

Hardware Manual for 3 Color LED Sign Controller (DIBD160N-)



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Read Me First

Thank you for using DIBD(Display Intelligent Board) of 3 color LED sign controller.

With this manual, we expect you get to know about DIBD and its setting method at ease.

Contents of this manual may be partially changed by manufacturer's purpose without prior notice.

Images and screenshots in this manual may differ in appearance from the actual product.

For more information, please contact us at davitsol@gmail.com or get from www.davitsol.com.

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1. General Instruction

1.1 Configuration

DIBD160 is a controller installed inside the 3 color LED sign to display various forms(text/graphic/animation) of messages created by the sign software(DIBD manager) installed in PC. This can control/display the tri-color LED sign with up to "2 rows x 20 columns" of LED modules. Basic configuration is as follows:

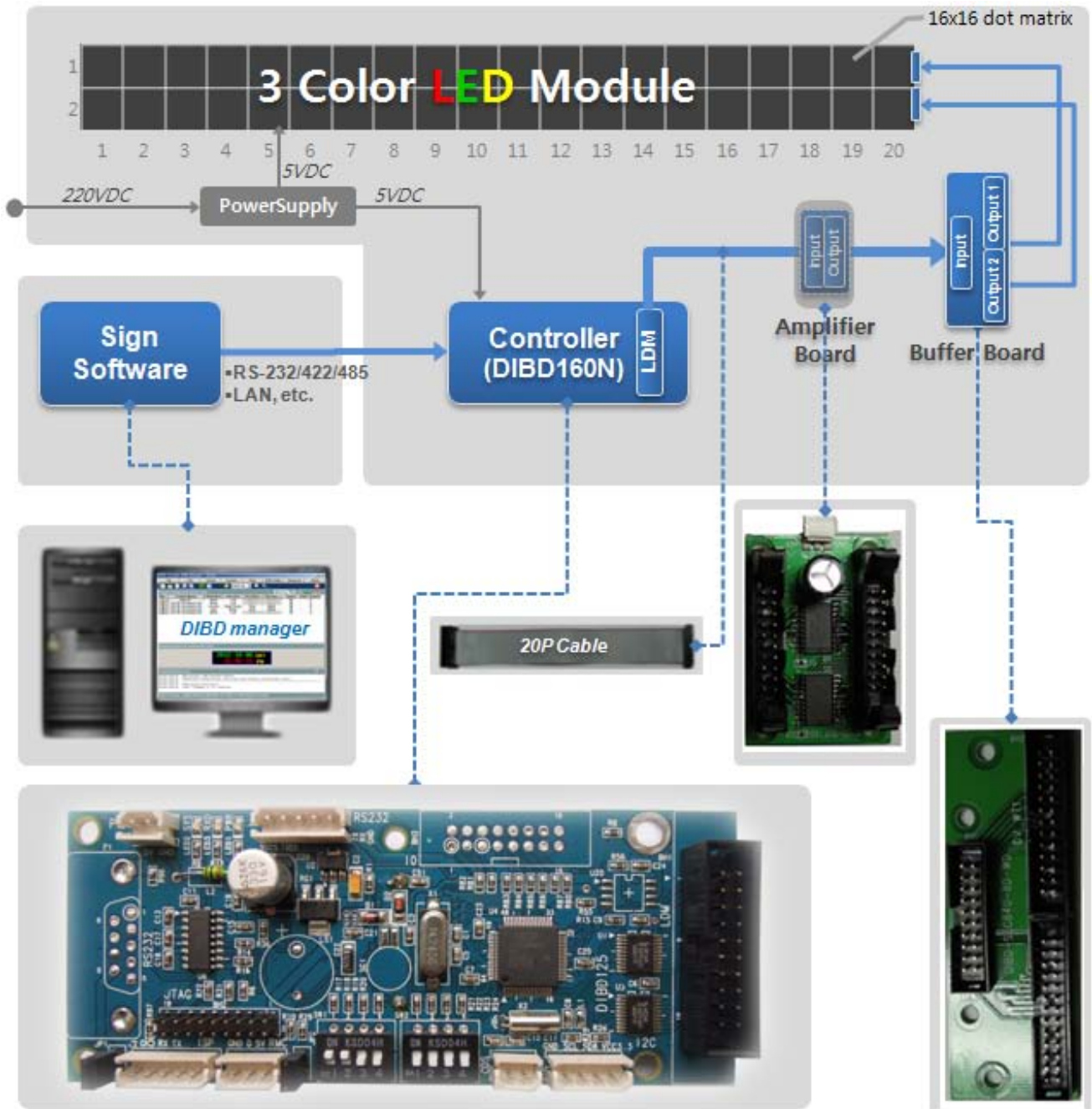


Fig. 1 Configuration of 3 Color LED sign with DIBD160N

- ✓ DIBD manager : To setup system, edit contents(text/graphic/animation, information text) and operate the sign.
- ✓ DIBD(Display Intelligent Board) : The type depends on the sign's size and color. Baud rate, DIBD Address shall be set.
- ✓ Buffer Board : Different one to be delivered depending on LED manufacturer or Duty ratio(1/16D, 1/8D, 1/4D).
- ✓ Amp. Board : To install when the distance between DIBD and LED exceeds 5~8m to prevent any comm. noise.

1.2 Hardware

Controller for Special LED sign

Sign Color	Sign Size (Row x Col.)	Controller Type	Remarks
3 Color LED Sign	2R x 20C	DIBD220P-3C-2R20C	① Com. Ports for RS232(2pcs) and RS485(1pc) ② Duty ratio : 1/16, 1/8, 1/4 ③ Options : RS422/485 or LAN converter, Temp./Humidity/ Photo sensor, GPS time receiver, SD memory ④ Most commonly used in Special LED sign
	2R x 32C	DIBD260P-3C-64M	⑤ Same as above "①②③"
	3R x 21C		
	4R x 16C		
	2R x 48C	DIBD500P-3C-4R24C	⑥ Same as above "①②" ⑦ CF memory is embedded. ⑧ Options : RS422/485 or LAN converter, Temp./Humidity sensor, GPS time receiver ⑨ With Section controllers, it can display up to 16Rx255C(or 510 modules) of LED sign.
4R x 24C			
Full Color LED Sign	4R x 08C	DIBD500P-FC-4R8C	⑩ Same as above "①⑦⑧" ⑪ Duty ratio : 1/8, 1/4 ⑫ With Section controllers, it can display up to 16Rx32C(or 160 modules) of LED sign.

☞ **"Special LED sign"** is to display message data transmitted from external systems such as web server, imbedded system, Control center, measuring system, PLC, etc. Basically, the data shall be transmitted by DIBD protocol format. But, only by sending simple switching signal, it is possible to display reserved images.

Controller for General LED sign

Sign Color	Sign Size (Row x Col.)	Controller Type	Remarks
3 Color Sign Board	1R x 20C	DIBD120N-3C-1R20C	① Com. Port for RS232(2pcs) ② Duty ratio : 1/16, 1/8, 1/4 ③ Options : RS422/485 or LAN converter, Temperature/Humidity/Photo sensor
	2R x 20C	DIBD160N-3C-2R20C	
	2R x 32C	DIBD260N-3C-64M	④ Com. Ports for RS232(2pcs) and RS485(1pc) ⑤ Duty ratio : 1/16, 1/8, 1/4 ⑥ Options : RS422/485 or LAN converter, Temp./Humidity/ Photo sensor, GPS time receiver, SD memory
	3R x 21C		
	4R x 16C		
	2R x 48C	DIBD500N-3C-4R24C	⑦ Same as above "④⑤" ⑧ CF memory embedded. ⑨ Options : RS422/485 or LAN converter, Temp./Humidity sensor, GPS time receiver ⑩ With Section controllers, it can display up to 16Rx255C(or 510 modules) of LED sign.
4R x 24C			
Full Color Sign Board	2R x 8C	DIBD500N-FC-2R08C	⑪ Same as above "④⑧⑨" ⑫ Duty ratio : 1/8, 1/4
	2R x 16C	DIBD500N-FC-4R08C	⑬ Same as above "④⑧⑨" ⑭ Duty ratio : 1/8, 1/4 ⑮ With Section controllers, it can display up to 16Rx32C(or 160 modules) of LED sign.
	4R x 8C		

☞ **"General LED sign"** is to display general forms(text/graphic/animation) of messages created/converted by the sign software(DIBD Manager) installed in PC.

1.3 Software (installed in PC)

DIBD Manager

This is a software to setup the system configuration, edit Contents(text/graphic/animation, information text), make a Playlist, and upload them to LED sign. You can install this software at PC connected to the LED sign and control the sign single or in a group.

There are several versions which could not be compatible with each other. When you reinstall the software with higher version, you are strongly required to consult the sign manufacturer on the compatibility between you sign controller and the software version.

1.4 Options

Customers can select/buy various options depending on the controller as follows.

Kinds of Options

Options	Names	Remarks
RS	RS-422/485 Converter	This option makes it possible to have a long distance communication or multi-communication by converting the RS-232 signals of sign board controller to RS-422 or RS-485.
LAN	LAN Converter	This option makes it possible to have LAN communication by converting the RS-232 signals of sign board.
SD	SD Memory Card	3-Color controller's memory can be extended, including SD slot. (2GB) Full Color controller has an embedded CF memory as standard.
BD	Switching Signal Conversion Board	This option converts the switching signal 12/24VDC of PLC(Programmable Logical Converter) to 5VDC and then send it to a controller. With this, LED sign board can display various reserved text/graphic messages corresponding to PLC signal.
CdS	Photo Sensor	This option senses the brightness of surroundings and automatically controls the brightness of LED module.
T	Temperature Sensor	This option senses the temperature of surroundings and displays it onto sign board.
T+H	Temperature & Humidity Sensor	This option senses the temperature and humidity of surroundings and displays them onto sign board.
GPS	GPS Time Receiver	This option receives accurate GPS time and displays it onto sign board.
AMP	Amplifier Board	If the distance between controller and LED module is over 5~8 meters, this option amplifies its signal.
BUF	Buffer Board	This option can be sold when there is a need to have additional buffer board instead of basic one provided. Its specification differs, depending on LED module and duty ratio(1/16, 1/4, 1/8).

Applicable Controller

Color	Controller Type	RS	LAN	SD	BD	CdS	T	T+H	GPS	AMP	BUF
3-Color	DIBD120N-3C-1R20C	○	○			○	○	○		○	○
	DIBD160N-3C-2R20C	○	○	○		○	○	○		○	○
	DIBD160-3C-2R20C	○	○	○	○	○	○	○	○	○	○
	DIBD260N-3C-64M	○	○	○		○	○	○	○	○	○
	DIBD500N-3C-4R24C DIBD500P-3C-4R24C	○	○	[1]			○	○	○		○
Full Color	DIBD500N-FC-2R08C		○	[1]			○	○	○		○
	DIBD500N-FC-4R08C DIBD500P-FC-4R08C		○	[1]			○	○	○		○

[1] CF memory card is embedded as standard.

2. Specification of DIBD160

DIBD160 is a controller that stores various data(Contents, Playlist, Parameters, etc.) at its embedded Flash ROM or SD card(option), and makes them displayed on LED sign properly. The specification is as follows.

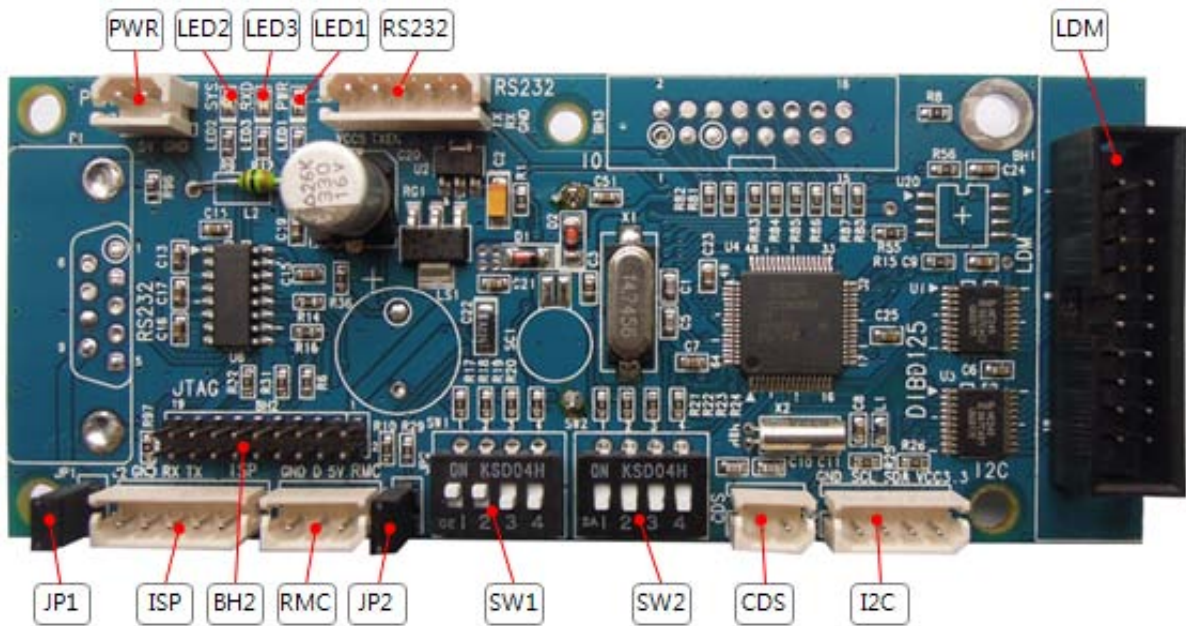


Fig. 2 DIBD160 of 3 Color LED Sign Controller

2.1 Part Description

Items	Description	Items	Description
RS232 (J5)	COM1 communication port <ul style="list-style-type: none"> • 2:RXD,3:TXD,4:TX-EN,5:GND,9:VCC • JP1 : connect COM with 232 by jumper 	PWR	Power Supply(DC 5V)
LED1	Power LED (Red) : Indicating while power ON	ISP (J2)	ISP download COM2 port(additional) for RS232:
LED2	System LED (Green) : Flickering every 500ms under normal condition	CDS	Port for Photo sensor
LED3	RXD LED (Red) : Flickering when receiving Data through comm. port.	I2C	Port for Temp. & Humidity sensor
SW1	DIP Switches for setting up Baud Rate		
SW2	DIP Switches for setting up the sign address (DIBD00~DIBD15)	LDM	Output to LED Module

☞ Other ports are of special purposes.

2.2 DIBD160 Specification

- Main Process 32Bit ARM7 Microcontroller, 256Kbit on chip static RAM, 4Mbit on chip flash program
- Display Processor CPLD, 570LEs
- Range 3 Color LED sign with "2 rows x 20 columns" of modules (16x16 LED dot matrix)
- Scan mode(Duty Ratio) 1/16D, 1/8D, 1/4D
- Display Image format Text/Bitmap/Animation in 3 Color
- Image number to display Max. 115 images(by built-in memory)
- Extended interface Built-in clock
- Options Auto-brightness control sensor, temperature/humidity sensor
- Environments Industrial at -20℃~80℃
- Power consumption DC 5V, Max. 100mA

2.3 Communication Specification

- Topology Asynchronous Link
- Cabling system RS-232(2 ports as default)
RS-422/485 or LAN(by using converter)
- Transmission Mode Full/Half Duplex
- Baud Rate 9,600 / 38,400 / 57,600 /115,200 bps
- Communication Mode N(Parity check), 8(Data bit), 1(Stop bit)
- Signal Pin Name COM1
 - . J5 5Pin Connector - 1:GND, 2:RXD, 3:TXD, 4:TX Enable, 5:VCC
 - . 9Pin Port - 2:RXD, 3:TXD, 5:GND, 4:TX Enable, 9:VCCCOM2
 - . J2 5Pin Connector - 1:GND, 2:RXD, 3:TXD





3. Dip Switch Setting

3.1 Switch 1 – Communication Speed

COM1(**RS-232**) is mainly used for Serial communication port. COM2(**ISP**) is used for ISP download, but it can be used for RS232 communication port as the secondary.






- Setting up the Communication Speed

You can set up the communication speed for COM1 & COM2 by using dip switches #1, #2 of **SW1** as follows.

Dip switches				
Comm. speed	9,600bps	38,400bps	57,600bps	115,200bps

3.2 Switch 2 – DIBD Address

When you use multi-communication(RS422/485), you can set up to 16 addresses of the sign by using dip switches #1~#4 of **SW2**. In case of multi-communication with RS-485, "address 0" shall be used as the master because the command response requested from the master comes back to "address 0".

Dip switches					-----	
Address value	0	1	2	3	-----	15

DIBD120/160 series have only a fixed address of "0" as they do not support multi-communication.

4. Check Points for LED sign

4.1 Check for the DIBD(Controller)

- When the power is supplied to the DIBD, check if Power LED(red) is turned on.
- When the system is working normally, check if System LED(green) is blinking at every 500ms.
- Check if power is stably supplied with 5VDC. Unstable power frequently causes system malfunction.
- Check the insulation between power terminals(+/-) and the sign's body. Poor insulation frequently causes communication error or noise.

4.2 Check for the Communication Status

- A. Confirm the address of PC and DIBD, and check the communication port and the communication speed.
- B. Confirm the settings of wire/wireless communication terminal (or converter), and check the function.
- C. Check the connection of wire/wireless communication line, and confirm the communication distance. As for RS-232 communication, 115,200bps can be achieved at less than 16m of communication distance. Communication speed is inversely proportional to the communication distance. If the communication distance becomes double, the communication speed falls down to the half. As for LAN communication, 10 Mbps will be achieved at less than 100m communication distance.
- D. Try to send simple command packet such as "power on", "power off", and check if LED sign works properly by those commands. And then, try to send bigger size of command packet like "DIBD upload", and check if it works normally also.

4.3 Check for LED modules & the Cabling

- A. Check the connection between connectors and cables.
- B. Check the length of data cable. When the cable is longer than 5~8m, it is recommended to insert Amplifier board between DIBD and buffer board in order to prevent any noise.
- C. Check power supply and part condition of each LED driver for LED module,
- D. Check whether all images are well displayed on the LED Sign without blurred or omitted pixels. Check any short-circuit or disconnection of LED and any foreign objects in LED PCB. If abnormal, try to change LED driver to see any differences of the function.
- E. Check whether the image is naturally displayed on the LED Sign from right to left direction from the front view(See **Fig.3** below).

When you can't see image on the LED modules at "1-2, 1-1" while you see image at "1-6, 1-5, 1-4, 1-3", you need to check the data cable & LED driver between "1-3" and "1-2". It is good practice to change each of cable or driver with good one to troubleshoot.

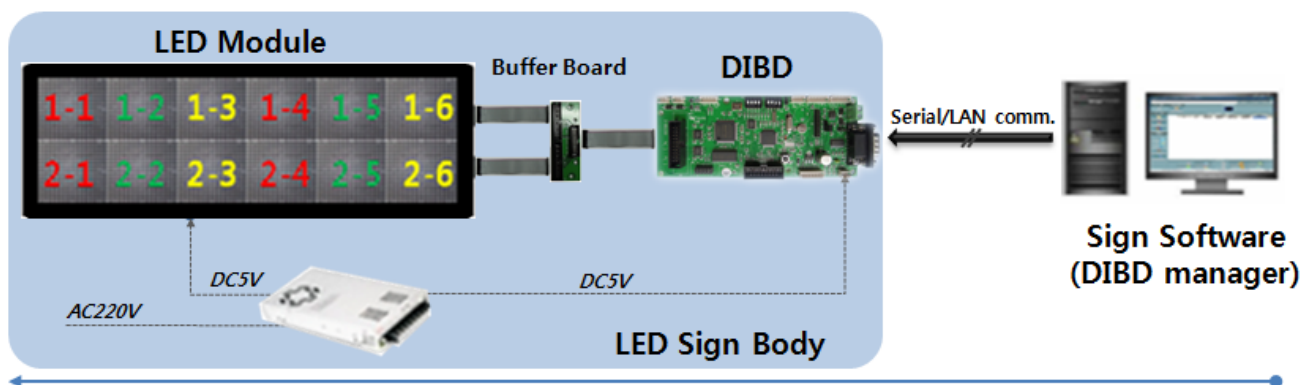


Fig. 3 Data Flow of LED Sign System

Thanks