

# LCD Controller Manual

## MSMF240128-1 Version 1.1



**MST** MI SUNG TECHNOLOGY

1. MSMF240128-1

2. MSMF240128-1 Connector

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- 2-2. Backlight Power Connector
- 2-3. RS-232C Connector
- 2-4. Power Connector

3.

3-1.

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- 3-1-5. Text Layer
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[ 1.] MSMD-FX2 Special Font

## 1. MSMF240128-1

## ◆ MSMF240128-1

- ◆ LCD Resolution : FSTN Mono 240\*128 dots
- ◆ : KS5601
- ◆ LCD Back Light : Inverter On/Off 가 (CCFL Backlight )
- ◆ Font : 16\*16 dots  
8\*16 dots  
16\*16

## ◆ MSMF240128-1

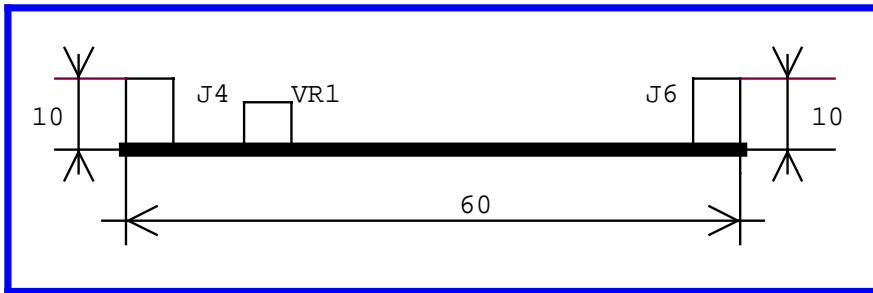
- ◆ CPU : T89C51
- ◆ LCD Controller : LC7981
- ◆ Display Type : FSTN Mono 240\*128 dots
- ◆ : DC 5[V]
- ◆ : RS-232C 4800, 9600, 19200, 57600 [bps]  
Default 57600 [bps]

## ◆ MSMF240128-1

- ◆ Text Layer : Text Layer ON/OFF
- ◆ , : 가 2 , 2 , 가 2
- ◆ Graphic : , Line, Rectangle, ,
- ◆ / Font
- ◆
- ◆ Cursor
- ◆ : Enter
- ◆ Backspace
- ◆ Clear : Block Clear , Clear
- ◆



## MSMF240128-1



## 2-1. Backlight Power Connector : J6

Pin Number	Symbol	Description
1	IN	CCFL Power VDC
2	IN	CCFL Power

## 2-2. RS-232C Connector : J5

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

## 2-3. Power Connector : J4

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

## 3.

'Esc' = 0x1b [hex]

			Parameter	
'Esc'	'K'	'0x01'		3-1-1
		'0x02'	KS5601	
'Esc'	'E'	'0x01'		3-1-2
		'0x02'		
'Esc'	'P'	'0x01'	Text Layer OFF	3-1-3
		'0x02'	Text Layer ON	
		'0x03'	Text Layer ON	
		'0x04'	Text Layer OFF	3-1-4
		'0x05'	Text Layer Font ON	
		'0x06'	Text Layer Font 가 ON	3-1-5
		'0x07'	Text Layer Font ON	
		'0x08'	Text Layer Font OFF	
		'0x09'	Serial baud rate 4800 [bps]	
		'0x0a'	Serial baud rate 9600 [bps]	3-1-6
		'0x0b'	Serial baud rate 19200 [bps]	
		'0x0c'	Serial baud rate 57600 [bps]	
		'0x0d'	Text Layer ON	3-1-7
		'0x0e'	Text Layer OFF	
'Esc'	'D'	'0x01'	Text Layer clear	3-1-8
		'0x02'	(X1,Y1,X2,Y2) Text Layer clear (X1,Y1,X2,Y2 hex 가 :0x00 0x1d :0x00 0x07)	
		'0x03'	(X1,Y1,X2,Y2) Graphic clear (X1, Y1, X2, Y2 hex 가 :0x000 0xef :0x00 0x7f)	
'Esc'	'C'	'0x01'	(X,Y) Text Layer X,Y cursor (X,Y hex 가 :0x00 0x1d :0x00 0x07)	3-1-9
'Esc'	'L'	'0x01'	CCFL Power ON	3-1-10
		'0x02'	CCFL Power OFF	
'Esc'	'S'		Serial Baud rate <b>Rebooting</b>	MSMF240128-1 3-1-11
'Esc'	'G'	'0x01'	(X,Y) Graphic X:0x000 0xef Y:0x00 0x7e	3-1-12

			Parameter		
		'0x02'	(X,Y)	Graphic X:0x000 0x13f Y:0x00 0xEf	
		'0x03'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	3-1-13
		'0x04'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	
		'0x05'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	3-1-14
		'0x06'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	
		'0x07'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	
		'0x08'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x000 0x13f Y1,Y2:0x00 0xEf	
		'0x09'	(X,Y,radius)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf Radius :0x00 0x3f	3-1-15
		'0x0a'	(X,Y,radius)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf Radius :0x00 0x3f	
		'0x0b'	(X,Y,radius)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf Radius :0x00 0x3f	
		'0x0c'	(X,Y,radius)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf Radius :0x00 0x3f	
		'0x0d'	(X,Y,a,b)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf a :240/2 b :128/2	
		'0x0e'	(X,Y,a,b)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf a :240/2 b :128/2	3-1-16
		'0x0f'	(X,Y,a,b)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf a :240/2 b :128/2	
		'0x10'	(X,Y,a,b)	Graphic	

			Parameter		
				X Y X:0x000 0x13f Y:0x00 0xEf a :240/2 b :128/2	

3-1.

Parameter '+'  
'Esc' = 0x1b (Hex)

Graphic X MSMF240128-1 byte(Hex)

3-1-1.

	'ESC'+ 'K'
	'0x01' or '0x02'
Parameter	
	'ESC'+ 'K' '0x01' '0x02' KS5601
	'ESC'+ 'K'+ '0x01' => 'ESC'+ 'K'+ '0x02' => KS5601

3-1-2.

	'ESC'+ 'E'
	'0x01' or '0x02'
Parameter	
	'ESC'+ 'E' '0x01' '0x02'
	'ESC'+ 'E'+ '0x01' => ASCII 256 'ESC'+ 'E'+ '0x02' =>

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











<pre>'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle ) Graphic (10, 10, 100, 100) Line =&gt; 'ESC'+ 'G'+ '0x05'+ '0x0a'+ '0x64'+ '0x64' 'ESC'+ 'G'+ '0x06'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle ) Graphic (10, 10, 100, 100) Rectangle =&gt; 'ESC'+ 'G'+ '0x06'+ '0x0a'+ '0x64'+ '0x64' 'ESC'+ 'G'+ '0x07'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle ) Graphic (10, 10, 100, 100) Rectangle =&gt; 'ESC'+ 'G'+ '0x07'+ '0x0a'+ '0x64'+ '0x64' 'ESC'+ 'G'+ '0x08'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle ) Graphic (10, 10, 100, 100) Rectangle =&gt; 'ESC'+ 'G'+ '0x08'+ '0x0a'+ '0x64'+ '0x64' X1, X2</pre>
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3-1-15. Graphic / /

	'ESC'+ 'G'
	'0x09' or '0x0a' or '0x0b' or '0x0c'
<b>Parameter</b>	'X'+ 'Y'+ radius
	<pre>'ESC'+ 'G'      '0x09'가      Parameter Graphic      radius '0x0a'가      Parameter      Graphic radius '0x0b'가      Parameter      Graphic radius '0x0c'      Parameter      Graphic radius Graphic      X      0x00  0xef      , Y 0x00  0x7f      radius      '0x01'  '0x3f'</pre>
	<pre>'ESC'+ 'G'+ '0x09'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius' ) Graphic (100, 100) radius = 50 =&gt; 'ESC'+ 'G'+ '0x09'+ '0x64'+ '0x64'+ '0x32' 'ESC'+ 'G'+ '0x0a'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius' ) Graphic (100, 100) radius = 50 =&gt; 'ESC'+ 'G'+ '0x0a'+ '0x64'+ '0x64'+ '0x32' 'ESC'+ 'G'+ '0x0b'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius' ) Graphic (100, 100) radius = 50 =&gt; 'ESC'+ 'G'+ '0x0b'+ '0x64'+ '0x64'+ '0x32' 'ESC'+ 'G'+ '0x0c'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius' ) Graphic (100, 100) radius = 50 =&gt; 'ESC'+ 'G'+ '0x0c'+ '0x64'+ '0x64'+ '0x32' X</pre>

3-1-16. Graphic

	'ESC'+ 'G'
	'0x0d' or '0x0e' or '0x0f' or '0x10'
Parameter	'X'+ 'Y'+ 'a'+ 'b'
	<p>'ESC'+ 'G'                      '0x0d'가                      Parameter</p> <p>Graphic 가                      'a'                      ,                      'b'</p> <p>'0x0e'가                      Parameter                      Graphic 가                      'a'</p> <p>                    'b'</p> <p>'0x0f'가                      Parameter                      Graphic 가                      'a'</p> <p>                    'b'</p> <p>'0x10'                      Parameter                      Graphic 가                      'a'</p> <p>                    'b'</p> <p>                    Graphic Layer                      X                      0x00                      0xef                      , Y</p> <p>                    0x00                      0x7f                      . 'a'                      '0x01'                      '0x3f'                      , 'b'</p> <p><u>'0x01                      0x77'</u></p>
	<p>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가                      'a'                      ,                      'b'</p> <p>                    ) Graphic                      (150, 120)                      'a'= 50, 'b'= 20</p> <p>                    =&gt; 'ESC'+ 'G'+ '0x0d'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0e'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가                      'a'                      ,                      'b'</p> <p>                    ) Graphic                      (150, 120)                      'a'= 50, 'b'= 20</p> <p>                    =&gt; 'ESC'+ 'G'+ '0x0e'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0f'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가                      'a'                      ,                      'b'</p> <p>                    ) Graphic                      (150, 120)                      'a'= 50, 'b'= 20</p> <p>                    =&gt; 'ESC'+ 'G'+ '0x0f'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x10'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가                      'a'                      ,                      'b'</p> <p>                    ) Graphic                      (150, 120)                      'a'= 50, 'b'= 20</p> <p>                    =&gt; 'ESC'+ 'G'+ '0x10'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>                    X</p>

[ 1.] MSMD-FX2 Special Font

< 1- 1 > MSMD-FX1 (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 <sup>3</sup>	cm <sup>3</sup>	m <sup>3</sup>	km <sup>3</sup>	fm	nm	μm	mm	cm	km	mm <sup>2</sup>	cm <sup>2</sup>	m <sup>2</sup>	km <sup>2</sup>	ha	ℓg
0x30	m <sub>g</sub>	k <sub>g</sub>	kt	cal	kcal	dB	‰	‰	ps	ns	μs	ms	pV	nV	μV	mV
0x40	kV	MV	PA	nA	μA	mA	KA	PW	nW	μW	mW	kW	MW	Hz	kHz	MHz
0x50	GHz	THz	Ω	kΩ	MΩ	PF	nF	μF	mol	cd	rad	rad <sub>s</sub>	rad <sub>s</sub>	sr	Pa	kPa
0x60	MPa	GPa	Wb	lm	lx	Bq	Gy	Sv	‰	㉿	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	㊇	㊈	㊉	㊊	㊋	㊌	㊍	㊎	㊏	㊑	㊒	㊓	㊔
0xE0	㊕	㊖	㊗	㊘	㊙	㊚	㊛	㊜	㊝	㊞	㊟	㊠	㊡	㊢	㊣	㊤
0xF0	㊥	㊦	㊧	㊨	㊩	㊪	㊫	㊬	㊭	㊮	㊯	㊰	㊱	㊲	㊳	㊴

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