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# Specification

## MCOB21605GX-EBP



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## Midas Displays OLED Part Number System

**MCO**    **B**    **21605**    **A**    **\***    **V**    **-**    **E**    **W**    **I**    **\***  
**1**    **2**    **3**    **4**    **5**    **6**       **7**    **8**    **9**    **10**

- 1 = **MCO:** Midas Displays OLED
- 2 = **Blank:** **B:** COB (Chip on Board)    **T:** TAB (Taped Automated Bonding)
- 3 = **No of dots:** (e.g. 240064 = 240 x 64 dots)    (e.g. 21605 = 2 x 16 5mm C.H.)
- 4 = **Series** A to Z
- 5 = **Series Variant:** A to Z and 1 to 9 – **see addendum**
- 6 = **Operating Temp Range:** **B:** -40+70° C    **V:** -40+80° C    **Y:** -40 +70° C    **Z:** -30+70° C
- 7 = **Character Set:** **Blank:** Not Applicable  
E: Multi European Font Set (English/Japanese – Western European (K) – Cyrillic (R))
- 8 = **Colour:** **Y:** Yellow    **W:** White    **B:** Blue    **R:** Red    **G:** Green    **RGB:** Full Colour
- 9 = **Interface:** **P:** Parallel    **I:** I<sup>2</sup>C    **S:** SPI    **M:** Multi
- 10 = **Voltage Variant:** e.g. 3 = 3v

## Functions and Features

- 2 lines x 16 characters
- Built-in controller
- Parallel or serial MPU interface (Default 6800 MPU parallel)
- +2.8V ~ +5.3V Power Supply
- viewing angle “Free”
- Wide Temperature -40°C ~ +80°C (Operating)
- Sunlight Readable Technology
- RoHS compliant

## Mechanical Specification

Item	Description	
Product No.	ΑΠΡΟΤΥΠΟ	
Viewing Area	58.22(W)×13.52(H)	mm
Module Size	80.0(W)×36.0(H)×9.1 (D)	mm
Dot Size	0.57(W)×0.67(H)	mm
Dot Pitch	0.60(W)×0.70(H)	mm
Display Format	16 characters (W)×2 lines (H)	
Duty Ratio	1/16	Duty
Controller	SSD1311 or Equivalent	
Interface	6800 (Default) 8Bit 8080 (Option) SPI (Option) I2C (Option)	



# Pin Description

Parallel Interface (default):

Pin No.	Symbol	External Connection	Description
1	VSS	Power Supply	Ground
2	VDD	Power Supply	Supply Voltage for OLED and logic
3	Vo	-	Contrast Adjustment
4	RS(D/C#)	MPU	Register select signal. H: DATA, L: Command
5	R/W# (WR#)	MPU	6800-interface:  Read/Write select signal, R/W=1: Read R/W: =0: Write  8080-interface:  Active LOW Write signal.
6	E or /RD	MPU	6800-interface:  Operation enable signal. Falling edge triggered.  8080-interface:  Active LOW Read signal.
7-14	DB0~DB7	MPU	8-bit Bi-directional data bus lines
15-16	NC	-	No Connect

## DC Characteristics

Item	Symbol	Condition	Min.	Type	Max.	Unit
Power Supply for Logic	VDD	(Wide Voltage I/O Application)	2.8	5.0	5.3	Volt
Input Voltage for I/O Pins	V <sub>i</sub>	(Wide Voltage I/O Application)	2.8	5.0	5.3	Volt
Input Voltage	V <sub>IL</sub>	L level	0	-	0.2 VDD	Volt
Input Voltage	V <sub>IH</sub>	H level	0.8 VDD	-	VDD	Volt
Output Voltage	V <sub>OL</sub>	L level	0	-	0.1 VDD	
Output Voltage	V <sub>OH</sub>	H level	0.9 VDD	-	VDD	
Power Supply Current for OLED	I <sub>DD</sub>	Note	-	30		mA
Sleep Mode Current for VDD	I <sub>DD,SLEEP</sub>			1	10	μA

Note:

VDD = 5.0V, 25% Display Area Turn on. 100 cd/m<sup>2</sup>

When random texts pattern is running, averagely, about 1/4 of pixels will be on.

## Optical Characteristics

Item	Symbol	Min.	Typ	Max.	Unit
Viewing angle range			Free		Degree
Dark Room Contrast	Cr		>10,000:1		
Brightness	Lbr		140		cd/m <sup>2</sup>
Peak Emission Wavelength	C.I.E 1931	X=0.12 Y=0.22	X=0.16 Y=0.26	X=0.20 Y=0.30	

# Electrical Absolute Ratings

Item	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply for Logic	VDD	-0.3	5.0	5.5	Volt	1,2
Input Voltage for I/O Pins	VI	-0.3	5.0	5.5	Volt	1,2
Life Time (100 cd/m <sup>2</sup> )		---	70,000	---	Hours	3

Note 1: All the above voltages are on the basis of "VSS = 0V".

Note 2: When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur.

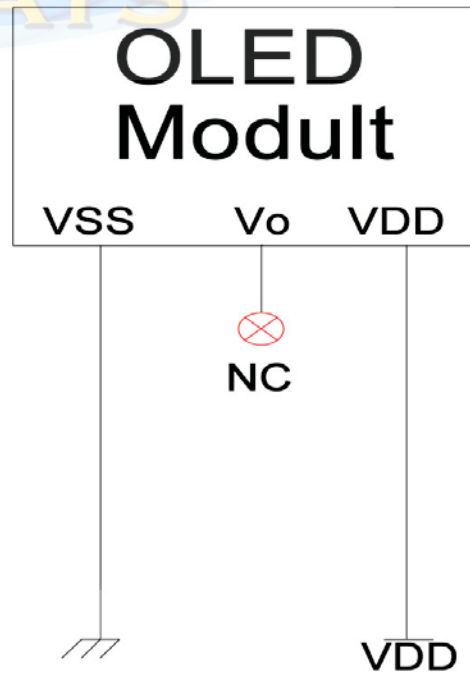
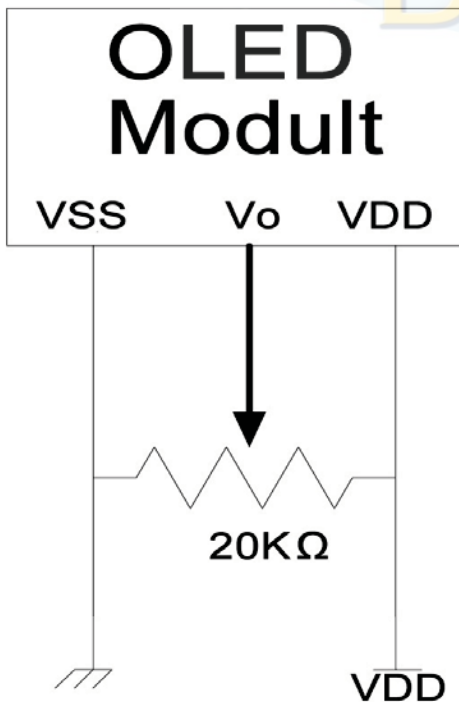
Note 3: Ta = 25°C, 25% Checkerboard.

Software configuration follows Section ACTUAL APPLICATION EXAMPLE Initialization. End of lifetime is specified as 50% of initial brightness reached. The average operating lifetime at room temperature is estimated by the accelerated operation at high temperature conditions.

## POWER SUPPLY

Adjust Brightness by Software & Hardware(VR)

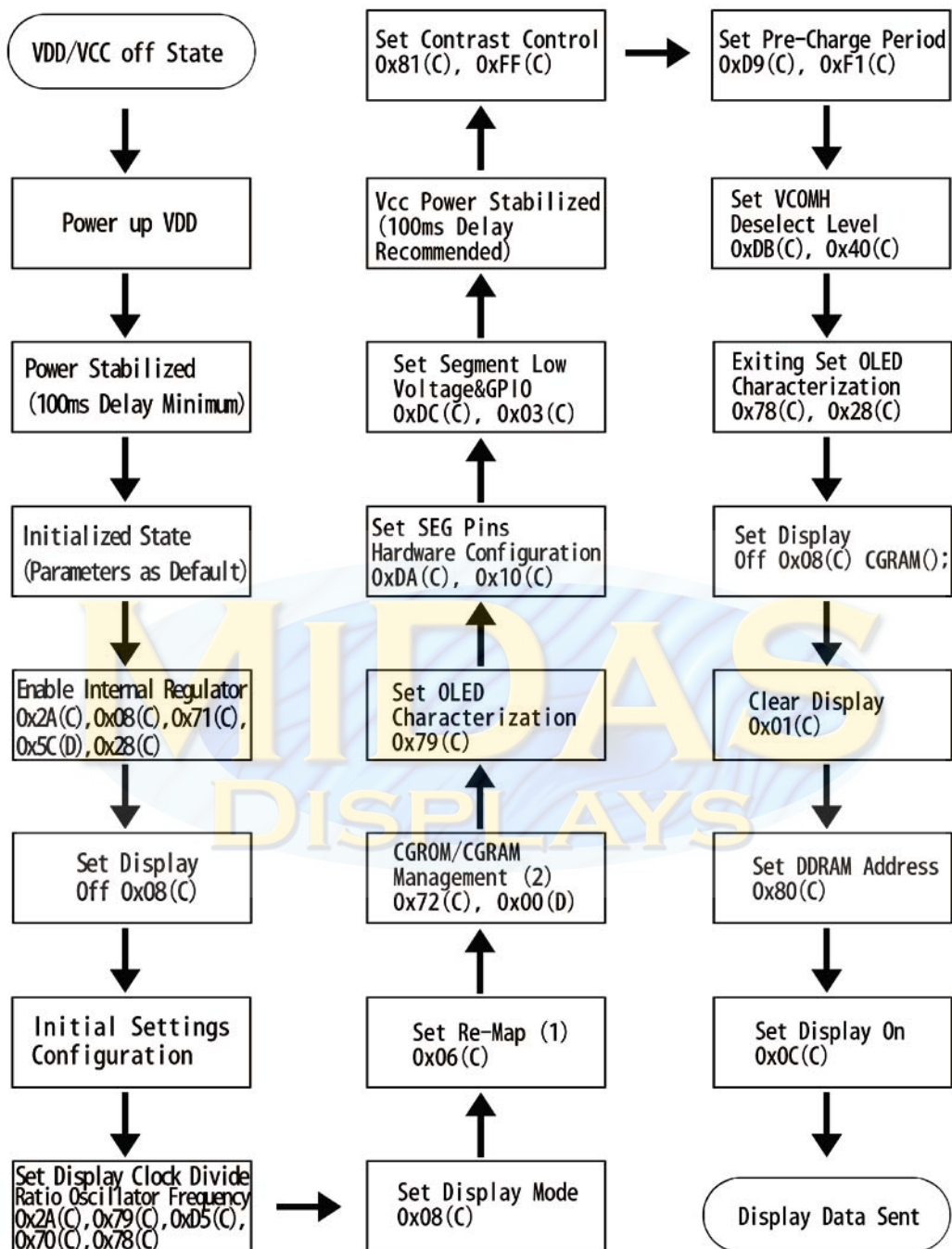
Adjust Brightness by Software(Only)





# Application

## Power up Sequence



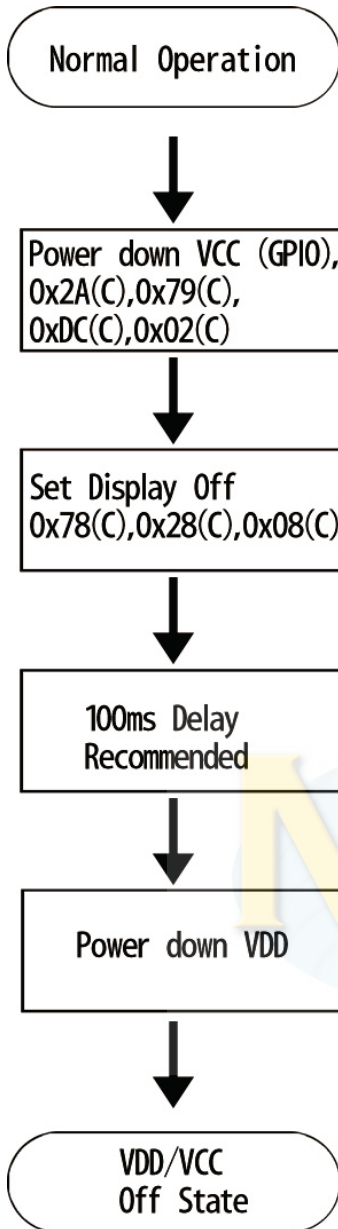
(1) This command could be programmable or defined by pin configuration.

(2) This command could be programmable or defined by pin configuration.

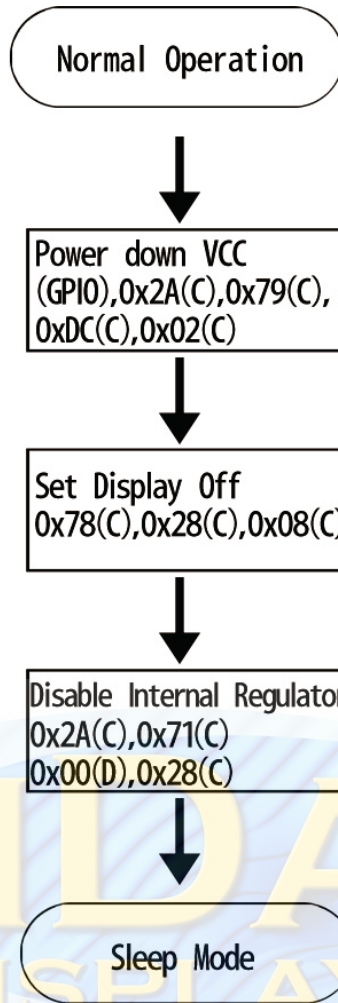
※ ( C ) : Write Command    ※ ( D ) : Write Data

If the noise is accidentally occurred at the displaying window during the operation, please reset the display in order to recover the display function.

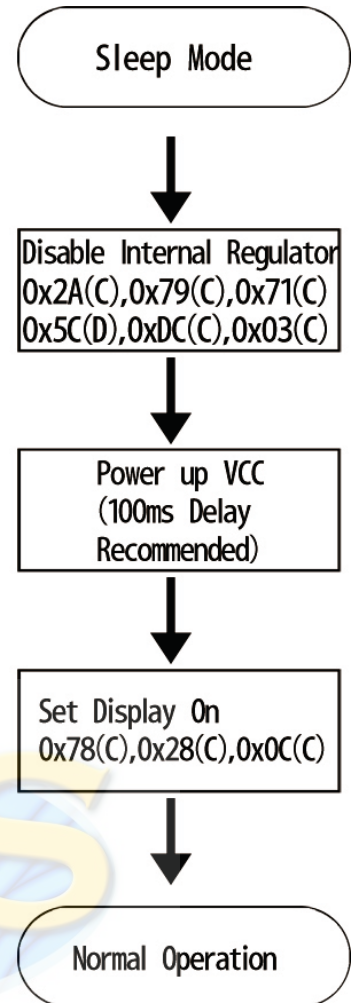
### Power down Sequence



### Entering Sleep Mode



### Exiting Sleep Mode



# SSD1311 CGROM CHARACTER CODE

## ROM A

b7-4 \ b3-0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000																
0001	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
0010	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	
0011	0	1	2	3	4	5	6	7	8	9	*	*	<	=	>	?
0100	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
0101	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
0110	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
0111	p	q	r	s	t	u	v	w	x	y	z	A	B	C	D	E
1000	0	1	2	3	4	5	6	7	8	9	*	*	<	=	>	?
1001	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1010	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1011	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1100	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1101	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1110	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛
1111	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛	⬛



# ROM B

	b7-4	b3-0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000																		
0001			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲				
0010			!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/	
0011			0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
0100			Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ	Ⓢ	Ⓚ	Ⓛ	Ⓜ	Ⓝ	Ⓞ	Ⓟ
0101			Ⓟ	Ⓠ	Ⓡ	Ⓢ	Ⓣ	Ⓤ	Ⓥ	Ⓦ	Ⓧ	Ⓨ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
0110			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
0111			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1000			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1001			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1010			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1011			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1100			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1101			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1110			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ
1111			Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ	Ⓩ



# ROM C

b7-4	b3-0															
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
0001	6	7	8	9	A	B	C	D	E	F	G	H	I	J	K	L
0010	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	[	]
0011	{	}	~	^	_	`	~	^	_	`	~	^	_	`	~	^
0100	0	1	2	3	4	5	6	7	8	9	*	+	=	>	?	
0101	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
0110	p	q	r	s	t	u	v	w	x	y	z	{		}	~	^
0111	_	~	^	_	`	~	^	_	`	~	^	_	`	~	^	_
1000	0	1	2	3	4	5	6	7	8	9	*	+	=	>	?	
1001	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
1010	p	q	r	s	t	u	v	w	x	y	z	{		}	~	^
1011	_	~	^	_	`	~	^	_	`	~	^	_	`	~	^	_
1100	0	1	2	3	4	5	6	7	8	9	*	+	=	>	?	
1101	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	
1110	p	q	r	s	t	u	v	w	x	y	z	{		}	~	^
1111	_	~	^	_	`	~	^	_	`	~	^	_	`	~	^	_