

LCD Controller Manual

MMS2412KC Version 1.01

3 48-6

110002

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[1] MMS2412KC

Special Font

1. MMS2412KC

◆ MMS2412KC

- ◆ LCD Resolution : FSTN Mono 240*128 dots
- ◆ : ,
- ◆ : (GB2132-80)
- ◆ LCD Back Light : Inverter On/Off 가 (CCFL Backlight)
- ◆ Font : 16*16 dots
(GB2312-80) 16*16 dots
8*16 dots
16*16 dots

◆ MMS2412KC

- ◆ CPU : 16Bit micro controller
- ◆ Display Type : FSTN Mono 240*128 dots
- ◆ : DC 5[V]
- ◆ : RS-232C 9600, 19200, 57600,115200 [bps]
Default 57600 [bps]

◆ MMS2412KC

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

2. MMS2412KC Connector

2 MMS2412KC Dimensions Connector

2-1. Backlight Power Connector : J3

Pin Number	Symbol	Description
1		LED VCC
2		NC
3		GND

2-2. RS-232C Connector : CN2

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

2-3. Power Connector : CN1

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

2-4. Parallel Interface : CN3

Pin Number	Symbol	Description
1	OPEN	OPEN
2	OPEN	OPEN
3	OPEN	OPEN
4	RST	Reset (High 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

2-5. RS232C Baudrate select

	J1 - 1	J1 - 2
9600	SHORT	OPEN
19200	OPEN	SHORT
57600	SHORT	SHORT
115200	OPEN	OPEN

3.

'Esc' = 0x1b [hex]

			Parameter		
'Esc'	'K'	'0x01'		3-1-0	
		'0x02'			KS5601
'Esc'	'J'	'0x01'		3-1-1	
'Esc'	'E'	'0x01'		3-1-2	
		'0x02'			
'Esc'	'P'	'0x01'		Text Layer ON	3-1-3
		'0x02'		Text Layer ON	
		'0x03'		Text Layer ON	
		'0x04'		Text Layer OFF	3-1-4
		'0x05'		Text Layer Font ON	3-1-5
		'0x06'		Text Layer Font 가 ON	
		'0x07'		Text Layer Font ON	
		'0x08'		Text Layer Font OFF	
		'0x09'		Reserved	
		'0x0a'		Reserved	
		'0x0b'		Reserved	
		'0x0c'		Reserved	
		'0x0d'		Text Layer ON	3-1-7
		'0x0e'		Text Layer OFF	
		'Esc'	'D'	'0x01'	
'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
		'0x06'	(X,Y)	Text Layer X,Y cursor (X,Y hex 가 :0x00 ~ 0xef :0x00 ~ 0x7f)	
'Esc'	'L'	'0x01'		CCFL Power ON	3-1-10
		'0x02'		CCFL Power OFF	
'Esc'	'S'			Serial Baud rate MMS2412KC Rebooting	3-1-11
'Esc'	'G'	'0x01'	(X,Y)	Graphic _____ X:0x000 ~ 0xef Y:0x00 ~ 0x7e	3-1-12
		'0x02'	(X,Y)	Graphic _____ X:0x000 ~ 0x13f Y:0x00 ~ 0xEf	
		'0x03'	(X1,Y1,X2,Y2)	Graphic _____ Line X1,X2:0x000 ~ 0x13f Y1,Y2:0x00 ~ 0xEf	3-1-13

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

3-1.

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

Graphic X MMS2412KC byte(Hex)

3-1-0.

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

3-1-1.

	'ESC'+ 'J'
	'0x01'
Parameter	
	'ESC'+ 'J'+ '0x01' [2] 1byte 'ESC'+ 'J'+ '0x01'+ '0x86' 中 가 display

3-1-2.

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

3-1-3. Text Layer

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

3-1-4. Text Layer ON/OFF

	'ESC'+ 'P'
	'0x03' or '0x04'
Parameter	
	'ESC'+ 'P'+ '0x03' => Text Layer ON 'ESC'+ 'P'+ '0x04' => Text Layer OFF

3-1-5. Text Layer

	'ESC'+ 'P'
	'0x04' or '0x05' or '0x06' or '0x07'
Parameter	
	'ESC'+ 'P'+ '0x04' => Text Layer Font 8*16 dots => 16*32 dots 16*16 dots => 32*32 dots 'ESC'+ 'P'+ '0x05' => Text Layer Font 가 8*16 dots => 16*16 dots 16*16 dots => 32*16 dots 'ESC'+ 'P'+ '0x06' => Text Layer Font 8*16 dots => 8*32 dots 16*16 dots => 16*32 dots 'ESC'+ 'P'+ '0x07' => Text Layer Font OFF

3-1-6. Serial Baud Rate

	J5 Header pin												
Parameter													
	MMS2412KC J5 Header pin .(default:57600)												
	<table border="0"> <tr> <td>NO.1 [115200]</td> <td>NO.2 [19200]</td> </tr> <tr> <td>1번 </td> <td>1번 </td> </tr> <tr> <td>2번 </td> <td>2번 </td> </tr> <tr> <td>NO.3 [57600]</td> <td>NO.4 [9600]</td> </tr> <tr> <td>1번 </td> <td>1번 </td> </tr> <tr> <td>2번 </td> <td>2번 </td> </tr> </table>	NO.1 [115200]	NO.2 [19200]	1번 	1번 	2번 	2번 	NO.3 [57600]	NO.4 [9600]	1번 	1번 	2번 	2번 
NO.1 [115200]	NO.2 [19200]												
1번 	1번 												
2번 	2번 												
NO.3 [57600]	NO.4 [9600]												
1번 	1번 												
2번 	2번 												

3-1-7. Text Layer ON/OFF

	'ESC'+ 'P'
	'0x0d' or '0xe'
Parameter	
	'ESC'+ 'P'+ '0x0d' => Text Layer ON 'ESC'+ 'P'+ '0x0e' => Text Layer OFF

3-1-8. Text Layer Clear

	'ESC'+ 'D'
	'0x01' or '0x02' or '0x03'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'

'ESC'+ 'D'+ '0x01'	=> Text Layer	Clear
Text Layer	(5, 0, 20, 11)	Clear
=>	'ESC'+ 'D'+ '0x02'+ '0x05'+ '0x00'+ '0x14'+ '0x0b'	
'ESC'+ 'D'+ '0x03'	=> Graphic Layer	Clear
Graphic Layer	(10, 25, 200, 110)	Clear
=>	'ESC'+ 'D'+ '0x03'+ '0x0a'+ '0x19'+ '0xc8'+ '0x6e'	
Graphic Layer		Clear
	X1 X2	
, Text Layer	X1 X2	0x00 ~ 0x1d
Text Layer	Y1 Y2	0x00 ~ 0x07
, Graphic	X1 X2	0x00 ~ 0xef
Graphic	Y1 Y2	0x00 ~ 0x7f
Graphic	X1 X2	1 byte(0x00~0xef)
(Hex)		
, Text Layer		8*16
Text Layer	X	240/8
0x00 ~ 0x1d	. Y	128/16
0x00 ~ 0x07	.	

3-1-9. Text Layer Cursor

	'ESC'+ 'C'
	'0x01' or '0x06'
Parameter	'X'+ 'Y'
	'ESC'+ 'C'+ '0x01'+ 'X'+ 'Y' => Text Layer (X, Y) Cursor
	'ESC'+ 'C'+ '0x02'+ 'X'+ 'Y' => Text Layer (X, Y) Cursor
	(Text Layer) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f

3-1-10. CCFL Power ON/OFF

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

3-1-11. MMS2412KC Rebooting

	'ESC'+ 'S'
Parameter	
	'ESC'+ 'S' => MMS2412KC Rebooting
	Serial Baud Rate
Baud Rate	Default 57,600[bps]
MMS2412KC	LCD 20

3-1-12. Graphic /

	'ESC'+ 'G'
	'0x01' or '0x02'
Parameter	'X'+ 'Y'
	<p>'ESC'+ 'G'+ '0x01'+ 'X'+ 'Y' => (X, Y) .) Graphic (50, 80) => 'ESC'+ 'G'+ '0x01'+ '<u>0x32</u>'+'0x50'</p> <p>'ESC'+ 'G'+ '0x02'+ 'X'+ 'Y' => (X, Y) .) Graphic Layer (50, 80) => 'ESC'+ 'G'+ '0x02'+ '<u>0x32</u>'+'0x50'</p> <p style="text-align: center;">X</p> <p>(Graphic Layer) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f</p>

3-1-13. Graphic Line /

	'ESC'+ 'G'
	'0x03' or '0x04'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	<p>'ESC'+ 'G'+ '0x03'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line .) Graphic (0, 10, 210, 120) Line => 'ESC'+ 'G'+ '0x03'+ '<u>0x00</u>'+'0x0a'+ '<u>0xd2</u>'+'0x78'</p> <p>'ESC'+ 'G'+ '0x04'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line .) Graphic (0, 10, 210, 120) Line => 'ESC'+ 'G'+ '0x04'+ '<u>0x00</u>'+'0x0a'+ '<u>0xd2</u>'+'0x78'</p> <p style="text-align: center;">X1, X2</p> <p>(Graphic Layer) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f</p>

3-1-14. Graphic / Rectangle /

	'ESC'+ 'G'
	'0x05' or '0x06' or '0x07' or '0x08'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	<p>'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle => 'ESC'+ 'G'+ '0x05'+ '<u>0x0a</u>'+'0x0a'+ '<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x06'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle => 'ESC'+ 'G'+ '0x06'+ '<u>0x0a</u>'+'0x0a'+ '<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x07'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle => 'ESC'+ 'G'+ '0x07'+ '<u>0x0a</u>'+'0x0a'+ '<u>0x64</u>'+'0x64'</p> <p>'ESC'+ 'G'+ '0x08'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle => 'ESC'+ 'G'+ '0x08'+ '<u>0x0a</u>'+'0x0a'+ '<u>0x64</u>'+'0x64'</p> <p style="text-align: center;">X1, X2</p> <p>(Graphic Layer) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f</p>

3-1-15. Graphic / /

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

3-1-16. Graphic / /

	'ESC'+ 'G'
	'0x0d' or '0x0e' or '0x0f' or '0x10'
Parameter	'X'+ 'Y'+ 'a'+ 'b'
	<pre>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') (150, 120) 'a'= 50, 'b'= 20 => 'ESC'+ 'G'+ '0x0d'+ '0x96'+ '0x78'+ '0x32'+ '0x14'</pre> <pre>'ESC'+ 'G'+ '0x0e'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') (150, 120) 'a'= 50, 'b'= 20 => 'ESC'+ 'G'+ '0x0e'+ '0x96'+ '0x78'+ '0x32'+ '0x14'</pre> <pre>'ESC'+ 'G'+ '0x0f'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') (150, 120) 'a'= 50, 'b'= 20 => 'ESC'+ 'G'+ '0x0f'+ '0x96'+ '0x78'+ '0x32'+ '0x14'</pre> <pre>'ESC'+ 'G'+ '0x10'+ 'X'+ 'Y'+ 'a'+ 'b' => (X,Y) 가 'a', 'b') (150, 120) 'a'= 50, 'b'= 20 => 'ESC'+ 'G'+ '0x10'+ '0x96'+ '0x78'+ '0x32'+ '0x14'</pre> <p style="text-align: center;">X</p> <hr/> <p style="text-align: center;">(Graphic Layer) : X 0x00 ~ 0xef, Y 0x00 ~ 0x7f</p> <hr/> <p style="text-align: center;">'a' '0x01' ~ '0x3f', 'b' '0x01' ~ 0x77'</p>

[1] MMS2412KC

Special Font

< 1- 1> MMS2412KC

(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 ² /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	㊇	㊈	㊉	㊊	㊋	㊌	㊍	㊎	㊏	㊑	㊒	㊓	㊔
0xE0	㊕	㊖	㊗	㊘	㊙	㊚	㊛	㊜	㊝	㊞	㊟	㊠	㊡	㊢	㊣	㊤
0xF0	㊥	㊦	㊧	㊨	㊩	㊪	㊫	㊬	㊭	㊮	㊯	㊰	㊱	㊲	㊳	㊴

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