

## 1. Application

- This kit is to display the LED text message for your "Robot, PLC, PC, IoT, Embedded system, network server, LPR, etc."
- You can insert this kit to your custom case (or equipment) with power supply(DC5V-200W).
- If you need a different size of the screen, please contact us after referring to [www.LEDmsg.com](http://www.LEDmsg.com).

## 2. Product



- RS232 / TTL / Ethernet
- RS485(option)
- PLC SSR signal(option)

- ✓ 256mm(64dot) x 1024mm(256dot)
- ✓ Pitch:4mm, 4 Row x 16 Column
- ✓ 6000 nits Outdoor, best view distance: 5 ~ 14m
- ✓ DC5V-240W(Max), Total 3000gram



- ① LED module(LMD-P4-2R4C)
- ② LMD controller(LMD-C2-1E)
- ③ DC5V to LED module
- ④ DC5V to Controller
- ⑤ Flat cables(16P)
- ⑥ SMPS(DC5V)...not included
- ⑦ Ethernet connector(RJ45)

This product includes all the related parts except the LED case and SMPS. The controller and LED module can be purchased separately.

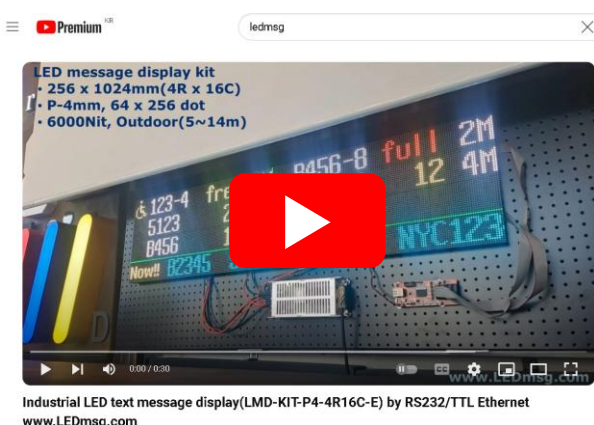
Optional parts below can be ordered in addition.

- 1. [TTL to Ethernet converter](#) (+ \$19)
- 2. [TTL to RS485 converter](#) (+ \$9)
- 3. [PLC SSR Signal IO board](#) (+ \$16)
- 4. [GPS time receiver](#) (+ \$28)
- 4. [Temp./Humidity sensor](#) (+ \$19)
- 5. [Relay board](#) (2 channels, + \$9)
- 6. [Auto brightness control cell](#) (+ \$9)

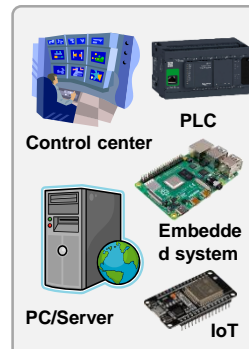
## 3. Features

Model Name	LMD-KIT-P4-4R16C-E
Hardware	4 rows x 16 columns, 256mm(64dot) x 1024mm(256dot) Pitch 4mm, 6000nits, outdoor, best view distance 5 ~ 14m DC5V total 240w(Max.), Total 3000gram
Connections	RS232, TTL, Ethernet
Protocol	<a href="#">LEDmsg Sign Communication Protocol</a>
Text Color	distinct pure seven color (Red, green, yellow, blue, pink, sky-blue, white)
Message types	<b>real-time message</b> and <b>stored message</b> (max. 10 pages), Various types of background images (text, graphics, animation) can be stored and displayed individually or together with message data. It can displays <b>32 alpha-numeric characters</b> or 16 special characters per line while displays over 120 characters with scrolling left effect.
Languages fonts	Alpha-numeric characters, Korean, Chinese, Japanese, European extended fonts and custom font
Software provided ( on Window PC )	<a href="#">LEDmsg protocol simulator</a> (English version) Background editing software( <a href="#">DabitChe</a> -English version)

## 4. LEDmsg demo on Youtube



## 5. LEDmsg Protocol ?

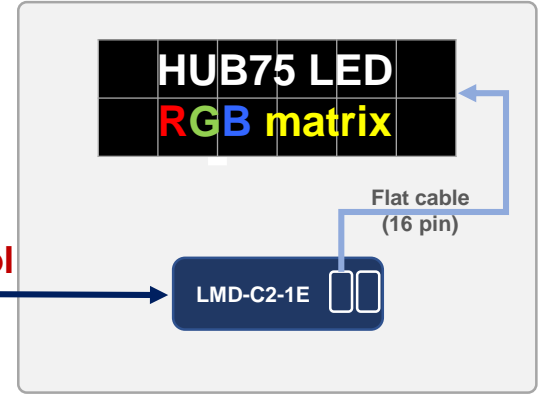


- ✓ Simple, smart & reliable !
- ✓ Real-time display with page message, background images
- ✓ Various effects / options
- ✓ Distinct 7 colors
- ✓ Multi-language, custom fonts

### LEDmsg Protocol

- RS232 / TTL / Ethernet
- RS485 (option)
- PLC SSR signal(option)

Your system/devices



LMD stands for "Industrial LED Message Display".

※ Structure of LEDmsg Protocol : ![abc ... !]

Start character	Address	Error check	Command type	Data	End character
![	a	b	c	up to 208 byte	!]

① ※ Examples of real-time message command protocol ( screen size : "2 Row x 6 Column" basis )



- ① ![000Hello world!]
- ② ![000/C1Industrial /C2LED /C6sign /C7123!]
- ③ ![000/F0103/C1123 /C2ようこそ /C3歓迎 /C75678!]

※ Data consists of "display property" and "text message".  
 ※ /Cx : character color  
 /C1: red, /C2:green, /C3:yellow, /C6:skyBlue, /C7:white .....  
 ※ /Fxyy : character type and size

## 6. Protocol samples



#	Real-time message of sample of LEDmsg protocols
1	![000Hello world!]
2	![000/C11ST LINE MESSAGE 01/C22ND LINE MESSAGE 02/C63RD LINE MESSAGE 03/C74TH LINE MESSAGE 04!]
3	![000/P0000/Y0004/C210:00 /C7LONDON MARYLEBONE /C6On Time!] // section 0 ![000/P0001/Y0408/C210:05 /C7Destination xxxxx /C6On Time!] // section 1 ![000/P0002/Y0812/C210:15 /C7Destination yyyy /C1delayed!] // section 2 ![000/P0003/Y1216/C210:20 /C7Destination zzzzz /C6On Time!] // section 3
4	![000/P0000/Y0004/S1002/B001/C6/U196 /C3A123-1 /C1FULL /C31/C2M /C7City hall!] // section 0 ![000/P0001/Y0408/C2/U197 /C3B456 /C123 /C33/C2M /C7Seoul Station!] // section 1 ![000/P0002/Y0812/C2/U197 /C3C67-8 /C109 /C34/C2M /C7Destination XY!] // section 2 ![000/P0003/X0964/Y1216/E0606/S1000/C1123-5 B-456 C678-9!] // section 3
5	![000/P0000/X0032/Y0012/S1002/B003/C3/U196/C7123-4 /C3free /C71M/C3 /C75123 /C323 /C72M /C3 /C7B456 /C312 /C73M!] // section 0 ![000/P0001/X3264/Y0012/S1002/C3 /C7B456-8 /C1full /C72M/C3/U196/C75000-1 /C312 /C74M!] // section 1 ![000/P0002/X0900/Y1216/E0606/S1000/C6B2345 5001 S100-2 NYC1234 L-123!] // section 2

- Hello world ..... : Text message (Max. 208 byte), One blank space gives an 8 pixel margin.
- /C1 /C2 ... : Text color (0: black 1: red, 2:green, 3:yellow, 4:blue, 5:pink, 6:skyBlue, C7:white)
- /U049 /U050 ... : Identifier to call an User font(Special character/symbol)
- /P0000 /P0001 ... : Section number for split screen (0000 ~ 0003)
- /X0964 /Y0004 ... : X/Y area coordinates of the section by nibble (1 nibble = 4 pixels)
- /E0606 /E4900... : Display effect code (1st two numbers:entry effect, 2nd two numbers: exit effect)
- /S1000 /S9900... : 1st two numbers:effect speed, 2nd two numbers: Stay time)
- /B001 /B002 ... : This is to call up a prestored Background image number(red/green lines) for the text message.

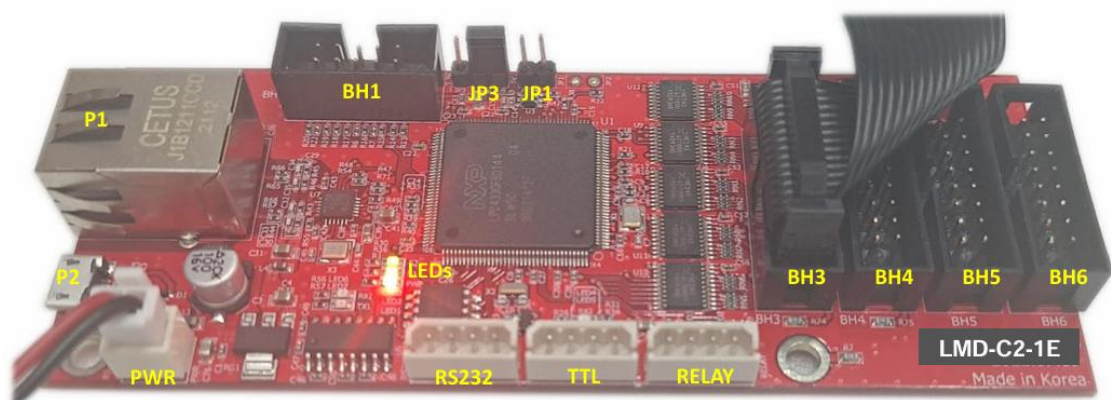
For details, refer to "LMD sign protocol document(Chapter 5, Chapter 6.1, Chapter 7) and ", "DabitChe Manual(chapter 4 and A-3)".

## 7. How to Simulate



1. Connect your PC to the LED display kit with RS232 cable, and supply the power(DC5V).
2. Download the [Protocol Simulator](#) to your PC(Window only), unzip it and run the simulator.
3. Click "Special Function" and set up the followings by referring to "[Simulator manual, 2. Preparation](#)".
  - Communication method: [RS232/485](#) or [Ethernet](#)
  - [Screen size](#): Vertical-4, Horizontal-16, 3BPP, Array-Horizontal
  - [LED display signal type](#): **08D-P32D1S31, RGB**
4. Proceed the message simulation as follows for the above samples one by one:
  - ① Click "ASCII Message" tap.
  - ② Enter the message protocol (Ex. "[000Hello world!]") in a text input box.
  - ③ Click "Save".
  - ④ Click "Preview" to see the preview image on the pop-up screen.
  - ⑤ Click "Send". Then the message will be displayed on the LED signboard.
5. Try to send various message protocol of "real time message" and "page messages" by referring to "[the simulator manual](#)" and "[LEDmsg protocol document](#)".  
If you want to display the message with various background images, refer to the "[DabitChe software manual](#)".
6. Apply your final message protocol packet to your messaging system.

## 8. Controller Specifcaton

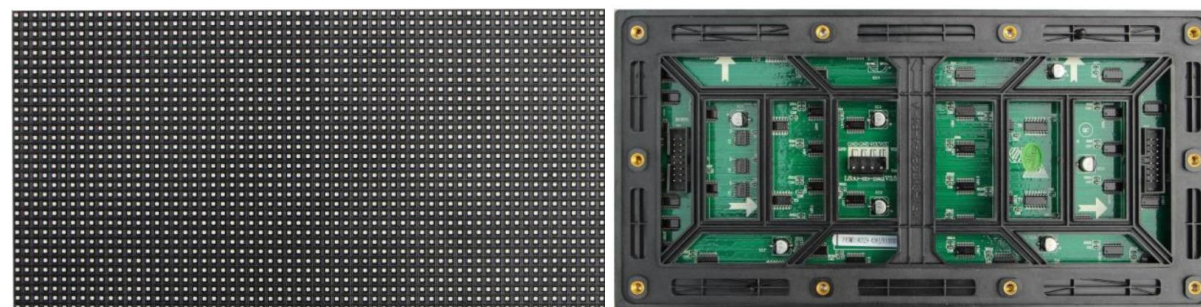
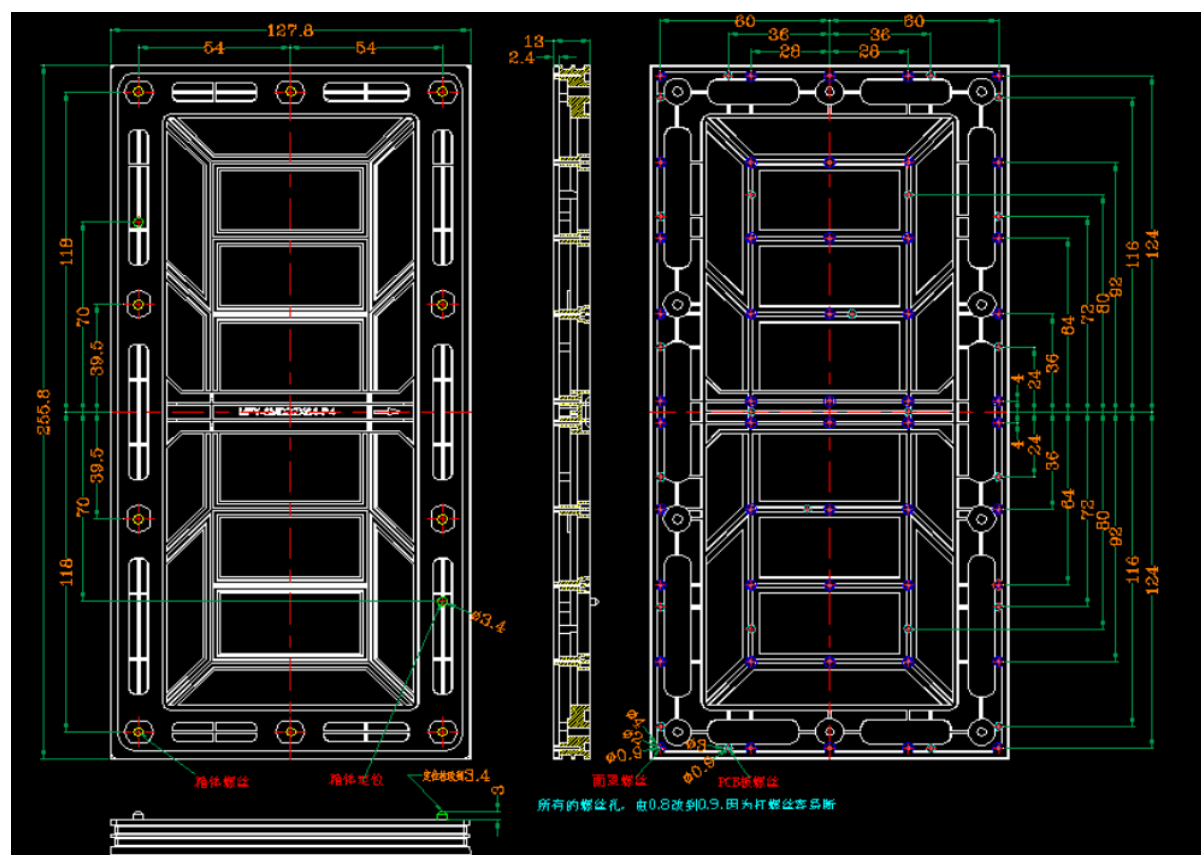


Port	Description	Port	Description
PWR	Power (DC5V, Max. 350mA)	LED (PWR)	LED(red) lights up when power is applied
P1	Ethernet Port	LED (S1)	LED(green) blinks when CPU is normal. If not, the CPU might be in problem.
RS232	RS232 Port (5V-TX-RX-GND )	LED (S2)	LED(green) blinks when the video output signal is normal.
TTL	5V-TX-RX-GND <a href="#">GPS Time receiver</a> can be connected.	P2	Micro USB type B
RELAY	1. <a href="#">Relay output (2-channel, 5V-D2-D1-GND)</a> 2. <a href="#">CdS sensor</a>	JP3	No use
BH1	1. <a href="#">RS485 converter</a> 2. <a href="#">PLC SSR signal IO board</a>	JP1	Used for Factory reset
		BH3, BH4, BH5, BH6	These are the video signal output to LED screen. BH3: Connect to the 1 <sup>st</sup> row BH4: Connect to the 2 <sup>nd</sup> row BH5: Connect to the 3 <sup>rd</sup> row BH6: Connect to the 4 <sup>th</sup> row

- Model name : **LMC-C2-1E**
- Max. Screen resolution : **64 x 320** dots  
4-row x 20-column or 2-row x 40-columns by "16x16 dot matrix"
- Display Image / Color: text, graphic and animation in **7 colors** (red, green, yellow, blue, pink, sky blue, white)
- Main Process : ARM Cortex-M4 Dual core microcontroller, 180MHz
- Memory : 2MByte Flash memory, 264KByte SRAM, USB memory
- Scan rate : 1/16, 1/8, 1/4
- Serial Port(RS-232/TTL): **115,200bps, N(Parity check), 8(Data bit), 1(Stop bit)...** Default
- Ethernet Port : **Server mode, 192.168.0.201, Port 5000**
- Working Temperature: -40°C ~ 85°C
- Power Consumption : DC5V, 350mA(Max.)

## 9. LED module Specification

Model Name	LMD-P4-2R4C-8S
LED spec.	3 in 1 SMD3535, pitch 4mm
Size(Height x Width x Depth)	128 x 256 x 16.6 mm
Pixels	32 x 64 dots
Density (dots/m <sup>2</sup> )	62500 dots/m <sup>2</sup>
Weight (Kg)	0.308kg
Brightness	≥6000cd/m <sup>2</sup>
Connector type	HUB75, 16pin
Driving method	<b>1/8duty</b> Constant current method
View angle	Horizontal: ≥170 degree , Vertical: ≥120 degree
Best view distance	5 ~ 14M
Color	R,G,B 4096Gray
Display color	4096*4096*4096
Life span	>8000 hours
Voltage	DC 5V
Power consumption (Max.)	≤30 W/pc
Average power	≤15 W/pc (when displaying text only)
Power per 1m <sup>2</sup> (Max.)	915 W/m <sup>2</sup>
Average power per 1m <sup>2</sup>	467 W/m <sup>2</sup> (when displaying text only)
Working temperature	-20°C ~ 60°C
Working humidity	10% ~ 90%RH



- Fixing screw : M4 x 10pcs
- Waterproof packing included

### Technical Matrials

1. [LEDmsg protocol Document](#)
2. LEDmsg protocol simulator: [User manual](#), [software](#)
3. Specification: [LMD-C2-1E](#), [LMD-P4-2R4C](#)

For any question, please contact to Mr. **Dabit HEO** as below :  
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