

# LCD Controller Manual

## MMS2464K Version 1.50

3 48-6

110002

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1. MMS2464K

◆ MMS2464K

- ◆ LCD Resolution : Mono 240\*64 dots
- ◆ : ,
- ◆ LCD Back Light : Inverter On/Off 가
- ◆ Font : 16\*16 dots  
8\*16 dots  
16\*16 dots

◆ MMS2464K

- ◆ CPU : Atmega128
- ◆ Display Type : Mono 240\*64 dots
- ◆ : DC 5[V]
- ◆ : RS-232C 9600, 19200, 57600,115200 [bps]  
Default 57600 [bps]

◆ MMS2464K

- ◆ , : 가 2 , 2 ,  
가 2
- ◆ Graphic : , Line, Rectangle ,
- ◆ / Font
- ◆
- ◆ Cursor
- ◆ Backspace
- ◆

## 2. MMS2464K Connector

2 MMS2464K 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	SHORT
19200	SHORT	OPEN
57600	OPEN	SHORT
115200	OPEN	OPEN

## 3.

**'Esc' = 0x1b [hex]**

			Parameter		
'Esc'	'K'	'0x01'			3-1-1
		'0x02'		KS5601	
		'0x03'			
		'0x04'			
Esc'	'E'	'0x01'			3-1-2
		'0x02'			
		'0x03'			
		'0x04'			
'Esc'	'P'	'0x01'		Text OFF	3-1-3
		'0x02'		Text ON	
		'0x03'		Text ON	3-1-4
		'0x04'		Text OFF	
		'0x05'		Text Font ON	
		'0x06'		Text Font 가 ON	
		3-1-5	'0x07'		Text Font ON
			'0x08'		Text Font OFF
'Esc'	'D'	'0x01'		Text clear	3-1-6
		'0x02'	(X1,Y1,X2,Y2)	Text clear (X1,Y1,X2,Y2 hex 가 :0x00 ~ 0x1d :0x00 ~ 0x03)	
		'0x03'	(X1,Y1,X2,Y2)	Graphic clear (X1, Y1, X2, Y2 hex 가 :0x00 ~ 0xef :0x00 ~ 0x3f)	
'Esc'	'C'	'0x01'	(X,Y)	Text X,Y cursor (X,Y hex 가 :0x00 ~ 0x1d :0x00 ~ 0x03)	3-1-7
		'0x06'	(X,Y)	Graphic X,Y cursor (X,Y hex 가 :0x00 ~ 0xef :0x00 ~ 0x3f)	
'Esc'	'L'	'0x01'		Back Light Power ON	3-1-8
		'0x02'		Back Light Power OFF	
'Esc'	'G'	'0x01'	(X,Y)	Graphic X:0x00 ~ 0xef Y:0x00 ~ 0x3f	3-1-9
		'0x02'	(X,Y)	Graphic X:0x00 ~ 0xef Y:0x00 ~ 0x3f	
		'0x03'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f	3-1-10
		'0x04'	(X1,Y1,X2,Y2)	Graphic <u>Line</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f	

			Parameter			
		'0x05'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f	3-1-11	
		'0x06'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f		
		'0x07'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f		
		'0x08'	(X1,Y1,X2,Y2)	Graphic <u>Rectangle</u> X1,X2:0x00 ~ 0xef Y1,Y2:0x00 ~ 0x3f		
		'0x09'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f Radius :0x01 ~ 0x20		3-1-12
		'0x0a'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f Radius :0x01 ~ 0x20		
		'0x0b'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f Radius :0x01 ~ 0x20		
		'0x0c'	(X,Y,radius)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f Radius :0x01 ~ 0x20		
		'0x0d'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f a :240/2 b :64/2	3-1-13	
		'0x0e'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f a :240/2 b :64/2		
		'0x0f'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f a :240/2 b :64/2		
		'0x10'	(X,Y,a,b)	Graphic X Y X:0x00 ~ 0xef Y:0x00 ~ 0x3f a :240/2 b :64/2		
'Esc'	'I'	'0x01'	(X)	Image One page draw (X 0x00~0x5d)		

## 3-1.

Parameter                    '+'  
 \_\_\_\_\_ .  
'Esc' = 0x1b (Hex)

Graphic                    X                    MMS2464K                    byte(Hex)  
 \_\_\_\_\_

## 3-1-1.

	'ESC'+ 'K'
	'0x01' or '0x02' or '0x03' or '0x04'
<b>Parameter</b>	
	'ESC'+ 'K'+ '0x01' => 'ESC'+ 'K'+ '0x02' =>                    KS5601 'ESC'+ 'K'+ '0x03' => 'ESC'+ 'K'+ '0x04' =>

## 3-1-2.

	'ESC'+ 'E'
	'0x01' or '0x02' or '0x03' or '0x04'
<b>Parameter</b>	
	'ESC'+ 'E'+ '0x01' =>                    ASCII 256 'ESC'+ 'E'+ '0x02' => 'ESC'+ 'K'+ '0x03' => 'ESC'+ 'K'+ '0x04' =>

## 3-1-3. Text

	'ESC'+ 'P'
	'0x01' or '0x02'
<b>Parameter</b>	
	'ESC'+ 'P'+ '0x01' => Text 'ESC'+ 'P'+ '0x02' => Text

## 3-1-4. Text                    ON/OFF

	'ESC'+ 'P'
	'0x03' or '0x04'
<b>Parameter</b>	
	'ESC'+ 'P'+ '0x03' => Text                    ON 'ESC'+ 'P'+ '0x04' => Text                    OFF





**3-1-8. Back Light Power ON/OFF**

	'ESC'+ 'L'
	'0x01' or '0x02'
<b>Parameter</b>	
	'ESC'+ 'L'+ '0x01' => Back Light Power ON 'ESC'+ 'L'+ '0x02' => Back Light Power OFF

**3-1-9. Graphic /**

	'ESC'+ 'G'
	'0x01' or '0x02'
<b>Parameter</b>	'X'+ 'Y'
	'ESC'+ 'G'+ '0x01'+ 'X'+ 'Y' => (X, Y) . ) Graphic (50, 80) => 'ESC'+ 'G'+ '0x01'+ ' <u>0x32</u> '+'0x50' 'ESC'+ 'G'+ '0x02'+ 'X'+ 'Y' => (X, Y) . ) Graphic (50, 80) => 'ESC'+ 'G'+ '0x02'+ ' <u>0x32</u> '+'0x50' X (Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x3f

**3-1-10. Graphic Line /**

	'ESC'+ 'G'
	'0x03' or '0x04'
<b>Parameter</b>	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'G'+ '0x03'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line . ) Graphic (0, 10, 210, 60) Line => 'ESC'+ 'G'+ '0x03'+ ' <u>0x00</u> '+'0x0a'+ ' <u>0xd2</u> '+'0x3c' 'ESC'+ 'G'+ '0x04'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Line . ) Graphic (0, 10, 210, 60) Line => 'ESC'+ 'G'+ '0x04'+ ' <u>0x00</u> '+'0x0a'+ ' <u>0xd2</u> '+'0x3c' X1, X2 (Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x3f

**3-1-11. Graphic / Rectangle /**

	'ESC'+ 'G'
	'0x05' or '0x06' or '0x07' or '0x08'
<b>Parameter</b>	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	<pre>'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle    ) Graphic (10, 10, 100, 60)      Rectangle =&gt; 'ESC'+ 'G'+ '0x05'+ '0x0a'+ '0x0a'+ '0x64'+ '0x3c' 'ESC'+ 'G'+ '0x06'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle    ) Graphic (10, 10, 100, 60)      Rectangle =&gt; 'ESC'+ 'G'+ '0x06'+ '0x0a'+ '0x0a'+ '0x64'+ '0x3c' 'ESC'+ 'G'+ '0x07'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle    ) Graphic (10, 10, 100, 60)      Rectangle =&gt; 'ESC'+ 'G'+ '0x07'+ '0x0a'+ '0x0a'+ '0x64'+ '0x3c' 'ESC'+ 'G'+ '0x08'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' =&gt; (X1,Y1,X2,Y2)      Rectangle    ) Graphic (10, 10, 100, 60)      Rectangle =&gt; 'ESC'+ 'G'+ '0x08'+ '0x0a'+ '0x0a'+ '0x64'+ '0x3c'</pre> <p style="text-align: center;"><b>X1, X2</b></p> <p style="text-align: center;">(Graphic) : X      0x00 ~ 0xef, Y      0x00 ~ 0x3f</p>

**3-1-12. Graphic / /**

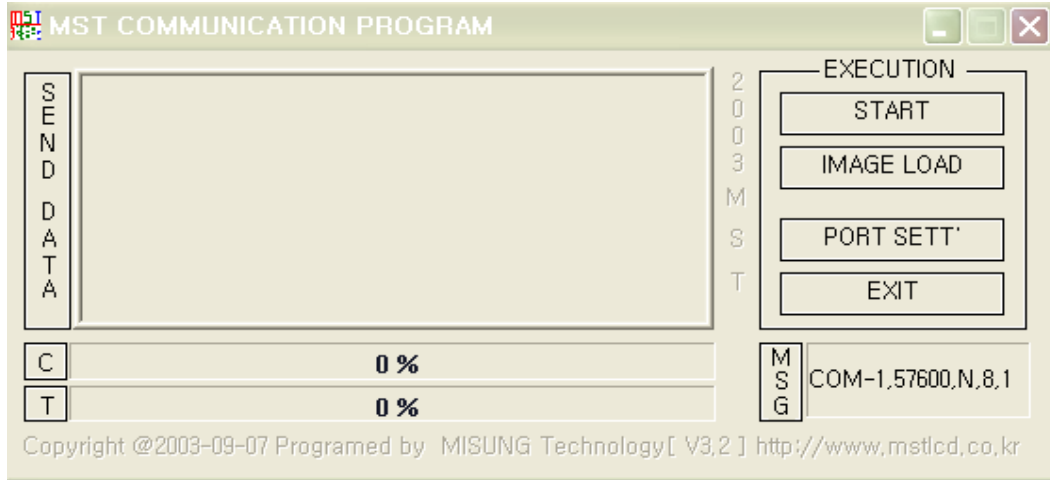
	'ESC'+ 'G'
	'0x09' or '0x0a' or '0x0b' or '0x0c'
<b>Parameter</b>	'X'+ 'Y'+ radius
	<pre>'ESC'+ 'G'+ '0x09'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius'    ) Graphic (100, 32) radius = 10 =&gt; 'ESC'+ 'G'+ '0x09'+ '0x64'+ '0x20'+ '0x0a' 'ESC'+ 'G'+ '0x0a'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius'    ) Graphic (100, 32) radius = 10 =&gt; 'ESC'+ 'G'+ '0x0a'+ '0x64'+ '0x20'+ '0x0a' 'ESC'+ 'G'+ '0x0b'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius'    ) Graphic (100, 32) radius = 10 =&gt; 'ESC'+ 'G'+ '0x0b'+ '0x64'+ '0x20'+ '0x0a' 'ESC'+ 'G'+ '0x0c'+ 'X'+ 'Y'+ 'radius' =&gt; (X,Y) 'radius'    ) Graphic (100, 32) radius = 10 =&gt; 'ESC'+ 'G'+ '0x0c'+ '0x64'+ '0x20'+ '0x0a'</pre> <p style="text-align: center;"><b>X</b></p> <p style="text-align: center;">(Graphic) : X      0x00 ~ 0xef, Y      0x00 ~ 0x3f</p> <p style="text-align: center;">radius      '0x01' ~ '0x20'</p>

3-1-13. Graphic / /

	'ESC'+ 'G'
	'0x0d' or '0x0e' or '0x0f' or '0x10'
<b>Parameter</b>	'X'+ 'Y'+ 'a'+ 'b'
	<p>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가 'a', 'b'</p> <p>) (100, 32) 'a'= 10, 'b'= 5</p> <p>=&gt; 'ESC'+ 'G'+ '0x0d'+ '<u>0x64</u>'+'0x20'+ '0x0a'+ '0x05'</p> <p>'ESC'+ 'G'+ '0x0e'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가 'a', 'b'</p> <p>) (100, 32) 'a'= 10, 'b'= 5</p> <p>=&gt; 'ESC'+ 'G'+ '0x0e'+ '<u>0x64</u>'+'0x20'+ '0x0a'+ '0x05'</p> <p>'ESC'+ 'G'+ '0x0f'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가 'a', 'b'</p> <p>) (100, 32) 'a'= 10, 'b'= 5</p> <p>=&gt; 'ESC'+ 'G'+ '0x0f'+ '<u>0x64</u>'+'0x20'+ '0x0a'+ '0x05'</p> <p>'ESC'+ 'G'+ '0x10'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=&gt; (X,Y) 가 'a', 'b'</p> <p>) (100, 32) 'a'= 10, 'b'= 5</p> <p>=&gt; 'ESC'+ 'G'+ '0x10'+ '<u>0x64</u>'+'0x20'+ '0x0a'+ '0x05'</p> <p style="text-align: center;">X</p> <hr/> <p>(Graphic) : X 0x00 ~ 0xef, Y 0x00 ~ 0x3f</p> <p>'a' 0x01 ~ '0x20', 'b' 0x01 ~ 0x77'</p>

#### 4. MMS3224K Image Overwrite

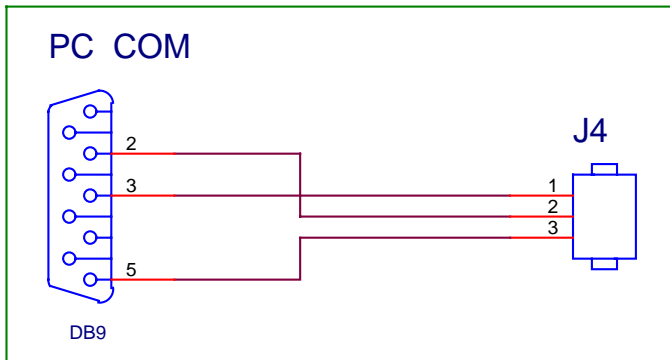
#### Image Overwrite Application Program



Overwrite Application Program

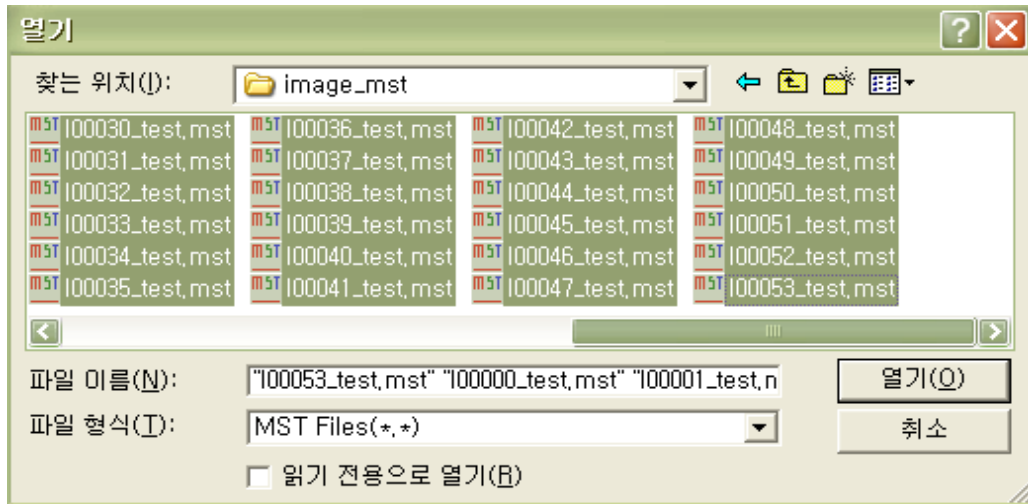
MMS3224K Image display  
Image page Overwrite

#### MMS3224K PC Serial Cable

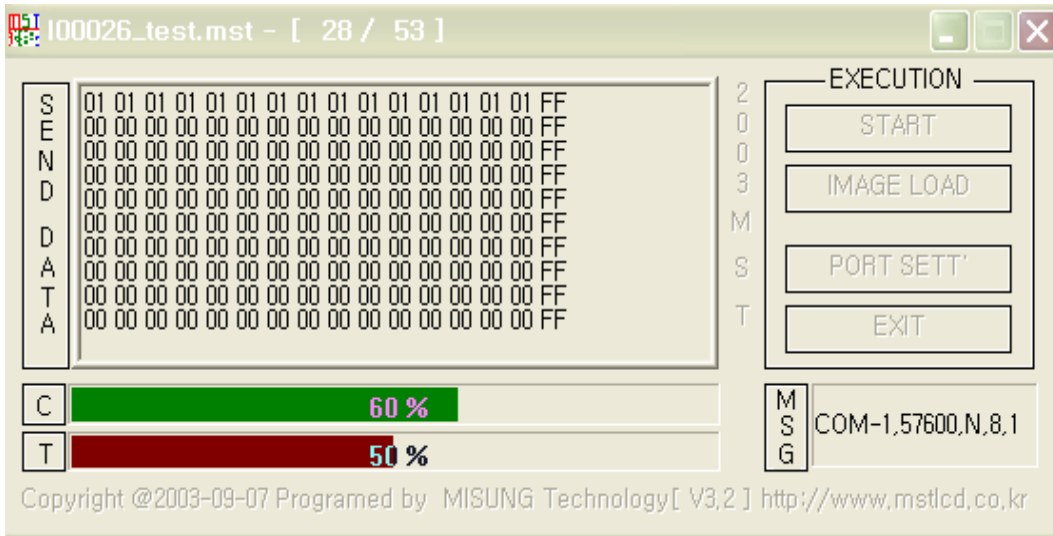


'IMAGE LOAD'

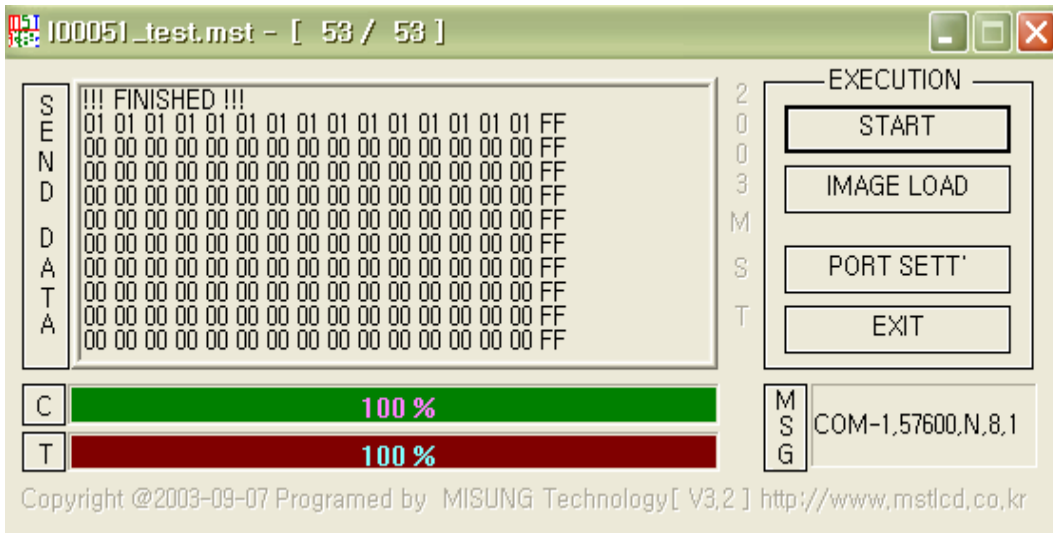
image



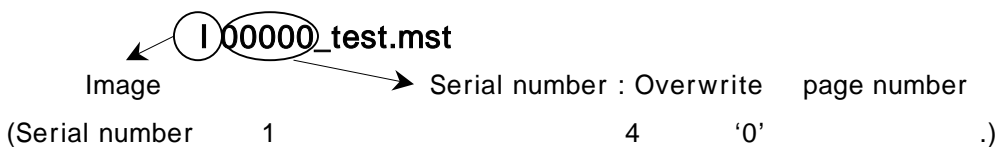
, 'START' MMS3224K Overwrite



Bar Bar Download  
 , Bar  
 Bar 가 '100%' Image Overwrite



'IMAGE LOAD' Image



Ex) 1 page Overwrite file I00001\_test.mst

[ 1 ] MMS2464K

Special Font

< 1- 1> MMS2464K (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 <sup>g</sup>	k <sup>g</sup>	kt	cal	kcal	dB	m/s	m/s <sup>2</sup>	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/s	rad/s <sup>2</sup>	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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