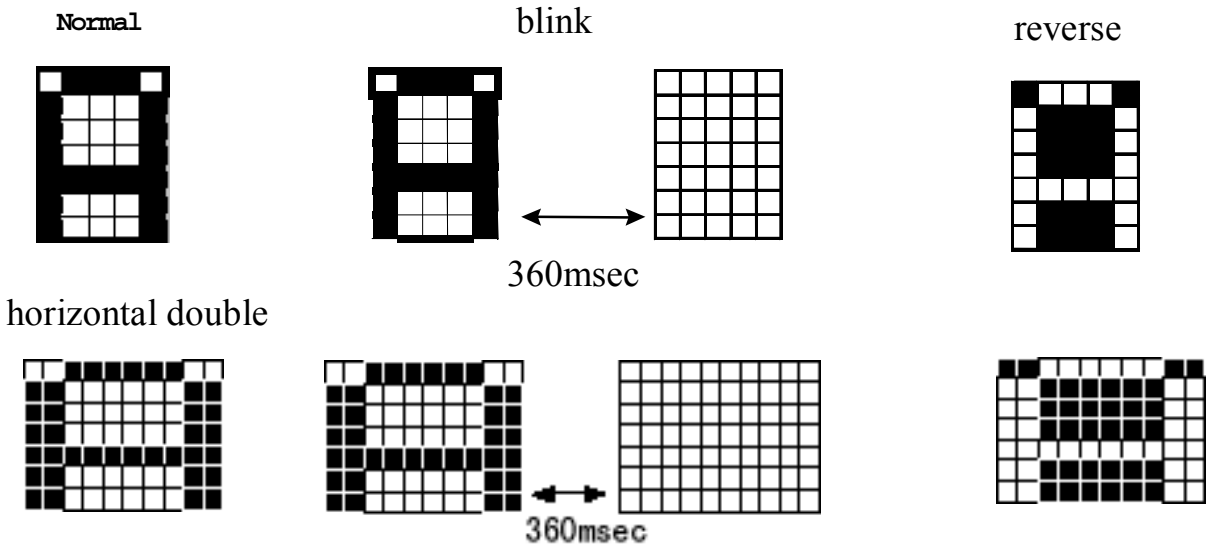
Format: Blink: ESC[5m (1B 5B 35 6D)
Reverse: ESC[7m (1B 5B 37 6D)
Blink/Reverse Reset: ESC[0m (1B 5B 30 6D)
Horizontal Double Set: ESC#6 (1B 23 36)
Horizontal Double Reset: ESC#5 (1B 23 35)

Function: characters following the definition described above will be displayed with attributes as specified.

Example)

LIUST-52 Set Screen Mode 4 Line x 20 Colum ANK 5x7

```
*1  Liu_outs("\x1b#5\x1b[0mA");                  // Normal  'A'
    Liu_outs("\x1b#5\x1b[5mA\x1b[0m");           // Blink   'A'
    Liu_outs("\x1b#5\x1b[7mA\x1b[0m");  // Reverse 'A'
    Liu_outs("\x1b[0m\x1b#6A\x1b#5");            // horizontal double 'A'
    Liu_outs("\x1b[5m\x1b#6A\x1b#5\x1b[0m");   // horizontal double + Blink   'A'
    Liu_outs("\x1b[7m\x1b#6A\x1b#5\x1b[0m");   // horizontal double + Reverse 'A'
```



*1 See Appendix-A3.

15) External character setting (Only for LIUST-52/LIUST-53)

Format: ESC\?LWPf;Pn;Pc;Pd…Pd (1B 5C 3F 4C 57 Pf 3B Pn 3B Pc 3B Pd…Pd)

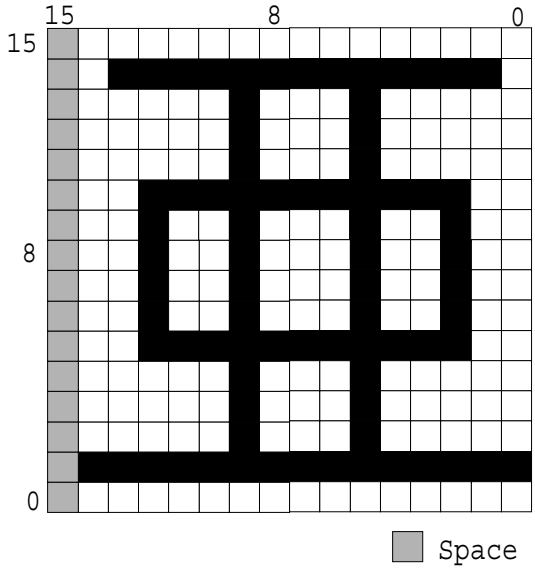
Function: Sets character fonts.
Controls by Pn FONT number. Pc signifies Character Code.
When Pc=0 is specified, fonr will be deleted.
(In this case, Pd…Pd is not allowed.)

Parameter: Pf Pn Pc Pd…Pd

Parameter		LIUST -52	LIUST -53
Pf Character Font	1 (31): ANK 5x 7 Font	*	*
	2 (32): ANK 8x16 Font	*	*
	3 (33): Shift-JIS KANJI 16x16 Font	*	*
	4 (34): ANK 12x24 Font	-	*
	5 (35): Shift-JIS KANJI 24x24 Font	-	*
Pn Font NO.	1-32 (01-20) (Pf=1,2,4) 1-16 (01-10) (Pf=3,5)		
Pc Character Code	xx (20-FF) (Pf=1,2,4) xx yy(Shift-JIS KANJI CODE) (Pf=3,5)		
Pd…Pd Font Data	xx (00-FF)		

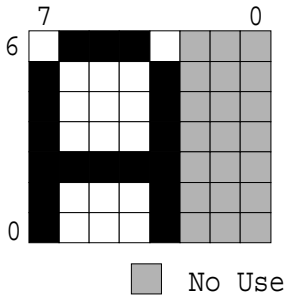
*Valid / -Invalid

16x16 Font



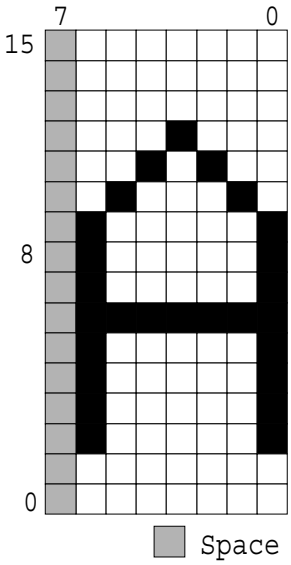

```
 0 Byte  (00)    1 Byte  (00)
 2 Byte  (3F)    3 Byte  (FE)
 4 Byte  (02)    5 Byte  (20)
 6 Byte  (02)    7 Byte  (20)
 8 Byte  (02)    9 Byte  (20)
10 Byte  (1F)   11 Byte  (FC)
12 Byte  (12)   13 Byte  (24)
14 Byte  (12)   15 Byte  (24)
16 Byte  (12)   17 Byte  (24)
18 Byte  (12)   19 Byte  (24)
20 Byte  (1F)   21 Byte  (FC)
22 Byte  (02)   23 Byte  (20)
24 Byte  (02)   25 Byte  (20)
26 Byte  (02)   27 Byte  (20)
28 Byte  (7F)   29 Byte  (FF)
30 Byte  (00)   31 Byte  (00)
```

5x7 Font




```
0 Byte  (70)
1 Byte  (88)
2 Byte  (88)
3 Byte  (88)
4 Byte  (F8)
5 Byte  (88)
6 Byte  (88)
```

8x16 Font




```
 0 Byte  (00)
 1 Byte  (00)
 2 Byte  (00)
 3 Byte  (08)
 4 Byte  (14)
 5 Byte  (22)
 6 Byte  (41)
 7 Byte  (41)
 8 Byte  (41)
 9 Byte  (7F)
10 Byte  (41)
11 Byte  (41)
12 Byte  (41)
13 Byte  (41)
14 Byte  (00)
15 Byte  (00)
```

Example)

LIUST-52 Set ANK 5x7 Font, 'A' , ANK Code= 41H , Font No= 16

```
*1  Liu_outs("\x1b\\?LW1;");
    Liu_outb(16);                 // Font No= 16
    Liu_outs(";"); Liu_outb(0x41);  // ANK Code= 41H 'A'
    Liu_outs(";");
    Liu_outb(0x70);               // 0 Byte Font ANK 5x7 Font Pd…Pd
    Liu_outb(0x88);               // 1 Byte
    Liu_outb(0x88);               // 2 Byte
    Liu_outb(0x88);               // 3 Byte
    Liu_outb(0xF8);               // 4 Byte
    Liu_outb(0x88);               // 5 Byte
    Liu_outb(0x88);               // 6 Byte
```

Clear ANK 5x7 Font ,Font No=16

```
*1  Liu_outs("\x1b\\?LW1;");
    Liu_outb(16);                 // Font No= 16
    Liu_outs(";"); Liu_outb(0);     // ANK Code= 00H  Font Clear
    Liu_outs(";");
```

*1 See Appendix-A3.

16) Graphic display (Only for LIUST-52/LIUST-53)

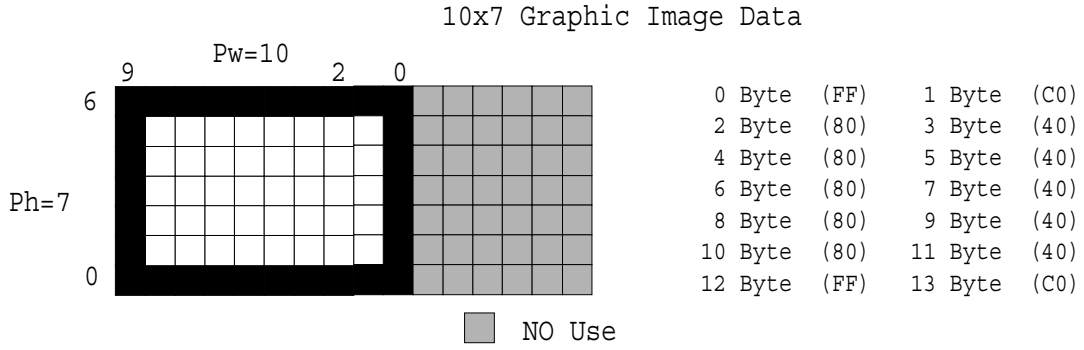
Format: ESC\?LGPx;Py;Ph;Pw;Pd…Pd
(1B 5C 3F 4C 47 Px 3B Py 3B Ph 3B Pw 3B Pd…Pd)

Function: Displays graphic image.

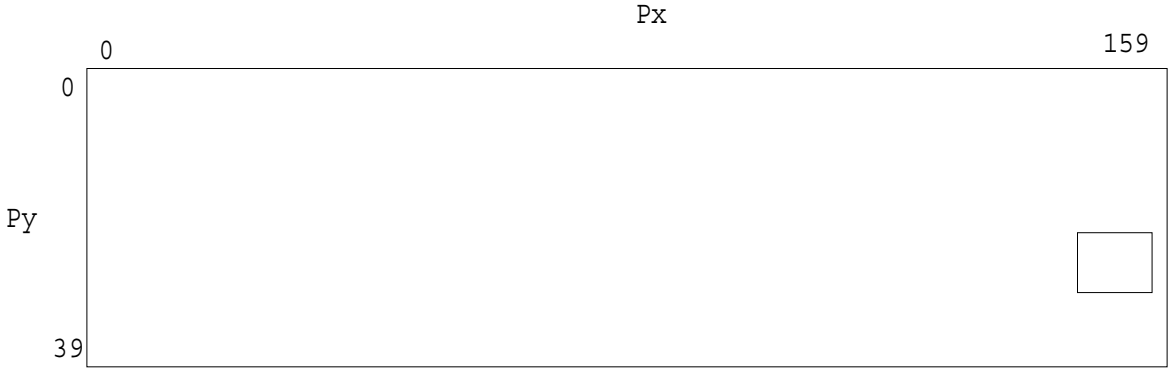
Parameter: Px Py Ph Pw Pd…Pd

Display Position	LIUST-52	LIUST-53
Px (ASCII 1-3 Byte)	0-159 (30-31 35 39)	0-255 (30-32 35 35)
Py (ASCII 1-2 Byte)	0-39 (30-33 39)	0-63 (30-36 33)
Height Ph (ASCII 1-2 Byte)	1-40 (31-34 30)	1-64 (31-36 34)
Wide Pw (ASCII 1-3 Byte)	1-160 (31-31 36 30)	1-256 (31-32 35 36)
Graphic Image Pd…Pd	xx (00-FF)	

Example)




```
*1 liu_outs("\x1b\\?LG150;24;7;10;");
   liu_outs("\xFF\xC0\x80\x40\x80\x40\x80\x40\x80\x40\x80\x40\xFF\xC0");
```



*1 See Appendix-A3.

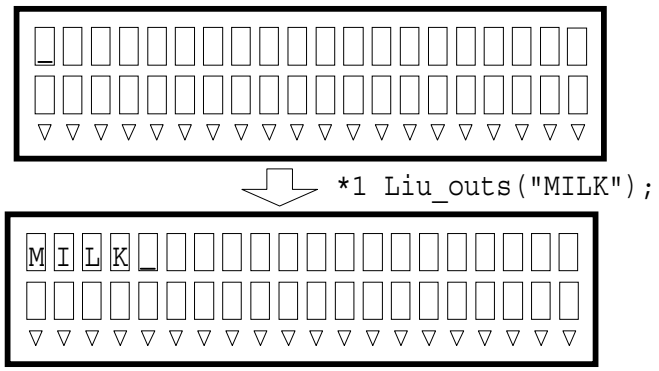
17) Character Font Data ANK

Format: xx (20-FF)

Function: Displays ANK characters.
Font to be used is decided by Screen Mode and Country Code.(See Appendix-A1.)

Example)

LIUST-51



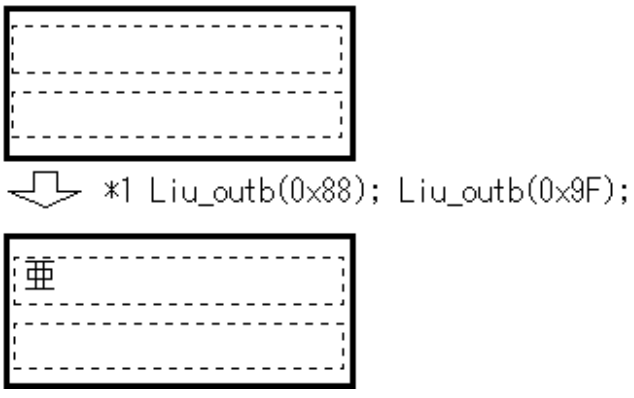
18) Character Font Data Japan Shift-JIS (Only for LIUST-52/LIUST-53)

Format: xx 1st byte(81-9F, E0-EF)
yy 2nd byte(40-7E, 80-FC)

Function: Displays Japan Shift-JIS characters.
See Appendix-A2 for fonts to be used.
Can be displayed only when Screen Mode=8 and Country Code=63.

Example)

LIUST-52



*1 See Appendix-A3.

19) Multi-line horizontal scroll (Mode dedicated to horozontal scroll)

(Only for LIUST-52/LIUST-53)

Format: Start: ESC\?LMS (1B 5C 3F 4C 4D 53)
End: ESC\?LME (1B 5C 3F 4C 4D 45)
Go ESC\?LMG (1B 5C 3F 4C 4D 47)
Set Line String: ESC\?LMPm;Pl;Pt;Pn;Pd…Pd
(1B 5C 3F 4C 4D Pm 3B Pl 3B Pt 3B Pn 3B Pd…Pd)

Function: Sets multi-line horizontal scroll.
Mode is dedicated to horizontal scroll and no other commands are not executable.

Parameter: Pm Pl Pt Pn Pd…Pd

Pm Screen Mode	1 (31): 8 Line x 42 Colum ANK 5x7 2 (32): 3 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16) 3 (33): 2 Line x 10(20) Colum Shift-JIS KANJI 24x24 (ANK 12x24) 5 (35): 4 Line x 16(32) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	LI5U3ST
	6 (36): 4 Line x 20 Colum ANK 5x7 7 (37): 5 Line x 20 Colum ANK 5x7 8 (38): 2 Line x 10(20) Colum Shift-JIS KANJI 16x16 (ANK 8x16)	LI5U2ST
Pl Scroll Line	1-MAX Line No.	
Pt Scroll Speed	1 (31H): 1 dot/10ms 2 (32H): 1 dot/20ms	
Pn Number of Character	ANK/Shift-JIS ANK 1 Shift-JIS KANJI 2 MAX 128 (80)Bytes	
Pd…Pd Character Code	Character Code The following display attributes are available. 1)Blink 2)Inverse 3)Hrizontal Double	

Basic operation (Specify instructions as shown below.)

(1) Start

Multi-line Scroll Mode starts by this instruction. Cursor position, screen mode and screen status before executing this instruction will be kept. However, normal instructions will not be accepted after accepting this instruction.

(2) Set Line String

This instruction can be specified for multiple lines. However, this instruction operates under the following conditions depending on parameters.

- If Pm(Screen Mode) specification is different, the last screen mode is effective and the previous specification is invalid.
- If the same Pl(Scroll Line) is specified, the last one is valid.
- If Pt(Scroll Speed) specification is dofferent, the last one is valid.

(3) GO

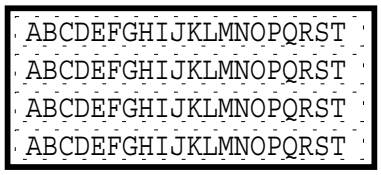
Multi-line Scroll starts by this instruction. Other commands than End command will not be executed after this command is started. Therefore, display characters cannot be changed during execution.

(4) End

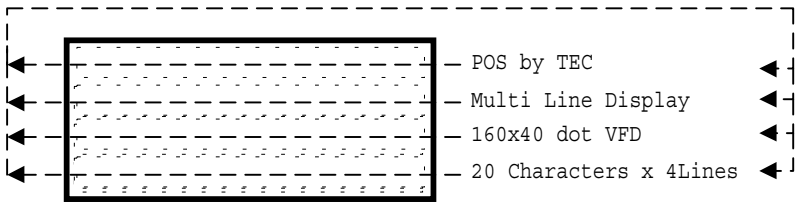
Multi-line scroll is stopped by this command and the cursor position, screen mode and screen status before executing this instruction will be resumed.

Example)

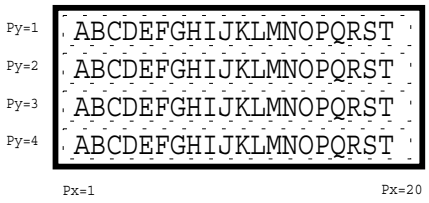
LIUST-52




```
*1 Liu_outs("\x1b\\?LMS");     // Start Scroll Mode
   Liu_outs("\x1b\\?LM6;1;1;"); Liu_outb(10); liu_outs("POS by TEC");
   Liu_outs("\x1b\\?LM6;2;1;"); Liu_outb(18); liu_outs("Multi Line Display");
   Liu_outs("\x1b\\?LM6;3;1;"); Liu_outb(14); liu_outs("160x40 dot VFD");
   Liu_outs("\x1b\\?LM6;4;1;"); Liu_outb(22); liu_outs("20 Characters x 4Lines");
   Liu_outs("\x1b\\?LMG");     // Start Scroll
```




```
*1 Liu_outs("\x1b\\?LME");     // Stop Scroll
```



*1 See Appendix-A3.

4. Diagnostics

4.1. Self diagnostics

After power on, the display module performs ROM test and RAM test TEST and in the case of error, it disables RTS to show receive not ready.

After power on, all lights are lit for about 500ms.

4.2. Display test

After power on, display test is done under the following conditions.

1)When DipSW's Self Test Mode=Test.

2)When DipSW's Self Test Mode=Normal and the display module's RTS and CTS/RXD and TXD are connected.

• LIUST-51

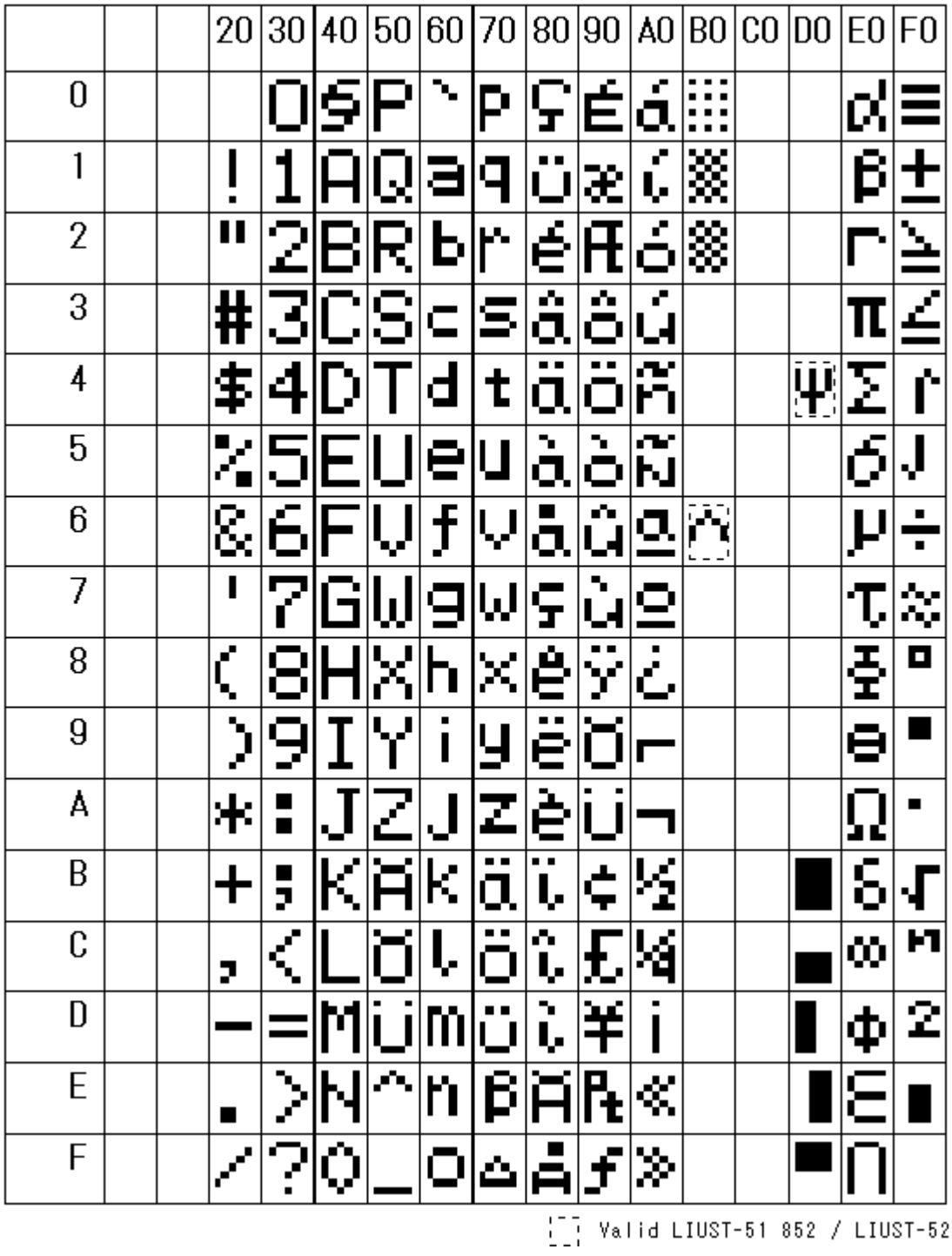
1) All lights lighting display (2S)
2) All dots light up every other column (2S)
3) Two vertical lines light up (2S)
4) Three horizontal lines light up (2S)
5) All lights light off (2S)
6) Displays country codes from 20H to FFH one at a time on the entire screen.(2S) Triangle marks are lit up and off by one character.
7) After displaying the country code USA, other country codes with the different font will be displayed on the entire screen in the following order. France, Germany, Great Britain, Denmark 1,Sweden…
8) After displaying all country codes, returns to 1).

• LIUST-52/LIUST-53

1) All lights lighting display
2) All dots light up every other line
3) Four vertical lines light up (2S)
4) All lights light off (2S)
5) All lights light up again and stop.

A1. FONT 5x7 ANK

Default Mode (Germany Mode:02h)



Valid LIUST-51 852 / LIUST-52

International character set

No	Country/Char	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
00h	USA	#	$	@	[	\	]	^	`	{	|	}	~
01h	France	#	$	à	°	ç	§	^	`	é	ù	è	¨
02h	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
03h	UK	£	$	@	[	\	]	^	`	{	|	}	~
04h	Denmark 1	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
05h	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
06h	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
07h	Spain	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
08h	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
09h	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
0Ah	Denmark 2	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
0Bh	Spain 2	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
0Ch	Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

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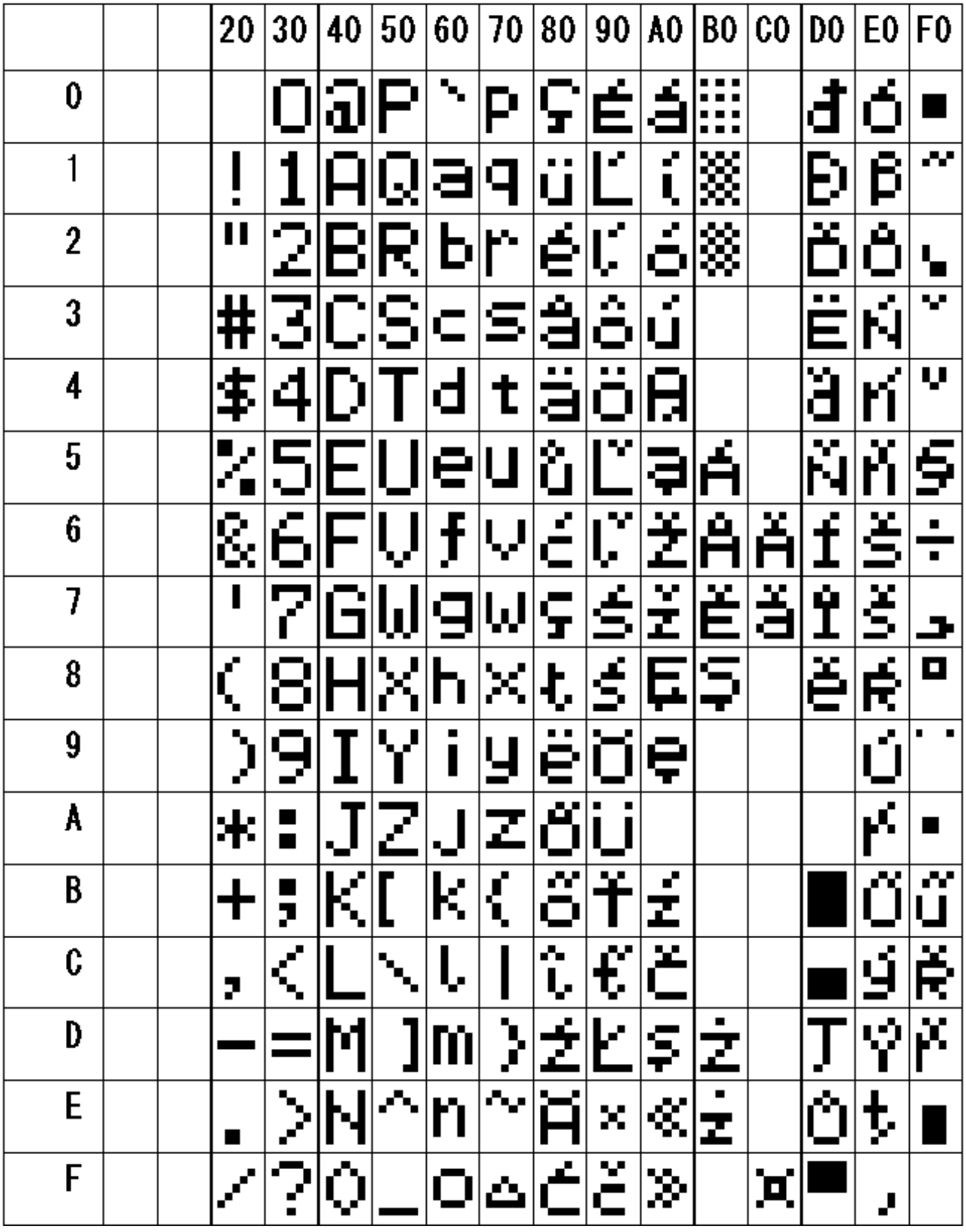
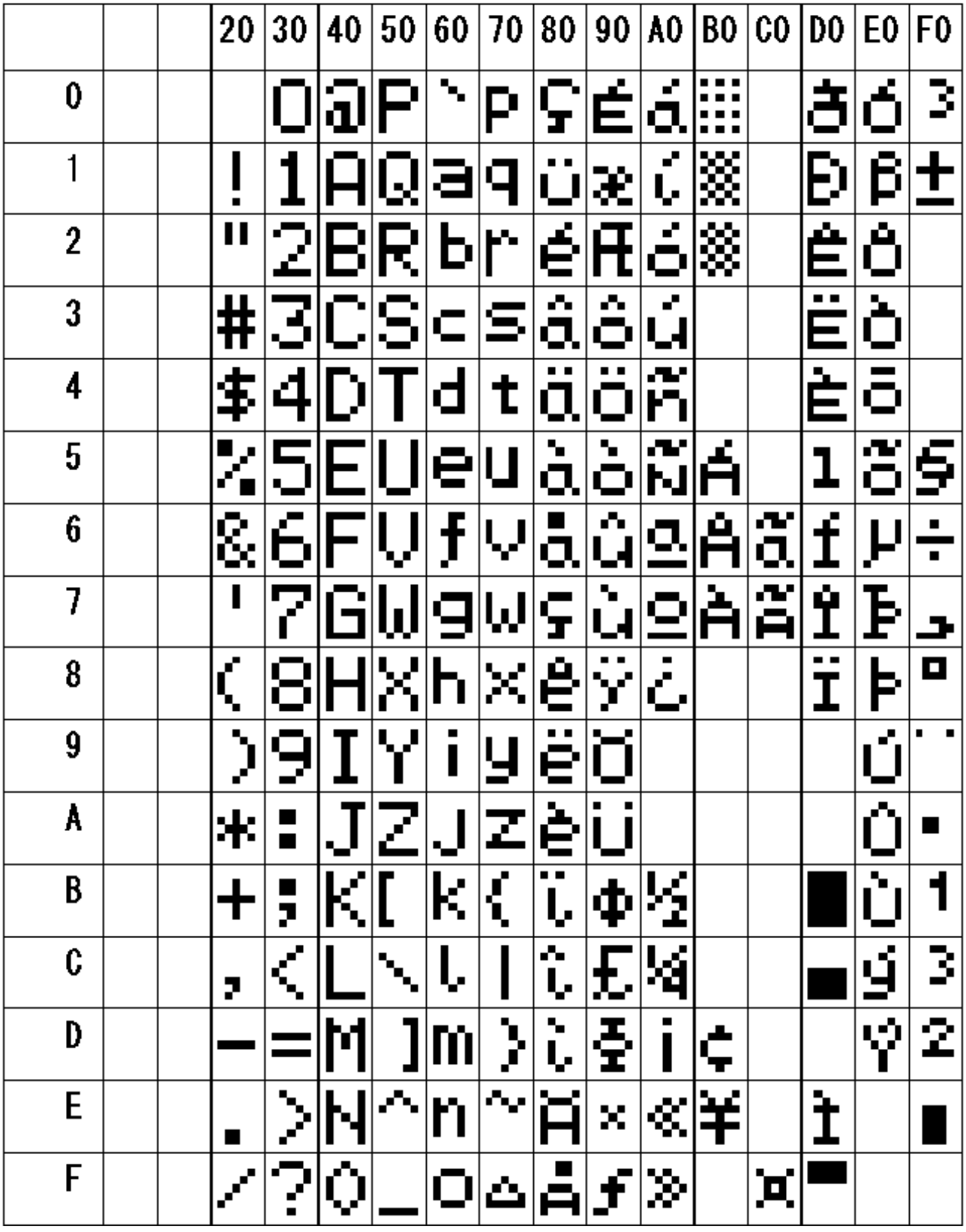
Japan Mode(Japan 2 Mode:63h)

Code Page 852 East Europe (East Europe Mode:0Dh)



Code Page 850 IceLand (IceLand Mode:0Eh)



A2. FONT ANK5x7,Japan Shift-JIS ANK8x16,12x24 (Shift-JIS Mode:64H)

ANK Char	ANK Char	ANK Char	ANK Char	ANK Char
20H SP	40H @	60H `		C0H タ
21H !	41H A	61H a	A1H 。	C1H チ
22H ”	42H B	62H b	A2H 「	C2H ツ
23H #	43H C	63H c	A3H 」	C3H テ
24H $	44H D	64H d	A4H 、	C4H ト
25H %	45H E	65H e	A5H ・	C5H ナ
26H &	46H F	66H f	A6H ヲ	C6H ニ
27H ’	47H G	67H g	A7H ァ	C7H ヌ
28H （	48H H	68H h	A8H ィ	C8H ネ
29H ）	49H I	69H i	A9H ゥ	C9H ノ
2AH *	4AH J	6AH j	AAH ェ	CAH ハ
2BH +	4BH K	6BH k	ABH ォ	CBH ヒ
2CH ,	4CH L	6CH l	ACH ャ	CCH フ
2DH −	4DH M	6DH m	ADH ュ	CDH ヘ
2EH .	4EH N	6EH n	AEH ョ	CEH ホ
2FH ／	4FH O	6FH o	AFH ッ	CFH マ
30H 0	50H P	70H p	B0H ー	D0H ミ
31H 1	51H Q	71H q	B1H ア	D1H ム
32H 2	52H R	72H r	B2H イ	D2H メ
33H 3	53H S	73H s	B3H ウ	D3H モ
34H 4	54H T	74H t	B4H エ	D4H ヤ
35H 5	55H U	75H u	B5H オ	D5H ユ
36H 6	56H V	76H v	B6H カ	D6H ヨ
37H 7	57H W	77H w	B7H キ	D7H ラ
38H 8	58H X	78H x	B8H ク	D8H リ
39H 9	59H Y	79H y	B9H ケ	D9H ル
3AH :	5AH Z	7AH z	BAH コ	DAH レ
3BH ;	5BH [	7BH {	BBH サ	DBH ロ
3CH <	5CH ¥	7CH |	BCH シ	DCH ワ
3DH =	5DH]	7DH }	BDH ス	DDH ン
3EH >	5EH ^	7EH ～	BEH セ	DEH ”
3FH ?	5FH _	7FH SP	BFH ソ	DFH °

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (1/6) (Shift-JIS Mode:64H)

Shift-JIS	0 1 2 3 4 5 6 7 8 9 A B C D E F
8140	SP、。，．・：；？！゛゜´｀¨＾
8150	￣＿ヽヾゝゞ〃仝々〆〇ー―‐／＼
8160	～‖｜…‥‘’“”（）〔〕［］｛
8170	｝〈〉《》「」『』【】＋－±×
8180	÷＝≠＜＞≦≧∞∴♂♀°′″℃¥
8190	＄￠￡％＃＆＊＠§☆★○●◎◇
819F	◆□■△▲▽▼※〒→←↑↓〓
81AF	∈∋⊆⊇⊂⊃∪
81BF	∩∧∨￢⇒⇔∀∃
81CF	∠⊥⌒∂∇
81DF	≡≒≪≫√∽∝∵∫∬
81EF	Å‰♯♭♪†‡¶◯
8240	０
8250	１２３４５６７８９
8260	ＡＢＣＤＥＦＧＨＩＪＫＬＭＮＯＰ
8270	ＱＲＳＴＵＶＷＸＹＺ
8280	ａｂｃｄｅｆｇｈｉｊｋｌｍｎｏ
8290	ｐｑｒｓｔｕｖｗｘｙｚ
829F	ぁあぃいぅうぇえぉおかがきぎくぐ
82AF	けげこごさざしじすずせぜそぞただ
82BF	ちぢっつづてでとどなにぬねのはば
82CF	ぱひびぴふぶぷへべぺほぼぽまみむ
82DF	めもゃやゅゆょよらりるれろゎわゐ
82EF	ゑをん
8340	ァアィイゥウェエォオカガキギクグ
8350	ケゲコゴサザシジスズセゼソゾタダ
8360	チヂッツヅテデトドナニヌネノハバ
8370	パヒビピフブプヘベペホボポマミ
8380	ムメモャヤュユョヨラリルレロヮワ
8390	ヰヱヲンヴヵヶ

Shift-JIS	0 1 2 3 4 5 6 7 8 9 A B C D E F
839F	ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠ
83AF	ΡΣΤΥΦΧΨΩ
83BF	αβγδεζηθικλμνξοπ
83CF	ρστυφχψω
83DF	
83EF	
8440	АБВГДЕЁЖЗИЙКЛМНО
8450	ПРСТУФХЦЧШЩЪЫЬЭЮ
8460	Я
8470	абвгдеёжзийклмн
8480	опрстуфхцчшщъыьэ
8490	юя
849F	─│┌┐┘└├┬┤┴┼━┃┏┓┛
84AF	┗┣┳┫┻╋┠┯┨┷┿┝┰┥┸╂
84BF	
84CF	
84DF	
84EF	
889F	亜唖娃阿哀愛挨姶逢葵茜穐悪握渥旭
88AF	葦芦鯵梓圧斡扱宛姐虻飴絢綾鮎或粟
88BF	袷安庵按暗案闇鞍杏以伊位依偉囲夷
88CF	委威尉惟意慰易椅為畏異移維緯胃萎
88DF	衣謂違遺医井亥域育郁磯一壱溢逸稲
88EF	茨芋鰯允印咽員因姻引飲淫胤蔭
8940	院陰隠韻吋右宇烏羽迂雨卯鵜窺丑碓
8950	臼渦嘘唄欝蔚鰻姥厩浦瓜閏噂云運雲
8960	荏餌叡営嬰影映曳栄永泳洩瑛盈穎頴
8970	英衛詠鋭液疫益駅悦謁越閲榎厭円
8980	園堰奄宴延怨掩援沿演炎焔煙燕猿縁
8990	艶苑薗遠鉛鴛塩於汚甥凹央奥往応
899F	押旺横欧殴王翁襖鴬鴎黄岡沖荻億屋
89AF	憶臆桶牡乙俺卸恩温穏音下化仮何伽
89BF	価佳加可嘉夏嫁家寡科暇果架歌河火
89CF	珂禍禾稼箇花苛茄荷華菓蝦課嘩貨迦
89DF	過霞蚊俄峨我牙画臥芽蛾賀雅餓駕介
89EF	会解回塊壊廻快怪悔恢懐戒拐改
8A40	魁晦械海灰界皆絵芥蟹開階貝凱劾外
8A50	咳害崖慨概涯碍蓋街該鎧骸浬馨蛙垣
8A60	柿蛎鈎劃嚇各廓拡撹格核殻獲確穫覚
8A70	角赫較郭閣隔革学岳楽額顎掛笠樫
8A80	橿梶鰹潟割喝恰括活渇滑葛褐轄且鰹
8A90	叶椛樺鞄株兜竃蒲釜鎌噛鴨栢茅萱
8A9F	粥刈苅瓦乾侃冠寒刊勘勧巻喚堪姦完
8AAF	官寛干幹患感慣憾換敢柑桓棺款歓汗
8ABF	漢澗潅環甘監看竿管簡緩缶翰肝艦莞
8ACF	観諌貫還鑑間閑関陥韓館舘丸含岸巌

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (2/6) (Shift-JIS Mode:64H)

Shift-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8ADF	玩	癌	眼	岩	翫	贋	雁	頑	顔	願	企	伎	危	喜	器	基
8AEF	奇	嬉	寄	岐	希	幾	忌	揮	机	旗	既	期	棋	棄		
8B40	機	帰	毅	気	汽	畿	祈	季	稀	紀	徽	規	記	貴	起	軌
8B50	輝	飢	騎	鬼	亀	偽	儀	妓	宜	戯	技	擬	欺	犠	疑	祇
8B60	義	蟻	誼	議	掬	菊	鞠	吉	吃	喫	桔	橘	詰	砧	杵	黍
8B70	却	客	脚	虐	逆	丘	久	仇	休	及	吸	宮	弓	急	救	
8B80	朽	求	汲	泣	灸	球	究	窮	笈	級	糾	給	旧	牛	去	居
8B90	巨	拒	拠	挙	渠	虚	許	距	鋸	漁	禦	魚	亨	享	京	
8B9F	供	侠	僑	兇	競	共	凶	協	匡	卿	叫	喬	境	峡	強	彊
8BAF	怯	恐	恭	挟	教	橋	況	狂	狭	矯	胸	脅	興	蕎	郷	鏡
8BBF	響	饗	驚	仰	凝	尭	暁	業	局	曲	極	玉	桐	粁	僅	勤
8BCF	均	巾	錦	斤	欣	欽	琴	禁	禽	筋	緊	芹	菌	衿	襟	謹
8BDF	近	金	吟	銀	九	倶	句	区	狗	玖	矩	苦	躯	駆	駈	駒
8BEF	具	愚	虞	喰	空	偶	寓	遇	隅	串	櫛	釧	屑	屈		
8C40	掘	窟	沓	靴	轡	窪	熊	隈	粂	栗	繰	桑	鍬	勲	君	薫
8C50	訓	群	軍	郡	卦	袈	祁	係	傾	刑	兄	啓	圭	珪	型	契
8C60	形	径	恵	慶	慧	憩	掲	携	敬	景	桂	渓	畦	稽	系	経
8C70	継	繋	罫	茎	荊	蛍	計	詣	警	軽	頚	鶏	芸	迎	鯨	
8C80	劇	戟	撃	激	隙	桁	傑	欠	決	潔	穴	結	血	訣	月	件
8C90	倹	倦	健	兼	券	剣	喧	圏	堅	嫌	建	憲	懸	拳	捲	
8C9F	検	権	牽	犬	献	研	硯	絹	県	肩	見	謙	賢	軒	遣	鍵
8CAF	険	顕	験	鹸	元	原	厳	幻	弦	減	源	玄	現	絃	舷	言
8CBF	諺	限	乎	個	古	呼	固	姑	孤	己	庫	弧	戸	故	枯	湖
8CCF	狐	糊	袴	股	胡	菰	虎	誇	跨	鈷	雇	顧	鼓	五	互	伍
8CDF	午	呉	吾	娯	後	御	悟	梧	檎	瑚	碁	語	誤	護	醐	乞
8CEF	鯉	交	佼	侯	候	倖	光	公	功	効	勾	厚	口	向		
8D40	后	喉	坑	垢	好	孔	孝	宏	工	巧	巷	幸	広	庚	康	弘
8D50	恒	慌	抗	拘	控	攻	昂	晃	更	杭	校	梗	構	江	洪	浩
8D60	港	溝	甲	皇	硬	稿	糠	紅	紘	絞	綱	耕	考	肯	肱	腔
8D70	膏	航	荒	行	衡	講	貢	購	郊	酵	鉱	砿	鋼	閤	降	
8D80	項	香	高	鴻	剛	劫	号	合	壕	拷	濠	豪	轟	麹	克	刻
8D90	告	国	穀	酷	鵠	黒	獄	漉	腰	甑	忽	惚	骨	狛	込	
8D9F	此	頃	今	困	坤	墾	婚	恨	懇	昏	昆	根	梱	混	痕	紺
8DAF	艮	魂	些	佐	叉	唆	嵯	左	差	査	沙	瑳	砂	詐	鎖	裟
8DBF	坐	座	挫	債	催	再	最	哉	塞	妻	宰	彩	才	採	栽	歳
8DCF	済	災	采	犀	砕	砦	祭	斎	細	菜	裁	載	際	剤	在	材
8DDF	罪	財	冴	坂	阪	堺	榊	肴	咲	崎	埼	碕	鷺	作	削	咋
8DEF	搾	昨	朔	柵	窄	策	索	錯	桜	鮭	笹	匙	冊	刷		
8E40	察	拶	撮	擦	札	殺	薩	雑	皐	鯖	捌	錆	鮫	皿	晒	三
8E50	傘	参	山	惨	撒	散	桟	燦	珊	産	算	纂	蚕	讃	賛	酸
8E60	餐	斬	暫	残	仕	仔	伺	使	刺	司	史	嗣	四	士	始	姉
8E70	姿	子	屍	市	師	志	思	指	支	孜	斯	施	旨	枝	止	
8E80	死	氏	獅	祉	私	糸	紙	紫	肢	脂	至	視	詞	詩	試	誌
8E90	諮	資	賜	雌	飼	歯	事	似	侍	児	字	寺	慈	持	時	
8E9F	次	滋	治	爾	璽	痔	磁	示	而	耳	自	蒔	辞	汐	鹿	式
8EAF	識	鴫	竺	軸	宍	雫	七	叱	執	失	嫉	室	悉	湿	漆	疾

Shift-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8EBF	質	実	蔀	篠	偲	柴	芝	屡	蕊	縞	舎	写	射	捨	赦	斜
8ECF	煮	社	紗	者	謝	車	遮	蛇	邪	借	勺	尺	杓	灼	爵	酌
8EDF	釈	錫	若	寂	弱	惹	主	取	守	手	朱	殊	狩	珠	種	腫
8EEF	趣	酒	首	儒	受	呪	寿	授	樹	綬	需	囚	収	周		
8F40	宗	就	州	修	愁	拾	洲	秀	秋	終	繍	習	臭	舟	蒐	衆
8F50	襲	讐	蹴	輯	週	酋	酬	集	醜	什	住	充	十	従	戎	柔
8F60	汁	渋	獣	縦	重	銃	叔	夙	宿	淑	祝	縮	粛	塾	熟	出
8F70	術	述	俊	峻	春	瞬	竣	舜	駿	准	循	旬	楯	殉	淳	
8F80	準	潤	盾	純	巡	遵	醇	順	処	初	所	暑	曙	渚	庶	緒
8F90	署	書	薯	藷	諸	助	叙	女	序	徐	恕	鋤	除	傷	償	
8F9F	勝	匠	升	召	哨	商	唱	嘗	奨	妾	娼	宵	将	小	少	尚
8FAF	庄	床	廠	彰	承	抄	招	掌	捷	昇	昌	昭	晶	松	梢	樟
8FBF	樵	沼	消	渉	湘	焼	焦	照	症	省	硝	礁	祥	称	章	笑
8FCF	粧	紹	肖	菖	蒋	蕉	衝	裳	訟	証	詔	詳	象	賞	醤	鉦
8FDF	鍾	鐘	障	鞘	上	丈	丞	乗	冗	剰	城	場	壌	嬢	常	情
8FEF	擾	条	杖	浄	状	畳	穣	蒸	譲	醸	錠	嘱	埴	飾		
9040	拭	植	殖	燭	織	職	色	触	食	蝕	辱	尻	伸	信	侵	唇
9050	娠	寝	審	心	慎	振	新	晋	森	榛	浸	深	申	疹	真	神
9060	秦	紳	臣	芯	薪	親	診	身	辛	進	針	震	人	仁	刃	塵
9070	壬	尋	甚	尽	腎	訊	迅	陣	靭	笥	諏	須	酢	図	厨	
9080	逗	吹	垂	帥	推	水	炊	睡	粋	翠	衰	遂	酔	錐	錘	随
9090	瑞	髄	崇	嵩	数	枢	趨	雛	据	杉	椙	菅	頗	雀	裾	
909F	澄	摺	寸	世	瀬	畝	是	凄	制	勢	姓	征	性	成	政	整
90AF	星	晴	棲	栖	正	清	牲	生	盛	精	聖	声	製	西	誠	誓
90BF	請	逝	醒	青	静	斉	税	脆	隻	席	惜	戚	斥	昔	析	石
90CF	積	籍	績	脊	責	赤	跡	蹟	碩	切	拙	接	摂	折	設	窃
90DF	節	説	雪	絶	舌	蝉	仙	先	千	占	宣	専	尖	川	戦	扇
90EF	撰	栓	梅	泉	浅	洗	染	潜	煎	煽	旋	穿	箭	線		
9140	繊	羨	腺	舛	船	薦	詮	賤	践	選	遷	銭	銑	閃	鮮	前
9150	善	漸	然	全	禅	繕	膳	糧	噌	塑	岨	措	曾	曽	楚	狙
9160	疎	疎	礎	祖	租	粗	素	組	蘇	訴	阻	遡	鼠	僧	創	双
9170	叢	倉	喪	壮	奏	爽	宋	層	匝	惣	想	捜	掃	挿	掻	
9180	操	早	曹	巣	槍	槽	漕	燥	争	痩	相	窓	糟	総	綜	聡
9190	草	荘	葬	蒼	藻	装	走	送	遭	鎗	霜	騒	像	増	憎	
919F	臓	蔵	贈	造	促	側	則	即	息	捉	束	測	足	速	俗	属
91AF	賊	族	続	卒	袖	其	揃	存	孫	尊	損	村	遜	他	多	太
91BF	汰	詑	唾	堕	妥	惰	打	柁	舵	楕	陀	駄	騨	体	堆	対
91CF	耐	岱	帯	待	怠	態	戴	替	泰	滞	胎	腿	苔	袋	貸	退
91DF	逮	隊	黛	鯛	代	台	大	第	醍	題	鷹	滝	瀧	卓	啄	宅
91EF	托	択	拓	沢	濯	琢	託	鐸	濁	諾	茸	凧	蛸	只		
9240	叩	但	達	辰	奪	脱	巽	竪	辿	棚	谷	狸	鱈	樽	誰	丹
9250	単	嘆	坦	担	探	旦	歎	淡	湛	炭	短	端	箪	綻	耽	胆
9260	蛋	誕	鍛	団	壇	弾	断	暖	檀	段	男	談	値	知	地	弛
9270	恥	智	池	痴	稚	置	致	蜘	遅	馳	築	畜	竹	筑	蓄	
9280	逐	秩	窒	茶	嫡	着	中	仲	宙	忠	抽	昼	柱	注	虫	衷
9290	註	酎	鋳	駐	樗	瀦	猪	苧	著	貯	丁	兆	凋	喋	寵	

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (3/6) (Shift-JIS Mode:64H)

Shift-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
929F	帖	帳	庁	弔	張	彫	徴	懲	挑	暢	朝	潮	牒	町	眺	聴
92AF	脹	腸	蝶	調	諜	超	跳	銚	長	頂	鳥	勅	捗	直	朕	沈
92BF	珍	賃	鎮	陳	津	墜	椎	槌	追	鎚	痛	通	塚	栂	掴	槻
92CF	佃	漬	柘	辻	蔦	綴	鍔	椿	潰	坪	壷	嬬	紬	爪	吊	釣
92DF	鶴	亭	低	停	偵	剃	貞	呈	堤	定	帝	底	庭	廷	弟	悌
92EF	抵	挺	提	梯	汀	碇	禎	程	締	艇	訂	諦	蹄	逓		
9340	邸	鄭	釘	鼎	泥	摘	擢	敵	滴	的	笛	適	鏑	溺	哲	徹
9350	撤	轍	迭	鉄	典	填	天	展	店	添	纏	甜	貼	転	顛	点
9360	伝	殿	澱	田	電	兎	吐	堵	塗	妬	屠	徒	斗	杜	渡	登
9370	菟	賭	途	都	鍍	砥	砺	努	度	土	奴	怒	倒	党	冬	
9380	凍	刀	唐	塔	塘	套	宕	島	嶋	悼	投	搭	東	桃	梼	棟
9390	盗	淘	湯	涛	灯	燈	当	痘	祷	等	答	筒	糖	統	到	
939F	董	蕩	藤	討	謄	豆	踏	逃	透	鐙	陶	頭	騰	闘	働	動
93AF	同	堂	導	憧	撞	洞	瞳	童	胴	萄	道	銅	峠	鴇	匿	得
93BF	徳	涜	特	督	禿	篤	毒	独	読	栃	橡	凸	突	椴	届	鳶
93CF	苫	寅	酉	瀞	噸	屯	惇	敦	沌	豚	遁	頓	呑	曇	鈍	奈
93DF	那	内	乍	凪	薙	謎	灘	捺	鍋	楢	馴	縄	畷	南	楠	軟
93EF	難	汝	二	尼	弐	迩	匂	賑	肉	虹	廿	日	乳	入		
9440	如	尿	韮	任	妊	忍	認	濡	禰	祢	寧	葱	猫	熱	年	念
9450	捻	撚	燃	粘	乃	廼	之	埜	嚢	悩	濃	納	能	脳	膿	農
9460	覗	蚤	巴	把	播	覇	杷	波	派	琶	破	婆	罵	芭	馬	俳
9470	廃	拝	排	敗	杯	盃	牌	背	肺	輩	配	倍	培	媒	梅	
9480	楳	煤	狽	買	売	賠	陪	這	蝿	秤	矧	萩	伯	剥	博	拍
9490	柏	泊	白	箔	粕	舶	薄	迫	曝	漠	爆	縛	莫	駁	麦	
949F	函	箱	硲	箸	肇	筈	櫨	幡	肌	畑	畠	八	鉢	溌	発	醗
94AF	髪	伐	罰	抜	筏	閥	鳩	噺	塙	蛤	隼	伴	判	半	反	叛
94BF	帆	搬	斑	板	氾	汎	版	犯	班	畔	繁	般	藩	販	範	釆
94CF	煩	頒	飯	挽	晩	番	盤	磐	蕃	蛮	匪	卑	否	妃	庇	彼
94DF	悲	扉	批	披	斐	比	泌	疲	皮	碑	秘	緋	罷	肥	被	誹
94EF	費	避	非	飛	樋	簸	備	尾	微	枇	毘	琵	眉	美		
9540	鼻	柊	稗	匹	疋	髭	彦	膝	菱	肘	弼	必	畢	筆	逼	桧
9550	姫	媛	紐	百	謬	俵	彪	標	氷	漂	瓢	票	表	評	豹	廟
9560	描	病	秒	苗	錨	鋲	蒜	蛭	鰭	品	彬	斌	浜	瀕	貧	賓
9570	頻	敏	瓶	不	付	埠	夫	婦	富	冨	布	府	怖	扶	敷	
9580	斧	普	浮	父	符	腐	膚	芙	譜	負	賦	赴	阜	附	侮	撫
9590	武	舞	葡	蕪	部	封	楓	風	葺	蕗	伏	副	復	幅	服	
959F	福	腹	複	覆	淵	弗	払	沸	仏	物	鮒	分	吻	噴	墳	憤
95AF	扮	焚	奮	粉	糞	紛	雰	文	聞	丙	併	兵	塀	幣	平	弊
95BF	柄	並	蔽	閉	陛	米	頁	僻	壁	癖	碧	別	瞥	蔑	箆	偏
95CF	変	片	篇	編	辺	返	遍	便	勉	娩	弁	鞭	保	舗	鋪	圃
95DF	捕	歩	甫	補	輔	穂	募	墓	慕	戊	暮	母	簿	菩	倣	俸
95EF	包	呆	報	奉	宝	峰	峯	崩	庖	抱	捧	放	方	朋		
9640	法	泡	烹	砲	縫	胞	芳	萌	蓬	蜂	褒	訪	豊	邦	鋒	飽
9650	鳳	鵬	乏	亡	傍	剖	坊	妨	帽	忘	忙	房	暴	望	某	棒
9660	冒	紡	肪	膨	謀	貌	貿	鉾	防	吠	頬	北	僕	卜	墨	撲
9670	朴	牧	睦	穆	釦	勃	没	殆	堀	幌	奔	本	翻	凡	盆	

Shift-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
9680	摩	磨	魔	麻	埋	妹	昧	枚	毎	哩	槙	幕	膜	枕	鮪	柾
9690	鱒	桝	亦	俣	又	抹	末	沫	迄	侭	繭	麿	万	慢	満	
969F	漫	蔓	味	未	魅	巳	箕	岬	密	蜜	湊	蓑	稔	脈	妙	粍
96AF	民	眠	務	夢	無	牟	矛	霧	鵡	椋	婿	娘	冥	名	命	明
96BF	盟	迷	銘	鳴	姪	牝	滅	免	棉	綿	緬	面	麺	摸	模	茂
96CF	妄	孟	毛	猛	盲	網	耗	蒙	儲	木	黙	目	杢	勿	餅	尤
96DF	戻	籾	貰	問	悶	紋	門	匁	也	冶	夜	爺	耶	野	弥	矢
96EF	厄	役	約	薬	訳	躍	靖	柳	薮	鑓	愉	愈	油	癒		
9740	諭	輸	唯	佑	優	勇	友	宥	幽	悠	憂	揖	有	柚	湧	涌
9750	猶	猷	由	祐	裕	誘	遊	邑	郵	雄	融	夕	予	余	与	誉
9760	輿	預	傭	幼	妖	容	庸	揚	揺	擁	曜	楊	様	洋	溶	熔
9770	用	窯	羊	耀	葉	蓉	要	謡	踊	遥	陽	養	慾	抑	欲	
9780	沃	浴	翌	翼	淀	羅	螺	裸	来	莱	頼	雷	洛	絡	落	酪
9790	乱	卵	嵐	欄	濫	藍	蘭	覧	利	吏	履	李	梨	理	璃	
979F	痢	裏	裡	里	離	陸	律	率	立	葎	掠	略	劉	流	溜	琉
97AF	留	硫	粒	隆	竜	龍	侶	慮	旅	虜	了	亮	僚	両	凌	寮
97BF	料	梁	涼	猟	療	瞭	稜	糧	良	諒	遼	量	陵	領	力	緑
97CF	倫	厘	林	淋	燐	琳	臨	輪	隣	鱗	麟	瑠	塁	涙	累	類
97DF	令	伶	例	冷	励	嶺	怜	玲	礼	苓	鈴	隷	零	霊	麗	齢
97EF	暦	歴	列	劣	烈	裂	廉	恋	憐	漣	煉	簾	練	聯		
9840	蓮	連	錬	呂	魯	櫓	炉	賂	路	露	労	婁	廊	弄	朗	楼
9850	榔	浪	漏	牢	狼	篭	老	聾	蝋	郎	六	麓	禄	肋	録	論
9860	倭	和	話	歪	賄	脇	惑	枠	鷲	亙	亘	鰐	詫	藁	蕨	椀
9870	湾	碗	腕													
9880																
9890																
989F	弌	丐	丕	个	丱	丶	并	乂	乖	乘	亂	亅	豫	事	舒	
98AF	弍	于	亞	亟	亠	亢	亰	亳	亶	从	仍	仄	仆	仂	仗	仞
98BF	伙	仟	价	伉	佚	估	佛	佝	佗	佇	佶	侈	侏	侘	佻	佩
98CF	佰	侑	佯	來	侖	儘	俔	俟	俎	俘	俛	俑	俚	俐	俤	俥
98DF	倚	倨	倔	倪	倥	倅	伜	俶	倡	倩	倬	俾	俯	們	倆	偃
98EF	假	會	偕	偐	做	偖	僉	偸	傀	傚	傅	傴	傲			
9940	僉	僊	傳	僂	僖	僞	僥	僭	僣	僮	價	僵	儉	儁	儂	儖
9950	儕	儔	儚	儡	儺	儷	儼	儻	儿	兀	兒	兌	兔	兢	竸	兩
9960	兪	兮	冀	冂	冏	冊	冉	冏	冑	冓	冕	冖	冤	冦	冢	冩
9970	冪	冫	决	冱	冲	冰	况	冽	凋	凉	凛	几	處	凩	凭	
9980	凰	凵	函	刃	刋	刎	刎	刧	刪	刮	刳	刹	剏	剋	剌	
9990	剞	剔	剪	剴	剩	剳	剿	劍	劒	劔	劖	劘	劑	辨		
999F	辦	劬	劭	劼	劵	勁	勍	勗	勞	勣	勦	飭	勠	勳	勵	勸
99AF	勹	匆	匈	甸	匍	匐	匏	匕	匚	匣	匯	匱	匳	匸	區	卆
99BF	卅	丗	卉	卍	凖	卞	卩	卮	夘	卻	卷	厂	厖	厠	厦	厥
99CF	厮	厰	厶	參	簒	雙	叟	曼	燮	叮	叨	叭	叺	吁	吽	呀
99DF	听	吭	吼	吮	吶	吩	吝	呎	咏	呵	咎	呟	呱	呷	呰	咒
99EF	呻	咀	呪	呶	咐	咆	哇	哂	咸	咥	咬	哄	哈	咨		
9A40	咫	哂	咤	咾	咼	哘	哥	哦	唏	唔	哽	哮	哭	哺	哢	唹
9A50	啀	啣	啌	售	啜	啅	啖	啗	唸	唳	啝	喙	喀	咯	喊	喟

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (4/6) (Shift-JIS Mode:64H)

Shift-JIS	0 1 2 3 4 5 6 7 8 9 A B C D E F
9A60	啻 啾 喘 喞 單 啼 喃 喩 喇 喨 嗚 嗅 嗟 嗄 嗜 嗤
9A70	嗔 嘔 嗷 嘖 嗾 嗽 嘛 嗹 噎 噐 營 嘴 嘶 嘲 嘸
9A80	噫 噤 嘯 噬 噪 嚆 嚀 嚊 嚠 嚔 嚏 嚥 嚮 嚶 嚴 囂
9A90	嚼 囁 囃 囀 囈 囎 囑 囓 囗 囮 囹 圀 囿 圄 圉
9A9F	圈 國 圍 圓 團 圖 嗇 圜 圦 圷 圸 坎 圻 址 坏 坩
9AAF	埀 垈 坡 坿 垉 垓 垠 垳 垤 垪 垰 埃 埆 埔 埒 埓
9ABF	堊 埖 埣 堋 堙 堝 塲 堡 塢 塋 塰 毀 塒 堽 塹 墅
9ACF	墹 墟 墫 墺 壞 墻 墸 墮 壅 壓 壑 壗 壙 壘 壥 壜
9ADF	壤 壟 壯 壺 壹 壻 壼 壽 夂 夊 夐 夛 梦 夥 夬 夭
9AEF	夲 夸 夾 竒 奕 奐 奎 奚 奘 奢 奠 奧 奬 奩
9B40	奸 妁 妝 佞 侫 妣 妲 姆 姨 姜 妍 姙 姚 娥 娟 娑
9B50	娜 娉 娚 婀 婬 婉 娵 娶 婢 婪 媚 媼 媾 嫋 嫂 媽
9B60	嫣 嫗 嫦 嫩 嫖 嫺 嫻 嬌 嬋 嬖 嬲 嫐 嬪 嬶 嬾 孃
9B70	孅 孀 孑 孕 孚 孛 孥 孩 孰 孳 孵 學 斈 孺 宀
9B80	它 宦 宸 寃 寇 寉 寔 寐 寤 實 寢 寞 寥 寫 寰 寶
9B90	寳 尅 將 專 對 尓 尠 尢 尨 尸 尹 屁 屆 屎 屓
9B9F	屐 屏 孱 屬 屮 乢 屶 屹 岌 岑 岔 妛 岫 岻 岶 岼
9BAF	岷 峅 岾 峇 峙 峩 峽 峺 峭 嶌 峪 崋 崕 崗 嵜 崟
9BBF	崛 崑 崔 崢 崚 崙 崘 嵌 嵒 嵎 嵋 嵬 嵳 嵶 嶇 嶄
9BCF	嶂 嶢 嶝 嶬 嶮 嶽 嶐 嶷 嶼 巉 巍 巓 巒 巖 巛 巫
9BDF	已 巵 帋 帚 帙 帑 帛 帶 帷 幄 幃 幀 幎 幗 幔 幟
9BEF	幢 幤 幇 幵 并 幺 麼 广 庠 廁 廂 廈 廐 廏
9C40	廖 廣 廝 廚 廛 廢 廡 廨 廩 廬 廱 廳 廰 廴 廸 廾
9C50	弃 弉 彝 彜 弋 弑 弖 弩 弭 弸 彁 彈 彌 彎 弯 彑
9C60	彖 彗 彙 彡 彭 彳 彷 徃 徂 彿 徊 很 徑 徇 從 徙
9C70	徘 徠 徨 徭 徼 忖 忻 忤 忸 忱 忝 悳 忿 怡 恠
9C80	怙 怐 怩 怎 怱 怛 怕 怫 怦 怏 怺 恚 恁 恪 恷 恟
9C90	恊 恆 恍 恣 恃 恤 恂 恬 恫 恙 悁 悍 惧 悃 悚
9C9F	悄 悛 悖 悗 悒 悧 悋 惡 悸 惠 惓 悴 忰 悽 惆 悵
9CAF	惘 慍 愕 愆 惶 惷 愀 惴 惺 愃 愡 惻 惱 愍 愎 慇
9CBF	愾 愨 愧 慊 愿 愼 愬 愴 愽 慂 慄 慳 慷 慘 慙 慚
9CCF	慫 慴 慯 慥 慱 慟 慝 慓 慵 憙 憖 憇 憬 憔 憚 憊
9CDF	憑 憫 憮 懌 懊 應 懷 懈 懃 懆 憺 懋 罹 懍 懦 懣
9CEF	懶 懺 懴 懿 懽 懼 懾 戀 戈 戉 戍 戌 戔 戛
9D40	戞 戡 截 戮 戰 戲 戳 扁 扎 扞 扣 扛 扠 扨 扼 抂
9D50	抉 找 抒 抓 抖 拔 抃 抔 拗 拑 抻 拏 拿 拆 擔 拈
9D60	拜 拌 拊 拂 拇 抛 拉 挌 拮 拱 挧 挂 挈 拯 拵 捐
9D70	挾 捍 搜 捏 掖 掎 掀 掫 捶 掣 掏 掉 掟 掵 捫
9D80	捩 掾 揩 揀 揆 揣 揉 插 揶 揄 搖 搴 搆 搓 搦 搶
9D90	攝 搗 搨 搏 摧 摯 摶 摎 攪 撕 撓 撥 撩 撈 撼
9D9F	據 擒 擅 擇 撻 擘 擂 擱 擧 舉 擠 擡 抬 擣 擯 攬
9DAF	擶 擴 擲 擺 攀 擽 攘 攜 攅 攤 攣 攫 攴 攵 攷 收
9DBF	攸 畋 效 敖 敕 敍 敘 敞 敝 敲 數 斂 斃 變 斛 斟
9DCF	斫 斷 旃 旆 旁 旄 旌 旒 旛 旙 无 旡 旱 杲 昊 昃
9DDF	旻 杳 昵 昶 昴 昜 晏 晄 晉 晁 晞 晝 晤 晧 晨 晟
9DEF	晢 晰 暃 暈 暎 暉 暄 暘 暝 曁 暹 曉 暾 暼

Shift-JIS	0 1 2 3 4 5 6 7 8 9 A B C D E F
9E40	曄 暸 曖 曚 曠 昿 曦 曩 曰 曵 曷 朏 朖 朞 朦 朧
9E50	霸 朮 朿 朶 杁 朸 朷 杆 杞 杠 杙 杣 杤 枉 杰 枩
9E60	杼 杪 枌 枋 枦 枡 枅 枷 柯 枴 柬 枳 柩 枸 柤 柞
9E70	柝 柢 柮 枹 柎 柆 柧 檜 栞 框 栩 桀 桍 栲 桎
9E80	梳 栫 桙 档 桷 桿 梟 梏 梭 梔 條 梛 梃 檮 梹 桴
9E90	梵 梠 梺 椏 梍 桾 椁 棊 椈 棘 椢 椦 棡 椌 棍
9E9F	棔 棧 棕 椶 椒 椄 棗 棣 椥 棹 棠 棯 椨 椪 椚 椣
9EAF	椡 棆 楹 楷 楜 楸 楫 楔 楾 楮 椹 楴 椽 楙 椰 楡
9EBF	楞 楝 榁 楪 榲 榮 槐 榿 槁 槓 榾 槎 寨 槊 槝 榻
9ECF	槃 榧 樮 榑 榠 榜 榕 榴 槞 槨 樂 樛 槿 權 槹 槲
9EDF	槧 樅 榱 樞 槭 樔 槫 樊 樒 櫁 樣 樓 橄 樌 橲 樶
9EEF	橸 橇 橢 橙 橦 橈 樸 樢 檐 檍 檠 檄 檢 檣
9F40	檗 蘗 檻 櫃 櫂 檸 檳 檬 櫞 櫑 櫟 檪 櫚 櫪 櫻 欅
9F50	蘖 櫺 欒 欖 鬱 欟 欸 欷 盜 欹 飮 歇 歃 歉 歐 歙
9F60	歔 歛 歟 歡 歸 歹 歿 殀 殄 殃 殍 殘 殕 殞 殤 殪
9F70	殫 殯 殲 殱 殳 殷 殼 毆 毋 毓 毟 毬 毫 毳 毯
9F80	麾 氈 氓 气 氛 氤 氣 汞 汕 汢 汪 沂 沍 沚 沁 沛
9F90	汾 汨 汳 沒 沐 泄 泱 泓 沽 泗 泅 泝 沮 沱 沾
9F9F	沺 泛 泯 泙 泪 洟 衍 洶 洫 洽 洸 洙 洵 洳 洒 洌
9FAF	浣 涓 浤 浚 浹 浙 涎 涕 濤 涅 淹 渕 渊 涵 淇 淦
9FBF	涸 淆 淬 淞 淌 淨 淒 淅 淺 淙 淤 淕 淪 淮 渭 湮
9FCF	渮 渙 湲 湟 渾 渣 湫 渫 湶 湍 渟 湃 渺 湎 渤 滿
9FDF	渝 游 溂 溪 溘 滉 溷 滓 溽 溯 滄 溲 滔 滕 溏 溥
9FEF	滂 溟 潁 漑 灌 滬 滸 滾 漿 滲 漱 滯 漲 滌
E040	漾 漓 滷 澆 潺 潸 澁 澀 潯 潛 濳 潭 澂 潼 潘 澎
E050	澑 濂 潦 澳 澣 澡 澤 澹 濆 澪 濟 濕 濬 濔 濘 濱
E060	濮 濛 瀉 瀋 濺 瀑 瀁 瀏 濾 瀛 瀚 潴 瀝 瀘 瀟 瀰
E070	瀾 瀲 灑 灣 炙 炒 炯 烱 炬 炸 炳 炮 烟 烋 烝
E080	烙 焉 烽 焜 焙 煥 煕 熈 煦 煢 煌 煖 煬 熏 燻 熄
E090	熕 熨 熬 燗 熹 熾 燒 燉 燔 燎 燠 燬 燧 燵 燼
E09F	燹 燿 爍 爐 爛 爨 爭 爬 爰 爲 爻 爼 爿 牀 牆 牋
E0AF	牘 牴 牾 犂 犁 犇 犒 犖 犢 犧 犹 犲 狃 狆 狄 狎
E0BF	狒 狢 狠 狡 狹 狷 倏 猗 猊 猜 猖 猝 猴 猯 猩 猥
E0CF	猾 獎 獏 默 獗 獪 獨 獰 獸 獵 獻 獺 珈 玳 珎 玻
E0DF	珀 珥 珮 珞 璢 琅 瑯 琥 珸 琲 琺 瑕 琿 瑟 瑙 瑁
E0EF	瑜 瑩 瑰 瑣 瑪 瑶 瑾 璋 璞 璧 瓊 瓏 瓔 珱
E140	瓠 瓣 瓧 瓩 瓮 瓲 瓰 瓱 瓸 瓷 甄 甃 甅 甌 甎 甍
E150	甕 甓 甞 甦 甬 甼 畄 畍 畊 畉 畛 畆 畚 畩 畤 畧
E160	畫 畭 畸 當 疆 疇 畴 疊 疉 疂 疔 疚 疝 疥 疣 痂
E170	疳 痃 疵 疽 疸 疼 疱 痍 痊 痒 痙 痣 痞 痾 痿
E180	痼 瘁 痰 痺 痲 痳 瘋 瘍 瘉 瘟 瘧 瘠 瘡 瘢 瘤 瘴
E190	瘰 瘻 癇 癈 癆 癜 癘 癡 癢 癨 癩 癪 癧 癬 癰
E19F	癲 癶 癸 發 皀 皃 皈 皋 皎 皖 皓 皙 皚 皰 皴 皸
E1AF	皹 皺 盂 盍 盖 盒 盞 盡 盥 盧 盪 蘯 盻 眈 眇 眄
E1BF	眩 眤 眞 眥 眦 眛 眷 眸 睇 睚 睨 睫 睛 睥 睿 睾
E1CF	睹 瞎 瞋 瞑 瞠 瞞 瞰 瞶 瞹 瞿 瞼 瞽 瞻 矇 矍 矗

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (5/6) (Shift-JIS Mode:64H)

Shit-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
E1DF	矇	矜	矣	矮	矼	砌	砒	礦	砠	礪	硅	碎	硴	碆	硼	碚
E1EF	碌	碣	碵	碪	碯	磑	磆	磋	磔	碾	碼	磅	磊	磬		
E240	磧	磚	磽	磴	礇	礒	礑	礙	礬	礫	祀	祠	祗	祟	祚	祕
E250	祓	祺	祿	禊	禝	禧	齋	禪	禮	禳	禹	禺	秉	秕	秧	秬
E260	秡	秣	稈	稍	稘	稙	稠	稟	禀	稱	稻	稾	稷	穃	穗	穉
E270	穡	穢	穩	龝	穰	穹	穽	窈	窗	窕	窘	窖	窩	竈	窰	
E280	窶	竅	竄	窿	邃	竇	竊	竍	竏	竕	竓	站	竚	竝	竡	竢
E290	竦	竭	竰	笂	笏	笊	笆	笳	笘	笙	笞	笵	笨	笶	筐	
E29F	筺	笄	筍	笋	筌	筅	筵	筥	筴	筧	筰	筱	筬	筮	箝	箘
E2AF	箟	箍	箜	箚	箋	箒	箏	筝	箙	篋	篁	篌	篏	箴	篆	篝
E2BF	篩	簑	簔	篦	篥	籠	簀	簇	簓	篳	篷	簗	簍	篶	簣	簧
E2CF	簪	簟	簷	簫	簽	籌	籃	籔	籏	籀	籐	籘	籟	籤	籖	籥
E2DF	籬	籵	粃	粐	粤	粭	粢	粫	粡	粨	粳	粲	粱	粮	粹	粽
E2EF	糀	糅	糂	糘	糒	糜	糢	鬻	糯	糲	糴	糶	糺	紆		
E340	紂	紜	紕	紊	絅	絋	紮	紲	紿	紵	絆	絳	絖	絎	絲	絨
E350	絮	絏	絣	經	綉	絛	綏	絽	綛	綺	綮	綣	綵	緇	綽	綫
E360	總	綢	綯	緜	綸	綟	綰	緘	緝	緤	緞	緻	緲	緡	縅	縊
E370	縣	縡	縒	縱	縟	縉	縋	縢	繆	繦	縻	縵	縹	繃	縷	
E380	縲	縺	繧	繝	繖	繞	繙	繚	繹	繪	繩	繼	繻	纃	緕	繽
E390	辮	繿	纈	纉	續	纒	纐	纓	纔	纖	纎	纛	纜	缸	缺	
E39F	罅	罌	罍	罎	罐	网	罕	罔	罘	罟	罠	罨	罩	罧	罸	羂
E3AF	羆	羃	羈	羇	羌	羔	羞	羝	羚	羣	羯	羲	羹	羮	羶	羸
E3BF	譱	翅	翆	翊	翕	翔	翡	翦	翩	翳	翹	飜	耆	耄	耋	耒
E3CF	耘	耙	耜	耡	耨	耿	耻	聊	聆	聒	聘	聚	聟	聢	聨	聳
E3DF	聲	聰	聶	聹	聽	聿	肄	肆	肅	肛	肓	肚	肭	冐	肬	胛
E3EF	胥	胙	胝	胄	胚	胖	脉	胯	胱	脛	脩	脣	脯	腋		
E440	隋	腆	脾	腓	腑	胼	腱	腮	腥	腦	腴	膃	膈	膊	膀	膂
E450	膠	膕	膤	膣	腟	膓	膩	膰	膵	膾	膸	膽	臀	臂	膺	臉
E460	臍	臑	臙	臘	臈	臚	臟	臠	臧	臺	臻	臾	舁	舂	舅	與
E470	舊	舍	舐	舖	舩	舫	舸	舳	艀	艙	艘	艝	艚	艟	艤	
E480	艢	艨	艪	艫	舮	艱	艷	艸	艾	芍	芒	芫	芟	芻	芬	苡
E490	苣	苟	苒	苴	苳	苺	莓	范	苻	苹	苞	茆	苜	茉	苙	
E49F	茵	茴	茖	茲	茱	荀	茹	荐	荅	茯	茫	茗	茘	莅	莚	莪
E4AF	莟	莢	莖	茣	莎	莇	莊	荼	莵	荳	荵	莠	莉	莨	菴	萓
E4BF	菫	菎	菽	萃	菘	萋	菁	菷	萇	菠	菲	萍	萢	萠	莽	萸
E4CF	蔆	菻	葭	萪	萼	蕚	蒄	葷	葫	蒭	葮	蒂	葩	葆	萬	葯
E4DF	葹	萵	蓊	葢	蒹	蒿	蒟	蓙	蓍	蒻	蓚	蓐	蓁	蓆	蓖	蒡
E4EF	蔡	蓿	蓴	蔗	蔘	蔬	蔟	蔕	蔔	蓼	蕀	蕣	蕘	蕈		
E540	蕁	蘂	蕋	蕕	薀	薤	薈	薑	薊	薨	蕭	薔	薛	藪	薇	薜
E550	蕷	蕾	薐	藉	薺	藏	薹	藐	藕	藝	藥	藜	藹	蘊	蘓	蘋
E560	藾	藺	蘆	蘢	蘚	蘰	蘿	虍	乕	虔	號	虧	虱	蚓	蚣	蚩
E570	蚪	蚋	蚌	蚶	蚯	蛄	蛆	蚰	蛉	蠣	蚫	蛔	蛞	蛩	蛬	
E580	蛟	蛛	蛯	蜒	蜆	蜈	蜀	蜃	蛻	蜑	蜉	蜍	蛹	蜊	蜴	蜿
E590	蜷	蜻	蜥	蜩	蜚	蝠	蝟	蝸	蝌	蝎	蝴	蝗	蝨	蝮	蝙	
E59F	蝓	蝣	蝪	蠅	螢	螟	螂	螯	蟋	螽	蟀	蟐	雖	螫	蟄	螳
E5AF	蟇	蟆	螻	蟯	蟲	蟠	蠏	蠍	蟾	蟶	蟷	蠎	蟒	蠑	蠖	蠕

Shit-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
E5BF	蠢	蠡	蠱	蠶	蠹	蠧	蠻	衄	衂	衒	衙	衞	衢	衫	袁	衾
E5CF	袞	衵	衽	袵	衲	袂	袗	袒	袮	袙	袢	袍	袤	袰	袿	袱
E5DF	裃	裄	裔	裘	裙	裝	裹	褂	裼	裴	裨	裲	褄	褌	褊	褓
E5EF	襃	褞	褥	褪	褫	襁	襄	褻	褶	褸	襌	褝	襠	襞		
E640	襦	襤	襭	襪	襯	襴	襷	襾	覃	覈	覊	覓	覘	覡	覩	覦
E650	覬	覯	覲	覺	覽	覿	觀	觚	觜	觝	觧	觴	觸	訃	訖	訐
E660	訌	訛	訝	訥	訶	詁	詛	詒	詆	詈	詼	詭	詬	詢	誅	誂
E670	誄	誨	誡	誑	誥	誦	誚	誣	諄	諍	諂	諚	諫	諳	諧	
E680	諤	諱	謔	諠	諢	諷	諞	諛	謌	謇	謚	諡	謖	謐	謗	謠
E690	謳	鞫	謦	謫	謾	謨	譁	譌	譏	譎	證	譖	譛	譚	譫	
E69F	譟	譬	譯	譴	譽	讀	讌	讎	讒	讓	讖	讙	讚	谺	豁	谿
E6AF	豈	豌	豎	豐	豕	豢	豬	豸	豺	貂	貉	貅	貊	貍	貎	貔
E6BF	豼	貘	戝	貭	貪	貽	貲	貳	貮	貶	賈	賁	賤	賣	賚	賽
E6CF	賺	賻	贄	贅	贊	贇	贏	贍	贐	齎	贓	賍	贔	贖	赧	赭
E6DF	赱	赳	趁	趙	跂	趾	趺	跏	跚	跖	跌	跛	跋	跪	跫	跟
E6EF	跣	跼	踈	踉	跿	踝	踞	踐	踟	蹂	踵	踰	踴	蹊		
E740	蹇	蹉	蹌	蹐	蹈	蹙	蹤	蹠	踪	蹣	蹕	蹶	蹲	蹼	躁	躇
E750	躅	躄	躋	躊	躓	躑	躔	躙	躪	躡	躬	躰	軆	躱	躾	軅
E760	軈	軋	軛	軣	軼	軻	軫	軾	輊	輅	輕	輒	輙	輓	輜	輟
E770	輛	輌	輦	輳	輻	輹	轅	轂	輾	轌	轉	轆	轎	轗	轜	
E780	轢	轣	轤	辜	辟	辣	辭	辯	辷	迚	迥	迢	迪	迯	邇	迴
E790	逅	迹	迺	逑	逕	逡	逍	逞	逖	逋	逧	逶	逵	逹	迸	
E79F	遏	遐	遑	遒	逎	遉	逾	遖	遘	遞	遨	遯	遶	隨	遲	邂
E7AF	遽	邁	邀	邊	邉	邏	邨	邯	邱	邵	郢	郤	扈	郛	鄂	鄒
E7BF	鄙	鄲	鄰	酊	酖	酘	酣	酥	酩	酳	酲	醋	醉	醂	醢	醫
E7CF	醯	醪	醵	醴	醺	釀	釁	釉	釋	釐	釖	釟	釡	釛	釼	釵
E7DF	釶	鈞	釿	鈔	鈬	鈕	鈑	鉞	鉗	鉅	鉉	鉤	鉈	銕	鈿	鉋
E7EF	鉐	銜	銖	銓	銛	鉚	鋏	銹	銷	鋩	錏	鋺	鍄	錮		
E840	錙	錢	錚	錣	錺	錵	錻	鍜	鍠	鍼	鍮	鍖	鎰	鎬	鎭	鎔
E850	鎹	鏖	鏗	鏨	鏥	鏘	鏃	鏝	鏐	鏈	鏤	鐚	鐔	鐓	鐃	鐇
E860	鐐	鐶	鐫	鐵	鐡	鐺	鑁	鑒	鑄	鑛	鑠	鑢	鑞	鑪	鈩	鑰
E870	鑵	鑷	鑽	鑚	鑼	鑾	钁	鑿	閂	閇	閊	閔	閖	閘	閙	
E880	閠	閨	閧	閭	閼	閻	閹	閾	闊	濶	闃	闍	闌	闕	闔	闖
E890	關	闡	闥	闢	阡	阨	阮	阯	陂	陌	陏	陋	陷	陜	陞	
E89F	陝	陟	陦	陲	陬	隍	隘	隕	隗	險	隧	隱	隲	隰	隴	隶
E8AF	隸	隹	雎	雋	雉	雍	襍	雜	霍	雕	雹	霄	霆	霈	霓	霎
E8BF	霑	霏	霖	霙	霤	霪	霰	霹	霽	霾	靄	靆	靈	靂	靉	靜
E8CF	靠	靤	靦	靨	勒	靫	靱	靹	鞅	靼	鞁	靺	鞆	鞋	鞏	鞐
E8DF	鞜	鞨	鞦	鞣	鞳	鞴	韃	韆	韈	韋	韜	韭	齏	韲	竟	韶
E8EF	韵	頏	頌	頸	頤	頡	頷	頽	顆	顏	顋	顫	顯	顰		
E940	顱	顴	顳	颪	颯	颱	颶	飄	飃	飆	飩	飫	餃	餉	餒	餔
E950	餘	餡	餝	餞	餤	餠	餬	餮	餽	餾	饂	饉	饅	饐	饋	饑
E960	饒	饌	饕	馗	馘	馥	馭	馮	馼	駟	駛	駝	駘	駑	駭	駮
E970	駱	駲	駻	駸	騁	騏	騅	駢	騙	騫	騷	驅	驂	驀	驃	
E980	騾	驕	驍	驛	驗	驟	驢	驥	驤	驩	驫	驪	骭	骰	骼	髀
E990	髏	髑	髓	體	髞	髟	髢	髣	髦	髯	髫	髮	髴	髱	髷	

A2. FONT Japan Shift-JIS Kanji16x16,24x24 (6/6) (Shift-JIS Mode:64H)

Shit-JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
E99F	髻	鬆	鬘	鬚	鬟	鬢	鬣	鬥	鬧	鬨	鬩	鬪	鬮	鬯	鬲	魄
E9AF	魃	魏	魍	魎	魑	魘	魴	鮓	鮃	鮑	鮖	鮗	鮟	鮠	鮨	鮴
E9BF	鯀	鯊	鮹	鯆	鯏	鯑	鯒	鯣	鯢	鯤	鯔	鯡	鰺	鯲	鯱	鯰
E9CF	鰕	鰔	鰉	鰓	鰌	鰆	鰈	鰒	鰊	鰄	鰮	鰛	鰥	鰤	鰡	鰰
E9DF	鱇	鰲	鱆	鰾	鱚	鱠	鱧	鱶	鱸	鳧	鳬	鳰	鴉	鴈	鳫	鴃
E9EF	鴆	鴪	鴦	鶯	鴣	鴟	鵄	鴕	鴒	鵁	鴿	鴾	鵆	鵈		
EA40	鵝	鵞	鵤	鵑	鵐	鵙	鵲	鶉	鶇	鶫	鵯	鵺	鶚	鶤	鶩	鶲
EA50	鷄	鷁	鶻	鶸	鶺	鷆	鷏	鷂	鷙	鷓	鷸	鷦	鷭	鷯	鷽	鸚
EA60	鸛	鸞	鹵	鹹	鹽	麁	麈	麋	麌	麒	麕	麑	麝	麥	麩	麸
EA70	麪	麭	靡	黌	黎	黏	黐	黔	黜	點	黝	黠	黥	黨	黯	
EA80	黴	黶	黷	黹	黻	黼	黽	鼇	鼈	皷	鼕	鼡	鼬	鼾	齊	齒
EA90	齔	齣	齟	齠	齡	齦	齧	齬	齪	齷	齲	齶	龕	龜	龠	
EA9F	堯	槇	遙	瑤												

A3. Example Program Module

```
/* ****************************************************************
        RIU Test
   **************************************************************** */
#include <conio.h>

#define   DEBUG   1                                   // 1:DEBUG else:NO DEBUG
/* ****************************************************************
        VL16C452 port definition
   **************************************************************** */
#define   COM1    0x03f8                              // VL16C452(#1) port address
#define   COM2    0x02f8                              // VL16C452(#2) port address
#define   COM3    0x03e8                              // VL16C452(#3) port address
#define   COM4    0x0270                              // VL16C452(#4) port address
#define   COM5    0x02e8                              // SIO port address
static const unsigned com_port[5]={COM1,COM2,COM3,COM4,COM5};
static unsigned COM;                                  // COM Port Base Address
unsigned char str[64];

#define   IER     1                                   // int. eanble reg.
#define   IIR     2                                   // int. identify reg.
#define   LCR     3                                   // line control reg.
#define   MCR     4                                   // modem control reg.
#define   LSR     5                                   // line status reg.
#define   MSR     6                                   // modem status reg.

#define   IER_RX  0x01      //00000001b               // RxRDY intr. enable
#define   IER_TX  0x02      //00000010b               // TxRDY intr. enable
#define   IER_ERR 0x04      //00000100b               // receive error intr. enable
#define   IER_MDM 0x08      //00001000b               // MODEM transition intr. enable

#define   MCR_DTR           0x01      //00000001b           // DTR ON
#define   MCR_RTS           0x02      //0000010b            // RTS ON
#define   MCR_MIE 0x08      //00001000b               // MIE enable

#define   LSR_RXR 0x01      //00000001b               // Rx ready
#define   LSR_OE  0x02      //00000010b               // overrun error
#define   LSR_PE  0x04      //00000100b               // parity  error
#define   LSR_FE  0x08      //00001000b               // framing error
#define   LSR_TXR 0x20      //00100000b               // Tx ready
#define   LSR_TXE 0x40      //01000000b               // Tx empty

#define   MSR_CTS           0x10      //00010000b           // CTS ON
#define   MSR_DSR           0x20      //00100000b           // DSR ON
#define   MSR_CI  0x40      //01000000b               // RI ON

/* ****************************************************************
        PC standard port definition
   **************************************************************** */
#define   PICMC   0x20                                // PIC(master) control reg.
#define   PICMM   0x21                                // PIC(master) mask reg.
#define   PICSC   0x0A0                               // PIC(slave)  control reg.
#define   PICSM   0x0A1                               // PIC(slave)  mask reg.
```

```
/* ######################################################
        liu_outb: LIU Output 1 byte Module
                rc = liu_outb(unsigned char dat)


        Input:  dat: RIU Output Data

        Output: rc = Return Code 0:Normal -1:Error
  ###################################################### */
liu_outb(unsigned char dat)
{
        long j;
        unsigned d;
        unsigned char flg;

        for(j=0l; j!=(2000l*3l*5l); j++){       // 2000*20/1336 -> 30ms*3*5 450ms
                d= LSR_TXR+LSR_TXE;
           _outp(0x0ed,0);                                              //Delay
           for(flg=(_inp(0x61))&0x10; flg==(_inp(0x61)&0x10););         //Delay 20/1336 msec
           if((_inp(COM+LSR)&d)==d)                     // read LSR

        //Tx ready & Empty
           if((_inp(COM+MSR)&MSR_CTS)!=0) break;        // read MSR
                                                                // test CTR ON
        }
/**/    if(j>=(2000l*3l)){                              // 2000*20/1336-> 30ms*3 90ms
                if(DEBUG==1) printf("\n###### liu_outb Delay Time %lu ms",j*20l/1336l);
/**/            gets(str);
        }
        if(j>=(2000l*3l*5l)){
                if(DEBUG==1) printf("\n###### liu_outb timeout");
/**/            gets(str);
                return(-1);             // timeout
        }
        _outp(COM,dat);                         // Output Data
        return(0);                      // normal
}/*liu_outb*/

/* ######################################################
        liu_out: LIU Output n byte Module
                rc = liu_out(unsigned char *dat, unsigned n)


        Input:  unsigned char *dat    : RIU Output Data
                unsigned n                      : Data size

        Output: rc = Return Code 0:Normal -1:Error
  ###################################################### */
liu_out(unsigned char *dat, unsigned n)
{
        int i,j;
        unsigned d;

        for(i=0; i<n; i++)
         if(liu_outb(dat[i])!=0){
                if(DEBUG==1) printf("\n###### liu_out timeout");
/**/            gets(str);
                return(-1);
         }
        return(0);                      // normal
}/*liu_out*/
```

```
/* ######################################################
        liu_outs: LIU Output String Module
                rc = liu_outs(unsigned char *dat)


        Input:  unsigned char *dat    : RIU Output Data

        Output: rc = Return Code 0:Normal -1:Error
  ###################################################### */
liu_outs(unsigned char *dat)
{
        int i,j;
        unsigned d;

        for(i=0; dat[i]!='\0'; i++)
         if(liu_outb(dat[i])!=0){
                if(DEBUG==1) printf("\n###### liu_outs timeout");
/**/            gets(str);
                return(-1);
         }
        return(0);                      // normal
}/*liu_outs*/

/* ######################################################
        liu_idrd: LIU id read Module
                rc = liu_idrd(unsigned char *id, unsigned sw)

        Input:  none :

        Output: unsigned char *id : id data
  ###################################################### */
/* ======================================================
        liu_idrd: LIU id read Module
                rc = liu_idrd(unsigned char *id, unsigned sw)

        Input:  none :

        Output: unsigned char *id : id data
  ====================================================== */
/* ------------------------------------------------
        Dummy_rd: Dummy read Module
                void Dummy_rd()
        Input:  none :
        Output: none :
  ------------------------------------------------ */
void Dummy_rd()
{
   int i,d,j;
 unsigned char s,flg;

  for(i=0; i<15; i++)
   for(j=(20000l/30l); j>0l; j--){          // 2000*20/1336 -> 30ms/30 1ms
        _outp(0x0ed,0);                                 // Delay
        for(flg=(_inp(0x61))&0x10; flg==(_inp(0x61)&0x10);); //Delay 20/1336 msec
        if(((s=_inp(COM+LSR))&LSR_RXR)!=0){   // read LSR
                                                        // test Rx ready
          if((s&(LSR_OE+LSR_PE+LSR_FE))!=0){
                if(DEBUG==1) printf("\n###### get_data parity error");          // parity error
          }else{
/*Dummy Read*/  d= _inp(COM);
                if((i>=14)&&(d=='c')) break;
          }
        }
   }
}/*Dummy_rd*/

get_data(unsigned char *id,unsigned sw)
{
```

```
  int i,s;
  long j,k;
  unsigned char flg,tflg;

  Dummy_rd();
  liu_outs("\x1b[0c");                                  // LIUST-5X Read ID Command
  for(i=tflg=0; (tflg==0)&&(i<17); i++){
    for(j=(20000l*1l); j>0l; j--){                      // 2000*20/1336 -> 30ms*1 30ms
              _outp(0x0ed,0);                                       // Delay
              for(flg=(_inp(0x61))&0x10; flg==(_inp(0x61)&0x10);); //Delay 20/1336 msec
              if(((s=_inp(COM+LSR))&LSR_RXR)!=0){   // read LSR
                                                                    // test Rx ready
                if((s&(LSR_OE+LSR_PE+LSR_FE))!=0){
                          if(DEBUG==1) printf("\n###### get_data parity error");
/**/                      gets(str);
                          id[i]='\0';
                          return(-1); // parity error
                 }else{
                          id[i]= _inp(COM);
                          if((i>=14)&&(id[i]=='c')) tflg=1;
/**/                      if(sw==1) printf("\ni:%2u(%02x)",i,id[i]);
                          break;
                 }
              }
    }
     if(sw!=0) if(j<=0l){
              if(DEBUG==1) printf("\n###### get_data timeout");
/**/                  gets(str);
              id[i]='\0';
              return(-1);                       // TimeOut error
    }
  }
  id[i]='\0';
  return(0);
}/*get_data*/

liu_idrd(unsigned char *id,unsigned sw)
{
              int r,retry;

              if(sw==1) retry=1; else retry= 3;
              id[0]='\0';
              _outp(COM+MCR, MCR_RTS); // RTS,DTR ON
              do{
                          r= get_data(id,sw);               // GET LIU Data
              }while((--retry>0)&&(strlen(id)!=15));
              _outp(COM+MCR, 0);                        // RTS,DTR OFF
/**/          if(DEBUG==1)if((sw==0)&&(retry==0)){
/**/                       printf("\n###### liu_idrd retry over");
/**/                      gets(str);
/**/          }
              return(r);
}/*liu_idrd*/
```

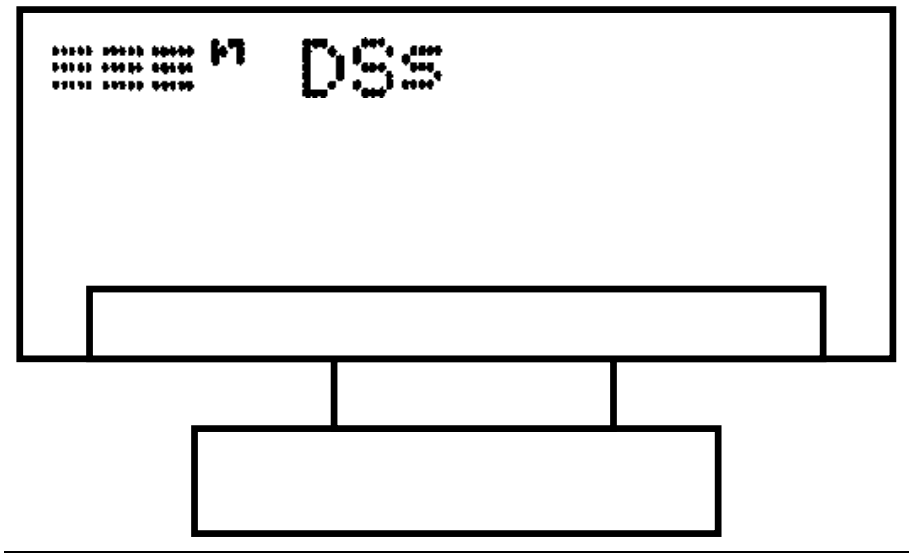
```
/* ######################################################
        liu_init: LIU Module Initialize
                rc = liu_init(int COM_NO)


        Input:  COM_NO: 1-5 COM1-COM5

        Output: rc = Return Code 0:Normal -1:Error
  ###################################################### */
liu_init(int com_no,int b)
{
        if((com_no<0)||(5<com_no)){
                if(DEBUG==1) printf("\n###### liu_init illigal COMx: No");
/**/            gets(str);
                return(-1);
        }
        COM= com_port[com_no];
        if(b==1) b= 6; /*19200bps*/ else b=12; /*9600bps*/
//printf("COM:%x com_no:%u\n",COM, com_no);
//gets(com_no);
        _outp(COM+LCR,0x8b);        //10001011b         // select Baud Rate reg.
        _outp(COM+IER,0);                       // all intr. disable
        _outp(COM,b);               //#0:9600bps 1:19200bps
        _outp(COM+1,0);                         // set Baud Rate
        _outp(COM+LCR,0x0b);        //00001011b         // odd parity
//      _outp(COM+LCR,0x13);        //00010011b         // EVEN NO parity

        liu_outs("\x1b[2J");        // 'ESC[2J'Clear display
        liu_outs("\x1b[1;1H");      // 'ESC[1;1H'        Set Home Pozition
        return(0);
}/*liu_init*/
```

A4. Attentions on WindowsNT

Problems on LIUST – 5X NT

Example LIUST – 53

NT displays Garbage when it is set up if it is connecting with COM1 - COM 4
(See the reference below)



It is possible to prevent displaying the garbage of LIU by changing the boot options on NT.

How to prevent:

The garbage should not be displayed by changing BOOT.INI files as follows.

If the serial mouse is not used:

[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(1)\WINNT
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation Version 4.00" ***/NOSERIALMICE /NOSERIAL***
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation Version 4.00 [VGA mode]"/basevideo /sos
C:\ = "MS-DOS"

If the serial mouse is used for COM1:

[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(1)\WINNT
[operating systems]
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation Version 4.00" ***/NOSERIALMICE=COM2,3,4***
multi(0)disk(0)rdisk(0)partition(1)\WINNT="Windows NT Workstation Version 4.00 [VGA mode]"/basevideo /sos
C:\ = "MS-DOS"