

LCD Controller Manual

MSMF240128-1 Version 1.0



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

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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
- ◆

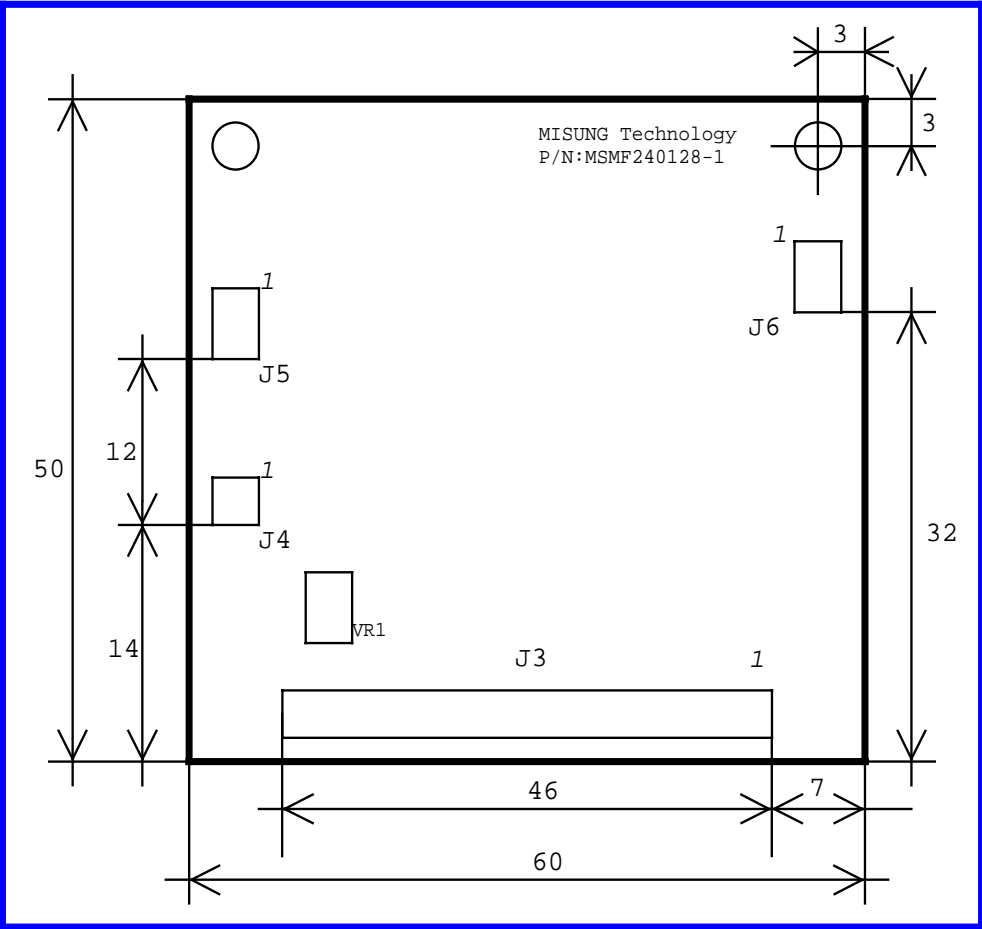
2. MSMF240128-1 Connector

2 MSMF240128-1 Dimensions Connector

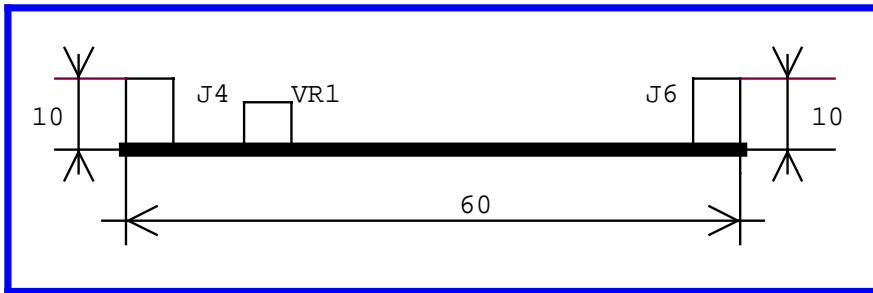
MSMF240128-1



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'		KS5601	3-1-1	
		'0x02'				
'Esc'	'E'	'0x01'			3-1-2	
		'0x02'				
'Esc'	'P'	'0x01'		Text Layer OFF	3-1-3	
		'0x02'		Text Layer ON		
		'0x04'		Text Layer ON		
		'0x05'		Text Layer OFF	3-1-4	
		'0x06'		Text Layer Font ON		
		'0x07'		Text Layer Font 가	ON	3-1-5
		'0x08'		Text Layer Font	ON	
		'0x09'		Text Layer Font	OFF	
		'0x0a'		Serial baud rate 4800 [bps]	3-1-6	
		'0x0b'		Serial baud rate 9600 [bps]		
		'0x0c'		Serial baud rate 19200 [bps]		
		'0x0d'		Serial baud rate 57600 [bps]		
		'0x0e'		Text Layer ON	3-1-7	
		'0x0f'		Text Layer OFF		
		'Esc'	'D'	'0x01'		Text Layer clear
'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	
		'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

3-1-4. Text Layer ON/OFF

	'ESC'+ 'P'			
	'0x03' or '0x04'			
Parameter				
	'ESC'+ 'P'	'0x03'	Text Layer	ON
		'0x04'	OFF	
	'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	Display Font
	(가 ,)	.		
		'0x05'	가	.
		, '0x06'		, '0x07'
		OFF		
	'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

	'ESC'+ 'P'			
	'0x09' or '0x0a' or '0x0b' or '0x0c'			
Parameter				
	'ESC'+ 'P'	'0x09'	Baud Rate	4800[bps]
		'0x0a'	9600[bps]	'0x0b'
	19200[bps]	'0x0c'	57600[bps]	
	'ESC'+ 'P'+ '0x09' => Serial Baud Rate 4800[bps]			
	'ESC'+ 'P'+ '0x0a' => Serial Baud Rate 9600[bps]			
	'ESC'+ 'P'+ '0x0b' => Serial Baud Rate 19200[bps]			
	'ESC'+ 'P'+ '0x0c' => Serial Baud Rate 57600[bps]			

3-1-7. Text Layer ON/OFF

	'ESC'+ 'P'
	'0x0d' or '0xe'
Parameter	
	'ESC'+ 'P' '0x0d' Text Layer , '0x0e' Text Layer 가 OFF .
	'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 , '0x02' Parameter Text Layer가 Clear . '0x03' Parameter Graphic Clear . , Text Layer X1 X2 0x00 0x1d Text Layer Y1 Y2 0x00 0x07 , Graphic X1 X2 0x00 0xef Graphic Y1 Y2 0x00 0x7f <u>Graphic X1 X2 1 byte(0x00 0xef)</u> (Hex) , Text Layer 8*16 . Text Layer X 240/8 0x00 0x1d 가 Y 128/16 0x00 0x07 .
	'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

3-1-9. Text Layer Cursor

	'ESC'+ 'C'
	'0x01'
Parameter	'X'+ 'Y'

	'ESC'+ 'C' '0x01'	Parameter	Cursor
	가 . Text Layer	X	0x00 0x1d
	, Y 0x00 0x07		
	'ESC'+ 'C'+ '0x01'+ 'X'+ 'Y' => Text Layer (X, Y)		Cursor

3-1-10. CCFL Power ON/OFF

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

3-1-11. MSMF240128-1 Rebooting

	'ESC'+ 'S'		
Parameter			
	'ESC'+ 'S'	MSMF240128-1	Rebooting
		Serial Baud Rate	. Baud
	Rate Default	57,600[bps]	.
	MSMF240128-1	LCD	20[]
	'ESC'+ 'S' => MSMF240128-1 Rebooting		

3-1-12. Graphic

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

3-1-13. Graphic Line /

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

3-1-14. Graphic / Rectangle /

	'ESC'+ 'G'
	'0x05' or '0x06' or '0x07' or '0x08'
Parameter	'X1'+ 'Y1'+ 'X2'+ 'Y2'
	'ESC'+ 'G' '0x05'가 Parameter Graphic Rectangle . '0x06' Parameter Graphic Rectangle . , '0x07' Parameter Graphic Rectangle . '0x08' Parameter Graphic Rectangle . _____ Graphic X _____ 0x00 0xef , Y _____ 0x00 0x7f .

<pre>'ESC'+ 'G'+ '0x05'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Line => 'ESC'+ 'G'+ '0x05'+ '0x0a'+ '0x64'+ '0x64'</pre> <pre>'ESC'+ 'G'+ '0x06'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle . => 'ESC'+ 'G'+ '0x06'+ '0x0a'+ '0x64'+ '0x64'</pre> <pre>'ESC'+ 'G'+ '0x07'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle . => 'ESC'+ 'G'+ '0x07'+ '0x0a'+ '0x64'+ '0x64'</pre> <pre>'ESC'+ 'G'+ '0x08'+ 'X1'+ 'Y1'+ 'X2'+ 'Y2' => (X1,Y1,X2,Y2) Rectangle .) Graphic (10, 10, 100, 100) Rectangle . => 'ESC'+ 'G'+ '0x08'+ '0x0a'+ '0x64'+ '0x64'</pre> <p style="text-align: center;">X1, X2</p>
--

3-1-15. Graphic / /

	'ESC'+ 'G'
	'0x09' or '0x0a' or '0x0b' or '0x0c'
Parameter	'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' => (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>

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> <hr/> <p> Graphic Layer X 0x00 0xef , Y</p> <hr/> <p> 0x00 0x7f 'a' '0x01' '0x3f' , 'b'</p> <hr/> <p>'0x01 0x77'</p>
	<p>'ESC'+ 'G'+ '0x0d'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=> (X,Y) 가 'a' , 'b'</p> <p>) Graphic (150, 120) 'a'= 50, 'b'= 20</p> <p> => 'ESC'+ 'G'+ '0x0d'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0e'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=> (X,Y) 가 'a' , 'b'</p> <p>) Graphic (150, 120) 'a'= 50, 'b'= 20</p> <p> => 'ESC'+ 'G'+ '0x0e'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x0f'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=> (X,Y) 가 'a' , 'b'</p> <p>) Graphic (150, 120) 'a'= 50, 'b'= 20</p> <p> => 'ESC'+ 'G'+ '0x0f'+ '<u>0x96</u>'+'0x78'+ '0x32'+ '0x14'</p> <p>'ESC'+ 'G'+ '0x10'+ 'X'+ 'Y'+ 'a'+ 'b'</p> <p>=> (X,Y) 가 'a' , 'b'</p> <p>) Graphic (150, 120) 'a'= 50, 'b'= 20</p> <p> => '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 ³	cm ³	m ³	km ³	fm	nm	μm	mm	cm	km	mm ²	cm ²	m ²	km ²	ha	ℓg
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	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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가 1 5-60 3

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