

# LCD Controller Manual

## MMS2412K - VM Version 1.01

84-2

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1. MMS2412K-VM

2. MMS2412K-VM Connector

2-1. LCD Module Interface Connector

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[ 1.] MMS2412K-VM

Special Font

## 1. MMS2412K-VM

## ◆ MMS2412K-VM

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

## ◆ MMS2412K-VM

- ◆ CPU : ATMEGA128-16AI
- ◆ LCD Controller : T6963C
- ◆ Display Type : Mono 240\*128 dots
- ◆ : DC 5[V]
- ◆ : RS-232C 9600, 19200, 57600, 115200 [bps]

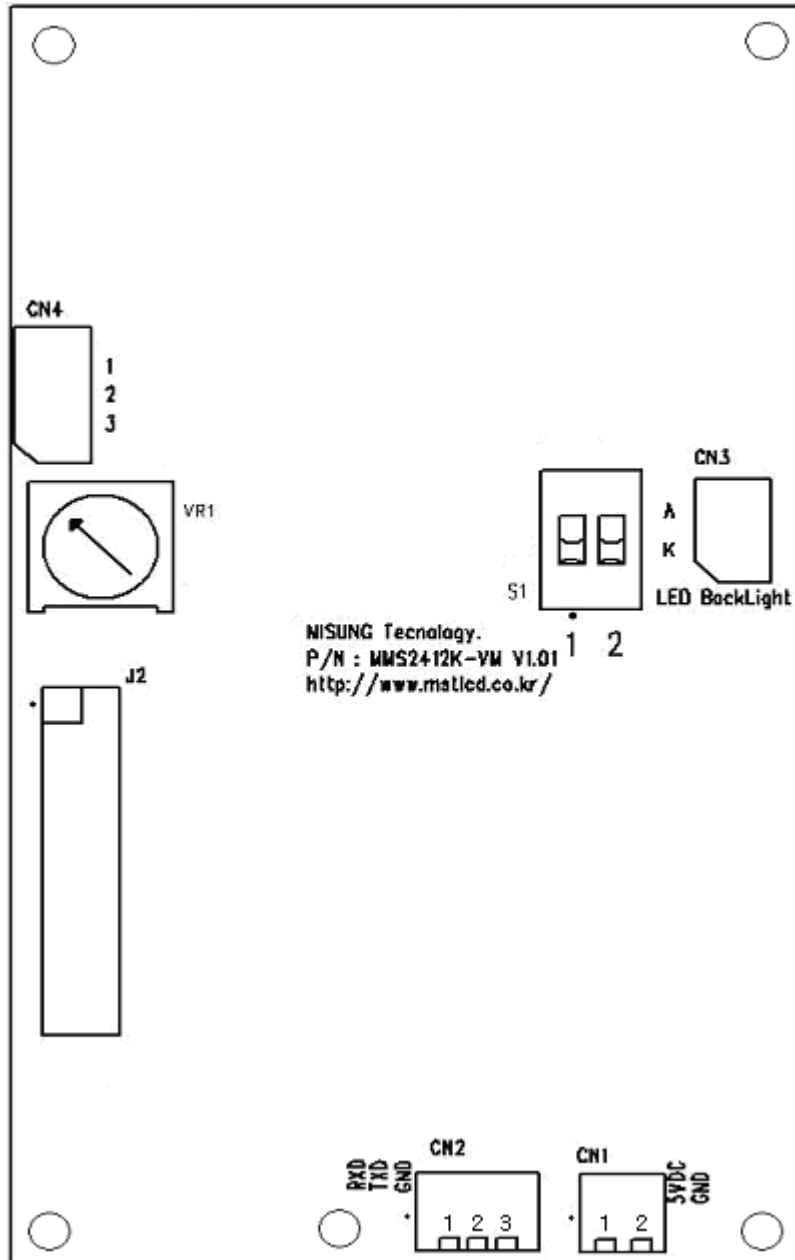
## ◆ MMS2412K-VM

- ◆ Text : (0, 1)
- ◆ , : 가 2 , 2 , 가 2
- ◆ Graphic : , Line, Rectangle, ,
- ◆ / Font
- ◆
- ◆ Cursor ( 8\*8)
- ◆ Clear : Block Clear , Clear
- ◆

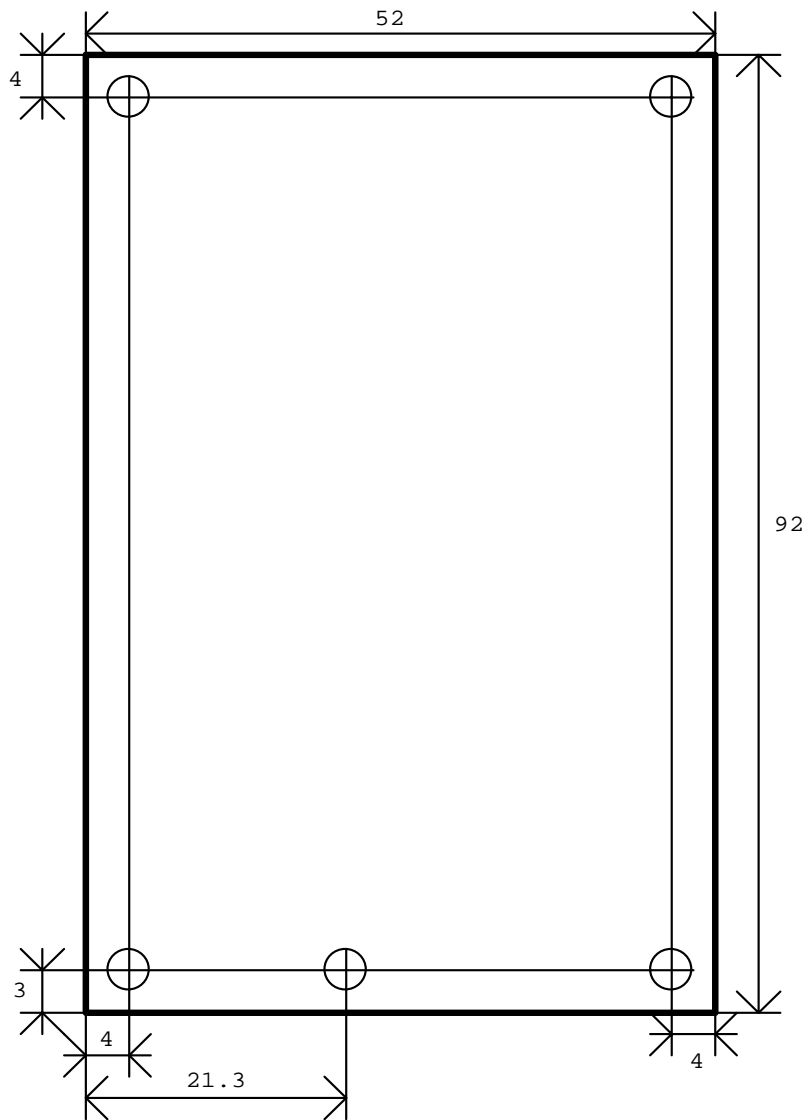
## 2. MMS2412K-VM Connector

2 MMS2412K-VM Dimensions Connector

MMS2412K-VM V1.01



MMS2412K-VM V1.01 Outline



**2-1. LCD Module Interface Connector : J2**

Pin Number	Symbol	Description
1	FG	Frame GND
2	GND	GND
3	VCC	+5VDC
4	VEE	LCD Voltage
5	/WR	Data write
6	/RD	Data read
7	/CE	Chip enable
8	C/D	Command/Data
9	NC	NC
10	/RST	Reset
11	D0	Data 0
12	D1	Data 1
13	D2	Data 2
14	D3	Data 3
15	D4	Data 4
16	D5	Data 5
17	D6	Data 6
18	D7	Data 7
19	FS	Font Select
20	RV	Reverse

**2-2. LED Backlight Power Connector : CN3**

Pin Number	Symbol	Description
1	Anode	Anode
2	Kathode	Kathode

**2-3. RS-232C Connector : CN2**

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

**2-4. Power Connector : CN1**

Pin Number	Symbol	Description
1	VCC5	+5[VDC]
2	GND	DC Ground

**2-5. LCD Connector : CN4**

VR1 가 1 1 .

**2-6. Switch : S1**

BaudRate S1 - 1,2 Switch on/off .

S1 - 1	S1 - 2	BaudRate [bps]
ON	ON	9,600
ON	OFF	19,200
OFF	ON	57,600
OFF	OFF	115,200

## 3.

'Esc' = 0x1b [hex]

			Parameter	( 가 )
'Esc'	'K'	'0x01'		
		'0x02'		KS5601
		'0x03'		
		'0x04'		
'Esc'	'E'	'0x01'		
		'0x02'		
		'0x03'		
		'0x04'		
'Esc'	'P'	'0x01'		Text
		'0x02'		Text
		'0x03'		Text ON
		'0x04'		Text OFF
		'0x05'		Text Font ON
		'0x06'		Text Font 가 ON
		'0x07'		Text Font ON
		'0x08'		Text Font OFF
'Esc'	'D'	'0x01'		Text clear ( .)
		'0x02'	(X1,Y1,X2,Y2)	Text 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 X,Y cursor (X,Y hex 가 :0x00 ~ 0x1d :0x00 ~ 0x07)
		'0x06'	(X,Y)	Graphic Cursor (Graphic font display ON) X:0x00 ~ 0xef Y:0x00 ~ 0x7f
		'0x07'		Graphic off (Graphic font display OFF)
		'0x08'		Cursor ON
		'0x09'		Cursor OFF
		'0x0a'		Cursor form X 0~7 (hex 1byte)
'Esc'	'L'	'0x01'		LED Backlight ON
		'0x02'		LED Backlight OFF
'Esc'	'G'	'0x01'	(X,Y)	Graphic X:0x00 ~ 0xef Y:0x00 ~ 0x7f



			Parameter		( 가 )
		'0x02'	(X,Y)	Graphic X:0x00 ~ 0xef Y:0x00 ~ 0x7f	
		'0x03'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x7f	3-1-4
		'0x04'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x7f	
		'0x05'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u>	3-1-5
		'0x06'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x7f	
		'0x07'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x7f	
		'0x08'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x7f	
		'0x09'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f Radius :0x00 ~ 0x3f	3-1-6
		'0x0a'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f Radius :0x00 ~ 0x3f	
		'0x0b'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f Radius :0x00 ~ 0x3f	
		'0x0c'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f Radius :0x00 ~ 0x3f	
		'0x0d'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f a :240/2 b :128/2	3-1-7
		'0x0e'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f a :240/2 b :128/2	
		'0x0f'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f a :240/2 b :128/2	
		'0x10'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x7f a :240/2 b :128/2	
'Esc'	'A'	'0x01'		Rebooting	

			Parameter		( 가 )
'Esc'	'A'	'0x02'		Reserved	
'Esc'	'A'	'0x03'		Echo "0x06" serial .	
'Esc'	'M'	'0x01'		View screen 0	
		'0x02'		View screen 1	
		'0x03'		Draw screen 0	
		'0x04'		Draw screen 1	
		'0x05'		font size 8*16 draw	<b>3-1-9</b>
		'0x06'		font size 8*12 draw	
		'0x07'		Cursor display down 8*16 font Cursor 8*8 Cursor font display .	<b>3-1-10</b>
		'0x08'		Cursor display up	
		'0x0a'	(X1,Y1,X2,Y2)	Block reverse display image start point (x1,y1), end point (x2,y2) 1byte .	
		'0x0b'		Image draw left selected	
		'0x0c'		Image draw right selected	
		'0x0d'		Image draw total selected	
'Esc'	'I'	'0x01'	(x)	Image display X=1byte (0~30) hex , 31	

3-1.

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

3-1-1. Clear

	'ESC'+ 'D'
	'0x01' or '0x02' or '0x03'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	<p>'ESC'+ 'D'+ '0x01' =&gt; Text Clear                  'ESC'+ 'D'+ '0x02' =&gt; Parameter Text Layer가 Clear                  ) Text (1, 1, 20, 6) Clear                  =&gt; 'ESC'+ 'D'+ '0x02'+ '0x01'+ '0x01'+ '0x14'+ '0x06'</p> <p>'ESC'+ 'D'+ '0x03' =&gt; Graphic Clear                  Graphic (10, 25, 200, 110) Clear                  =&gt; 'ESC'+ 'D'+ '0x03'+ '<u>0x0a</u>'+ '0x19'+ '<u>0xc8</u>'+ '0x6e'                  X1 X2</p> <p>, Text X1 X2 0x00 ~ 0x1d                  Text Y1 Y2 0x00 ~ 0x07                  , Graphic X1 X2 0x00 ~ 0xef                  Graphic Y1 Y2 0x00 ~ 0x7f                  Graphic X1 X2 1 byte(0x00~0xef)</p> <p>(Hex )</p> <p>, Text 8*16 Text X                  240/8 0x00 ~ 0x1d가 . Y                  128/16 0x00 ~ 0x07 .</p>

3-1-2. Cursor form

	'ESC'+ 'C'
	'0x0a'
Parameter	'X'
	<p>'ESC'+ 'C'+ '0x0a' =&gt; Cursor form                  x 0~7 (hex 1byte)                  0 -&gt; - 8x1                  1 -&gt; = 8x2                  2 -&gt; ≡ 8x3                  ∫                  ≡                  ≡                  ≡                  7 -&gt; ≡ 8x8</p>

Graphic	X	MMS2412K-VM
byte(Hex)		.

## 3-1-3. Graphic -

	'ESC'+ 'G'
	'0x01' or '0x02'
Parameter	'X'+ 'Y'
	'ESC'+ 'G'+ '0x01'+ 'X'+ 'Y' => (X, Y) . ) Graphic (50, 80) => 'ESC'+ 'G'+ '0x01'+ '0x32'+ '0x50' X (Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f

## 3-1-4. Graphic - Line

	'ESC'+ 'G'
	'0x03' or '0x04'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'G'+ '0x03'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line . ) Graphic (0, 10, 210, 120) Line => 'ESC'+ 'G'+ '0x03'+ '0x00'+ '0x0a'+ '0xd2'+ '0x78' X1 X2 (Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f

## 3-1-5. Graphic - Rectangle

	'ESC'+ 'G'
	'0x05' or '0x06' or '0x07' or '0x08'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle . ) Graphic (10, 10, 100, 100) Rectangle => 'ESC'+ 'G'+ '0x05'+ '0x0a'+ '0x0a'+ '0x64'+ '0x64' X1 X2 (Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f



**3-1-6. Graphic** -

	'ESC'+ 'G'
	'0x09' or '0x0a' or '0x0b' or '0x0c'
<b>Parameter</b>	'X'+ 'Y'+ radius
	<pre>'ESC'+ 'G'+ '0x09'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius' ) Graphic (100, 100) radius = 50 =&gt; 'ESC'+ 'G'+ '0x09'+ '0x64'+ '0x64'+ '0x32'</pre> <p style="text-align: center;">X</p> <p>(Graphic) : X      0x00 ~ 0xef, Y      0x00 ~ 0x7f</p> <p>radius      '0x01' ~ '0x3f'</p>

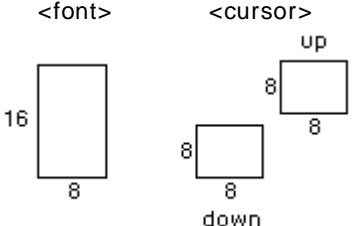
**3-1-7. Graphic** -

	'ESC'+ 'G'
	'0x0d' or '0x0e' or '0x0f' or '0x10'
<b>Parameter</b>	'X'+ 'Y'+ 'a'+ 'b'
	<pre>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b' =&gt; (X,Y) 가 'a', 'b' ) Graphic (120,63) 'a'= 50, 'b'= 20 =&gt; 'ESC'+ 'G'+ '0x0d'+ '0x78'+ '0x3f'+ '0x32'+ '0x14'</pre> <p style="text-align: center;">X</p> <p>(Graphic) : X      0x00 ~ 0xef, Y      0x00 ~ 0x7f</p> <p>'a'      '0x01' ~ '0x3f', 'b'      '0x01 ~ 0x77'</p>

**3-1-8. font size draw**

	'ESC'+ 'M'
	'0x05' or '0x06'
<b>Parameter</b>	
	<pre>'ESC'+ 'C'+ '0x05' =&gt; font size 8*16 draw</pre> <div style="text-align: center;">  </div> <pre>'ESC'+ 'C'+ '0x06' =&gt; font size 8*13 draw</pre> <div style="text-align: center;">  </div>

## 3-1-9. Cursor display

	'ESC' + 'M'
	'0x07' or '0x08'
<b>Parameter</b>	
	<p>'ESC' + 'C' + '0x07' =&gt; Cursor display down  Cursor font display</p> <p>'ESC' + 'C' + '0x08' =&gt; Cursor display up  Cursor font display</p>  <p style="text-align: center;">8*16 font                      Cursor 8*8</p>

[ 1.] MMS2412K-VM

Special Font

< 1- 1 > MMS2412K-VM (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.		PM.	Tel.
0x10	I	II	III	IV	V	VI	VII	VIII	IX	X	μ	m	d	l	k	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	μg
0x30	mg	kg	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/s	rad/s <sup>2</sup>	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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