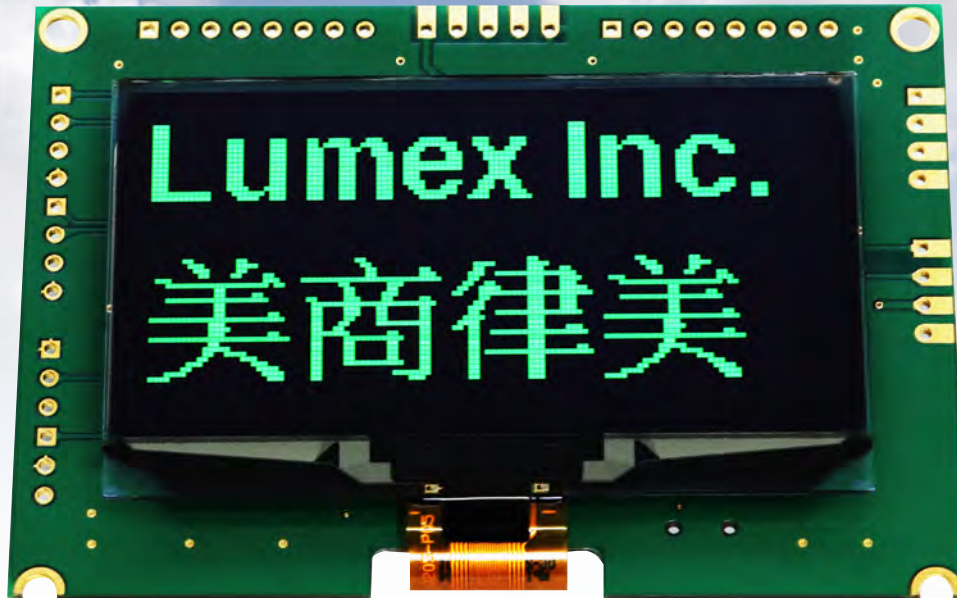# ezDisplay OLED Display

ITW ECS brand Lumex® announces the release of the ezDisplay OLED Display equipped UART interface which features an ultra thin display with low power consumption. The UART OLED Display has a fast response time for quick display refresh and a wide viewing angle, ideal for portable electronics displays.

With the UART interface it can shorten the developing process and be the most friendly OLED display ever for engineer, Maker and student.

Features:

- UART interface
- Runs HEX or AT command modes
- Able to receive 128x64 bitmap data and display the bitmap simultaneously
- Build in fonts and patterns
- Mixed Character and Graphic modes
- Multi screens display capability
- AP for Win10 is available

Benefits:

- Fits any MCUs and Embedded systems
- No driver or library needed
- Able to show animation
- Different languages are available on request
- More complex information can be showed
- Control multi OLED modules by one controller
- User can run and test the display contents on PC

ezDisplay OLED Display

Spec & Technical Information

P/N	Size	Pixel Color	Operating Temp.
LOD-H12864GP-W-UR	128x64	White	-40°C to +70°C
LOD-H12864GP-Y-UR	128x64	Yellow	-40°C to +70°C
LOD-H12864GP-G-UR	128x64	Green	-40°C to +70°C
LOD-H12864GP-B-UR	128x64	Blue	-40°C to +70°C

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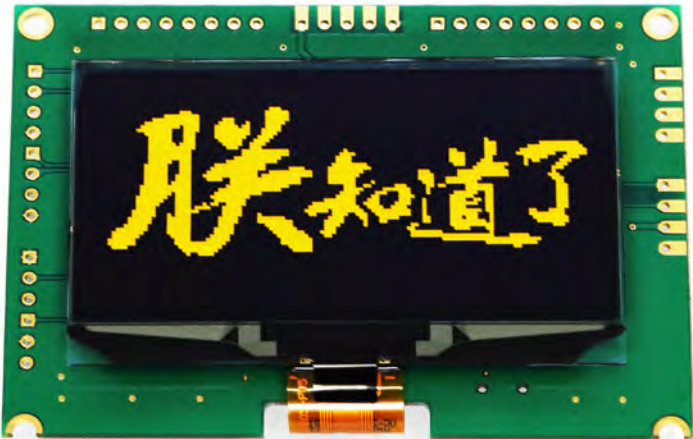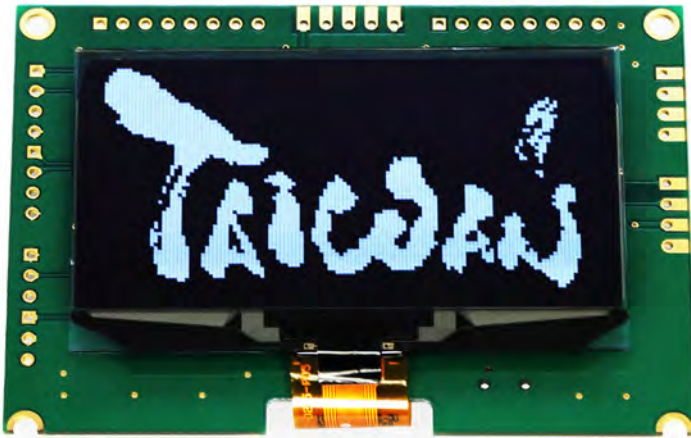
Item	P/N	Description
	WIRE001	4Pins 200mm with YH2.0 Terminal + 4Pins Housing x 2 (AWG#24)
	WIRE002	4Pins 200mm with YH2.0 Terminal + 4Pins Housing + 1Pin Housing (AWG#24)
	WIRE003	4Pins 450mm with YH2.0 Terminal + 4Pins Housing x 2 (AWG#24)
	USB-UART-1	USB to Serial convert board (Supply by WAVESHARE ELECTRONICS)
	Bluetooth-UART-1	UART interface Bluetooth module (Supply by WAVESHARE ELECTRONICS)
	LDM-768-4LT-OLED	1 to 4 expansion board for OLED
	LDM-768-4LT	1 to 4 expansion board for 96x8 LED Display Module
	LDM-768-16LT	1 to 16 expansion board for 96x8 LED Display Module
	LDM-768-64LT	1 to 64 expansion board for 96x8 LED Display Module

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The ezDisplay OLED Display is an ultra thin, high resolution display for a variety of portable display applications.

Markets:

Consumer Products

Industrial Controls

White Goods

Application:

Portable electronic, toy displays

Robotics display control panel

Household appliances

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Code	Function	Sequence of HEX command mode through UART
N/A	Sent a page (128X64 bitmap) to OLED (An array consist of 1024 bytes bitmap information)	1. A "for" loop to send 1024 bytes user define display information 2. Wait until receive a module available byte ('E') from OLED
0x80	Write a 5X7 Character	1. Send 0x80 2. Send which line to put this character 3. Send which cloumn to put this character 4. Send character's ASCII code 5. Wait until receive a module available byte ('E') from OLED
0x81	Write a 8X8 String	1. Send 0x81 2. Send which line to start the string 3. Send which cloumn to start the string 4. Send string 5. Wait until receive a module available byte('E') from OLED
0x82	Write a 8X16 Character	1. Send 0x80 2. Send which line to put this character 3. Send which cloumn to put this character 4. Send character's ASCII code 5.Wait until receive a module available byte('E') from OLED
0x83	Write a 8X16 String	1. Send 0x83 2. Send which line to stary the string 3. Send which cloumn to start the string 4. Send string 5. Wait until receive a module available byte('E') from OLED
0x84	Dsiplay a 8X8 pattern	1. Send 0x84 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0x85	Dsiplay a 8X16 pattern	1. Send 0x85 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0x86	Dsiplay a 16X16 pattern	1. Send 0x86 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0x87	Dsiplay a 32X32 pattern	1. Send 0x87 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 5. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED

Code	Function	Sequence of HEX command mode through UART
0x90	Draw a line	1. Send 0x90 2. Send the X coordinate of first point 3. Send the Y coordinate of first point 4. Send the X coordinate of second point 5. Send the Y coordinate of second point 6. Send 1 or 0 for display mode (1 for positive, 0 for negative) 7. Wait until receive a module available byte ('E') from OLED
0x91	Draw a Rectangle	1. Send 0x91 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send 1 or 0 for display mode (1 for positive, 0 for negative) 7. Wait until receive a module available byte ('E') from OLED
0x92	Draw a filled Rectangle	1. Send 0x92 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send 1 or 0 for display mode (1 for positive, 0 for negative) 7. Wait until receive a module available byte ('E') from OLED
0x93	Draw a Square	1. Send 0x93 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the width of this square 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x94	Draw a Circle	1. Send 0x94 2. Send the X coordinate of the center 3. Send the Y coordinate of the center 4. Send the radius of this circle 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x95	Draw a filled Circle	1. Send 0x95 2. Send the X coordinate of the center 3. Send the Y coordinate of the center 4. Send the radius of this circle 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x96	Draw a tip upward Triangle	1. Send 0x96 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the height of the tip to the bottom 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED

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Code	Function	Sequence of HEX command mode through UART
0x97	Draw a filled tip upward Triangle	1. Send 0x97 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the height of the tip to the bottom 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x98	Draw a tip downward Triangle	1. Send 0x98 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the height of the tip to the top 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x99	Draw a filled tip downward Triangle	1. Send 0x99 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the height of the tip to the top 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6.Wait until receive a module available byte ('E') from OLED
0x9a	Draw a tip leftward Triangle	1. Send 0x9a 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the width of the tip to the right 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6.Wait until receive a module available byte ('E') from OLED
0x9b	Draw a filled tip leftward Triangle	1. Send 0x9b 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the width of the tip to the right 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6.Wait until receive a module available byte ('E') from OLED
0x9c	Draw a tip rightward Triangle	1. Send 0x9c 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the width of the tip to the left 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6.Wait until receive a module available byte ('E') from OLED
0x9d	Draw a filled tip rightward Triangle	1. Send 0x9d 2. Send the X coordinate of the tip 3. Send the Y coordinate of the tip 4. Send the width of the tip to the left 5. Send 1 or 0 for display mode (1 for positive, 0 for negative) 6. Wait until receive a module available byte ('E') from OLED
0x9e	Set a pixel for positive display (show pixel)	1. Send 0x9e 2. Send the X coordinate of the pixel 3. Send the Y coordinate of the pixel 4. Wait until receive a module available byte ('E') from OLED
0x9f	Set a pixel for negative display (clear pixel)	1. Send 0x9f 2. Send the X coordinate of the pixel 3. Send the Y coordinate of the pixel 4. Wait until receive a module available byte ('E') from OLED

Code	Function	Sequence of HEX command mode through UART
0xa0	Display image row by row Up Ward	1. Send 0xa0 2. Send the speed (typical time is 20ms) 3.Wait until receive a module available byte ('E') from OLED
0xa1	Display image row by row Down Ward	1. Send 0xa1 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED"
0xa2	Display image column by column Left Ward	1. Send 0xa2 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa3	Display image column by column Right Ward	1. Send 0xa3 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa4	Erase image row by row Up Ward	1. Send 0xa4 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa5	Erase image row by row Down Ward	1. Send 0xa5 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa6	Erase image column by column Left Ward	1. Send 0xa6 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa7	Erase image column by column Right Ward	1. Send 0xa7 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa8	Display image Inside Out	1. Send 0xa8 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xa9	Display image Outside In	1. Send 0xa9 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED"
0xaa	Erase image Inside Out	1. Send 0xaa 2. Send the speed (typical time is 20ms) 3. Wait until receive a module available byte ('E') from OLED
0xab	Erase image Outside In	1. Send 0xab 2. Send the speed (typical time is 20ms) 6. Wait until receive a module available byte ('E') from OLED
0xc0	Build user define 8X8 pattern bitmap into OLED's display memory (Maximum number of user define 8X8 pattern is 10 (0-9)	1. Send 0xc0 2. Send the pattern ID 3. Sent the bitmap of this pattern ID 4. Wait until receive a module available byte ('E') from OLED
0xc1	Build user define 8X16 pattern bitmap into OLED's display memory (Maximum number of user define 8X16 pattern is 10 (0-9))	1. Send 0xc1 2. Send the pattern ID 3. Sent the bitmap of this pattern ID 4. Wait until receive a module available byte ('E') from OLED

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Code	Function	Sequence of HEX command mode through UART
0xc2	Build user define 16X16 pattern bitmap into OLED's display memory (Maximum number of user define 16X16 pattern is 10 (0-9))	1. Send 0xc2 2. Send the pattern ID 3. Sent the bitmap of this pattern ID 4. Wait until receive a module available byte ('E') from OLED
0xc3	Build user define 32X32 pattern bitmap into OLED's display memory (Maximum number of user define 32X32 pattern is 5 (0-4))	1. Send 0xc3 2. Send the pattern ID 3. Sent the bitmap of this pattern ID 4. Wait until receive a module available byte ('E') from OLED
0xc4	Dsiplay a user define 8X8 pattern (Build user define 8X8 pattern function needs to run before this function)	1. Send 0xc4 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0xc5	Dsiplay a user define 8X16 pattern (Build user define 8X16 pattern function needs to run before this function)	1. Send 0xc5 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0xc6	Dsiplay a user define 16X16 pattern (Build user define 16X16 pattern function needs to run before this function)	1. Send 0xc6 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0xc7	Dsiplay a user define 32X32 pattern (Build user define 32X32 pattern function needs to run before this function)	1. Send 0xc7 2. Send the Up Left X coordinate of pattern 3. Send the Up Left Y coordinate of pattern 4. Send the ID of pattern 5. Wait until receive a module available byte ('E') from OLED
0xd0	Clear display	1. Send 0xd0 2. Wait until receive a module available byte ('E') from OLED
0xd1	Show the data in the display memory	1. Send 0xd1 2. Wait until receive a module available byte ('E') from OLED
0xd2	Scroll the whole display upward	1. Send 0xd2 2. Send the shift time (typical time is 70ms) 3. Wait until receive a module available byte ('E') from OLED
0xd3	Scroll the whole display downward	1. Send 0xd3 2. Send the shift time (typical time is 70ms) 3. Wait until receive a module available byte ('E') from OLED"
0xd4	Scroll the whole display leftward	1. Send 0xd4 2. Send the shift time (typical time is 70ms) 3. Wait until receive a module available byte ('E') from OLED"

Code	Function	Sequence of HEX command mode through UART
0xd5	Scroll the whole display rightward	1. Send 0xd5 2. Send the shift time (typical time is 70ms) 3. Wait until receive a module available byte ('E') from OLED
0xd6	Scroll the section display upward	1. Send 0xd6 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send the shift time (typical time is 20ms) 7. Wait until receive a module available byte ('E') from OLED
0xd7	Scroll the section display downward	1. Send 0xd7 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send the shift time (typical time is 70ms) 7. Wait until receive a module available byte ('E') from OLED"
0xd8	Scroll the section display leftward	1. Send 0xd8 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send the shift time (typical time is 20ms) 7. Wait until receive a module available byte ('E') from OLED
0xd9	Scroll the section display rightward	1. Send 0xd9 2. Send the X coordinate of up left corner 3. Send the Y coordinate of up left corner 4. Send the X coordinate of bottom right corner 5. Send the Y coordinate of bottom right corner 6. Send the shift time (typical time is 70ms) 7. Wait until receive a module available byte ('E') from OLED"
0xf0	Turn display Off	1. Send 0xf0 2. Wait until receive a module available byte ('E') from OLED
0xf1	Turn display On	1. Send 0xf0 2. Wait until receive a module available byte ('E') from OLED
0xf2	Set the brightness of the OLED	1. Send 0xf2 2. Send the level of brightness 3. Wait until receive a module available byte ('E') from OLED
0xf3	Set the status of 8 output pins on OLED	1. Send 0xf3 2. Send the output pin No. 3. Send 0 or 1 (0--> Low, 1-->High) 4. Wait until receive a module available byte ('E') from OLED
0xf4	Read the input pins status on the OLED	1. Send 0xf4 2. Send the input pin No. 4. Recive the input pins status from OLED (0 or 1) 5. Return the input pins status
0xf6	Change Instruction mode (1 for AT command)	1. Send 0xf6 2. Send instruction mode 1 3. Wait until receive a module available byte ('E') from OLED