

LCD Controller Manual
MSMF320240-1 Version 5.03

1. MSMF320240-1

2. MSMF320240-1 Connector

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- 2-2 Parallel Connector
- 2-3 Backlight Power Connector
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- 2-6 Touch Connector
- 2-7 Expansion Memory Interface

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4. MSMF320240-1 Image Overwrite

- [1.] MSMF320240-1 Special Font

1. MSMF320240-1

◆ MSMF320240-1

- ◆ LCD Resolution : FSTN Mono 320*240 dots
- ◆ : KS5601
- ◆ LCD Bias Voltage 가
- ◆ LCD Back Light : Inverter _On/Off 가
- ◆ Font : 16*16 dots
16*16 dots
8*16 dots
8*16 dots
16*16
- ◆ Touch Panel Interface
- ◆ Expansion Memory Interface
320*240 BMP 53 [Page] 가
(Serial overwrite program)

Font , / , /

◆ MSMF320240-1

- ◆ CPU : Atmega128-16AI
- ◆ LCD Controller : S1D13305F00A
- ◆ Display Type : FSTN Mono 320*240 dots
- ◆ : DC 5[V]
- ◆ LCD Backlight Inverter
- ◆ : RS-232C
- => 4800, 9600, 19200, 57600, 115200 [bps]
(Default 57600[bps]) : Software
- => 9600, 19200, 57600, 115200 [bps] : Hardware
- 8 Bit Parallel
- Reset

◆ MSMF320240-1

- ◆ Text Layer, Graphic Layer : Layer ON/OFF
- ◆ , : 가 2 , 2 , 가 2
- ◆ Graphic : , Line, Rectangle, ,
- ◆ LCD Bias Voltage
- ◆ / Font
- ◆ 320*240 Mono BMP Image display 가 (53 [Page])
- ◆ Image display Text/Graphic Layer 가 (default Text Layer)
- ◆
- ◆ Cursor , Cursor ,Cursor Off
- ◆ : Enter
- ◆ Backspace
- ◆
- ◆ Clear : Block Clear , Clear
- ◆
- ◆ Rectangle : Text Layer, Graphic Layer

2. MSMF320240-1 Connector

2 MSMF320240-1 Dimensions Connector

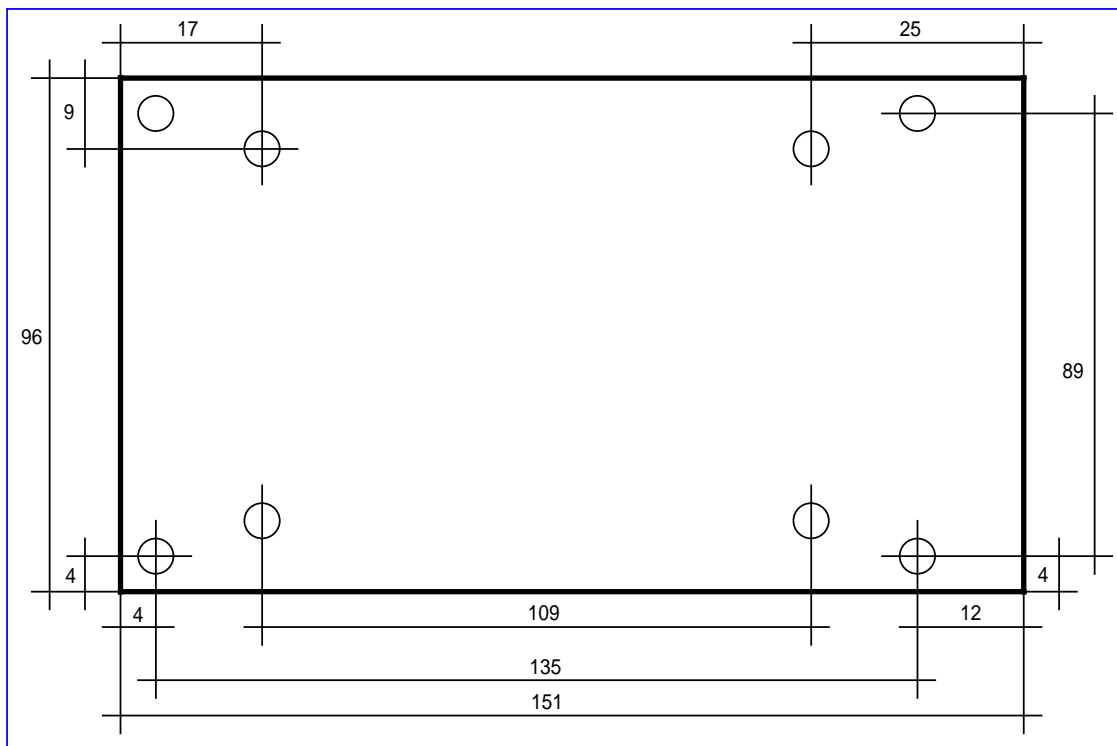
MSMF320240-1



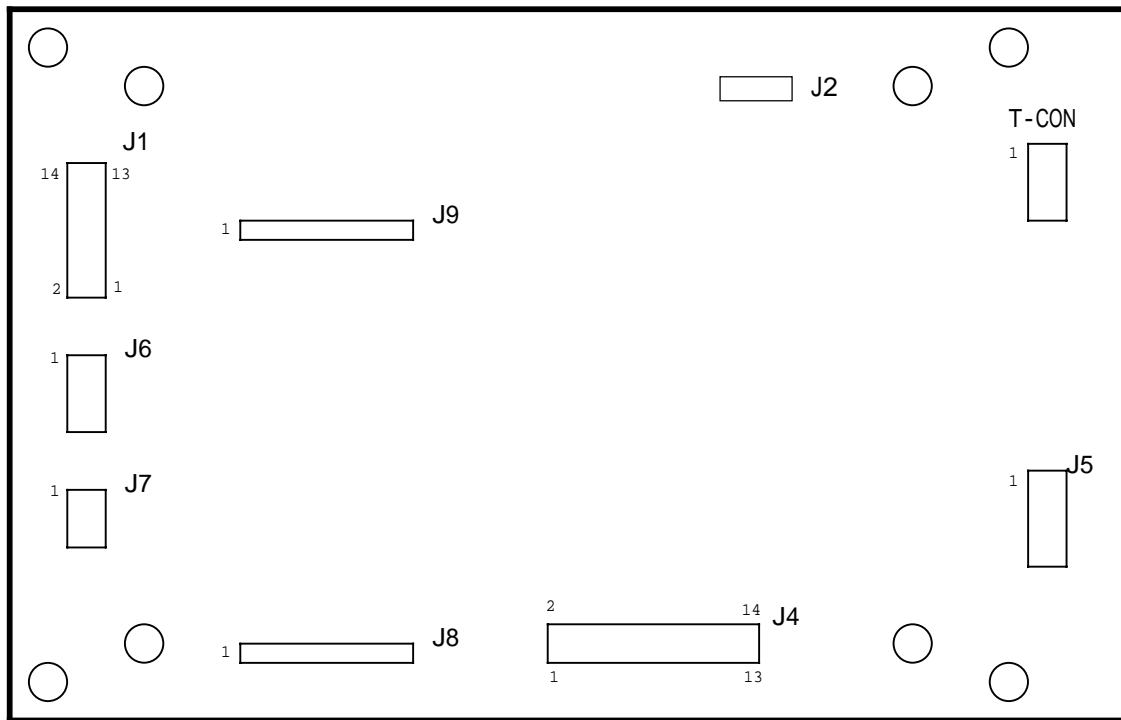
Expansion Board



MSMF320240-1 Dimensions



LCD Controller Connector



2-1. LCD Module Interface Connector : J4

Pin Number	Symbol	Description
1	VEE	Power supply for LCD operating(-V)
2	VO	Power supply for LCD operating
3	GND	Ground
4	VDD	Power supply (5V)
5	CL2	Data shift signal
6	DISPOFF	Display off control signal
7	M	Frame modulation signal
8	CL1	Data latch signal
9	OPEN	OPEN
10	FLM	Display cycle clock
11	D0	Display data line
12	D1	Display data line
13	D2	Display data line
14	D3	Display data line

2-2 Parallel Connector: J1

Pin Number	Symbol	Description
1	OPEN	Open
2	OPEN	Open
3	RST_EN	Reset Enable (High Active)
4	RST	Reset (Low Active)
5	GND	Ground
6	CS	Chip Select
7	D7	Data 7
8	D6	Data 6
9	D5	Data 5
10	D4	Data 4
11	D3	Data 3
12	D2	Data 2
13	D1	Data 1
14	D0	Data 0

2-3. Backlight Power Connector : J5

Pin Number	Symbol	Description
1	OUT	CCFL OUT
2	OPEN	OPEN
3	OPEN	OPEN
4	OUT_COM	CCFL_COM OUT

2-4. RS-232C Connector : J6

Pin Number	Symbol	Description
1	RXD	Receive Data : LCD Controller
2	TXD	Transmit Data : LCD Controller
3	GND	Ground

2-5. Power Connector : J7

Pin Number	Symbol	Description
1	VCC	DC+5[V]
2	GND	Ground

2-6. Touch Connector : T-CON

Pin Number	Symbol	Description
1	X+	
2	Y-	
3	X-	
4	Y+	

2-7. Expansion Memory Interface : J8

Pin Number	Symbol	Description
1	VCC	+5 [VDC]
2	Open	Not use
3	Data	use
4	Data	use
5	Date	use
6	Date	use
7	Open	Not use
8	GND	GND

2-7-1. Expansion Memory Interface : J9

Pin Number	Symbol	Description
1	D0	Data 0
2	D1	Data 1
3	D2	Data 2
4	D3	Data 3
5	D4	Data 4
6	D5	Data 5
7	D6	Data 6
8	D7	Data 7

3.

'Esc' = 0x1b [hex]

			Parameter	
'Esc'	'K'	'0x01'		3-1-1
		'0x02'	KS5601	
		'0x03'	(default)	
		'0x04'		
'Esc'	'E'	'0x01'		3-1-2
		'0x02'		
		'0x03'	(default)	
		'0x04'		
'Esc'	'P'	'0x01'	Text Layer ON	3-1-3
		'0x02'	Text Layer ON	
		'0x03'	Graphic Layer ON	3-1-4
		'0x04'	Graphic Layer ON	
		'0x05'	Text Layer ON	3-1-5
		'0x06'	Text Layer OFF	
		'0x07'	Text Layer Font ON	3-1-6
		'0x08'	Text Layer Font 가 ON	
		'0x09'	Text Layer Font ON	
		'0x0a'	Text Layer Font OFF	3-1-7
		'0x0b'	Serial baud rate 4800 [bps]	
		'0x0c'	Serial baud rate 9600 [bps]	
		'0x0d'	Serial baud rate 19200 [bps]	
'0x0e'	Serial baud rate 57600 [bps] (default)	3-1-8		
'0x0f'	Text Layer ON			
'0x10'	Text Layer OFF			
'0x11'	Graphic Layer ON			
'0x12'	Graphic Layer OFF			
'0x13'	Serial baud rate 115200 [bps]			
'Esc'	'D'	'0x01'	Text Layer clear	3-1-9
		'0x02'	(X1,Y1,X2,Y2) Text Layer clear (X1,Y1,X2,Y2 hex 가 :0x00 ~ 0x27 :0x00 ~ 0x0e)	
		'0x03'	Graphic Layer clear	
		'0x04'	(X1,Y1,X2,Y2) Graphic Layer clear (X1, Y1, X2, Y2 hex 가 :0x000 ~ 0x13f :0x00 ~ 0xEf)	

			Parameter		
'Esc'	'C'	'0x01'	(X,Y)	Text Layer X,Y cursor Text Display (X,Y hex 가 :0x00 ~ 0x27 :0x00 ~ 0x0e)	3-1-10
		'0x02'		Text Layer cursor	
		'0x03'		Text Layer cursor 8bit Line	
		'0x04'		Text Layer cursor 8 x 16 dot	
		'0x05'		Cursor off	
'Esc'	'R'	'0x01'	(X1,Y1,X2,Y2)	Text Layer 1 Line Rectangle (X1,Y1,X2,Y2 hex 가 :0x00 ~ 0x27 :0x00 ~ 0x0e)	3-1-11
		'0x02'	(X1,Y1,X2,Y2)	Text Layer 2 Line Rectangle (X1,Y1,X2,Y2 hex 가 :0x00 ~ 0x27 :0x00 ~ 0x0e)	
'Esc'	'B'	'0x01'		Text Layer ON	3-1-12
		'0x02'		Text Layer OFF	
		'0x03'		Graphic Layer ON	
		'0x04'		Graphic Layer OFF	
'Esc'	'L'	'0x01'		CCFL Power ON	3-1-13
		'0x02'		CCFL Power OFF	
'Esc'	'V'	'0x01'		LCD Bias Voltage UP	3-1-14
		'0x02'		LCD Bias Voltage DOWN	
'Esc'	'S'			LCD Bias Voltage Serial Baud rate MSMF320240-1 Rebooting	3-1-15
'Esc'	'G'	'0x01'	(X,Y)	Graphic Layer _____ X:0x000 ~ 0x13f Y:0x00 ~ 0xEf	3-1-16
		'0x02'	(X,Y)	Graphic Layer _____ X:0x000 ~ 0x13f Y:0x00 ~ 0xEf	
		'0x03'	(X1,Y1,X2,Y2)	Graphic Layer Line _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	3-1-17
		'0x04'	(X1,Y1,X2,Y2)	Graphic Layer Line _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	
		'0x05'	(X1,Y1,X2,Y2)	Graphic Layer Rectangle _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	3-1-18
		'0x06'	(X1,Y1,X2,Y2)	Graphic Layer Rectangle _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	
		'0x07'	(X1,Y1,X2,Y2)	Graphic Layer Rectangle _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	
		'0x08'	(X1,Y1,X2,Y2)	Graphic Layer Rectangle _____ X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	
		'0x09'	(X,Y,radius)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf Radius :0x00 ~ 0x78	

			Parameter		
		'0x0a'	(X,Y,radius)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf Radius :0x00 ~ 0x78	3-1-19
		'0x0b'	(X,Y,radius)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf Radius :0x00 ~ 0x78	
		'0x0c'	(X,Y,radius)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf Radius :0x00 ~ 0x78	
		'0x0d'	(X,Y,a,b)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf a :320/2 b :240/2	3-1-20
		'0x0e'	(X,Y,a,b)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf a :320/2 b :240/2	
		'0x0f'	(X,Y,a,b)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf a :320/2 b :240/2	
		'0x10'	(X,Y,a,b)	Graphic Layer _____ X Y X:0x000 ~ 0x13f Y:0x00 ~ 0xEf a :320/2 b :240/2	
'Esc'	'A'	'0x01'		Reset (MSMF320240-1 Rebooting)	3-1-21
		'0x02'		LCD Bias Voltage Serial Baudrate	
		'0x03'		Echo '0x06' Send	
'Esc'	'I'	'0x01'	(X)	Image One page draw (X 0x00~0x34)	3-1-22
		'0x02'		Select Text Layer (default)	
		'0x03'		Select Graphic Layer	
'Esc'	'T'	'0x01'		Touch start	3-1-23
		'0x02'		Touch end	
		'0x03'		Touch start -> Touch input -> Send to serial X,Y value coordinate -> Touch end	

3-1.

Parameter	'+'
'Esc' = 0x1b	
Graphic Layer	X
MSMF320240-1	byte
X	가 1 byte
(byte	Graphic Layer
X2)	X(X1
.	.)

3-1-1.

	'ESC'+ 'K'
	'0x01' or '0x02' or '0x03' or '0x04'
Parameter	
	'ESC'+ 'K' '0x01'
	'0x02' KS5601
	'0x03' (default)
	'0x04'
	'ESC'+ 'K'+ '0x01' =>
	'ESC'+ 'K'+ '0x02' => KS5601
	'ESC'+ 'K'+ '0x03' => (default)
	'ESC'+ 'K'+ '0x04' =>

3-1-2.

	'ESC'+ 'E'
	'0x01' or '0x02' or '0x03' or '0x04'
Parameter	
	'ESC'+ 'E' '0x01'
	'0x02'
	'0x03' (default)
	'0x04'
	'ESC'+ 'E'+ '0x01' => ASCII 256
	'ESC'+ 'E'+ '0x02' =>
	'ESC'+ 'E'+ '0x03' => (default)
	'ESC'+ 'E'+ '0x04' =>

3-1-3. Text Layer

	'ESC'+ 'P'
	'0x01' or '0x02'
Parameter	
	'ESC'+ 'P' '0x01' Text Layer '0x02' Text Layer
	'ESC'+ 'P'+ '0x01' => Text Layer 'ESC'+ 'P'+ '0x02' => Text Layer

3-1-4. Graphic Layer

	'ESC'+ 'P'
	'0x03' or '0x04'
Parameter	
	'ESC'+ 'P' '0x03' Graphic Layer '0x04' Graphic Layer
	'ESC'+ 'P'+ '0x03' => Graphic Layer 'ESC'+ 'P'+ '0x04' => Graphic Layer

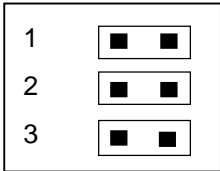
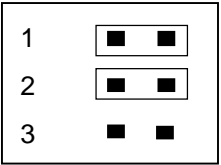
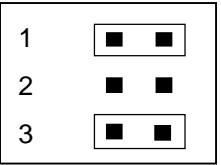
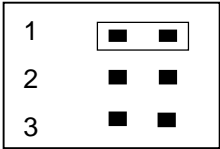
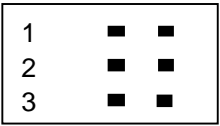
3-1-5. Text Layer ON/OFF

	'ESC'+ 'P'
	'0x05' or '0x06'
Parameter	
	'ESC'+ 'P' '0x05' Text Layer ON '0x06' OFF
	'ESC'+ 'P'+ '0x05' => Text Layer ON 'ESC'+ 'P'+ '0x06' => Text Layer OFF

3-1-6. Text Layer

	'ESC'+ 'P'				
	'0x07' or '0x08' or '0x09' or '0x0a'				
Parameter					
	'ESC'+ 'P' (가 ,)	'0x07'	Text Layer	Display	Font
		'0x08'	가	.	
		'0x09'		,	'0x0a'
		OFF	.		
	'ESC'+ 'P'+ '0x07' => Text Layer Font				
	8*16 dots => 16*32 dots				
	16*16 dots => 32*32 dots				
	'ESC'+ 'P'+ '0x08' => Text Layer Font 가				
	8*16 dots => 16*16 dots				
	16*16 dots => 32*16 dots				
	'ESC'+ 'P'+ '0x09' => Text Layer Font				
	8*16 dots => 8*32 dots				
	16*16 dots => 16*32 dots				
	'ESC'+ 'P'+ '0x0a' => Text Layer Font OFF				

3-1-7. Serial Baud Rate

	'ESC'+ 'P' (Software)																				
	'0x0b' or '0x0c' or '0x0d' or '0x0e'																				
Parameter																					
	'ESC'+ 'P' '0x0b' Baud Rate 4800[bps] '0x0c' 9600[bps] , '0x0d' 19200[bps] . '0x0e' 57600[bps] . 115200[bps] => 3-1-8																				
	'ESC'+ 'P'+ '0x0b' => Serial Baud Rate 4800[bps] 'ESC'+ 'P'+ '0x0c' => Serial Baud Rate 9600[bps] 'ESC'+ 'P'+ '0x0d' => Serial Baud Rate 19200[bps] 'ESC'+ 'P'+ '0x0e' => Serial Baud Rate 57600[bps]																				
	J2 Head pin (Hardware)																				
	J2 Head pin . <table border="1"> <thead> <tr> <th>NO</th> <th>2</th> <th>3</th> <th>(baudrate)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> <td>0</td> <td>9600</td> </tr> <tr> <td>2</td> <td>0</td> <td>1</td> <td>19200</td> </tr> <tr> <td>3</td> <td>1</td> <td>0</td> <td>57600</td> </tr> <tr> <td>4</td> <td>1</td> <td>1</td> <td>115200</td> </tr> </tbody> </table>	NO	2	3	(baudrate)	1	0	0	9600	2	0	1	19200	3	1	0	57600	4	1	1	115200
NO	2	3	(baudrate)																		
1	0	0	9600																		
2	0	1	19200																		
3	1	0	57600																		
4	1	1	115200																		
	<p>NO.1 [9600] NO.2 [19200] NO.3 [57600] ->default</p>    <p>NO.4 [115200] Software Buadrate 1</p> <p>open .(2,3)</p>  																				

3-1-8. Text Layer, Graphic Layer ON/OFF

	'ESC'+ 'P'
	'0x0f' or '0x10' or '0x11' or '0x12' or '0x13'
Parameter	
	'ESC'+ 'P' '0x0f' Text Layer , '0x10' Text Layer 가 OFF . '0x11' Graphic Layer , '0x12' Graphic Layer OFF . '0x13' Serial 가 115200[bps] .
	'ESC'+ 'P'+ '0x0f' => Text Layer ON 'ESC'+ 'P'+ '0x10' => Text Layer OFF 'ESC'+ 'P'+ '0x11' => Graphic Layer ON 'ESC'+ 'P'+ '0x12' => Graphic Layer OFF 'ESC'+ 'P'+ '0x13' => Serial Baud Rate 115200[bps]

3-1-9. Text, Graphic Layer Clear

	'ESC'+ 'D'
	'0x01' or '0x02' or '0x03' or '0x04'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'D' '0x01' Text Layer Clear , '0x02' Parameter Text Layer가 Clear . '0x03' Graphic Layer Clear , '0x04' Parameter Graphic Layer가 Clear . , Text Layer X1 X2 0x00 ~ 0x27 Text Layer Y1 Y2 0x00 ~ 0x0e , Graphic Layer X1 X2 0x00 ~ 0x13f Graphic Layer Y1 Y2 0x00 ~ 0xef Graphic Layer X1 X2 MSMF320240-1 Board _____ byte) X2 = 0x136(310 decimal) _____ byte _____ 0x01 , 0x36 _____ , Text Layer 8*16 dots . Text Layer X 320/8 0x00 ~ 0x27 . Y 240/16 0x00 ~ 0x0e가 .

<p>'ESC'+ 'D'+ '0x01' => Text Layer Clear Text Layer (5, 0, 20, 11) Clear => 'ESC'+ 'D'+ '0x02'+ '0x05'+ '0x00'+ '0x14'+ '0x0b'</p> <p>'ESC'+ 'D'+ '0x03' => Graphic Layer Clear Graphic Layer (10, 25, 300, 210) Clear => 'ESC'+ 'D'+ '0x04'+ '<u>0x00'+ '0x0a'</u>'+ '0x19'+ '<u>0x01'+ '0x2c'</u>'+ '0xd2'</p> <p>Graphic Layer Clear X1 X2</p> <p><u>Graphic Layer</u> X <u>MSMF320240-1</u> <u>byte</u> .</p> <p>(10, 25, 300, 210) X1 가 1 byte <u>byte</u> .</p> <p><u>byte</u> <u>Graphic Layer</u> <u>X(X1 X2)</u> .</p>

3-1-10. Text Layer Cursor

	'ESC'+ 'C'
	'0x01' or '0x02' or '0x03' or '0x04' or '0x05'
Parameter	'X'+ 'Y' or 'None'
	<p>'ESC'+ 'C' '0x01' Parameter Cursor가 . (Graphic Layer Cursor .) _____ Text Layer <u>X</u> _____ <u>0x00 ~ 0x27</u> , <u>Y</u> _____ <u>0x00 ~ 0x0e</u> .</p> <p>'ESC'+ 'C' 가 '0x02' Cursor , '0x03' Cursor Line, '0x04' Cursor Block .</p> <p>'0x05' Cursor off .</p>
	<p>'ESC'+ 'C'+ '0x01'+ 'X'+ 'Y' => Text Layer (X, Y) Cursor 'ESC'+ 'C'+ '0x02' => Cursor 'ESC'+ 'C'+ '0x03' => Cursor Line 'ESC'+ 'C'+ '0x04' => Cursor Block 'ESC'+ 'C'+ '0x05' => Cursor OFF</p>

3-1-11. Text Layer Rectangle

	'ESC'+ 'R'
	'0x01' or '0x02'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'R' '0x01' Parameter 1 Line Rectangle . '0x02'가 Parameter 2 Line Rectangle . _____ Text Layer X _____ 0x00 ~ 0x27 , Y _____ 0x00 ~ 0x0e .
	'ESC'+ 'R'+ '0x01'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => Text Layer (X1, Y1, X2, Y2) 1 Line Rectangle) (5, 3, 35, 12) 1 Line Rectangle => 'ESC'+ 'R'+ '0x01'+ '0x05'+ '0x03'+ '0x23'+ '0x0c' 'ESC'+ 'R'+ '0x02'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => Text Layer (X1, Y1, X2, Y2) 2 Line Rectangle) (5, 3, 35, 12) 2 Line Rectangle => 'ESC'+ 'R'+ '0x02'+ '0x05'+ '0x03'+ '0x23'+ '0x0c'

3-1-12. Blink

	'ESC'+ 'B'
	'0x01' or '0x02' or '0x03' or '0x04'
Parameter	
	'ESC'+ 'B' '0x01' Text Layer 가 ON. '0x02' Text Layer OFF. '0x03' Graphic Layer ON. '0x04' Graphic Layer OFF.
	'ESC'+ 'B'+ '0x01' => Text Layer ON. 'ESC'+ 'B'+ '0x02' => Text Layer OFF 'ESC'+ 'B'+ '0x03' => Graphic Layer ON 'ESC'+ 'B'+ '0x04' => Graphic Layer OFF

3-1-13. CCFL Power ON/OFF

	'ESC'+ 'L'
	'0x01' or '0x02'
Parameter	
	'ESC'+ 'L' '0x01' CCFL Power OFF. '0x02' CCFL Power ON.
	'ESC'+ 'L'+ '0x01' => CCFL Power OFF. 'ESC'+ 'L'+ '0x02' => CCFL Power ON.

3-1-14. LCD Bias Voltage UP/DOWN

	'ESC'+ 'V'
	'0x01' or '0x02'
Parameter	
	'ESC'+ 'V' '0x01' LCD Bias Voltage UP '0x02' LCD Bias Voltage DOWN.
	'ESC'+ 'V'+ '0x01' => LCD Bias Voltage UP. 'ESC'+ 'V'+ '0x02' => LCD Bias Voltage DOWN.

3-1-15. MSMF320240-1 Rebooting

	'ESC'+ 'S'
Parameter	
	'ESC'+ 'S' MSMF320240-1 Rebooting LCD Bias Voltage Serial Baud Rate Baud Rate Default 57600[bps] MSMF320240-1 LCD 20[]
	'ESC'+ 'S' => MSMF320240-1 Rebooting

3-1-16. Graphic Layer /

	'ESC'+ 'G'
	'0x01' or '0x02'
Parameter	'X'+ 'Y'
	'ESC'+ 'G' '0x01' Parameter Graphic Layer '0x02'가 Parameter Graphic Layer Graphic Layer X 0x000 ~ 0x13f Y 0x00 ~ 0xef
	'ESC'+ 'G'+ '0x01'+ 'X'+ 'Y' => (X, Y)) Graphic Layer (50, 80) => 'ESC'+ 'G'+ '0x01'+ '0x00'+ '0x32'+ '0x50' 'ESC'+ 'G'+ '0x02'+ 'X'+ 'Y' => (X, Y)) Graphic Layer (310, 80) => 'ESC'+ 'G'+ '0x02'+ '0x01'+ '0x36'+ '0x50' X Graphic Layer X MSMF320240-1 byte (50, 80) X 가 1 byte byte

3-1-17. Graphic Layer Line /

	'ESC'+ 'G'
	'0x03' or '0x04'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'G' '0x03' Parameter Graphic Layer Line '0x04'가 Parameter Graphic Layer Line Graphic Layer X 0x000 ~ 0x13f, Y 0x00 ~ 0xef
	'ESC'+ 'G'+ '0x03'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line) Graphic Layer (0, 10, 319, 229) Line => 'ESC'+ 'G'+ '0x03'+ '0x00'+ '0x00'+ '0x0a'+ '0x01'+ '0x3f'+ '0xe5' 'ESC'+ 'G'+ '0x04'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line) Graphic Layer (0, 10, 319, 229) Line => 'ESC'+ 'G'+ '0x04'+ '0x00'+ '0x00'+ '0x0a'+ '0x01'+ '0x3f'+ '0xe5' X1, X2

3-1-18. Graphic Layer / Rectangle /

	'ESC'+ 'G'
	'0x05' or '0x06' or '0x07' or '0x08'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	<p>'ESC'+ 'G' '0x05'가 Parameter</p> <p>Graphic Layer Rectangle .</p> <p>'0x06' Parameter Graphic Layer</p> <p> Rectangle .</p> <p>, '0x07' Parameter</p> <p>Graphic Layer Rectangle .</p> <p>'0x08' Parameter Graphic Layer</p> <p> Rectangle .</p> <p>_____ Graphic Layer <u>X</u> _____ <u>0x00 ~ 0x13f</u> ,</p> <p><u>Y</u> _____ <u>0x00 ~ 0xef</u> .</p>
	<p>'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2'</p> <p>=> (X1,Y1,X2,Y2) Rectangle .</p> <p>) Graphic Layer (10, 10, 100, 100) Line</p> <p>=> 'ESC'+ 'G'+ '0x05'+ '<u>0x00</u>'+'<u>0x0a</u>'+'0x0a'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x06'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2'</p> <p>=> (X1,Y1,X2,Y2) Rectangle .</p> <p>) Graphic Layer (10, 10, 100, 100) Rectangle .</p> <p>=> 'ESC'+ 'G'+ '0x06'+ '<u>0x00</u>'+'<u>0x0a</u>'+'0x0a'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x07'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2'</p> <p>=> (X1,Y1,X2,Y2) Rectangle .</p> <p>) Graphic Layer (10, 10, 100, 100) Rectangle .</p> <p>=> 'ESC'+ 'G'+ '0x07'+ '<u>0x00</u>'+'<u>0x0a</u>'+'0x0a'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x08'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2'</p> <p>=> (X1,Y1,X2,Y2) Rectangle .</p> <p>) Graphic Layer (10, 10, 100, 100) Rectangle .</p> <p>=> 'ESC'+ 'G'+ '0x08'+ '<u>0x00</u>'+'<u>0x0a</u>'+'0x0a'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'</p> <p style="text-align: center;">X1, X2</p>

3-1-19. Graphic Layer

	'ESC'+ 'G'
	'0x09' or '0x0a' or '0x0b' or '0x0c'
Parameter	'X'+ 'Y'+ radius
	<p>'ESC'+ 'G' '0x09'가 Parameter</p> <p>Graphic Layer radius .</p> <p>'0x0a'가 Parameter Graphic Layer</p> <p> radius .</p> <p>'0x0b'가 Parameter Graphic Layer</p> <p> radius .</p> <p>'0x0c' Parameter Graphic Layer</p> <p> radius .</p> <p>_____ Graphic Layer <u>X</u> _____ <u>0x000 ~ 0x13f</u> ,</p> <p><u>Y</u> _____ <u>0x00 ~ 0xef</u> . <u>radius</u> _____ <u>'0x01' ~ '0x78'</u> .</p>
	<p>'ESC'+ 'G'+ '0x09'+ 'X'+ 'Y'+ 'radius'</p> <p>=> (X,Y) 'radius'</p> <p>) Graphic Layer (100, 100) radius = 50</p> <p>=> 'ESC'+ 'G'+ '0x09'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'+ '0x32'</p> <p>'ESC'+ 'G'+ '0x0a'+ 'X'+ 'Y'+ 'radius'</p> <p>=> (X,Y) 'radius'</p> <p>) Graphic Layer (100, 100) radius = 50</p> <p>=> 'ESC'+ 'G'+ '0x0a'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'+ '0x32'</p> <p>'ESC'+ 'G'+ '0x0b'+ 'X'+ 'Y'+ 'radius'</p> <p>=> (X,Y) 'radius'</p> <p>) Graphic Layer (100, 100) radius = 50</p> <p>=> 'ESC'+ 'G'+ '0x0b'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'+ '0x32'</p> <p>'ESC'+ 'G'+ '0x0c'+ 'X'+ 'Y'+ 'radius'</p> <p>=> (X,Y) 'radius'</p> <p>) Graphic Layer (100, 100) radius = 50</p> <p>=> 'ESC'+ 'G'+ '0x0c'+ '<u>0x00</u>'+'<u>0x64</u>'+'0x64'+ '0x32'</p> <p style="text-align: center;">X</p>

3-1-20. Graphic Layer

	'ESC'+ 'G'
	'0x0d' or '0x0e' or '0x0f' or '0x10'
Parameter	'X'+ 'Y'+ 'a'+ 'b'
	<p>'ESC'+ 'G' '0x0d'가 Parameter Graphic Layer 가 'a' , 'b'</p> <p>'0x0e'가 Parameter Graphic Layer 가 'a' , 'b'</p> <p>'0x0f'가 Parameter Graphic Layer 가 'a' , 'b'</p> <p>'0x10' Parameter Graphic Layer 가 'a' , 'b'</p> <p>_____ Graphic Layer <u>X</u> _____ <u>0x000 ~ 0x13f</u> , <u>Y</u> _____ <u>0x00 ~ 0xef</u> . 'a' _____ <u>'0x01' ~ '0xa0'</u> , 'b' _____ <u>'0x01 ~ 0x78'</u> .</p>
	<p>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') Graphic Layer (150, 120) 'a'= 50, 'b'= 20</p> <p>=> 'ESC'+ 'G'+ '0x0d'+ '<u>0x00</u>'+ '<u>0x96</u>'+ '0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0e'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') Graphic Layer (150, 120) 'a'= 50, 'b'= 20</p> <p>=> 'ESC'+ 'G'+ '0x0e'+ '<u>0x00</u>'+ '<u>0x96</u>'+ '0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0f'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') Graphic Layer (150, 120) 'a'= 50, 'b'= 20</p> <p>=> 'ESC'+ 'G'+ '0x0f'+ '<u>0x00</u>'+ '<u>0x96</u>'+ '0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x10'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') Graphic Layer (150, 120) 'a'= 50, 'b'= 20</p> <p>=> 'ESC'+ 'G'+ '0x10'+ '<u>0x00</u>'+ '<u>0x96</u>'+ '0x78'+ '0x32'+ '0x14'</p> <p style="text-align: center;">X</p>

3-1-21. Reset

	'ESC'+ 'A'
	'0x01' or '0x02' or '0x03'
Parameter	
	'ESC'+ 'A' '0x01' Rebooting . '0x02' LCD Bias Voltage Serial Baudrate Rebooting '0x03' MSMF320240-1 System check . Serial '0x06' , MSMF320240-1
	'ESC'+ 'A'+ '0x01' => Rebooting 'ESC'+ 'A'+ '0x02' => LCD Bias Voltage Serial Baudrate 'ESC'+ 'A'+ '0x03' => MSMF320240-1 System check

3-1-22. Image display

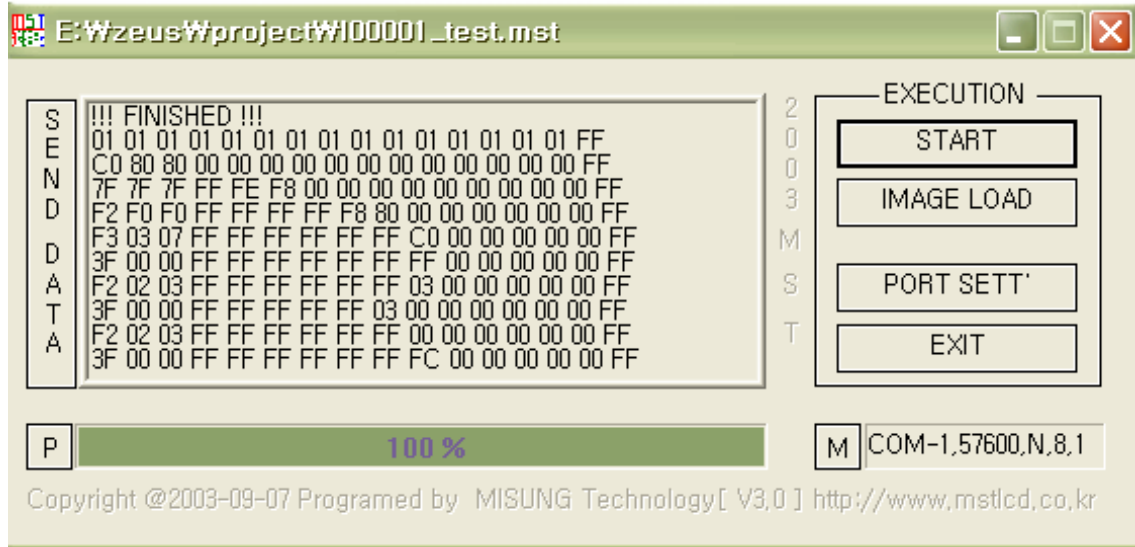
	'ESC'+ 'I'
	'0x01' or '0x02' or '0x03'
Parameter	'X'
	'ESC'+ 'I' '0x01' x (page number) Memory Image display . ' X ' [0x00 ~ 0x34] . * Display default가 Text Layer Graphic Layer 가 . '0x02' Image display Text Layer display . (default) '0x03' Image display Graphic Layer display .
	'ESC'+ 'I'+ '0x01'+ 'X' => Image display) Image Text Layer(default) Display ' ESC'+ 'I'+ '0x01'+ '0x02' => 320*240 Text Layer . 'ESC'+ 'I'+ '0x02' => Image display at Text Layer (default) 'ESC'+ 'I'+ '0x03' => Image display at Graphic Layer

3-1-23. Touch

	'ESC'+ 'T'
	'0x01' or '0x02' or '0x03'
Parameter	
	<p>'ESC'+ 'T' '0x01' Touch .</p> <p>Touch Panel X (1~319 decimal), Y (1~239) Touch end</p> <p>end RS-232C ASCII "xxx,yyy" format</p> <p>. (Touch event)</p> <p>Touch Panel X, Y ASCII Format ,</p> <p>가 .</p> <p>'0x02' Touch end.</p> <p>'0x03' 'ESC'+ 'T'+ '0x01' ASCII format Touch Panel</p> <p>Data X,Y data Touch</p> <p>(Touch event)</p>
	<p>'ESC'+ 'T'+ '0x01' => Touch end Touch Panel X,Y</p> <p>'ESC'+ 'T'+ '0x02' => Touch End</p> <p>'ESC'+ 'T'+ '0x03' => Touch Panel X,Y ASCII format</p> <p>(xxx,yyy) Touch .</p>

4. MSMF320240-1 Image Overwrite

Image Overwrite Application Program



Overwrite Application Program
 MSMF320240-1 Image display ,
 Image page Overwrite .
 , MSMF320240-1 PC Serial Cable ,
 'IMAGE LOAD' image 'START'
 MSMF320240-1 Overwrite , '100%'
 Image Overwrite .
 'IMAGE LOAD' Image
 .
 Image Serial number : Overwrite page number
 (Serial number 1 4 '0' .)

Ex) 1 page Overwrite file I00001_test.mst

[1.] MSMF320240-1

Special Font

< 1- 1 > MSMF320240-1 (Special Font)

Special < 1- 1 >

	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07	0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x00		☎	☎	☎	☎	☎	☎	☎		No.	Co.	TM.	am.		FM.	Tel.
0x10	I	II	III	IV	V	VI	VII	VIII	IX	X	ℓℓ	mℓ	dℓ	ℓ	kℓ	cc
0x20	mm ³	cm ³	m ³	km ³	fm	nm	μm	mm	cm	km	mm ²	cm ²	m ²	km ²	ha	ℓg
0x30	m ^g	k ^g	kt	cal	kcal	dB	m ³ /s	m ³ /s	ps	ns	μs	ms	pV	nV	μV	mV
0x40	kV	MV	PA	nA	μA	mA	KA	FW	nW	μW	mW	kW	MW	Hz	kHz	MHz
0x50	GHz	THz	Ω	kΩ	MΩ	PF	nF	μF	mol	cd	rad	rad ² /s	rad ³ /s	sr	Pa	kPa
0x60	MPa	GPa	Wb	Im	lx	Bq	Gy	Sv	°/kg	㉿	㊀	㊁	㊂	㊃	㊄	㊅
0x70	㊆	㊇	㊈	㊉	㊊	㊋	㊌	㊍	㊎	㊏	㊑	㊒	㊓	㊔	㊕	㊖
0x80	㊗	㊘	㊙	㊚	㊛	㊜	㊝	㊞	㊟	㊠	㊡	㊢	㊣	㊤	㊥	㊦
0x90	㊧	㊨	㊩	㊪	㊫	㊬	㊭	㊮	㊯	㊰	㊱	㊲	㊳	㊴	㊵	㊶
0xA0	㊷	㊸	㊹	㊺	㊻	㊼	㊽	㊾	㊿	①	②	③	④	⑤	⑥	⑦
0xB0	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓
0xC0	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜	㉝	㉞	㉟	㊀	㊁	㊂	㊃
0xD0	㊄	㊅	㊆	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
0xE0	(n)	(o)	(p)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(y)	(z)	(1)	(2)	(3)
0xF0	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)				

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