



# LCD Controller Manual

## MSMF240128-1 Version 1.1



**mst** MI SUNG TECHNOLOGY

1. MSMF240128-1

2. MSMF240128-1 Connector

- 2-1. LCD Module Interface Connector
- 2-2. Backlight Power Connector
- 2-3. RS-232C Connector
- 2-4. Power Connector

3.

3-1.

- 3-1-1.
- 3-1-2.
- 3-1-3. Text Layer
- 3-1-4. Text Layer ON/OFF
- 3-1-5. Text Layer
- 3-1-6. Serial Baud Rate
- 3-1-7. Text Layer ON/OFF
- 3-1-8. Text Layer Clear
- 3-1-9. Text Layer Cursor
- 3-1-10. CCFL Power ON/OFF
- 3-1-11. MSMF240128-1 Rebooting
- 3-1-12. Graphic /
- 3-1-13. Graphic Line /
- 3-1-14. Graphic / Rectangle /
- 3-1-15. Graphic / /
- 3-1-16. Graphic / /

[ 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]

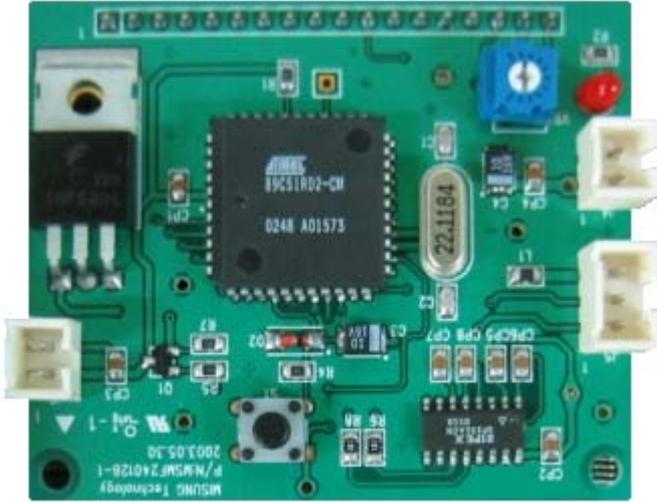
◆ MSMF240128-1

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

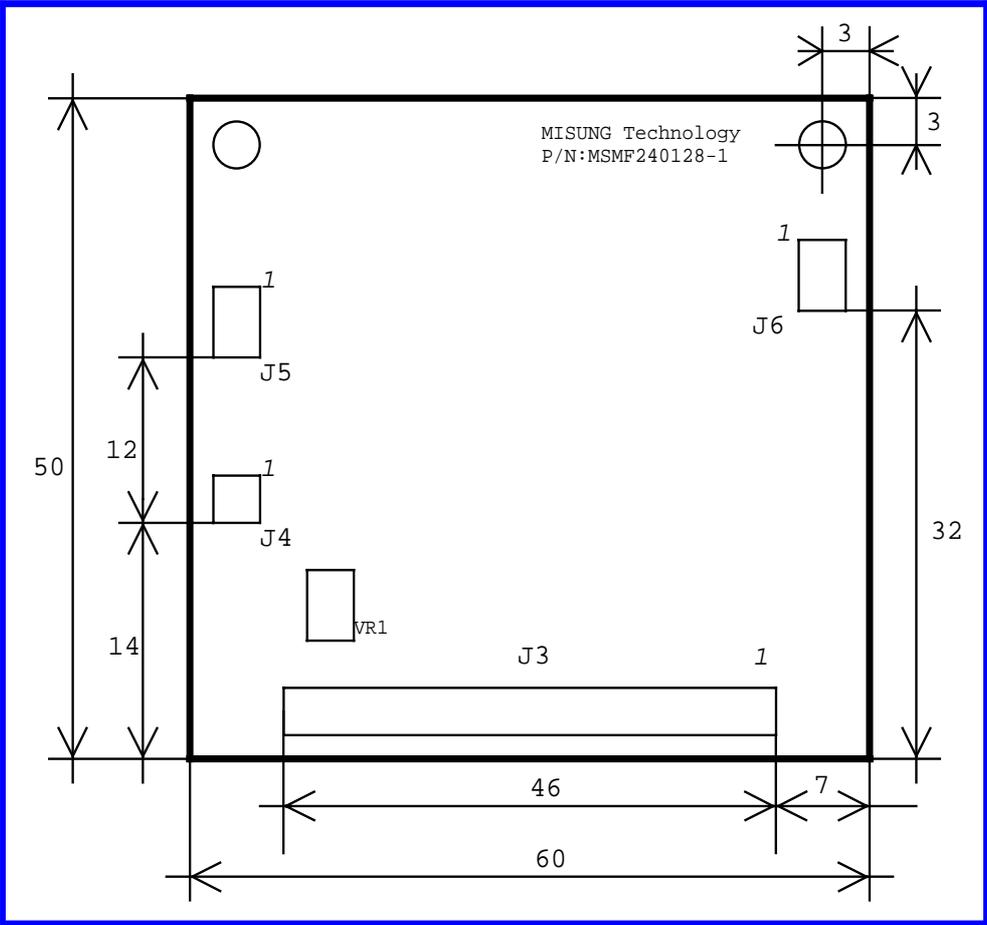
2. MSMF240128-1 Connector

2 MSMF240128-1 Dimensions Connector

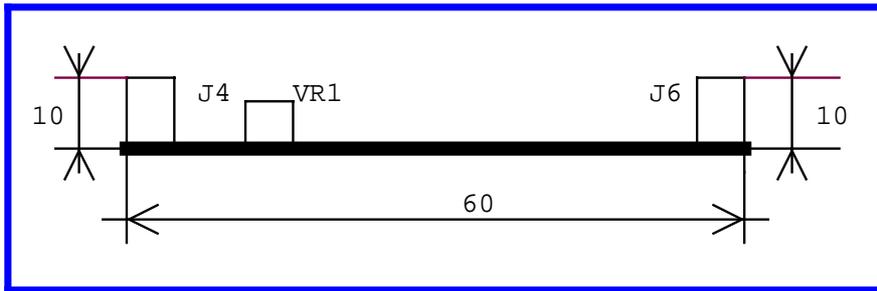
MSMF240128-1



MSMF240128-1 Dimensions



## 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 <u>MSMF240128-1</u> <u>Rebooting</u>	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	3-1-16
		'0x0e'	(X,Y,a,b)	Graphic X Y X:0x000 0x13f Y:0x00 0xEf a :240/2 b :128/2	
		'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>
--	--

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> <sup>2</sup>	sr	Pa	kPa
0x60	MPa	GPa	Wb	lm	lx	Bq	Gy	Sv	‰	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ
0x70	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ	ⓗ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ
0x80	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ	ⓗ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ
0x90	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
0xA0	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔	㉕	㉖	㉗	㉘	㉙	㉚	㉛	㉜
0xB0	㉝	㉞	㉟	㊱	㊲	㊳	㊴	㊵	㊶	㊷	㊸	㊹	㊺	㊻	㊼	㊽
0xC0	㊾	㊿	Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓖ
0xD0	Ⓡ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ
0xE0	ⓗ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ
0xF0	ⓗ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ	Ⓩ	ⓐ	ⓑ	ⓒ	ⓓ	ⓔ	ⓕ	ⓖ

< 1 - 1 >

가 1 5-60 3

TEL : 051) 891-1626

FAX : 051) 891-1675

Home Page : <http://www.mstlcd.co.kr>

E-mail : [mst@mstlcd.co.kr](mailto:mst@mstlcd.co.kr)