Hardware Manual for 3 Color LED Sign Controller (DIBD260P-)

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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.

Content

1. General Instruction

1.1 Configuration

DIBD260P is a dedicated controller which can display message data from external system(or server), by DIBD protocol, on up to "4 rows x 16 columns" modules(or 64 modules) of tri-color LED sign. However it can display graphics, animated movies, temperature, counters, and more. Basic configuration is as follows:
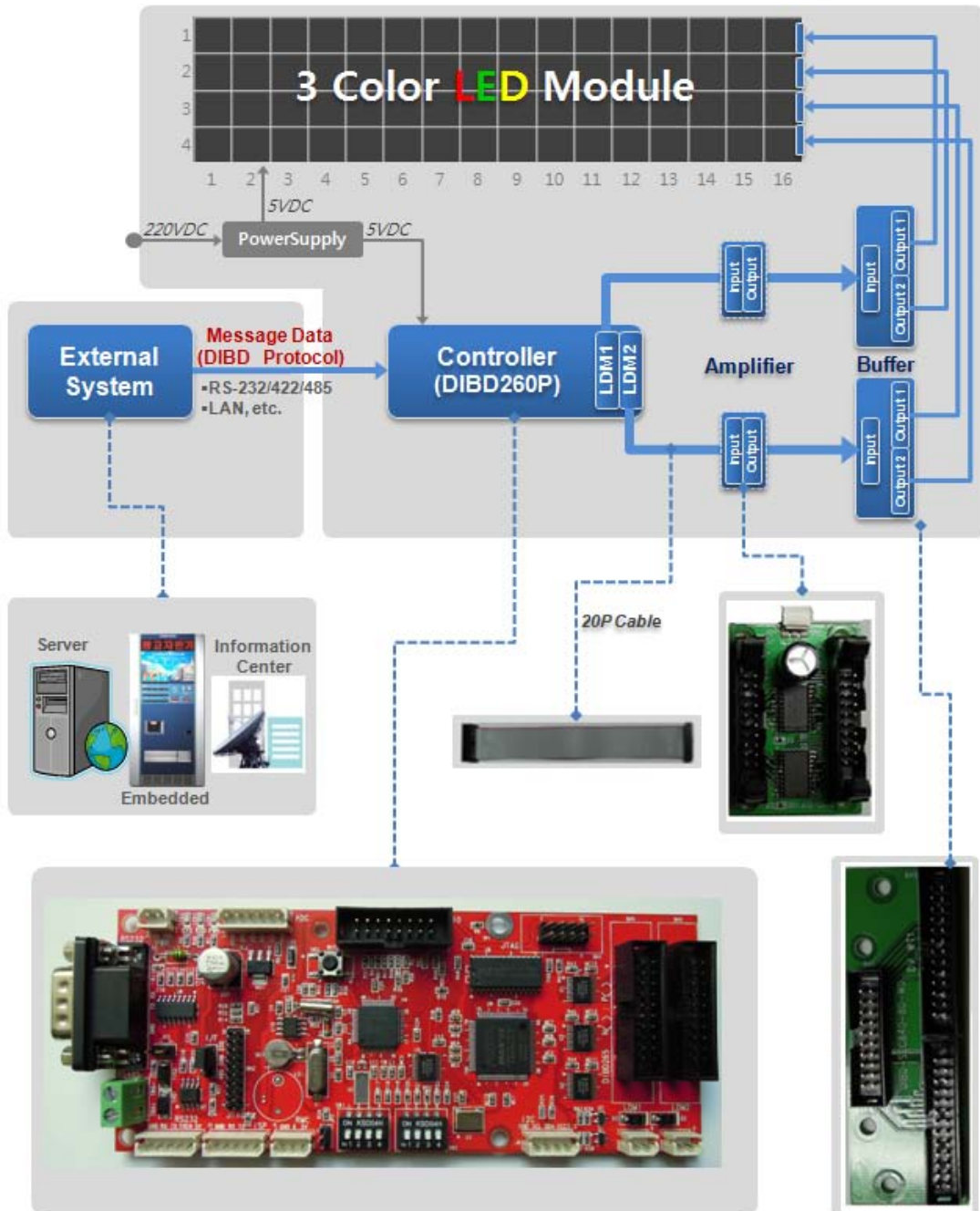
Fig. 1 Configuration of 3 Color LED sign with DIBD260P

- ✓ External System : sends the message data to DIBD in real-time or on a regular basis by DIBD protocol.
- ✓ DIBD(Display Intelligent Board) : There are several types depending on the sign's size and color. Dip switches make it possible to set Baud rate, DIBD Address.
- ✓ Buffer Board : Different one to be delivered depending on LED manufacturer or Duty ratio(1/16D, 1/8D, 1/4D).
- ✓ Amp. Board : is installed when the distance between DIBD and LED exceeds 5~8m in order to prevent 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 for Special LED sign
	2R x 32C 3R x 21C 4R x 16C	**DIBD260P-3C-64M**	⑤ Same as above "①②③"
	2R x 48C 4R x 24C	**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.
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. Generally, the data shall be sent by DIBD protocol format. But, the simple switching signal could be used 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 3R x 21C 4R x 16C	**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
	2R x 48C 4R x 24C	**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.
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 4R x 8C	**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.

☞ **"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 Protocol Simulator : is to help the external message programmer understand the DIBD protocol packet structure well. You can easily write/send message packets in various forms & effects by this simulator and let them displayed on LED sign, and read the real packets from the log window.

DIBD Manager : DIBD manager is editing & operating software for the general LED sign controlled by PC. However, you can use this program for the protocol LED sign when you want to display the message on the sign in more advanced way such as inserting background images, adding Information Text, etc.

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**	O	O			O	O	O		O	O
	DIBD160N-3C-2R20C	O	O	O		O	O	O		O	O
	DIBD220P-3C-2R20C **DIBD260P-3C-64M**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**O**
	DIBD260N-3C-64M	O	O	O		O	O	O	O	O	O
	DIBD500N-3C-4R24C **DIBD500P-3C-4R24C**	O	O	[1]			O	O	O		O
Full Color	**DIBD500N-FC-2R08C**		O	[1]			O	O	O		O
	DIBD500N-FC-4R08C **DIBD500P-FC-4R08C**		O	[1]			O	O	O		O

[1] CF memory card is embedded as standard.

2. Specification of DIBD260

DIBD260 is a controller that stores various data(fonts, message data, images, playlist, parameters) at its embedded Flash ROM or SD card. When receiving message packet from external system, it makes them displayed on LED sign properly. The specification is as follows.
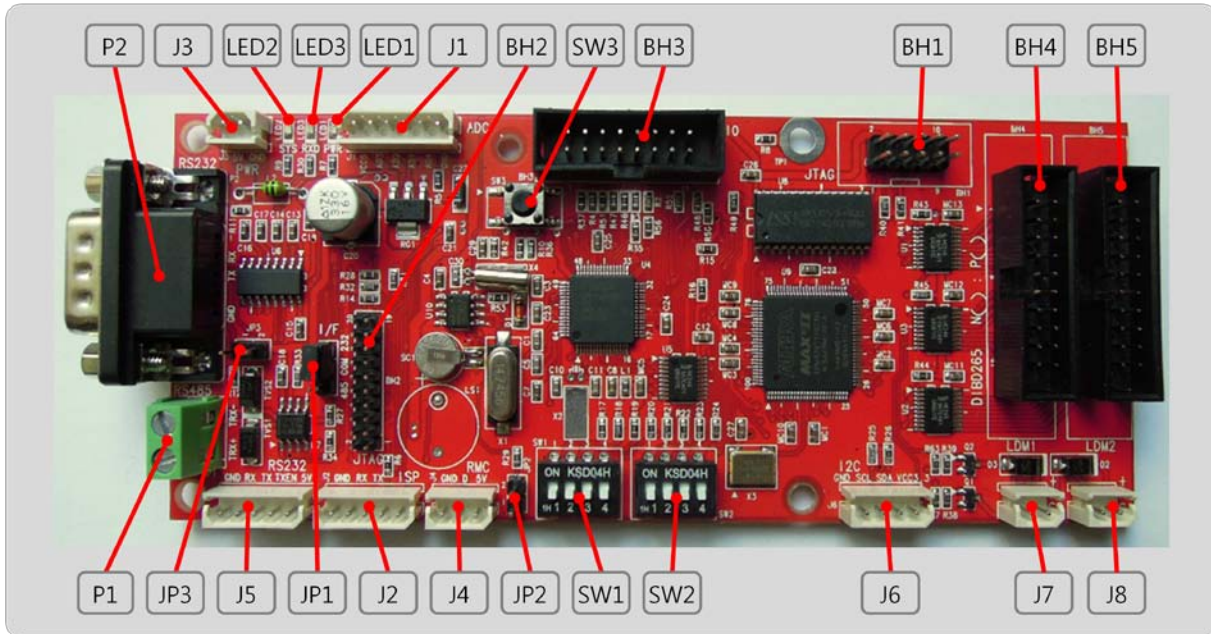

Fig. 2 DIB260 of 3 Color LED Sign Controller

2.1 Part Description

Items	Description	Items	Description
P1	COM1 port for **RS485** · 1:TRX+, 2:TRX- · **JP1** : connect **COM** with **485** by jumper	**P2**	COM1 port for **RS232** · 2:RXD,3:TXD,4:TX-EN,5:GND,9:VCC · **JP1** : connect **COM** with **485** by jumper
LED1	Power LED (**Red**) : Indicating while power ON	**LED2**	System LED (**Green**) : Flickering every 500ms under normal condition
LED3	RXD LED (**Red**) : Flickering when receiving Data through comm. port.	**J1**	ADC : Port for Analog data(#1~4) and Photo sensor(#5,6)
SW1	DIP Switches for setting up **Baud Rate**	**J2**	ISP download COM2 port(additional) for RS232:
SW2	DIP Switches for setting up the **sign address**(DIBD00~DIBD15)	**J3**	Power Supply(DC 5V)
SW3	Reset Switch	**J5**	COM1 port for RS232 Port for GPS time receiver
BH3	IOPORT for Special purpose - SD memory slot	**J6**	Port for Temp. & Humidity sensor
BH4	Output to LED Module	**J7, J8**	Port for controlling external devices: Cooling fan, Lamp, Buzzer..

☞ Other ports are of special purposes.

2.2 DIBD260 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 64 modules(2R32C, 3R21C, 4Row16Column)
- Scan mode(Duty Ratio)   1/16D, 1/8D, 1/4D
- Display Image format   Text/Bitmap/Animation in 3 Color
- Image number to display by built-in memory   Max. 75 images (based on 64 modules of screen)
- Multi-communication   Max. 32 signs supported
- Extended interface   Built-in clock, Two ports for controlling external devices(Cooling fan, Heater, lamp, buzzer), port for analog signal
- Options   Auto-brightness control sensor, temperature/humidity sensor, GPS time receiver, SD memory.
- Environments   Industrial at -20℃~80℃
- Power consumption   DC 5V, Max. 200mA

2.3 Communication Specification

- Topology   Asynchronous Link
- Communication method   RS-232, RS-422, RS-485, LAN
  Multi-communication supported(up to 32 signs)
- 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(RS232) - 1 : GND, 2 : RXD, 3 : TXD
  COM2(RS232) - 2 : RXD, 3 : TXD 5 : GND(4 : TX-EN[1], 9 : VCC[2])
  COM2(RS485) – 1:GND, 2: A(TRX+), 3:B(TRX-)

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[1] TX-EN: This is to control "Enable" state of TXD when sending data by RS422/485 communication mode. Normally it remains at low state of data receiving mode. But when required, it becomes high state mode and sends data to TXD.

[2] VCC: When mounting the LAN converter to **P2** serial port of DIBD, this is used for power supply to the converter. When you short-circuit **JP3** by a jumper, 5VDC is supplied to pin 9 of COM2.

3. Dip Switch Setting

3.1 Switch 1 – Communication Speed

COM1(**PI/P2 or J5**) is mainly used for Serial communication port(RS232/485). COM2(**J2**) 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

DIBD1xx 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)

A. When the power is supplied to the DIBD, check if Power LED(red) is turned on.

B. When the system is working normally, check if System LED(green) is blinking at every 500ms.

C. Check if power is stably supplied with 5VDC. Unstable power frequently causes system malfunction.

D. 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. In case of RS-422/485 multi-communication, DIBD's address shall be set from "address 1" as the PC has already occupied "address 0".

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.
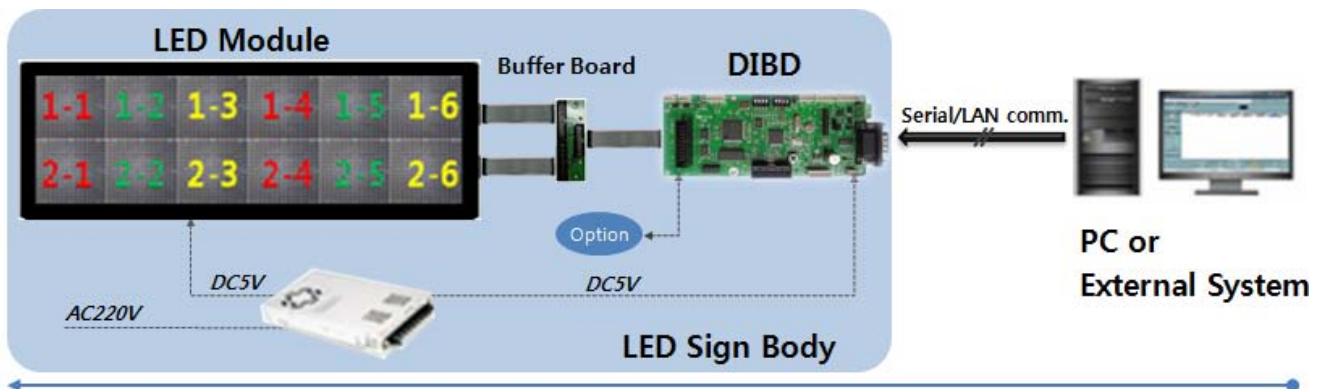
Fig. 3 Data Flow of LED Sign System

Thanks