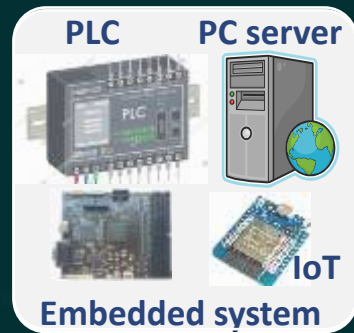


# Industrial LED Message Display Solution for PLC, PC, Embedded system



## LEDmsg protocol

RS232/485/TTL, Ethernet, WIFI, Bluetooth

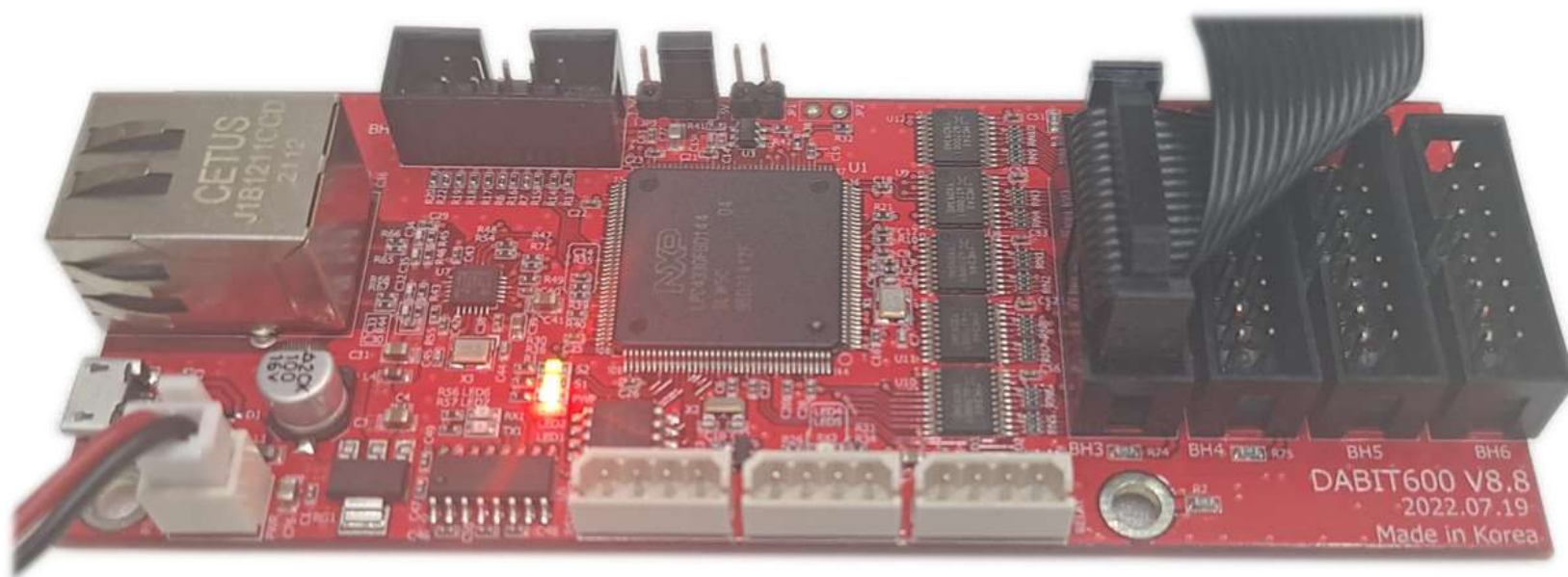


Simple, smart and reliable | real-time | multi-languages | distinct 7 colors | with background images and various effects

## LMD Controller Manual ( Model : LMD-C3-1S )

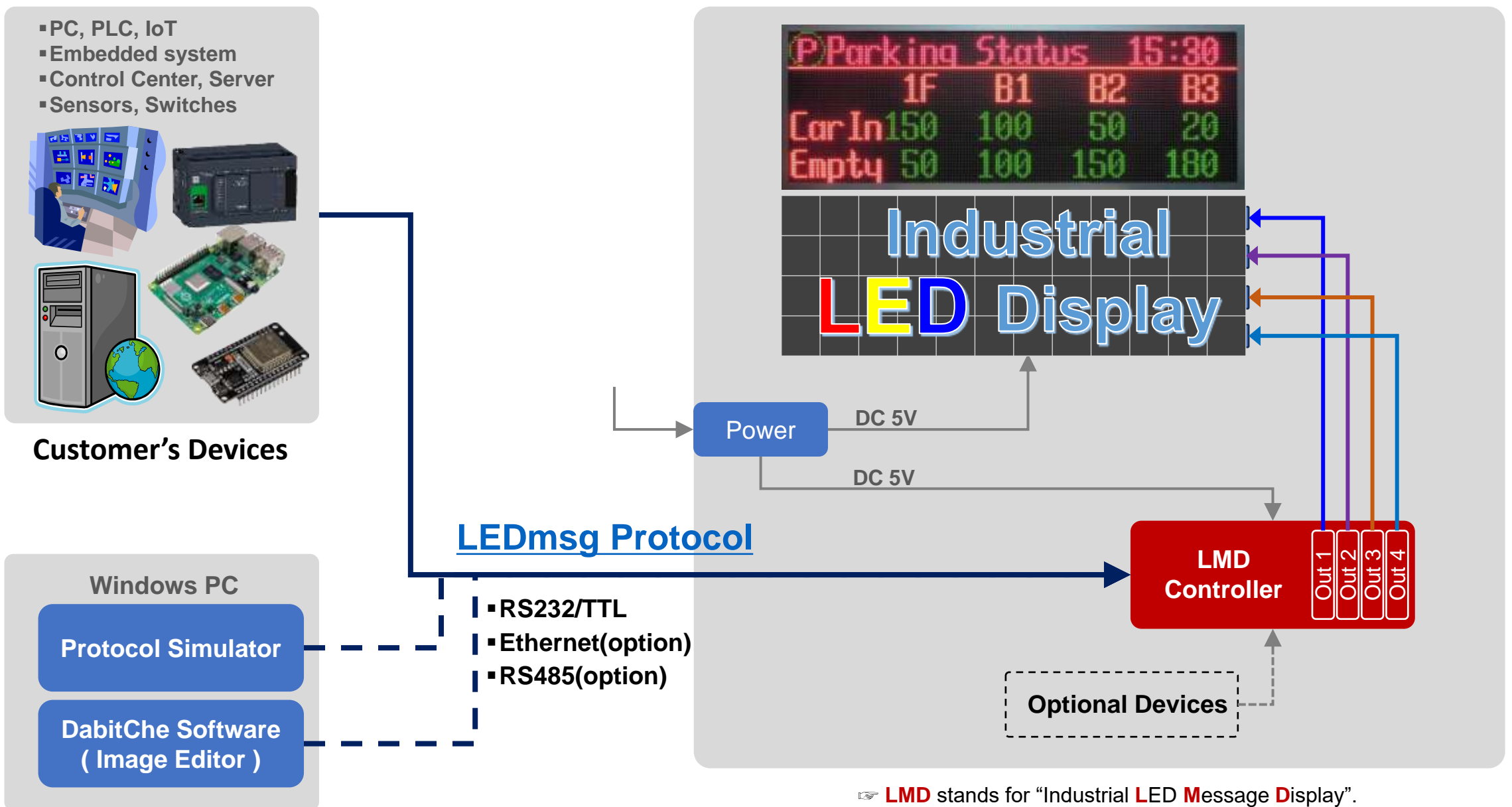
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This model disables several port functions (Ethernet, TTL, BH1) of the [LMD-C2-1E](#) to increase display resolution.

If you have any questions regarding the contents of this manual, please contact "82-2-2272-5038 or [LEDmsg01@gmail.com](mailto:LEDmsg01@gmail.com)".



LMD stands for "Industrial LED Message Display".

Components	Description																	
<b>Customer's Devices</b>	A customer's system or device that sends message data to display on the LED signboard It could be " PC, PLC, IoT, Embedded system, Control Center, Server, Sensors, Switches ....".																	
<b>LMD Controller</b>	<table border="1"> <thead> <tr> <th>Model</th> <th>Max. Screen Size ( Row x Column )</th> <th>Communication Methods</th> <th>Display Contents</th> </tr> </thead> <tbody> <tr> <td>LMD-C1-1S</td> <td>2R x 16C or 1R x 32C</td> <td>RS232/TTL, RS485(option)</td> <td rowspan="4"> <ul style="list-style-type: none"> <li>• Real Time Message</li> <li>• Page Messages (Stored Message)</li> <li>• Background Images (Text, Graphic, Animation)</li> </ul> </td> </tr> <tr> <td>LMD-C1-1E</td> <td>2R x 16C or 1R x 32C</td> <td>RS232/TTL, Ethernet</td> </tr> <tr> <td>LMD-C2-1E</td> <td>4R x 20C or 2R x 40C</td> <td>RS232/TTL, Ethernet, RS485(option)</td> </tr> <tr> <td>LMD-C3-1S</td> <td>8R x 16C</td> <td>RS232, Ethernet(option)</td> </tr> </tbody> </table>	Model	Max. Screen Size ( Row x Column )	Communication Methods	Display Contents	LMD-C1-1S	2R x 16C or 1R x 32C	RS232/TTL, RS485(option)	<ul style="list-style-type: none"> <li>• Real Time Message</li> <li>• Page Messages (Stored Message)</li> <li>• Background Images (Text, Graphic, Animation)</li> </ul>	LMD-C1-1E	2R x 16C or 1R x 32C	RS232/TTL, Ethernet	LMD-C2-1E	4R x 20C or 2R x 40C	RS232/TTL, Ethernet, RS485(option)	LMD-C3-1S	8R x 16C	RS232, Ethernet(option)
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<b>Optional Devices</b>	<p>This type of the controller can be used in connection with the devices below.</p> <ul style="list-style-type: none"> <li>• <a href="#">Ethernet Converter</a></li> <li>• <a href="#">Brightness Control sensor</a></li> <li>• <a href="#">Relay Output(2channel)</a></li> <li>• <a href="#">Temp./Humidity Sensor</a></li> </ul>																	
<b>LED module</b>	The LMD controller uses common HUB75E RGB 16x16 MATRIX LED modules produced in China. The display signal pattern of an LED module varies depending on the manufacturer and module type. Therefore, compatibility with the LMD controller must be tested according to "" <a href="#">Protocol Simulator Manual, A-7 How to set LED Display Signal</a> ". Otherwise, we recommend using our company's verified " <a href="#">LMD LED modules</a> ."																	
<b>Power</b>	DC5V shall be supplied to LMD controller and LED panels.																	
<b>Protocol Simulator</b>	This runs on a Windows PC and can perform basic setup and protocol simulation of the LED signboard. For details, refer to " <a href="#">Dabit Protocol Simulator Manual</a> "																	
<b>DabitChe Software</b>	By using DabitChe on Windows PC, you can create various image files, save them in one B.G Playlist(Max. 255) and upload them to the LMD controller. Then, you can call the file number and display it alone or use it as the background for a protocol message. For details, refer to " <a href="#">DABIT Software Manual, chapter 4 and attachment 6</a> "																	

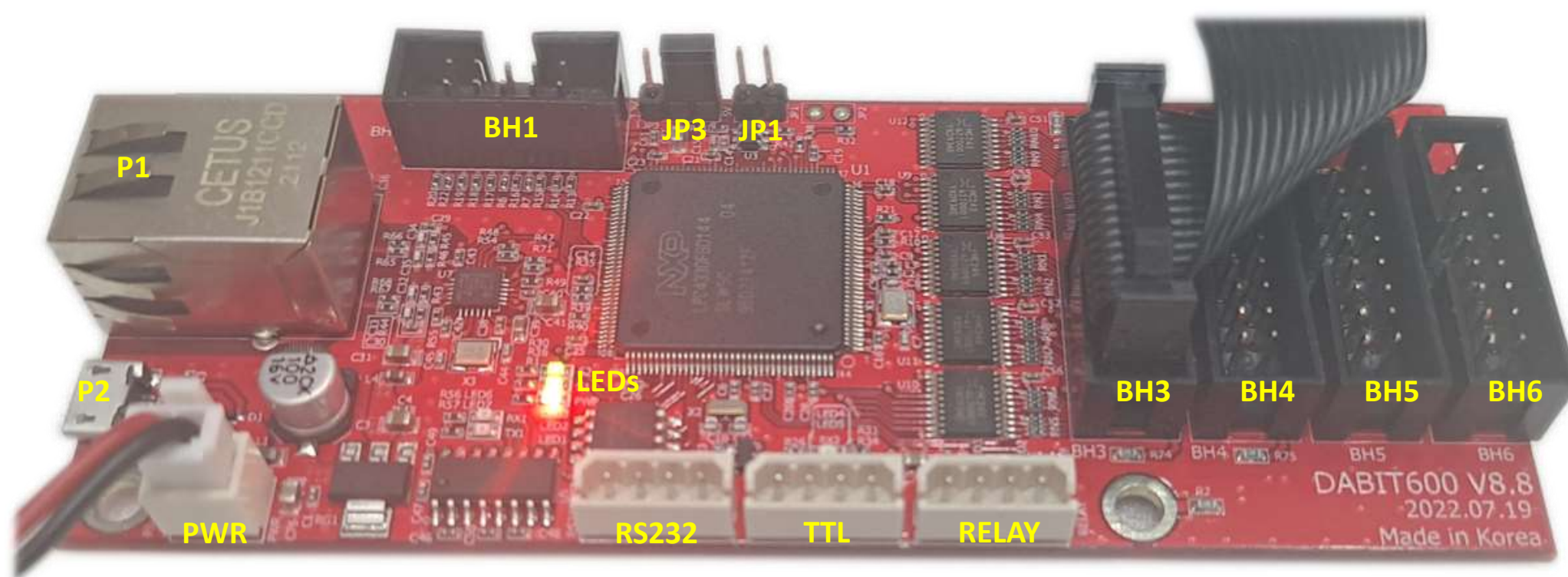
### A. Hardware side

1. Built-in high-performance Dual Core CPU, enabling use of various ports and multi-communications
2. Various optional products available
  - 1) [Ethernet Converter](#): communicates with Ethernet devices by using **RS232** port of the controller
  - 2) [Brightness Control sensor](#): automatically adjusts the brightness of the LED screen according to the surrounding brightness. As for the outdoor LED signboard, it has the effect of reducing power consumption, reducing glare, and increasing LED lifespan.
  - 3) [Relay Output\(2-channel\)](#): controls peripheral devices such as warning lights, buzzers, fans and guide bars.
  - 4) USB/SD card socket: increases the memory when necessary.
3. Since 2005, LMD solution has developed and proven in various industrial fields such Parking lots, subway/train/bus stations, terminals, airports, factories, roads, tunnels, stadiums, power plants, buildings, etc.  
These days, LMD controllers is often used as a small, high-brightness, low-power high-LED display for drones, robots, and IOT devices due to its' **simple, economic and effective display performance.**

### B. Software side

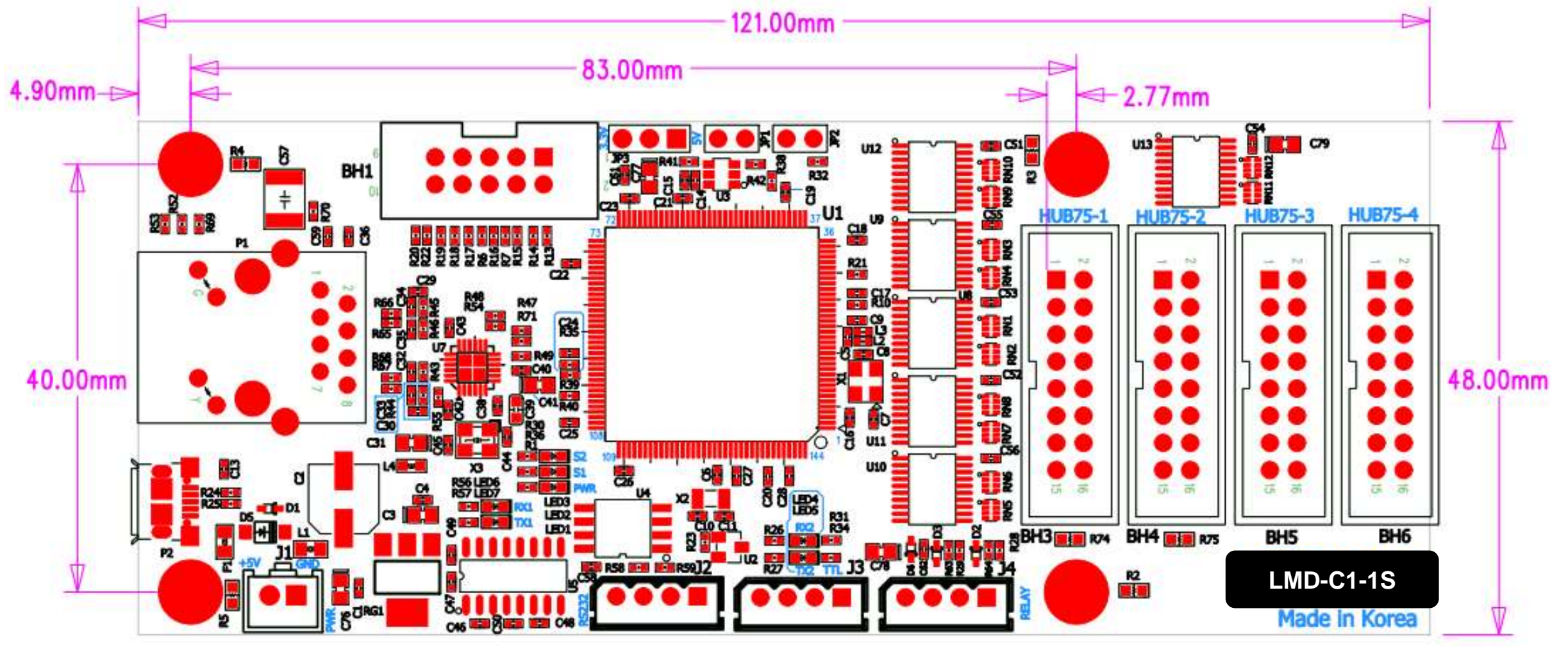
1. The [LEDmsg Protocol](#) is simple and highly scalable, so even beginners can easily apply it.  
If you simply sketch the text or image you want to display on the LED signboard and send it to us, we will provide you with a sample packets of the corresponding message protocol.
2. There are various ways to display messages as follows.
  - 1) Send message protocol and display it in real time
  - 2) Send multiple message protocols and display them in page order
  - 3) Add a background image file number into the message protocol and display them together
3. There are various message display effects.
  - 1) Supports over 40 effects, including moving effects and text/background blinking.  
But, The LMD-C3-1S model has limitations on the use of scrolling effects, 3D effects, etc. on screens larger than "4 rows x 20 columns".
  - 2) The screen can be divided into up to 4 sections, and individual message data can be transmitted and displayed with individual effects.
  - 3) Long messages can be displayed continuously up to 120 characters (240 English characters) by moving them to the left.
4. Through the DABIT Protocol Simulator, initial environment setup and message simulation can be easily performed.
5. You can create various image files with [DabitChe software](#) and save them on the LMD controller in advance, then import and display them directly or use them as background images for messages.

- Max. Screen Size(16x16 dot Matrix): Maximum size to display without effect  
**8-Row x 16-Column or 4-Row x 32-Column or 2-Row x 64-Column**
- 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 : 1/32, 1/16, 1/8, 1/4, 1/2 , Static
- Serial Port : RS-232 1 port  
☞ 9,600/38,400/57,600/**115,200bps**, N(Parity check), 8(Data bit), 1(Stop bit)... Default
- Ethernet Port : No use
- Working temp. : -40°C ~ 85°C
- Power Consumption : DC5V, 350mA(Max.)



Port	Description	Port	Description
<b>PWR</b>	Power (DC5V, Max. 350mA)	<b>LED (PWR)</b>	LED(red) lights up when power is applied
<b>P1</b>	No use <sup>[1]</sup>	<b>LED (S1)</b>	LED(green) blinks when CPU is normal.
<b>RS232</b>	RS232 Port (5V-TX-RX-GND) 1. <a href="#">RS232 to Ethernet converter</a>	<b>LED (S2)</b>	LED(green) blinks when the video output signal is normal.
<b>TTL</b>	No use <sup>[1]</sup>	<b>P2</b>	Micro USB type B
<b>RELAY</b>	5V-D2-D1-GND 1. <a href="#">Relay output (2-channel, 5V-D2-D1-GND)</a> 2. <a href="#">CdS sensor</a>	<b>JP3</b>	No use
<b>BH1</b>	No use <sup>[1]</sup>	<b>JP1</b>	Used for Factory reset
		<b>BH3</b>	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
		<b>BH4</b>	
		<b>BH5</b>	
		<b>BH6</b>	

**[NOTE 1]** This controller disables several port functions (Ethernet, TTL, BH1) of the [LMD-C2-1E](#) to increase display resolution.



- 121(width) x 48(height) x 20(depth) mm
- Diameter of the holes(4) : 4mm

By referring to "[Dabit Simulator Manual, A-9](#)", you can set the functionality and baud rate of ports on LMD controller depending on your optional devices or requirement.

On the DABIT Protocol Simulator, click "Special Function > Board Functions" to open "Board Functions" setup window as shown on the right, and try the followings:

### A. "J2(RS232)" Baud rate

The default is "115200bps" .

You can change it to "9600, 38400, 57600bps ...." to match your serial device baud rate according to "[Simulator Manual, A-9](#)."

### B. "J4(4-pin)" function

The default is "[Relay Signal Output](#)" mode.

When you use "[CDS sensor](#)", you need to change it to "CDS" mode.

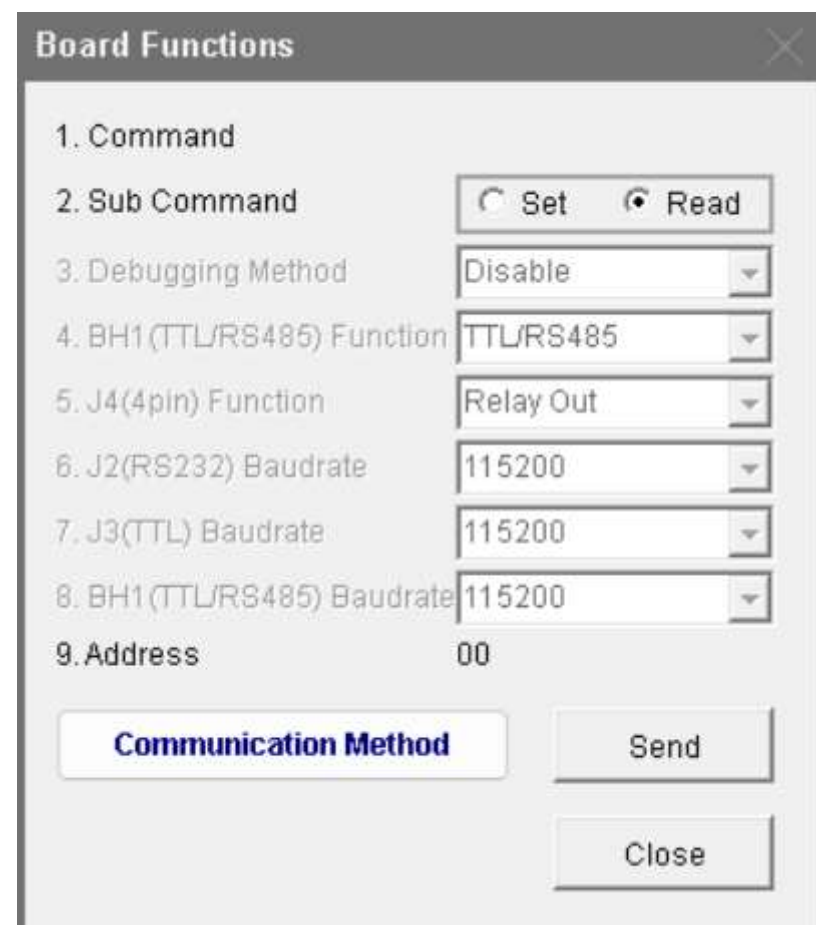
### C. "BH1" function (No use)

### D. "JP1" for Factory Reset

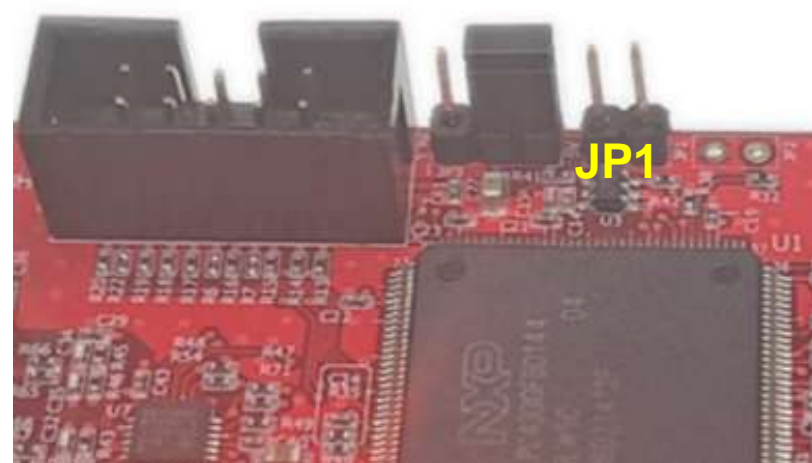
If you short-circuit "JP1" with a flat-blade screwdriver or jumper while the controller is powered on and then reset the power, the LMD controller will be factory reset.

After the Factory Reset, the above settings and all message data and image files are initialized.

However, the settings of "Screen size, Display signal type, Font file" are maintained.



"Board Functions" setup window showing the default mode of the LMD controller



Jumper Pin and Jumper