DIBD Protocol Manual(Ver.5)

LED Sign Communication Protocol

Issued on Feb 27, 2013

※ The screen shot images of this manual may vary, depending on the software version.

Contents

1. DIBD Protocol

1.1 Introduction

The LED sign board that displays the data sent by any customer's system(Server PC, PLC, Embedded System, etc.) is named as the Protocol Sign Board or the Server-Interfaced Sign Board. The data is transmitted in real time or on a regular basis, and the data must be made in the format of Sign Communication Protocol that can be recognized by Sign Controller.
The protocol of Sign Board do not have international standards yet, so every company manufacturing controllers has different protocol that are not understandable at ease and have different display function.

On the other hand, the DIBD(Display Intelligent Board, Product name of Davit Solution Inc.) sign communication protocol has relatively simple structures, as shown below, but has powerful function in displaying messages.

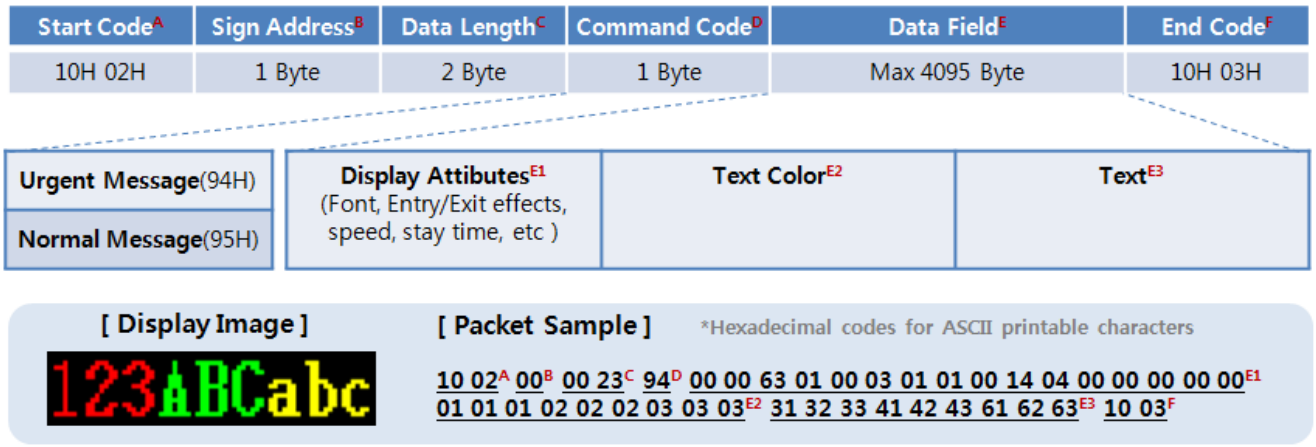

Fig. 1 Packet Structure of DIBD PROTOCOL

If you get to know on DIBD Sign Transmission Protocol through this manual, you can display any type of message in conjunction with your system on the LED sign easily and effectively.

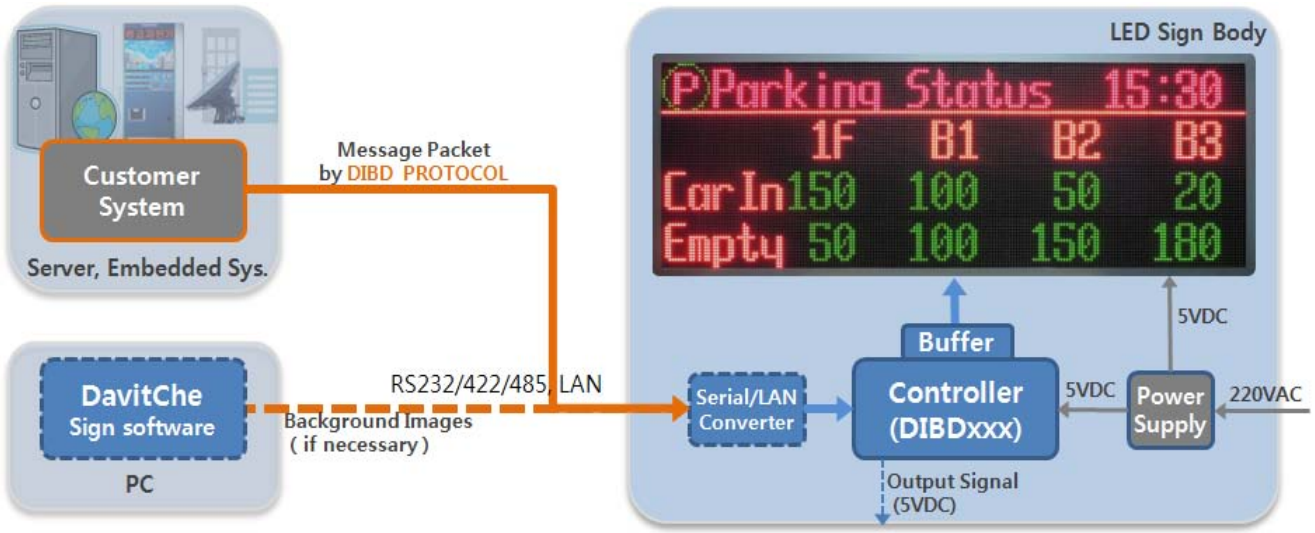

Fig. 2 Block Diagram of DIBD Protocol Sign Board

Customer System	• To send the message packet to the sign in real-time or on a regular basis. Signals(up to DC24V) of relays or SSR from PLC can be directly applicable for displaying the pre-configured stored messages.
DavitChe(if necessary)	• Used as an editing/operating software for the PC controlled LED sign, but also used as an simulating tool and other supporting functions for the Protocol LED sign.
Converter(Optional)	• RS232/485 to be provided as default. RS422 or LAN converter can be used as an option.
DIBD Controller	• Depending on the sign's size and color, different model to be applied.
Buffer Board	• Depending on module's manufacturer and duty ratio, appropriate one to be provided from delivery with controller.
LED module, Power supply	• Partner's(LED sign company or system/engineering company) option with our consultancy.
Output Signal	• To operate a buzzer, signal lamp, etc.

1.2 Features of DIBD Protocol

1. Easy to design the message protocol.

- The structure has been optimized for years to effectively display message data from external system.
- Using the **DavitChe software**, you can simulate various message, and read the real packets from the Log window.
- The **sample source** file we provide allows programmers of external system easily and quickly to program their message protocol.

2. Possible to display various types of messages.

- It is possible to split the screen into sections, and display texts on the position you want to put with different effect.
- Various languages and fonts are supported.
- Various message options can be applied depending on your needs.
  - ① To display single set of message data in real-time by Urgent Message code.
  - ② To display multiple set of message data in registered order by Normal Message code.
  - ③ To display message data by using both Urgent & Normal Message codes.
  - ④ To add background image, or to display text/graphic images for advertisement or information.

3. The DIBD controller has good adaptability and versatility.

- Only by replacing buffer board, the DIBD controller can be applied to any manufacturer of LED module. However, technical consultation with us is required, in advance, to develop the proper buffer board.
- A single DIBD220P controller can be applied to the resolution of sign up to "320 pixels wide x 32 pixels high". The sign over the resolution can be displayed by DIBD260P, DIBD500P.
- Various communication interfaces, options and additional functions are supported.
  Ex.) RS422/485 converter, LAN converter, SD Memory Card, Analog/Digital Time Display, Temperature/Humidity Display, CdS sensor for auto brightness control, etc.

2. Format of DIBD Protocol

2.1 Standard Format

- **Format of Protocol[1] Packet[2]**

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX
A		B	C	D	E	F	

Ex.) Packet for synchronizing time of the LED sign with that of PC.

Command: 10 02 00 00 08 41 12 04 20 05 21 58 39 10 03
A B C D E F

Return: 10 02 00 00 02 47 00 10 03 ☞The numerals indicate hexadecimal.
A B C D E F

- **Command Packet Format**

Indication	Length	Description
A	2 byte	DLE(10H[3]) STX(02H) indicates Start of DIBD Protocol.
B	1 byte	DST means **DeST**ination to send the packet. In case of using the single sign, address "00" shall be used for that. In case of using the multiple signs, the address shall be assigned from 01H(1) to 1FH(31), as address "00" shall be used as the master(PC).
C	2 byte	LEN(length) indicates the total byte length from CMD to DATA inclusive. When receiving the command packet, the sign counts the number of bytes and compares with this number. If they are not the same, the transmission is considered to be failed. With Bit 0~11, it can check up to 4096(2^{12}) while Bit 12~15 is used for other special purposes like "Replay packet disabled", "CRC Error Detection", "byte Stuffing".
D	1 byte	There are several kinds of Command codes as below: **Message Command Codes** • **94H** - Urgent Message Command • **95H** - Normal Message Command **Special Function Command Codes** • **6AH** - Checking the Communication • **4AH** - Setting Screen Size/Color • **41H** - Turning ON/OFF the Screen • **47H** - Time Synchronization • **66H** - Reading the Sign's Time • **4EH** - Generating Output Signal • **4FH** - Importing Background Image • Etc.
E	Variable	DATA field format is dependent on the preceding Command Code. As for Message Command Code, it is divided into three parts; Display Attributes, Text Color, Text.
F	2 byte	DLE(10H) ETX(03H) indicates "End of DIBD protocol".

- **Replay packet Format**

Indication	Length	Description
A	2 byte	DLE(10H) STX(02H) indicates Start of DIBD Protocol Packet.
B	1 byte	DST means **DeST**ination to send the packet. All LED signs responds the Replay packet to the master "00".
C	2 byte	LEN(length) indicates the number of data bytes.
D	1 byte	CMD indicates the Command code.
E	Variable	DATA is the replay contents for the command. Generally this will be shown as "00H".
F	2 byte	DLE(10H) ETX(03H) indicates "End of DIBD protocol".

- DIBD Protocol[1] Packet[2] consists of Command Packet and Replay Packet.
  The master(PC or external system) sends the command packet to LED sign controller, and the controller(DIBD) will send back the replay packet.
- Having 1024 bytes of ring buffer, the DIBD can receive bigger data than 1024 bytes perfectly.
- DIBD has two communication ports(COM1, COM2) which have the same function.
- If the DIBD does not receive any consecutive data within 200ms, it judges as an communication error and prepares to receive another command.
- The Normal Message packet is written in DIBD's flash ROM within milliseconds, while the Urgent Message packet is written in DIBD's RAM without delay. Thus, in order to secure the writing time, Normal Message needs at least 100ms of delay before sending the Replay packet, while Urgent Message do not need any delay time for the Replay packet.
- DIBD220P provides two communication Ports(COM1 for RS485, COM2 for RS232) as standard. Their function is the same. When using RS422 or LAN communication, you needs to add an proper converter before the controller as optional.
- LED sign communication baud rate is **115,200BPS, 8 data bit, 1 stop bit.**
- While Serial communication is simple and economic, it is susceptible to external noise. Under normal circumstances, the serial communication will have no problem with DIBD standard protocol format because the simple packet can detect any communication error by itself. But under the severe noisy circumstance, we recommend you to apply CRC16 to detect any communication error more precisely. For details, please send us an email at davitsol@gmail.com.

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[1] Protocol : A communications protocol is a system of digital message formats and rules for exchanging those messages in or between computing systems and in telecommunication. Protocols may include signaling, authentication and error detection and correction capabilities.

[2] Packet : Packet is a chunk of communication data which can be sent at a time for easy communication through computer networking. In general it consists of Header part and Data part. Header part includes information for control and destination

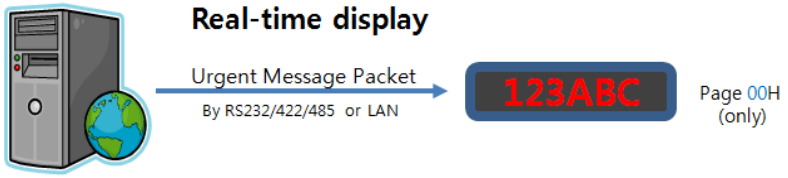
[3] "H" of "10H, 03H" indicates Hexadecimal.

3. Message Command Packets

3.1 Kinds of Message Commands

There are two kinds of message command: Urgent Message and Normal Message. They can be used respectively or together depending on the application.

Urgent Message Command(94H)

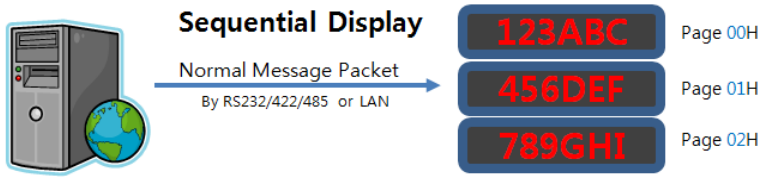


Step1 : Send the message packet with this command code, and the message will be displayed on the sign **in real time** for the set number of times or until receiving another packet.

Ex. "10 02 00 00 1D **94** **00** 00 63 01 00 03 01 01 00 32 04 00 00 00 00 00 01 01 01 01 01 01 31 32 33 41 42 43 10 03 "

☞ As this packet is stored in RAM of the controller, it will be deleted when the sign's power turns off.

Normal Message Command(95H)



Step1: Initially, send the command(4CH) packet **to register the total page of memory slot**.

Ex. "10 02 00 00 02 **4C 03** 10 03" // allocate 3 pages of memory slot(See Chapter 3.3.2)

Step2: Send multiple message packets with this command code with different page number, and they will be displayed on the sign **sequentially and repeatedly** according to the page number(00/01/02).

Ex."10 02 00 00 1D **95** **00** 00 63 00 00 03 01 01 00 32 04 00 00 00 00 00 01 01 01 01 01 01 31 32 33 41 42 43 10 03" // for page 00
"10 02 00 00 1D **95** **01** 00 63 01 00 03 01 01 00 32 04 00 00 00 00 00 01 01 01 01 01 01 34 35 36 44 45 46 10 03" // for page **01**
"10 02 00 00 1D **95** **02** 00 63 01 00 03 01 01 00 32 04 00 00 00 00 00 01 01 01 01 01 01 37 38 39 47 48 49 10 03" // for page **02**

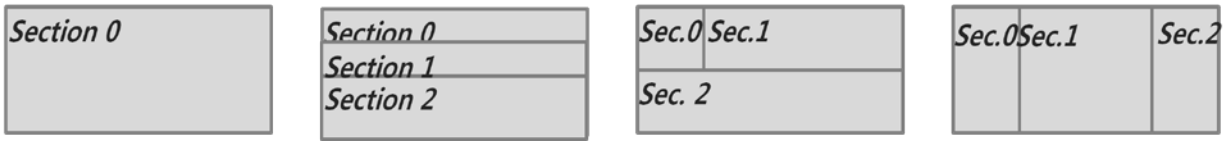
☞ You can change/update the message data for each page, anytime or on a regular basis.

☞ As these packets are stored in the flash memory, they will be saved regardless of the power ON/OFF.

☞ The memory slot can reset by sending the memory deletion command packet.(See Chapter 3.3.3)

Common Display Attributes of the two above

☞ In order to display different message with different effect on a screen(or page), you can divided that into up to three sections by setting X/Y-start/end position of the screen at a 4 pixel-unit.
In this case, you need to send the different message packet for each section. (See Attach.2)



☞ Various font size/color, entry/exit effect for the message can be applicable.

☞ When you create a DIBD BG Playlist with text/graphic/animation files and send it to the sign controller, you can assign any content of the list to use as a background image for Urgent/Normal Message.
This function makes it possible to display various logos, outline images, stylish text/animation, etc.

3.2 Urgent Message Command

3.2.1 Format of Urgent Message Packet

When you send a message packet by command code "94H", the message will be **immediately** displayed on the LED sign.

Sample Image ▶ 

Packet ▼

Command: 10 02 00 00 27 94[0] 00[1] 00[2] 01[3] 01[4] 00[5] 03[6] 01[7] 01[8] 00[9] 32[10] 08[11] 00[12] 00[13] 00[14] 00[15] 00[16]
01 01 01 01 02 02 02 02 03 03 03[17] 31 32 33 20 41 42 43 20 61 62 63[18] 10 03
Replay : 10 02 00 00 02 94 00 10 03

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX
10	02	00	00 27			10	03

Total 39(27H) bytes

CMD		1 byte	94[0]
DATA	Display Attributes	16 bytes(fixed)	00[1] 00[2] 01[3] 01[4] 00[5] 03[6] 01[7] 01[8] 00[9] 32[10] 08[11] 00[12] 00[13] 00[14] 00[15] 00[16]
	Text Color	11 bytes(Variable)	01 01 01 01 02 02 02 02 03 03 03[17]
	Text Message	11 bytes(Variable)	31 32 33 20 41 42 43 20 61 62 63[18]

No	Items	Length	Description
94[0]	Command Code	1 Byte	**94H** Command code for Urgent Message, Real-time display for a single page 95H Command code for Normal Message, Sequential display for multi-pages
00[1]	Page Number	1 Byte	• Disabled(**00H**) in Urgent Message code
00[2]	Section Number	1 Byte	• When you want to display different message in different position with different effect in the same screen, you can divided the screen into sections by assigning the Section Number and setting the X/Y coordinate values as Items #12~15 below. Hex value: **00H** / 01H / 02H Section number: 0 / 1 / 2 ☞ For more details, refer to "Attach.1. Example of Section Division".
01[3]	Display Control	1 Byte	• This is how to display the section message. At OFF mode, the section will be disabled. Hex value: 00H / **01H** / 02H / 03H / ~ / 62H / 63H Parameters: OFF / 1 time / 2 times / 3 times / ~ / 62 times / ON • **OFF** : "No display" **numerals** : the number of times the message shall be displayed. • **ON** :"Continuous display until receiving new message packet".
00[4]	Display Method	1 Byte	**00H** Normal: This is to start displaying the message on completion of the currently displaying message. 01H Clear: This is to immediately clear the currently displaying message and start displaying the new message.

<table>
<tr><td>00[5]</td><td>Text Code</td><td>1 Byte</td><td>
<table>
<tr><td>00H</td><td>ASCII</td><td>To display ASCII Characters(1 byte) or User Font(2 bytes).
☞ See "Attachment 2. ASCII Character Code"</td></tr>
<tr><td>01H</td><td>Unicode</td><td>To display Unicode Font(2 bytes) for Chinese, Japanese, etc.
For this application, we provide additional guidance on your request.</td></tr>
</table>
</td></tr>
<tr><td>03[6]</td><td>Font Size</td><td>1 Byte</td><td>
• Font size indicates pixels in "Width x Height" based on the size of Korean/Chinese/Japanese character.
ASCII characters(alphabets, numerals, etc) are half of the pixel in width.
Ex.) When "16x16 font" selected, numerals and alphabets has "08x16 pixels".
<table>
<tr><td>Hex value</td><td>02H</td><td>03H</td><td>04H</td><td>05H</td><td>06H</td><td>~</td><td>0FH</td></tr>
<tr><td>Font(Pixel)</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td>~</td><td>64</td></tr>
</table>
</td></tr>
<tr><td>01[7]</td><td>Entry Effect</td><td>1 Byte</td><td>
• This is to set up the appearing effect of the message to the section screen.
"01H" indicates "Stop effect(Static effect) with no direction".
☞ See "Attach.3. Codes of Message Display Effect".
• A text message longer then the screen width shall be set up to "06H(Shifting to Left)" for Entry Effect.
</td></tr>
<tr><td>01[8]</td><td>Exit Effect</td><td>1 Byte</td><td>
• You can set up the exiting effect of the message from the section screen.
"01H" indicates "Static effect(Static effect) with no direction".".
☞ See "Attach.3. Codes of Message Display Effect".
• A text message longer then the screen width shall be set up to "06H(Shifting to Left)" for Exit Effect.
</td></tr>
<tr><td>00[9]</td><td>Assistant Effect</td><td>1 Byte</td><td>• Disabled(00H)</td></tr>
<tr><td>32[10]</td><td>Effect Speed</td><td>1 Byte</td><td>
• This is to set up the relative speed of effect.
The lower the number, the fastest the speed is.
<table>
<tr><td>Hex value</td><td>00H</td><td>0AH</td><td>14H</td><td>1EH</td><td>28H</td><td>32H</td><td>3CH</td><td>~</td><td>FFH</td></tr>
<tr><td>Speed</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>~</td><td>255</td></tr>
</table>
</td></tr>
<tr><td>08[11]</td><td>Stay Time</td><td>1 Byte</td><td>
• This is to set up the stay time of the message on the screen after appearing onto the sign with Entry Effect.
<table>
<tr><td>Hex value</td><td>00H</td><td>02H</td><td>04H</td><td>08H</td><td>0AH</td><td>0FH</td><td>14H</td><td>~</td><td>EFH</td></tr>
<tr><td>x 0.5 Sec</td><td>0</td><td>2</td><td>4</td><td>8</td><td>10</td><td>15</td><td>20</td><td>~</td><td>239</td></tr>
</table>
<table>
<tr><td>Hex Value</td><td>FOH</td><td>F1H</td><td>F2H</td><td>F3H</td><td>F4H</td><td>F5H</td><td>F6H</td><td>F7H</td><td>F8H</td></tr>
<tr><td></td><td>2Min.</td><td>3Min.</td><td>5Min.</td><td>10Min.</td><td>30Min.</td><td>1Hour</td><td>3Hours</td><td>5Hours</td><td>9Hours</td></tr>
</table>
• A text message longer then the screen is recommended to set up to "00H" so that it can move from right-end to left-end smoothly without staying in the mid-sentence.
</td></tr>
<tr><td>00[12]</td><td>X-Start Position</td><td>1 Byte</td><td rowspan="4">
• This is to set up the coordinate values for each section.
<table>
<tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td><td>03H</td><td>04H</td><td>05H</td><td>06H</td><td>07H</td><td>~</td></tr>
<tr><td>Pixels</td><td>0</td><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td></td></tr>
</table>
• Each coordinate can be set by a 4-pixel unit from top & left end to the opposite.
☞ See "Attach.1. Example of Section Division".
• "00H" is a default value for the full screen not divided.
</td></tr>
<tr><td>00[13]</td><td>Y-Start Position</td><td>1 Byte</td></tr>
<tr><td>00[14]</td><td>X-End Position</td><td>1 Byte</td></tr>
<tr><td>00[15]</td><td>Y-End Position</td><td>1 Byte</td></tr>
<tr><td>00[16]</td><td>Background Image</td><td>1 Byte</td><td>• Once you register background image(Text/graphic/video) in BG Playlist(*.bgp), here you can set up the background image number to display together with text message.</td></tr>
</table>

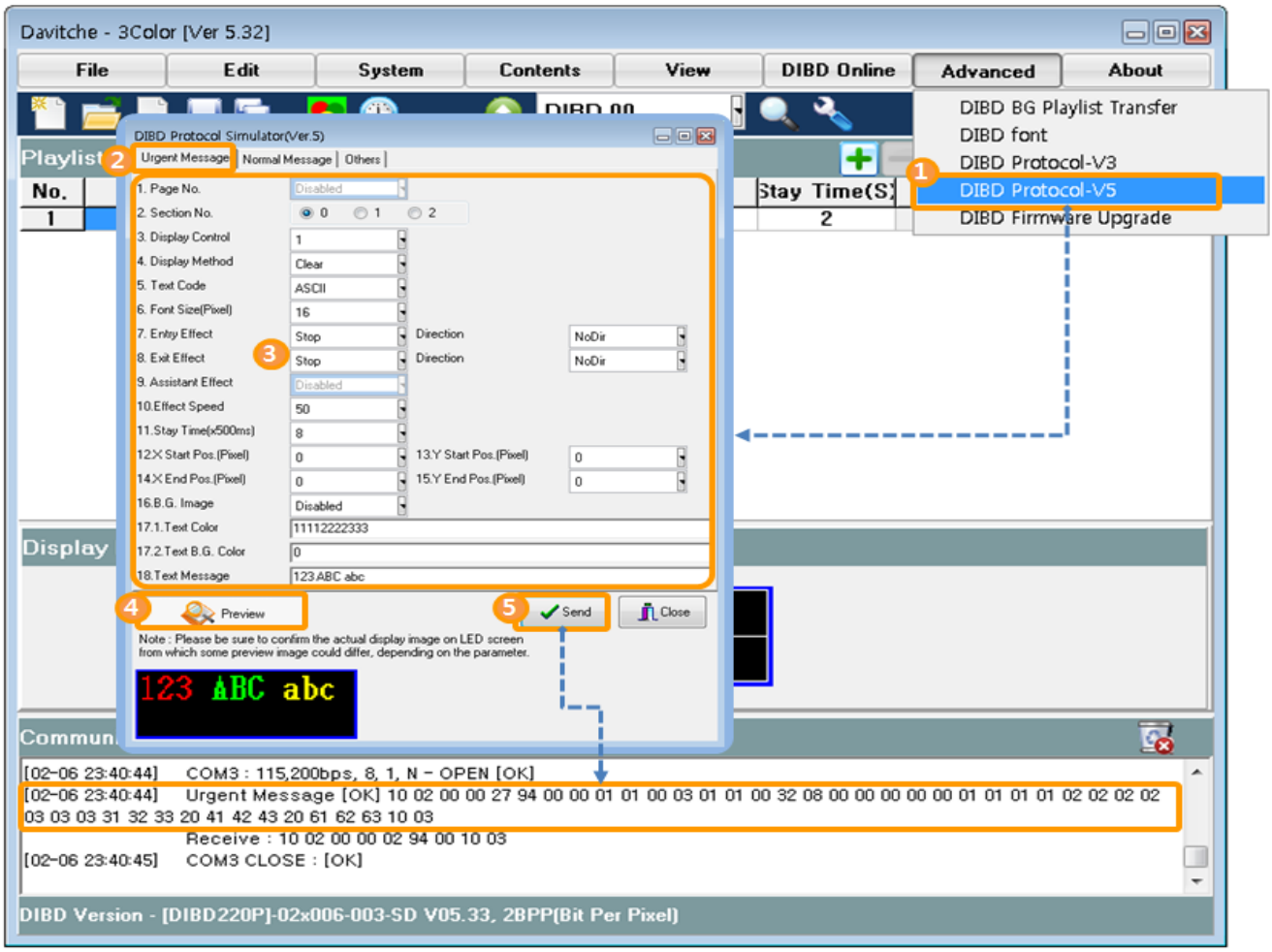
<table>
<tr><td></td><td></td><td></td><td>☞ See "Attach.5. How to Make the Background Playlist".
<table><tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td><td>03H</td><td>04H</td><td>~</td><td>20H</td></tr><tr><td>Img number</td><td>Not used</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>~</td><td>#20</td></tr></table>• You can set the background image number only at Section 0, not at Section 1 or 2.</td></tr>
<tr><td>01
01
01
01
02
02
02
02
03
03
03¹⁷</td><td>Text Color

Text B.G. Color</td><td>n Byte
(Variable)</td><td>• This is to set up the color or the background color of individual text.
<table><tr><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr><tr><td>Dummy</td><td colspan="3">Bits for background color</td><td>Dummy</td><td colspan="3">Bits for text color</td></tr></table>Example) "12H" indicates "1": red for background color of text, green for text color.
"01H" indicates "T" : none for background color, red for text color.
• Color code
<table><tr><td>Code</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Color</td><td>None</td><td>Red</td><td>Green</td><td>Yellow</td><td>Blue</td><td>Magenta</td><td>Cyan</td><td>White</td></tr></table>• Length of this color code(#17) is always the same with that of Text Message(#18).
• Under ASCII code(#5) mode, the color code has 1 byte for alphabetic & numeric characters, 2 bytes for User's font.
Example) #17.1 Text Color : "1111122223333" #17.2 Text BG Color : "0"
<table><tr><td>Sample Text</td><td>1</td><td>2</td><td>3</td><td></td><td>A</td><td>B</td><td>C</td><td></td><td>a</td><td>b</td><td>c</td></tr><tr><td>Color code</td><td>01</td><td>01</td><td>01</td><td>01</td><td>02</td><td>02</td><td>02</td><td>02</td><td>03</td><td>03</td><td>03</td></tr></table>• Under Unicode(#5) mode, the color code has 2 bytes for every font.
• When you use "12" of font size(#6), option for background color will be disabled.</td></tr>
<tr><td>31
32
33
20
41
42
43
20
61
62
63¹⁸</td><td>Text Message</td><td>n Byte
(Variable)</td><td>The actual text to be displayed on a sign. This could be one of the following font codes.
• ASCII Character Code (See Attachment. 3)
<table><tr><td>Length</td><td>Hex Value</td><td>Text Type</td></tr><tr><td>1 Byte</td><td>00H~7FH</td><td>Alphabet, Numerals, special symbols</td></tr><tr><td>2 Byte</td><td>B0A1H~C8FEH</td><td>Korean character, KSC5601 Code</td></tr></table>Example) #18 Text Message : "31 32 33 20 41 42 43 20 61 62 63"
<table><tr><td>Sample Text</td><td>1</td><td>2</td><td>3</td><td></td><td>A</td><td>B</td><td>C</td><td></td><td>a</td><td>b</td><td>c</td></tr><tr><td>Text Code</td><td>31</td><td>32</td><td>33</td><td>20</td><td>41</td><td>42</td><td>43</td><td>20</td><td>61</td><td>62</td><td>63</td></tr></table>• Unicode (Additional guidance to be provided on request)
<table><tr><td>Length</td><td>Hex Range</td><td>Text Type</td></tr><tr><td rowspan="5">2 Bytes</td><td>0000H~007FH</td><td>English Alphabet</td></tr><tr><td>3040H~309FH</td><td>Japanese Hiragana</td></tr><tr><td>30A0H~30FFH</td><td>Japanese Katakana</td></tr><tr><td>4E00H~9FFFH</td><td>CJK common kanji</td></tr><tr><td>AC00H~D7A3H</td><td>Hangul(Korean)</td></tr></table>• Costume(user) code (Additional guidance to be provided when necessary)
<table><tr><td>Length</td><td>Hex Value</td><td>Text Type</td></tr><tr><td>2 Bytes</td><td>E000H~E0FFH</td><td>Special marks & signs made by user can be used.</td></tr></table></td></tr>
</table>

3.2.2 Simulating the Urgent Message Packet

In case the sign is connected with a PC, by using the Divitche software, you can send various message packets to the sign and confirm the actual display image. For this simulation, you are required to perform “Chapter 4.1 & 4.2” in advance. Below are the simulating procedure for the LED sign configured by “2 rows x 6 columns, tri-color LED modules” as an example.

Note: You can download the software from www.davitsol.com > Download > software.



① To open “DIBD Protocol Simulator(Ver.5), select **[Advanced] > [DIBD Protocol-V5]** from the Davitche.

② Click on “Urgent Message” tab.

③ Set up the parameters and input the texts, as below.

Items	Values to set/input	Items	Values to set/input
1. Page No.	Disabled	10. Effect Speed	**50**
2. Section No.	**0**	11. Stay Time (x 500ms)	**8** (8 x 500ms = 4 seconds)
3. Display Control	**1**	12/13. X,Y Start Position	**0, 0** (Default)
4. Display Method	**Clear**	14/15. X,Y End Position	**0, 0** (Default)
5. Text Code	**ASCII**	16. B.G. Image	Disabled
6. Font Size(Pixel)	**16**	17.1 Text Color	**111122223333**
7. Entry Effect/Direction	**Stop / NoDir**	17.2 Text B.G. Color	**0**
8. Exit Effect/Direction	**Stop / NoDir**	18. Text Message	**123 ABC abc**

④ Click on **[Preview]** to preview the display image. Note: The preview here is your reference only.

⑤ Click on **[Send]**, and you will see the actual display image on the LED sign and the transmission packet on the log window as below.

```
Urgent Message [OK] 10 02 00 00 27 94 00 00 01 01 00 03 01 01 00 32 08 00 00 00 00 00 01 01 01 01 02 02 02 02 03 03 03
                    31 32 33 20 41 42 43 20 61 62 63 10 03
Receive : 10 02 00 00 02 94 00 10 03
```

⑥ You can simulate various messages by changing the parameters & texts.

3.2.3 Examples of Urgent Message Packet

With these sample packets, we hope you could get better understanding on DIBD Protocol.

These samples are for the LED sign, "2 rows x 6 columns, tri-color LED modules, 16x16 dot matrix"

Start Code	Sign Address	Data Length	Command Code	Data Field (Max. 4095 Byte)			End Code
				Display Attributes	Text Color	Text	
10H 02H	1 Byte	2 Bytes	**94H**	16 Bytes	N bytes	N bytes	10H 03H

	Display Image	Section No.	Message Packets
①		**00**	10 02 00 00 17 **94** 00 **00 01** 00 00 03 **01 01** 00 32 **08** **00 00 00 00** 00 01 01 01 31 32 33 10 03
②		**00**	10 02 00 00 41 **94** 00 **00 63** 01 00 03 **01 01** 00 32 00 **00 00 00 00** 00 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 01 31 32 33 20 41 42 43 20 61 62 63 20 34 35 36 20 44 45 46 20 64 65 66 20 10 03
③		**00**	10 02 00 00 41 **94** 00 **00 63** 01 00 03 **01 01** 00 32 00 **00 00 00 00** 00 01 01 01 01 03 03 03 03 02 02 02 02 01 01 01 01 03 03 03 03 02 02 02 02 31 32 33 20 41 42 43 20 61 62 63 20 34 35 36 20 44 45 46 20 64 65 66 20 10 03
④		**00** (1st line)	10 02 00 00 25 **94** 00 **00 63** 00 00 03 **01 01** 00 32 00 **00 00 18 04** 00 01 01 01 01 01 01 01 01 01 30 31 32 33 34 35 36 37 38 39 10 03
		01 (2nd line)	10 02 00 00 43 **94** 00 **01 63** 00 00 03 **06 06** 00 32 00 **00 04 18 08** 00 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 20 20 20 20 20 20 20 20 20 20 10 03
⑤		**00**	10 02 00 00 2F **94** 00 **00 63** 00 00 **07 06** 06 00 32 00 00 00 00 00 00 03 03 03 03 03 03 03 03 03 03 03 03 03 03 31 32 33 20 41 42 43 20 61 62 63 20 20 20 20 10 03

☞ "①" is to display a message, one time(01H) only, without any effect(01H, 01H), for 4 seconds(08H), on the full screen(00H 00H 00H 00H).

☞ "②③" is to display a message until receiving another message packet(63H), without any effect(01H, 01H), on the full screen(00H 00H 00H 00H).

☞ "④" is to divide the screen into two sections(1st line, 2nd line) and display different message on each section with different effect.

"Section 00(1st line)" is to display a message until receiving another message packet(63H), without any effect(01H, 01H) on Section 00(00H 00H 18H 04H).

"Section 01(2nd line)" is to display a message longer than the screen width, repeatedly until receiving another message packet(63H), with effect of shifting to left(06H, 06H), on Section 01(00H 04H 18H 08H).

☞ "⑤" is to display a message longer than the screen width, repeatedly until receiving another message packet(63H), by big font(07H), with effect with shifting to left(06H, 06H), on a full screen(00H 00H 00H 00H).

3.3 Normal Message Command

3.3.1 Format of Normal Message Packet

When you send multiple message packets by command code "95H" with different page number(00/01/02), they will be displayed on the sign **sequentially and repeatedly** according to the page number.

Sample Image ▶ 

Packet ▼

Command: 10 02 00 00 27 95[0] 00[1] 00[2] 63[3] 01[4] 00[5] 03[6] 01[7] 01[8] 00[9] 32[10] 08[11] 00[12] 00[13] 00[14] 00[15] 00[16]
01 01 01 01 02 02 02 02 03 03 03[17] 31 32 33 20 41 42 43 20 61 62 63[18] 10 03

Return : 10 02 00 00 02 95 00 10 03

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX
10	02	00	00 27			10	03

Total 39(27H) bytes

CMD		1 byte	95[0]
DATA	Display Attributes	16 bytes(fixed)	00[1] 00[2] 63[3] 01[4] 00[5] 03[6] 01[7] 01[8] 00[9] 32[10] 08[11] 00[12] 00[13] 00[14] 00[15] 00[16]
	Text Color	11 bytes(Variable)	01 01 01 01 02 02 02 02 03 03 03[17]
	Text Message	11 bytes(Variable)	31 32 33 20 41 42 43 20 61 62 63[18]

<table>
<tr><th>No</th><th>Items</th><th>Length</th><th>Description</th></tr>
<tr><td>95[0]</td><td>Command Code</td><td>1 Byte</td><td>
<table>
<tr><td>94H</td><td>Command code for Urgent Message, Real-time display for a single page</td></tr>
<tr><td>95H</td><td>Command code for Normal Message, Sequential display for multi-pages</td></tr>
</table>
</td></tr>
<tr><td>00[1]</td><td>Page Number</td><td>1 Byte</td><td>• You can set up to "three" to send multiple message packets at a time. They will be displayed on the sign according to this page number sequentially and repeatedly.
<table>
<tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td></tr>
<tr><td>Page number</td><td>0</td><td>1</td><td>2</td></tr>
</table>
</td></tr>
<tr><td>00[2]</td><td>Section Number</td><td>1 Byte</td><td>• When you want to display different message in different position with different effect in the same screen, you can divided the screen into sections by assigning the Section Number and setting the X/Y coordinate values as Items #12~15 below.
<table>
<tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td></tr>
<tr><td>Section number</td><td>0</td><td>1</td><td>2</td></tr>
</table>
☞ For more details, refer to "Attach.1. Example of Section Division".</td></tr>
<tr><td>63[3]</td><td>Display Control</td><td>1 Byte</td><td>• This is to determine whether the section shall be displayed or not.
<table>
<tr><td>Hex value</td><td>00H</td><td>63H</td></tr>
<tr><td>Parameters</td><td>OFF (no display)</td><td>ON (always display)</td></tr>
</table>
</td></tr>
<tr><td>01[4]</td><td>Display Method</td><td>1 Byte</td><td>
<table>
<tr><td>00H</td><td>Normal</td><td>This is to start displaying the message when completion of the currently displaying message.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>01H</td><td>Clear</td><td>This is to immediately clear the currently displaying message and start displaying the new message.</td></tr>
</table>
</td></tr>
<tr><td>00[5]</td><td>Text Code</td><td>1 Byte</td><td>
<table>
<tr><td>00H</td><td>ASCII</td><td>To display ASCII Characters(1 byte) or User Font(2 bytes).
☞ See "Attachment 2. ASCII Character Code"</td></tr>
<tr><td>01H</td><td>Unicode</td><td>To display Unicode Font(2 bytes) for Chinese, Japanese, etc.
For this application, we provide additional guidance on your request.</td></tr>
</table>
</td></tr>
<tr><td>03[6]</td><td>Font Size</td><td>1 Byte</td><td>
• Font size indicates pixels in "Width x Height" based on the size of Korean/Chinese/Japanese character.
ASCII characters(Alphabets, numerals, etc) are half of the pixel in width.
Ex.) When "16x16 font" selected, alphabets and numerals has "08x16 pixels".
<table>
<tr><td>Hex value</td><td>02H</td><td>03H</td><td>04H</td><td>05H</td><td>06H</td><td>~</td><td>0FH</td></tr>
<tr><td>Font(Pixel)</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td>~</td><td>64</td></tr>
</table>
</td></tr>
<tr><td>01[7]</td><td>Entry Effect</td><td>1 Byte</td><td>
• This is to set up the appearing effect of the message to the section screen.
"01H" indicates "Stop effect(Static effect) with no direction".
☞ See "Attach.2. Codes of Message Display Effect".
• A text message longer then the screen width shall be set up to "06H(Shifting to Left)" for Entry Effect.
</td></tr>
<tr><td>01[8]</td><td>Exit Effect</td><td>1 Byte</td><td>
• You can set up the exiting effect of the message from the section screen.
"01H" indicates "Static effect(Static effect) with no direction".".
☞ See "Attach.2. Codes of Message Display Effect".
• A text message longer then the screen width shall be set up to "06H(Shifting to Left)" for Exit Effect.
</td></tr>
<tr><td>00[9]</td><td>Assistant Effect</td><td>1 Byte</td><td>• Disabled(00H)</td></tr>
<tr><td>32[10]</td><td>Effect Speed</td><td>1 Byte</td><td>
• This is to set up the relative speed of effect.
The lower the number, the fastest the speed is.
<table>
<tr><td>Hex value</td><td>00H</td><td>0AH</td><td>14H</td><td>1EH</td><td>28H</td><td>32H</td><td>3CH</td><td>~</td><td>FFH</td></tr>
<tr><td>Speed</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>50</td><td>60</td><td>~</td><td>255</td></tr>
</table>
</td></tr>
<tr><td>08[11]</td><td>Stay Time</td><td>1 Byte</td><td>
• This is to set up the stay time of the message on the screen after appearing onto the sign with Entry Effect.
<table>
<tr><td>Hex value</td><td>00H</td><td>02H</td><td>04H</td><td>08H</td><td>0AH</td><td>0FH</td><td>14H</td><td>~</td><td>EFH</td></tr>
<tr><td>x 0.5 Sec</td><td>0</td><td>2</td><td>4</td><td>8</td><td>10</td><td>15</td><td>20</td><td>~</td><td>239</td></tr>
</table>
<table>
<tr><td>Hex Value</td><td>FOH</td><td>F1H</td><td>F2H</td><td>F3H</td><td>F4H</td><td>F5H</td><td>F6H</td><td>F7H</td><td>F8H</td></tr>
<tr><td></td><td>2Min.</td><td>3Min.</td><td>5Min.</td><td>10Min.</td><td>30Min.</td><td>1Hour</td><td>3Hours</td><td>5Hours</td><td>9Hours</td></tr>
</table>
• A text message longer then the screen is recommended to set up to "00H" so that it can move from right-end to left-end smoothly without staying in the mid-sentence.
</td></tr>
<tr><td>00[12]</td><td>X-Start Position</td><td>1 Byte</td><td rowspan="4">
• This is to set up the coordinate values for each section.
<table>
<tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td><td>03H</td><td>04H</td><td>05H</td><td>06H</td><td>07H</td><td>~</td></tr>
<tr><td>Pixels</td><td>0</td><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td><td>24</td><td>28</td><td></td></tr>
</table>
• Each coordinate can be set by a 4-pixel unit from top & left end to the opposite.
☞ See "Attach.1 Example of Section Division"
• "00H" is a default value for the full screen not divided.
</td></tr>
<tr><td>00[13]</td><td>Y-Start Position</td><td>1 Byte</td></tr>
<tr><td>00[14]</td><td>X-End Position</td><td>1 Byte</td></tr>
<tr><td>00[15]</td><td>Y-End Position</td><td>1 Byte</td></tr>
</table>

<table>
<tr>
<td>00[16]</td>
<td>Background Image</td>
<td>1 Byte</td>
<td>
• Once you register background image(Text/graphic/video) in BG Playlist(*.bgp), here you can set up the background image number to display together with text message.
☞ See "Attach.5 How to Make the Background Playlist".
<table>
<tr><td>Hex value</td><td>00H</td><td>01H</td><td>02H</td><td>03H</td><td>04H</td><td>~</td><td>20H</td></tr>
<tr><td>Img number</td><td>Not used</td><td>#1</td><td>#2</td><td>#3</td><td>#4</td><td>~</td><td>#20</td></tr>
</table>
• You can set the background image number only at Section 0, not at Section 1 or 2.
</td>
</tr>
<tr>
<td>01
01
01
01
02
02
02
02
03
03
03[17]</td>
<td>Text Color

Text B.G. Color</td>
<td>n Byte
(Variable)</td>
<td>
• This is to set up the color or the background color of individual text.
<table>
<tr><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
<tr><td>Dummy</td><td colspan="3">Bits for background color</td><td>Dummy</td><td colspan="3">Bits for text color</td></tr>
</table>
Example) "12H" indicates "A": red for background color of text, green for text color.
"01H" indicates "A" : none for background color, red for text color.
• Color code
<table>
<tr><td>Code</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>Color</td><td>none</td><td>Red</td><td>Green</td><td>Yellow</td><td>Blue</td><td>Magenta</td><td>Cyan</td><td>White</td></tr>
</table>
• Length of this color code(#17) is always the same with that of Text Message(#18).
• Under ASCII code(#5) mode, the color code has 1 byte for alphabetic & numeric characters, 2 bytes for User's font.
Example) #17.1 Text Color : "1111122223333" #17.2 Text BG Color : "0"
<table>
<tr><td>Sample Text</td><td>1</td><td>2</td><td>3</td><td></td><td>A</td><td>B</td><td>C</td><td></td><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Color code</td><td>01</td><td>01</td><td>01</td><td>01</td><td>02</td><td>02</td><td>02</td><td>02</td><td>03</td><td>03</td><td>03</td></tr>
</table>
• Under Unicode(#5) mode, the color code has 2 bytes for every font.
• When you use "12" of font size(#6), option for background color will be disabled.
</td>
</tr>
<tr>
<td>31
32
33
20
41
42
43
20
61
62
63[18]</td>
<td>Text Message</td>
<td>n Byte
(Variable)</td>
<td>
The actual text to be displayed on a sign. This could be one of the following font codes.
• ASCII Character Code (See Attachment. 3)
<table>
<tr><td>Length</td><td>Hex Value</td><td>Text Type</td></tr>
<tr><td>1 Byte</td><td>00H~7FH</td><td>Alphabet, Numerals, special symbols</td></tr>
<tr><td>2 Byte</td><td>B0A1H~C8FEH</td><td>Korean character, KSC5601 Code</td></tr>
</table>
Example) #18 Text Message : "31 32 33 20 41 42 43 20 61 62 63"
<table>
<tr><td>Sample Text</td><td>1</td><td>2</td><td>3</td><td></td><td>A</td><td>B</td><td>C</td><td></td><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Text Code</td><td>31</td><td>32</td><td>33</td><td>20</td><td>41</td><td>42</td><td>43</td><td>20</td><td>61</td><td>62</td><td>63</td></tr>
</table>
• Unicode (Additional guidance to be provided on request)
<table>
<tr><td>Length</td><td>Hex Range</td><td>Text Type</td></tr>
<tr><td rowspan="5">2 Bytes</td><td>0000H~007FH</td><td>English Alphabet</td></tr>
<tr><td>3040H~309FH</td><td>Japanese Hiragana</td></tr>
<tr><td>30A0H~30FFH</td><td>Japanese Katakana</td></tr>
<tr><td>4E00H~9FFFH</td><td>CJK common kanji</td></tr>
<tr><td>AC00H~D7A3H</td><td>Hangul(Korean)</td></tr>
</table>
• Costume(user) code(Additional guidance to be provided when necessary)
<table>
<tr><td>Length</td><td>Hex Value</td><td>Text Type</td></tr>
<tr><td>2 Bytes</td><td>E000H~E0FFH</td><td>Special marks & signs made by user can be used.</td></tr>
</table>
</td>
</tr>
</table>

3.3.2 Registering Total Page Number of Normal Message

In order to use the Normal Message command, you need to register the total page number(memory slots) in the flash memory of the sign controller by sending the command packet.
If not, Normal Message command packet could not be written to the controller.
The total page number can be set up to three as standard. However the number can increase by customers special request.

CMD	1 byte	**4CH** : Command code for this function
DATA	1 byte	**01H/02H/03H** : The total number of page you want to register.

Example:

Transmission : 10 02 00 00 02 4C 03 10 03
Response : 10 02 00 00 02 4C 00 10 03

☞ Sends command packet to allocate three pages of memory slots to DIBD address "00".

Tip: From Davitche menu, select **[Advanced] > [DIBD Protocol–V5] > [Others]**, and you can easily send the packet for this function at the section of "Register Page Number for N. Messsage".

3.3.3 Deleting Normal Message Memory

When you want to clear the Normal Message from DIBD memory, you can send this command packet to delete the data in the page memory slot.

DLE	STX	DST	LEN	**CMD**	**DATA**	DLE	ETX

CMD	1 byte	**4BH** : Command code
DATA	1 byte	**80H**: To delete all Normal Message data **00H/01H/02H** : To delete the selected page data only

Example:

Command Packet: 10 02 00 00 02 4B 80 10 03
Return Packet : 10 02 00 00 02 4B 00 10 03

☞ Sends command packet to delete all of the Normal Message data at DIBD address "00".

Tip: From Davitche menu, select **[Advanced] > [DIBD Protocol–V5] > [Others]**, and you can easily send the packet for this function at the section of "Delete Normal Message Memory".

3.3.4 Simulating Normal Message Packet

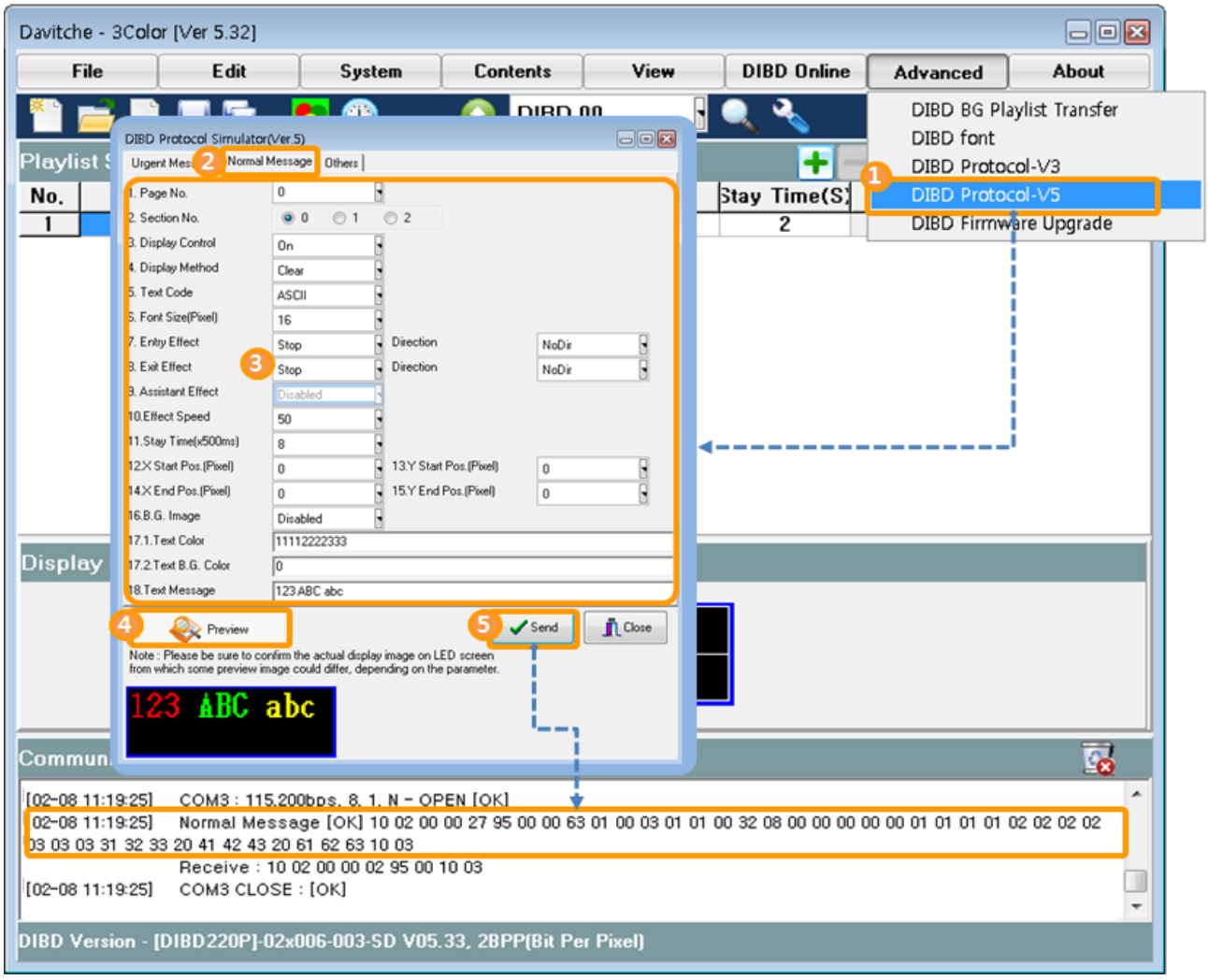
In case the sign is connected with a PC, by using the Divitche software, you can send various message packets to the sign and confirm the actual display image.

Note: You can download the software from "www.davitsol.com > Download > software".

The steps, including the preparation, are as follows:

1. Send the command packet for checking the communication status. (See Chapter 4.1)
2. Send the command packet for setting up the screen size/color. (See Chapter 4.2)
   Here, the sign is set to "2 rows x 6 columns, tri-color LED modules"
3. Send the command packet for registering the total page number of Normal Messages.(See Chapter 3.3.2)
   Here, the total page number is set to "three".
4. Send the Normal Message packet for each page, and you will see the messages displaying on the LED sign according to the page number sequentially, repeatedly.

Below is the detail steps for "No.4" item above, "Send the Normal Message packet for each page".



① At Davitche, select **[Advanced] > [DIBD Protocol-V5]**, and "DIBD Protocol Simulator(Ver.5)" will open.

② Click on "Normal Message" tab.

③ Set up the parameters and input the texts for "Page Number 00" as below.

Items	Values to set/input	Items	Values to set/input
1. Page No.	**0**	10. Effect Speed	**50**
2. Section No.	**0**	11. Stay Time (x 500ms)	**8** (8 x 500ms = 4 seconds)
3. Display Control	**On**	12/13. X,Y Start Position	**0, 0** (Default)
4. Display Method	**Clear**	14/15. X,Y End Position	**0, 0** (Default)
5. Text Code	**ASCII**	16. B.G. Image	Disabled
6. Font Size(Pixel)	**16**	17.1 Text Color	**111122223333**
7. Entry Effect/Direction	**Stop / NoDir**	17.2 Text B.G. Color	**0**
8. Exit Effect/Direction	**Stop / NoDir**	18. Text Message	**123 ABC abc**

④ Click on **[Preview]** to preview the display image.

Note: The preview here is only your reference because the image could differ from the actual display image on the LED sign.

⑤ Click on **[Send]**, and you will see the actual display image of "Page 00" on the LED sign and the transmission packet on the log window.

⑥ And then, repeat steps "③~⑤" for "Page #1, #2".
By changing parameters and texts, you can simulate various message display onto the LED sign.

On completion of all packets transmission, the LED sign will display the Normal Messages according to the page number sequentially, repeatedly.

Tip: In order not to display any page of message, you have two options as below :

1. Set up "#3. Display Control" to "OFF(00H)" and click on **[Send]**.
2. Send the command packet for deleting Normal Message Memory of the page to the sign.
   (See Chapter 3.3.3)

Tip: If you want to simulate while your PC is not connected to the LED sign, please see "Attach. 7. Changing to One-Way Communication Mode."

4. Special Function Command Packets

There are several special function commands for setting up the preference or controlling the LED sign.

From the Davitche software, we recommend you to send the command packet to the LED sign to get easier and better understanding on the actual function and the structure.

4.1 Checking the Communication Status

After connecting the server(external system or PC) and the LED sign by any of RS-232/422/485 or LAN, you are recommended to check the communication status by sending this command packet.

When the master receives the same data from the slave(LED sign) after sending this command packet, the communication is considered as being correct.

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX

CMD	1 byte	**6AH :** Command code
DATA	10 byte	**30H 31H 32H 33H 34H 35H 36H 37H 38H 39H** : data for checking the communication

[Example of Packet]

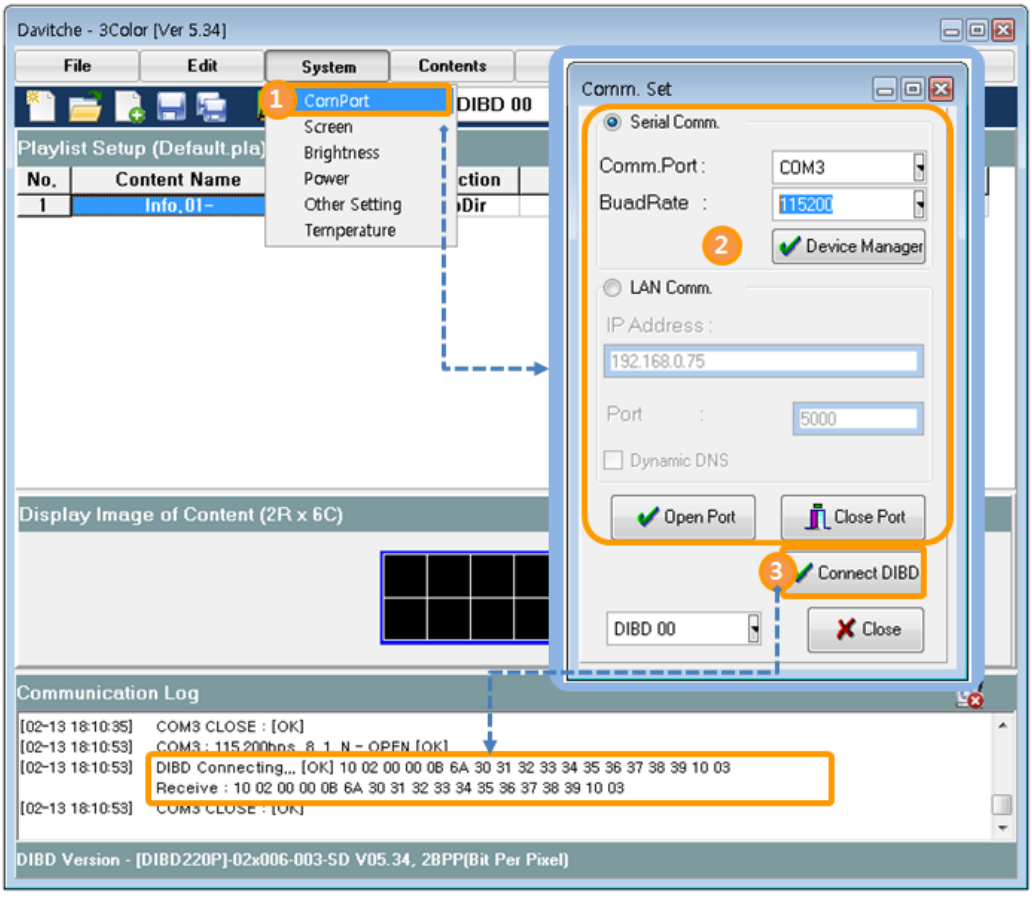
Command: "10 02 **00** 00 0B **6A 30 31 32 33 34 35 36 37 38 39** 10 03"
Return: "10 02 **00** 00 0B **6A 30 31 32 33 34 35 36 37 38 39** 10 03"

[How to simulate from Davitche Software]

① Select **[System] > [ComPort]**, and "Communication Set" window will pop up.

② Set up the communication depending on your preference.

③ Click on **[Connect DIBD]**, and the log window will show the packet and the communication status indicating "OK" or "FAIL".



4.2 Setting up Screen Size and Color

In order to use the LED sign, first, you should set up the number of LED modules and the color by sending this command packet. Each module consists of 16x16 pixel.

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX

CMD	1 byte	**4AH** : Command code
DATA	1 byte	Bit Per Pixel : **02H**(2 Bit_3Color), **18H**(24 Bit_FullColor)
	1 byte	**00H~F0H** : the number of module in row.
	1 byte	**00H~F0H** : the number of module in column.

[Example of Packet]

Command: "10 02 **00** 00 04 **4A** **02 02 06** 10 03 "

☞ Send the command packet to set up the sign size as "02 Rows x 06 Columns" and the color as "2Bit_3Color" to DIBD address "00.

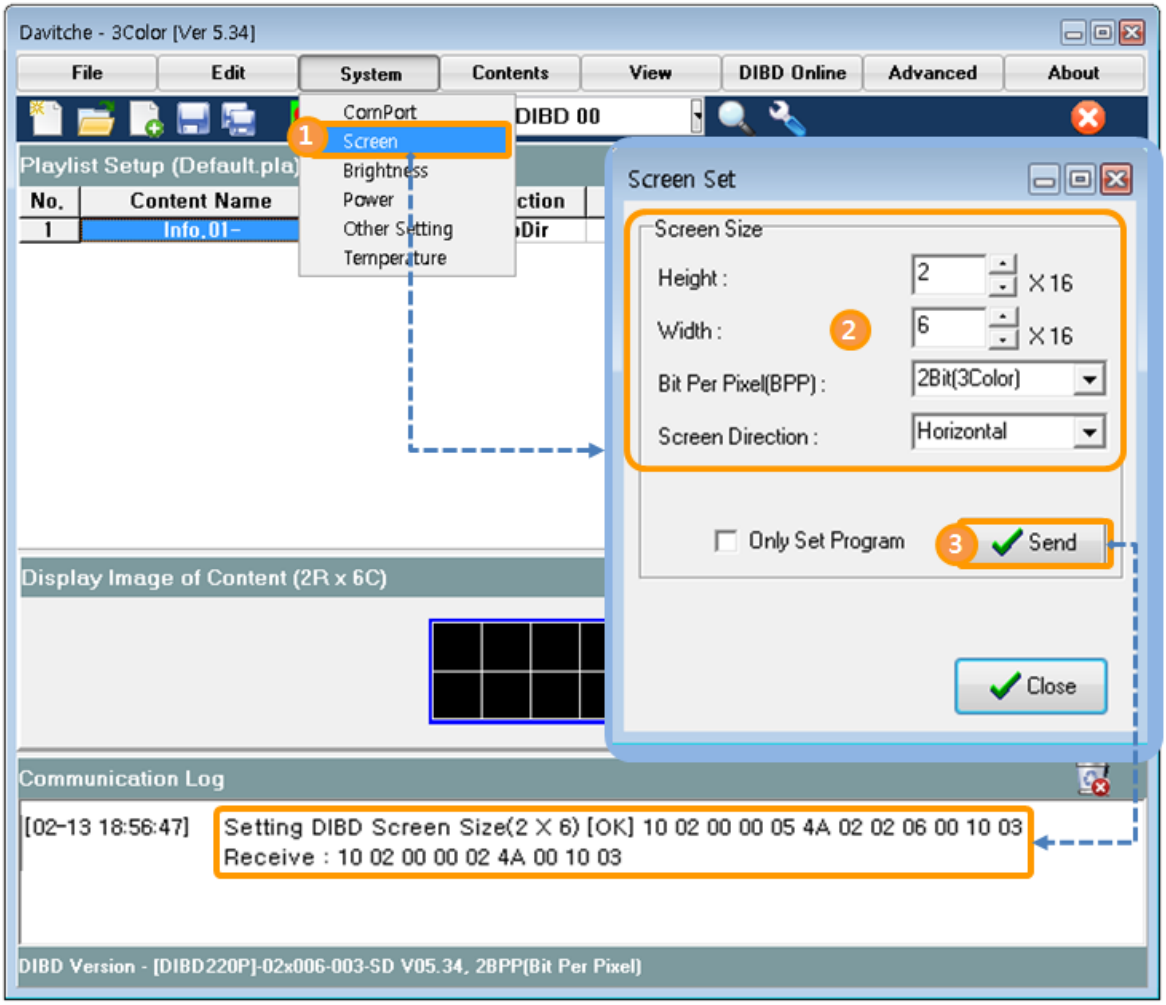
Return: "10 02 00 00 02 **4A** **00** 10 03"

[How to simulate from Davitche Software]

① Select **[System] > [ComPort]**, and "Communication Set" window will pop up.

② Set up the screen size and color for your sign.
Ex.) Height: 2x16, Width: 6x16, 2Bit(3Color), Horizontal screen(default)

③ Click on **[Send]**.



4.3 Turning ON/OFF the screen

This command is to turn ON/OFF the LED sign screen. Once you set up the screen size/color, we recommend you to try this function by sending the two packets: "Power off" and then "Power on" alternately.

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX

CMD	1 byte	**41H :** Command code
DATA	1 byte	**00H** : OFF, **01H** : ON

[Example of Packet]

Command: "10 02 **00** 00 02 **41 00** 10 03"
☞ Send the command packet to turn on the LED screen to DIBD address "00".
Return: "10 02 00 00 02 **41 00** 10 03"

[How to simulate from Davitche Software]

Select **[DIBD Online]** > **[Power OFF** or **[Power ON]**, and you will confirm the function and the packet.

4.4 Synchronizing the DIBD Time to the PC

This command is to synchronize the time of LED sign controller(DIBD) with that of PC. It is recommended to send this command packet once a month or after days of downtime to correct any possible time deviation.

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX

CMD	1 byte	**47H** : Command code
DATA	1 byte	**00H~99H** : YEAR, in BCD format
	1 byte	**01H~12H** : MONTH, BCD
	1 byte	**01H~31H** : DATE, BCD
	1 byte	**00H**(Sunday)~**06H**(Saturday) : DAY of the week
	1 byte	**01H~23H** : HOUR, BCD
	1 byte	**01H~59H** : MINUTE, BCD
	1 byte	**01H~59H** : SECOND, BCD

[Example of Packet]

Command: "10 02 **00** 00 08 **47 12 02 22 03 22 24 01** 10 03"
☞ Send the command packet indicating "2012-02-22, Wed., 22:24:01" to DIBD address **00.**
Return: "10 02 **00** 00 08 **47 00** 10 03"

[How to simulate from Davitche Software]

Select **[DIBD Online]** > **[Time Syn.]**, and you can confirm the function and the packet.

4.5 Reading the Time of DIBD

You can read the present time of the LED sign controller by sending this command packet.

DLE	STX	DST	LEN	**CMD**	**DATA**	DLE	ETX

CMD	1 byte	**66H** : Command code
DATA (Return Packet)	1 byte	**00H~99H** : YEAR, in BCD format
	1 byte	**01H~12H** : MONTH, BCD
	1 byte	**01H~31H** : DATE, BCD
	1 byte	**00H**(Sunday)~**06H**(Saturday) : DAY of the week
	1 byte	**01H~23H** : HOUR, BCD
	1 byte	**01H~59H** : MINUTE, BCD
	1 byte	**01H~59H** : SECOND, BCD

[Example of Packet]

Command: "10 02 **00** 00 02 **66 00** 10 03"
☞ Request DIBD(address "00") to send the actual time data.
Return: "10 02 **00** 00 08 **66 12 04 18 03 15 32 11** 10 03"
☞ Receive the packet indicating "2012-04-18, Wed. 15:32:11"

[How to simulate from Davitche Software]

① Click on [setting tools] on the top menu bar, and "Menu Window" will pop up.

② Click on **[DIBD Time]**, and the packet will appear on the low window.

4.6 Generating the Output Signal

You can make the controller generate the output signal(5VDC) from its output port by sending this command packet. The controller has two output ports(**J7, J8**) to control/operate any external device(buzzer, light, etc.).

DLE	STX	DST	LEN	**CMD**	**DATA**	DLE	ETX

CMD	1 byte	**4EH** : Command code
DATA	2 bytes	No.1 Output signal for J7 00H 00H : OFF , 00H F0H : Always ON , 00H F1H : The status Quo 01H 00H ~ FFH EFH : Keeping ON signal for " x 100ms".
	2 bytes	No.2 Output signal for J8 00H 00H : OFF , 00H F0H : Always ON , 00H F1H : The status Quo 01H 00H ~ FFH EFH : Keeping ON signal for " x 100ms".

[Example of Packet]

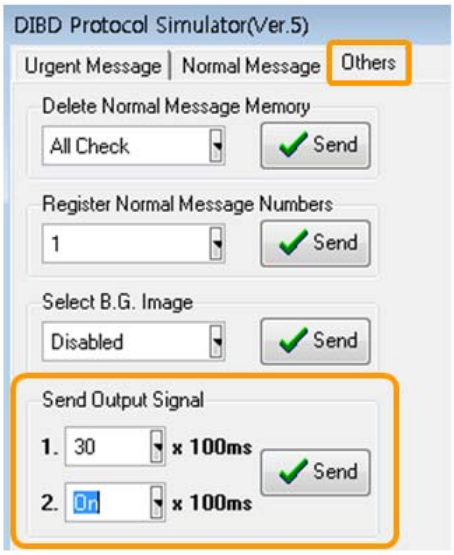
Command: "10 02 **00** 00 05 **4E 1E 00 00 F0** 10 03"
☞ Send the command packet to generate the output signal of "keeping ON for 3.0[1E(30)x100ms) seconds for NO.1 port(J7), keeping ON always for NO.2 port(J8)" to DIBD address **00**.
Return: "10 02 **00** 00 02 **4E 00** 10 03"

[How to simulate from Davitche Software]

① Select **[Advanced] > [DIBD Protocol-V5]**, and "DIBD Protocol Simulator(Ver.5)" will pop up.

② Click on "**Other**" tap and set up the "Send Output Signal".
Ex.) NO.1 Output : "**30** x 100ms", NO.2 Output : "**On**"

③ Click on **[Send]**, and you can confirm the function and the packets.



4.7 Selecting a BG Image number

Once you made the Background Playlist(see Attach 5,6) including various contents and sent them to the controller's flash memory, you can fetch any content number on the Playlist and display on the sign by sending this command packet.

The contents could be made in text/bitmap/animation file and registered to the Playlist with various display effects.

CMD	1 byte	**4FH** : Command code
DATA	1 byte	**01H/02H~FFH** : The content number of the B.G. Playlist (#1~#255) **00H :** Not displaying any content

[Example of Packet]

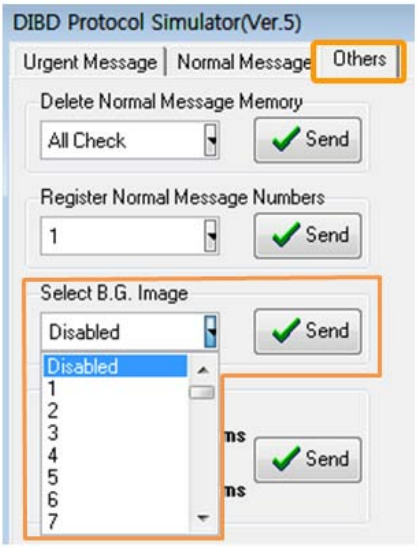
Command: "10 02 00 00 02 **4F 06** 10 03"
☞ Send the command packet to select the 6th content of B.G. Playlist to display on the sign.
Return: "10 02 00 00 02 **4C 00** 10 03"

[How to simulate from Davitche Software]

① Select **[Advanced] > [DIBD Protocol-V5]**, and "DIBD Protocol Simulator(Ver.5)" will pop up.

② Click on "**Other**" tap and set up the content number you want to display on the sign.

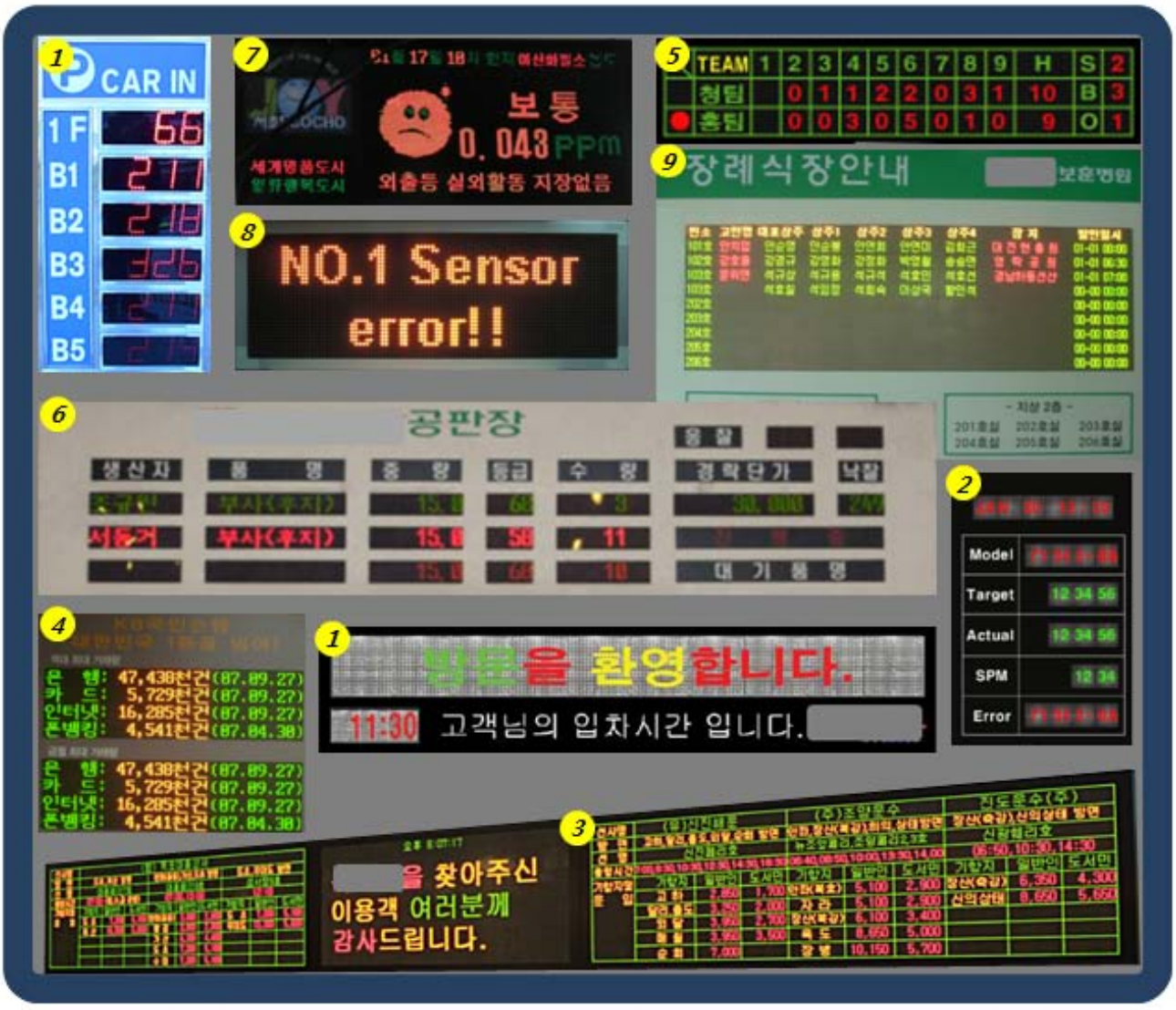
③ Click on **[Send]**, and you can confirm the function and the packets.



5. Application of DIBD Sign Protocol Controller

DIBD sign protocol controller can be applied to many kinds of LED signs as the following:

1. LED sign for Parking Guidance: number of free/occupied space, parking information...
2. LED sign for Production Information: products, target, actual, ratio
3. LED sign for Bus/Train Station or Ferry Terminal: service route, time, rate..
4. LED sign for Bank or Stock Market: Index, Trading volume, options, currency exchange rate
5. LED score board: team name, score, half/quarter, time
6. LED sign for Auction Information: producer, product, weight, auction bid price, rating..
7. LED sign for Pollutants Information: ozone, carbon monoxide, sulfur dioxide, dusts..
8. LED sign displaying PLC message
9. LED sign displaying Information of Hospital/School/Company
10. LED sign displaying Information of Solar Power
11. LED sign displaying Survey/Bus arrival Information or other traffic Information.
12. LED sign for vending machine, etc.



When you describe us your needs, we will sincerely introduce you the appropriate solution with the guidance.

Attach.1. Example of Section Division

This example is to show you how to divide a screen into two sections(rows) by sending different Urgent Message packets from DIBD Protocol Simulator.

First, set up the screen as "**2**x16 in Height, **6**x16 in Width, 2bit(3Color)" at **[System] > [Screen]**, and open the DIBD Protocol Simulator by selecting **[Advanced] > [DIBD Protocol V-5]**, and then follow the steps below.

Display Image Sample	Section	Message Packets
	**00** (1st line)	10 02 00 00 25 **94** 00 **00 63** 00 00 03 01 01 00 32 00 **00 00 18 04** 00 01 01 01 01 01 01 01 01 01 01 30 31 32 33 34 35 36 37 38 39 10 03
	01 (2nd line)	10 02 00 00 43 **94** 00 **01 63** 00 00 03 06 06 00 32 00 **00 04 18 08** 00 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 02 41 42 43 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 20 20 20 20 20 20 20 20 20 20 10 03

Step1 : Sending the command packet for Section "00"

① Click on **Urgent Message** tab.

② Select "**0**" for **Section No**.

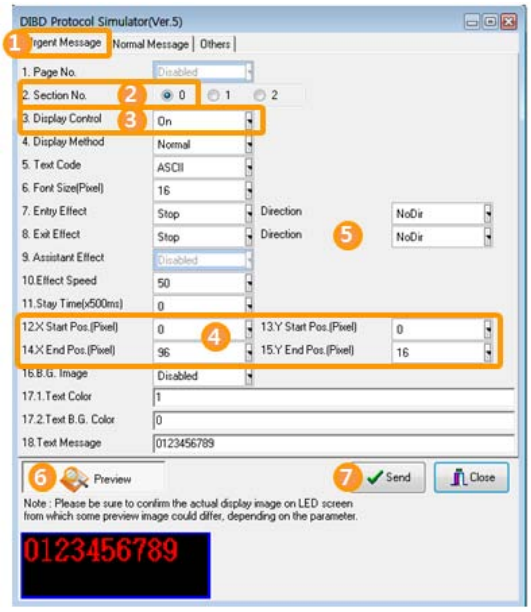
③ Set **Display Control** to **On**. At **Off** mode, the section will be disabled.

④ Set up XY coordinate values by a 4-pixel unit.
Here, you must set **X-Start** to **0**, **Y-Start** to **0**, **X-End** to **96** and **Y-End** to **16**.

⑤ Set up other parameters and input Text, "**0123456789**", as the same as the right figure.

⑥ Click on **[Preview]** to confirm the display image on the preview screen.

⑦ Click on **[Send]**, and the 1st line of the sign will display this message.



Step2 : Sending the command packet for Section "01"

① Click on Urgent Message tab.

② Select "**1**" for **Section No**.

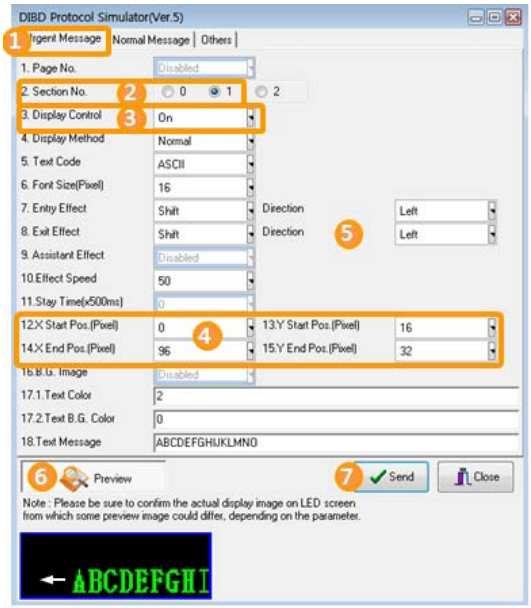
③ Set **Display Control** to **On**. At **Off** mode, the section will be disabled.

④ Set up XY coordinate values by a 4-pixel unit.
Here, you must set **X-Start** to **0**, **Y-Start** to **16**, **X-End** to **96** and **Y-End** to **32**.

⑤ Set up other parameters and input Text, "**ABCDEFGHIJKLMNO**", as the same as the right figure.

⑥ Click on **[Preview]** to confirm the display image on the preview screen.

⑦ Click on **[Send]**, and the 2nd line of the sign will display this message.

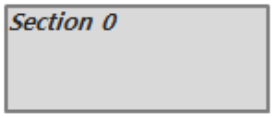


Note: In order not to display the above Urgent Message, you have two options as below:

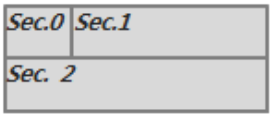
1. Set up "#3. Display Control" of each section to "**Off(00H)**" and click on **[Send]**.
2. Send another Urgent Message packet with the same Section No.

Tip: This is additional example of dividing sections for the LED sign(4 rows x 8 columns with 16x16 dot module). You can see, by setting the XY coordinate values, a screen can be divided into various forms of sections(Max. 3). (Unit : Pixel)

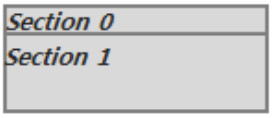
Screen A(Default)



Screen B



Screen C



Screen D

Items	Screen A			Screen B			Screen구 C			Screen D		
	Sec.0	Sec.1	Sec.2	Sec.0	Sec.1	Sec.2	Sec.0	Sec.1	Sec.2	Sec.0	Sec.1	Sec.2
3. Display Control	*On*	*Off*	*Off*	*On*	*On*	*On*	*On*	*On*	*Off*	*On*	*On*	*On*
12. X-start	*0*			*0*	*32*	*0*	*0*	*0*		*0*	*32*	*96*
13. Y-start	*0*			*0*	*0*	*32*	*0*	*16*		*0*	*0*	*0*
14. X-end	*0*			*32*	*128*	*128*	*128*	*128*		*32*	*96*	*128*
15. Y-end	*0*			*32*	*32*	*64*	*16*	*64*		*64*	*64*	*64*

Attach.2. ASCII Character Code

Char	Space	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/	
Hex	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	

Char	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	@
Hex	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F	40

Char	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Hex	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50	51

Char	R	S	T	U	V	W	X	Y	Z	[	₩	]	^	-	`		
Hex	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	60		

Char	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
Hex	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F	70	71

Char	r	s	t	u	v	w	x	y	z	{	|	}	~	DEL			
Hex	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F			

(Resources : http://www.powerindex.net/U_convt/ascii/ascii.htm)

Example. “123 ABC abc” → “31H 32H 33H 20H 41H 42H 43H 20H 61H 62H 63H”

Attach.3. Codes of Message Display Effects

HEX	Effect	Direction	Description
00	No Display		
01	STOP	NoDir.	No Effect
02		Bright On	Brightness to be increased from 10 to 250 in relative level.
03		Bright Off	Brightness to be decreased from 250 to 10 in relative level.
04		Horizontal Mirrow	To display a normal image and a horizontally/vertically reflected image (by a mirror), five times alternately.
05		Vertical Mirrow	
06	SHIFT	Left	To display the text/image scrolling to the direction.
07		Right	
08		Up	
09		Down	
0B		UpDown	To display the text/image scrolling up & down twice.
0C	WIPE	Left	To display the text/image writing on the screen to the direction.
0D		Right	
0E		Up	
0F		Down	
12	BLIND	Left	To display the text/image like opening the blind to the direction.
13		Right	
14		Up	
15		Down	
18	CURTAIN	Horizontal Side	To display the text/image like opening the curtain to the direction.
19		Horizontal Center	
1A		Vertical Side	
1B		Vertical Center	
1E	Zoom Out	Left Up	To display the text/image being reduced to the direction.
1F		Left Down	
20		Right Up	
21		Right Down	
22		Center	
23	Zoom In	Left Up	To display the text/image being enlarged to the direction.
24		Left Down	
25		Right Up	
26		Right Down	
27		Center	
28	ROTATE	Counterclockwise	To display the text/image rotating to the direction.
29		Clockwise	
2C	BLINK B.G.	Red	To blink the background with selected color.
2D		Green	
2E		Blue	
2F		Yellow	
30		All	To blink the background with all colors alternatively.
31	BLINK TEXT	Red	To blink the selected color of the text to highlight.
32		Green	
33		Blue	
34		Yellow	
35		Every Color(sequentially)	To blink the red/green/yellow color 8 times sequentially and repeatedly.
37		All Colors	To blink all text colors simultaneously.
36	3D Effect	Left	To move the text/image to the left with 3 dimensional effect.
79	Random	Sequential	To display the image by randomly selected effect among all.
7A		Random	

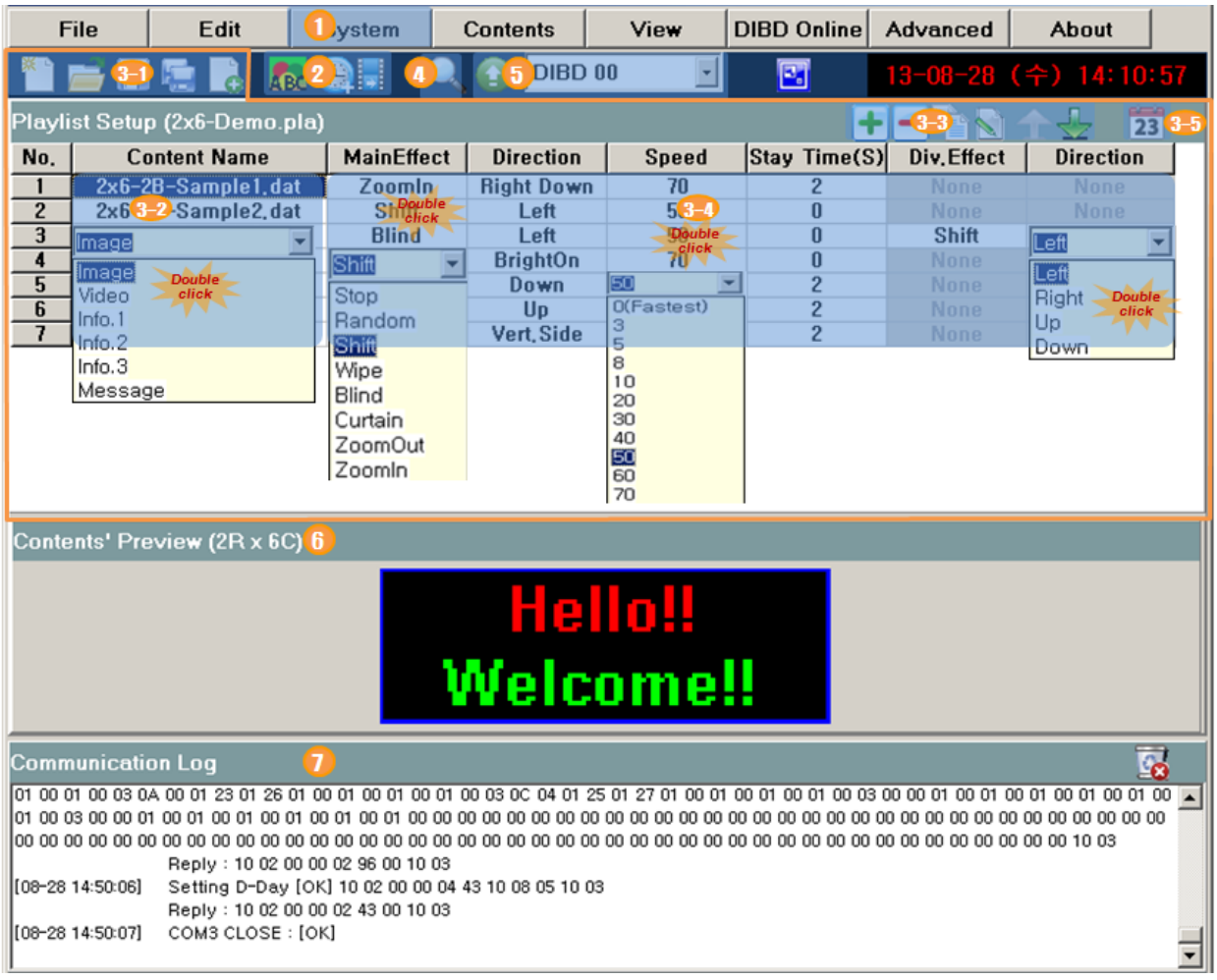
Attach.4. Basic Workflow of DavitChe Software

DavitChe is an editing & operating software for the general LED sign. But it includes various functions for the protocol LED sign as followings:

- ✓ Simulating various message command packets and special function command packets
- ✓ Editing various Content files and registering them in a Playlist

This chapter is to describe the basic workflow of Davitche software. For details, please refer to the software manual.

The followings are the process of setting up System environments, creating Contents & Playlists, and uploading them to DIBD.



① Setup System

Select **[System]** > **[ComPort]** and set up the communication method(Serial or LAN) at “Comm. Set” window.

Select **[System]** > **[Screen]** to set up the screen resolution(Height and Width) and the color(2Bit for 3Color, 24Bit for full color) at “Screen Set” window, and click on **[Send]**.

② Create Contents Files

Click on  [Image Editor], and you can create/edit text image files with graphic background image.

Click on  [Info. Text Format], and you can set up the display format for Analog/Digital clock, D-day counter, temperature/humidity.

Click on  [Video Converter, only for full color mode], and you can convert the common video file(wmv, avi, mov, mp4, gif..) into "*.frm" format for DIBD controller.

Note: When your PC connects to DIBD for the first time, it is recommended to click on **[DIBD Online]>[Time Sync.]** to synchronize the time of LED sign with that of PC, and **[Advanced]>[DIBD Font]** to transfer font files to DIBD. If not, Information Text may not be displayed normally.

③ Making A Playlist

Import Contents files and set up display order/effect/others and save them as a Playlist file(*.pla).

3-1. With these toolbars, you can **Renew/Open/Add/Save/SaveAs** the Playlist file.

3-2. When you double-click on any cell of Content Name column, a combo box will pop up so that you can select the type of Content to import.

3-3. These toolbars are to edit the contents registered on the Playlist : Add, Delete, Copy, Edit, Up/Down.

3-4. When you double-click any cell on the right area of the Content Name, a combo box will pop up so that you can select options for display effect/speed/time of the content.

3-5. When you click on  , "Advanced Playlist Set" window will pop up, where you can set up the advanced options like Exit effect, Display date/time of each Content.

④ Preview

When you click on  , Playlist Preview screen will pop up and start previewing the Contents with effects, one by one, from the selected Content(or top one) of the Playlist. To stop the preview, click on the button again.

After previewing, click on  to save the current Playlist as a new name(*.pla).

⑤ DIBD Upload

When you click on  after selecting DIBD address, the Playlist with Contents/Parameter files will be uploaded to the DIBD. Once the transmission has completed, LED sign will start displaying automatically.

When the PC with DavitChe software controls one LED sign only, **DIBD00** may be set as DIBD address. But when the PC controls more than one, you need to assign DIBD address for each sign.

If the size of data is too big or the communication does not work well, you can directly copy the data from PC to SD(or CF) memory card and insert it to the LED sign controller.

⑥ **Content's Preview** : shows the display image of the content, selected by the mouse click, on the Playlist.

⑦ **Communication Log** : shows the communication information between PC and the LED sign controller.

Attach.5. How to Make the Background Playlist(Case 1)

When you make a Background Playlist with text/graphic(or even animation) image files and upload it to DIBD, you can import the file from the Playlist and display on the sign as a background image for the following applications :

[Case 1] As for the LED sign for displaying PLC(Programmable Logic Control) message, you can create contents(mostly in text or graphic image) and register them onto the BG Playlist(*.bgp) in order. So LED sign can directly display the content corresponding to the number of Switching Signal coming from external PLC(Programmable Logic Control).

[Case 2] As for the protocol LED sign, you can assign one of the numbers of BG Playlist to any protocol message coming from external system(Ex. Web server, imbedded system and so on). So the protocol message(mostly in simple text) can be displayed on the assigned background image.

[Case 3] As for the general LED sign, you can assign one of the numbers of the BG Playlist(*.bgp) to any content of Playlist(*.pla) to be used as the background image.

This chapter is to describe how to make a BG Playlist(*.bgp) and apply for **Case [3]** as an example.

As this tutorial is based on the **old version(5.5)** of Davtiche software, the captured screen images may be different from your actual software version.
For more details, please refer to the “Davitche Software Manual of LED sign”.

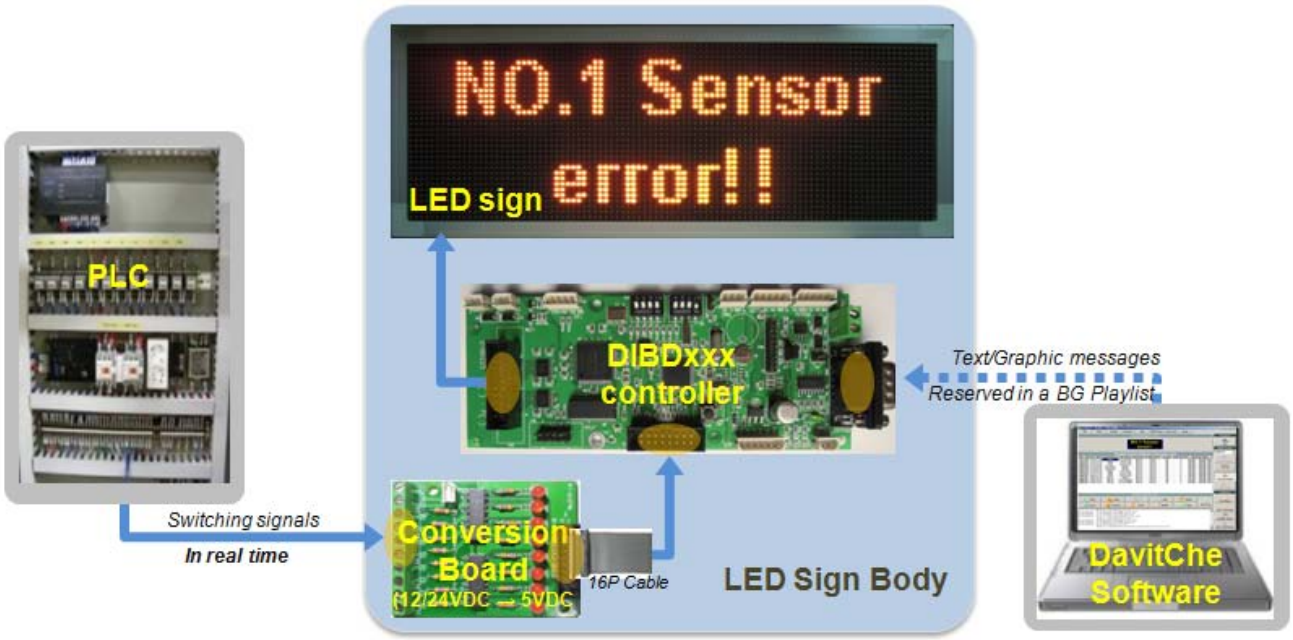


Fig. 3 Block Diagram of LED Sign Board for Displaying PLC Switching Signal Message

At DavitChe software, you can create messages to display on LED sign, register them in a BackGround Playlist file in order, and upload them onto DIBD.
8 bits of switching signal(00000000~11111111) can be made by 8 pieces of relays or PNP/NPN signals of PLC.

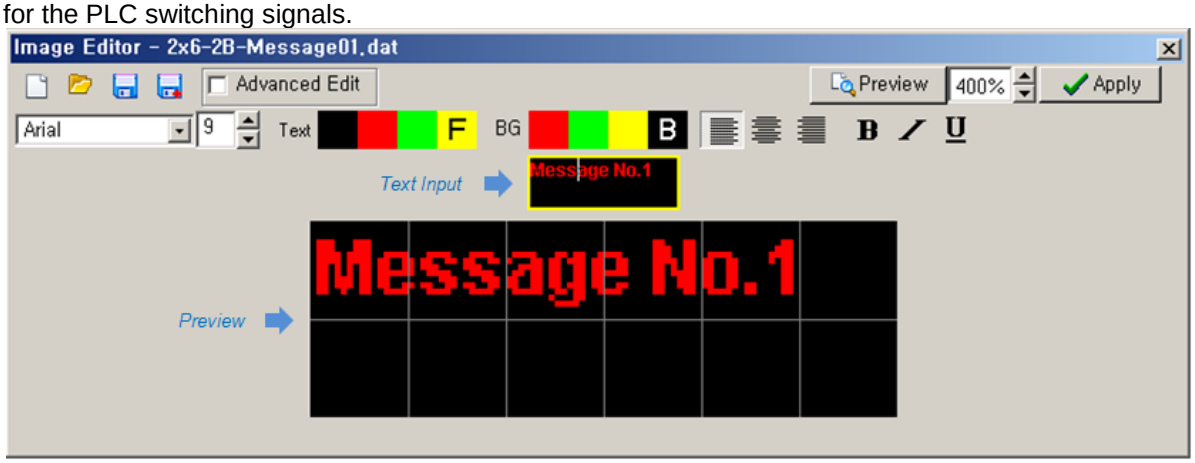
When DIBD receives a switching signal from PLC, the LED sign will display the registered number of messages (#1~255) on BG Playlist in an orderly manner: “00000001” will display “Message #1 ”, “00000010” “Message #2”, and similarly on up to “11111111” with “Message #255”.

When receiving no signal(00000000), the sign can be set to display general message(ad, data/time, information, etc.).

Now, let's see how to create Contents, make a BG Playlist and upload them to DIBD.

1) Creating Contents(Text Message Files)

At Davitche software, click on  to open Image Editor window and create the number of text message files for the PLC switching signals.

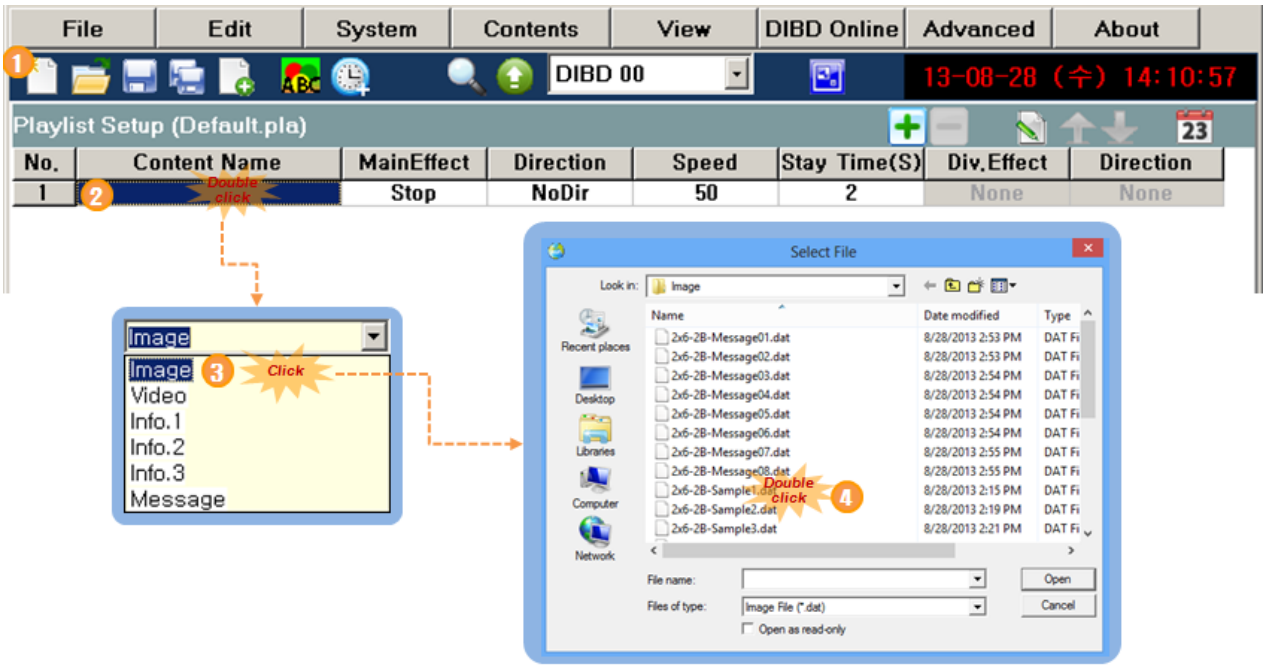


☞ For details, refer to **Chapter 4.1.1**.

☞ Save all the message files at "Davitche/Data/Image" folder.

Note: The message can be created in graphic files(bmp, jpg) also by using graphic tools such as Painter program, Photoshop, Illustrator and so on. For details, refer to **Chapter 4.2**.

2) Making a Background Playlist(*.bgp)



① Click on **[New Playlist]**.

② Double click on the blank cell below **Content Name**.

③ Select **Image** from the combo box for content type.

④ Import the message file that you want to display for number 1 switching signal from PLC.
Ex.) 2x6-2B-Message01.dat

⑤ Click on **[Add]** to add a lines for registering another content file.

⑥ Repeat steps "②~⑤" above and register all message files you have created.

⑦ Double click on the cell on the right area of each content file name, and set up the display Effect/Speed/StayTime/etc for your preference. (Refer to **Chapter 5.2**)

Note: Effect for longer text message than LED screen size will be set to "Shift to Left" by default.

Exit Effect can be set by clicking on [Advanced Playlist Set].

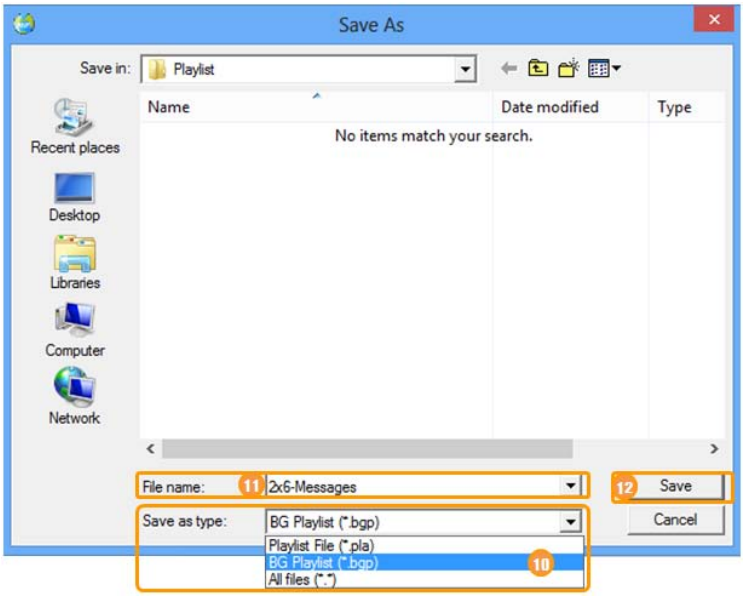
⑧ Click on **[Playlist Preview]** to confirm the display image of each content with effect.
In order to stop Preview, click on the toolbar again.

⑨ Click on **[SaveAs]**.

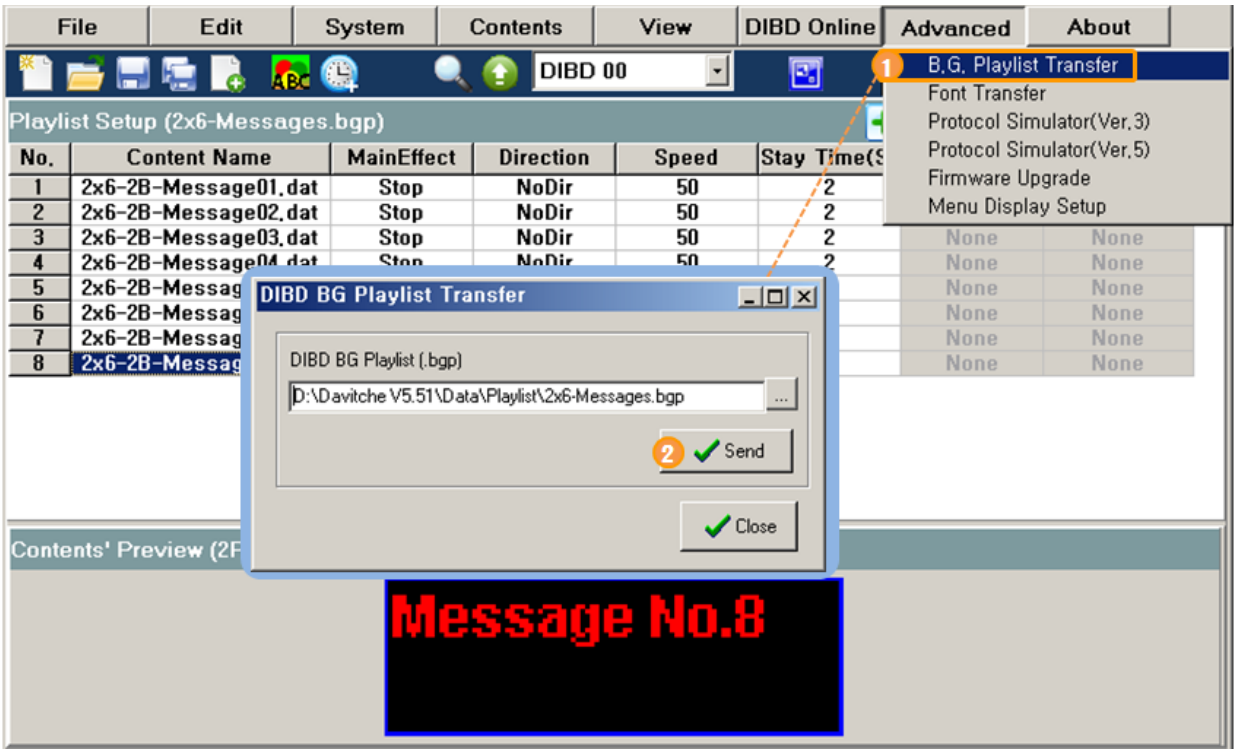
⑩ Select BG Playlist(*.bgp) for file type.

⑪ Save it as a proper name.
Ex.) 2x8-plc sample.bgp

⑫ Click on **[Save]**, and the file shall be saved at "DavitChe/Data/Playlist" folder.



3) Uploading The BG Playlist



① Select **[Advanced] > [DIBD BG Playlist Transfer]**, and "DIBD BG Playlist Transfer" window will pop up and show the previously saved BG Playlist file in the file path box by default.

If not shown, you can click on [...] [browse] and import the file(*.bgp) for yourself from "Davitche/Data/Playlist".

② Click on **[Send]** to transmit the BG Playlist to the flash memory in DIBD.

Now!

It's ready for the LED sign to display any text message corresponding to switching signal coming from PLC.

Attach.6. How to Make the Background Playlist(Case 2)

When you make a Background Playlist with text/graphic(or even animation) image files and upload it to DIBD, you can import the file from the Playlist and display on the sign as a background image for Urgent Message or Normal Message. This chapter describes how to make an outline image and display it on the sign as a background image for Urgent Message for example.
As this tutorial is based on the **old version(5.3)** of Davtiche software, the captured screen images may be different from your actual software version.

Fig. 4 Tri-Color LED sign having Background Image ("4 rows x 12 columns" of LED modules)

The steps are as follows:

A. Creating background image files as a common graphic format(*.bmp, *.jpg)
B. Converting the Image format(to *.dat)
C. Registering them in a Background Playlist(*.bgp)
D. Uploading them to DIBD flash memory
E. Importing the image file to display on the sign

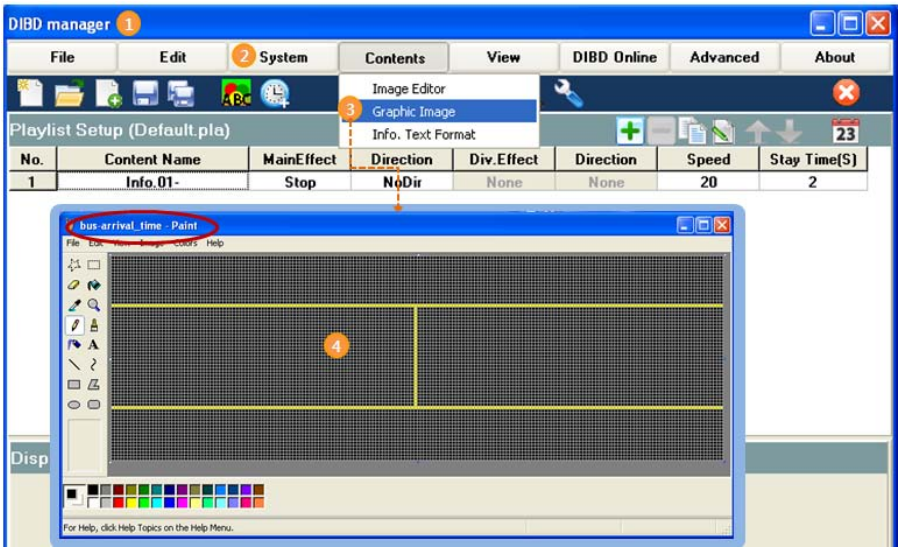
A. Creating Background Image Files

① Run DavitChe.

② Click on **[Setup] > [Screen Size]** and setup the screen as "**4**x16 Height, **12**x16 Width, **2Bit(3Color)**".

③ Click on **[Contents] > [Graphic Image]**, and the Painter program will open as the same resolution as that of your screen setup.
Ex.) Height:64 pixels, Width:144 pixels

④ Draw the yellow outline as the right image and save it as a new name at "Divitche/Data/ Image".
Ex.)"bus-arrival_time.bmp"



☞At the painter program, if you zoom in the screen and check "show grid" option, you can draw the image much more easily.

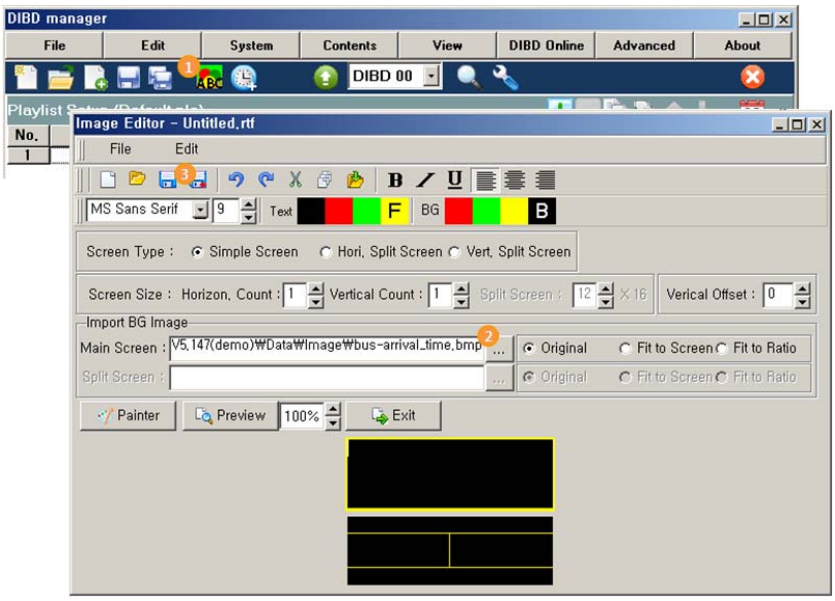
☞You can create the background not only in Graphic image but in stylish Text image or even in animated movie by the advanced editing program such as Photoshop, Illustator, Flash and so on.

B. Converting Image Format(*.bmp/jpg -> *.dat)

① Click on  to open Image Editor window.

② Click on  of Main Screen at Import BG Image, search/import the BG image file(Ex. Bus-arrival_time.bmp), and the image will be displayed at the Preview screen at the bottom.

③ Click on  and save it as a new name with "***.dat**" format at "Divitche/Data/ Image" folder.



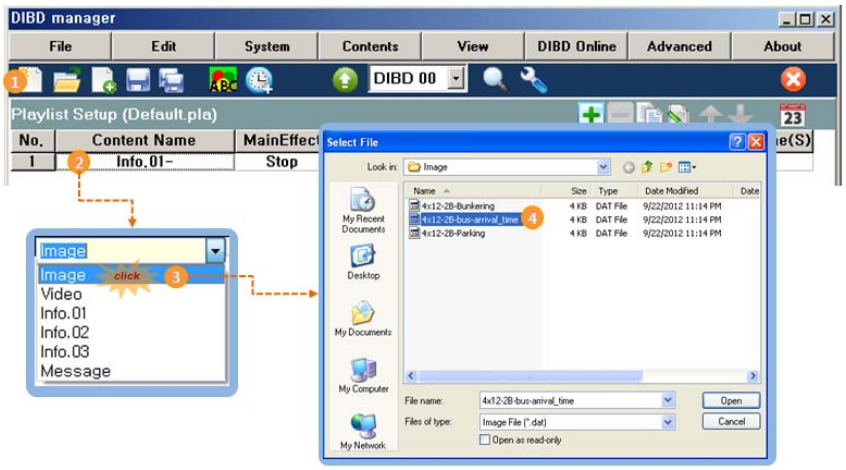
C. Registering in a Background Playlist(*.bgp)

⑬ Click on **New**.

⑭ Double-click on the default cell(**Info.01-**) just below Content Name.

⑮ Select **Image** as the file type.

16 When "Select File" window pops up, search/import the BG image file(Ex. Bus-arrival_time.dat) to register.

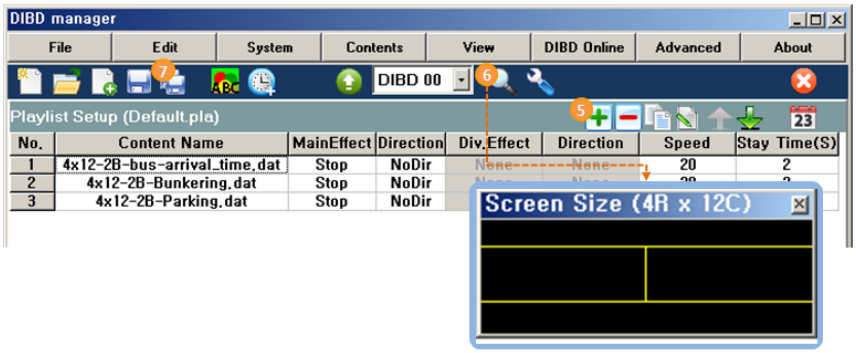


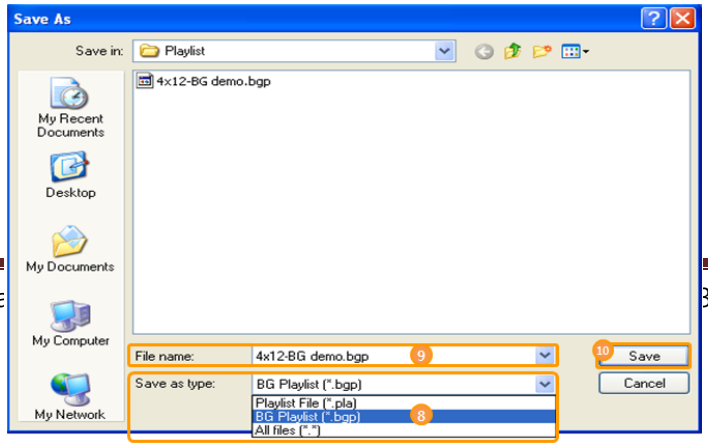
17 In order to register other BG files to the list, click on **[Add]** and proceed with the steps ②~④.

18 Click on **[Preview]** and confirm the display image of the Contents in order.

☞ In order to stop previewing, click the button again.

19 Click on **[Save As]**.



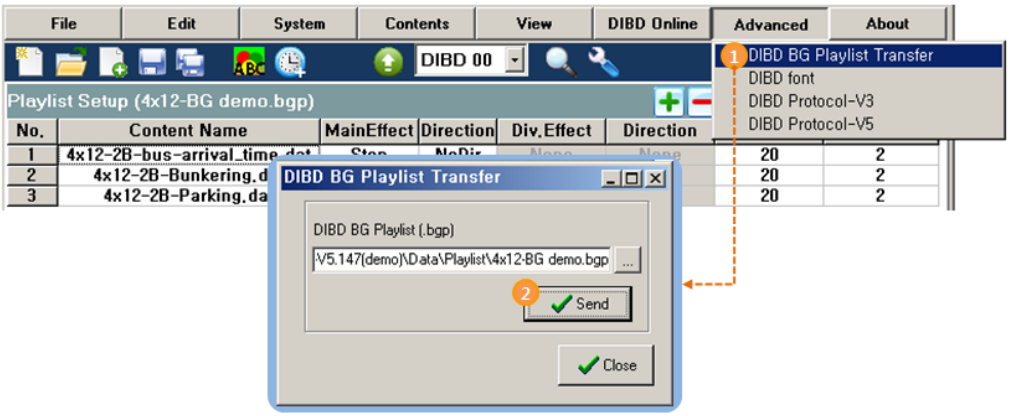


20 Click on the combo button and select “Background Playlist File(*.bgp)”

21 Save it as a new BG Playlist file name.
Ex.) 4x12-bus arrival time.bgp

22 Click on **[Save]** at
“DavitChe/Data/Playlist”.

D. Transmitting the File to DIBD



③ Click on **[Advanced] > [BG Playlist Transfer]**, and “DIBD BG Playlist Transfer” window will pop up with showing the previously saved BG Playlist file name at the file path box.
If not, click on ... and search/import the file for yourself.

④ Click on **[Send]**, and the BG Playlist file with its contents will be transmitted to DIBD flash memory.

E. Displaying the File as a Background Image

① Run “**DIBD Protocol V**5” simulator as right figure, and click on “Urgent Message” tab.

② Select ″**Section No. 0**″ and set up the display attributes and input the texts as shown in the table below.

☞ At ″#16. B.G. Image″, ″**1**″ indicates the content number of the BG Playlist. The BG number can be assigned only at **Section 0** of the message.

③ Click on **[Preview]** to preview the display image of the message.

④ Click on **[Send]**, and the message packet for **Section 0** will be sent to and displayed on the LED sign with the assigned number(#1) of B.G. image.

⑤ Select “**Section No. 1**” and repeat the steps ② ~④.

⑥ Select “**Selection No. 2**” and repeat the steps ②~④.

⑦ And then, you will see the full message image of **Table 2**.

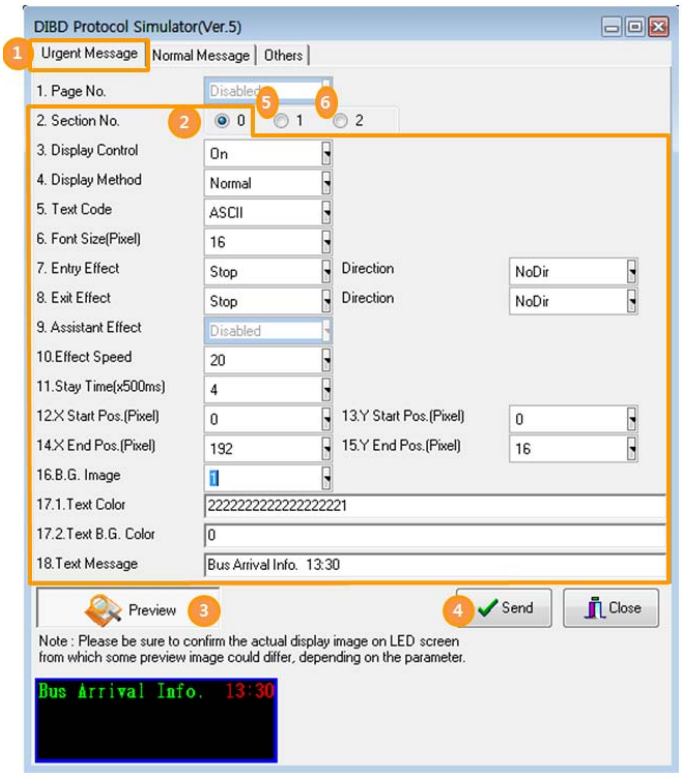
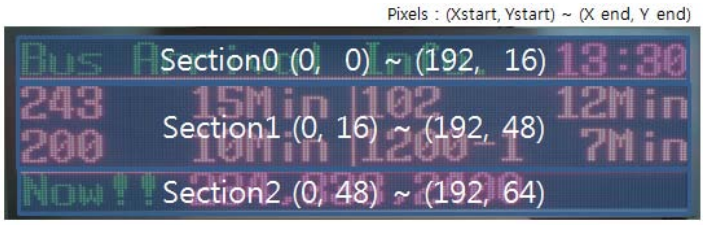


Table 1 Setting Parameters of each section for the sample Image

(3-color LED sign, "4 rows x 12 columns", 16x16 pixels of LED module)

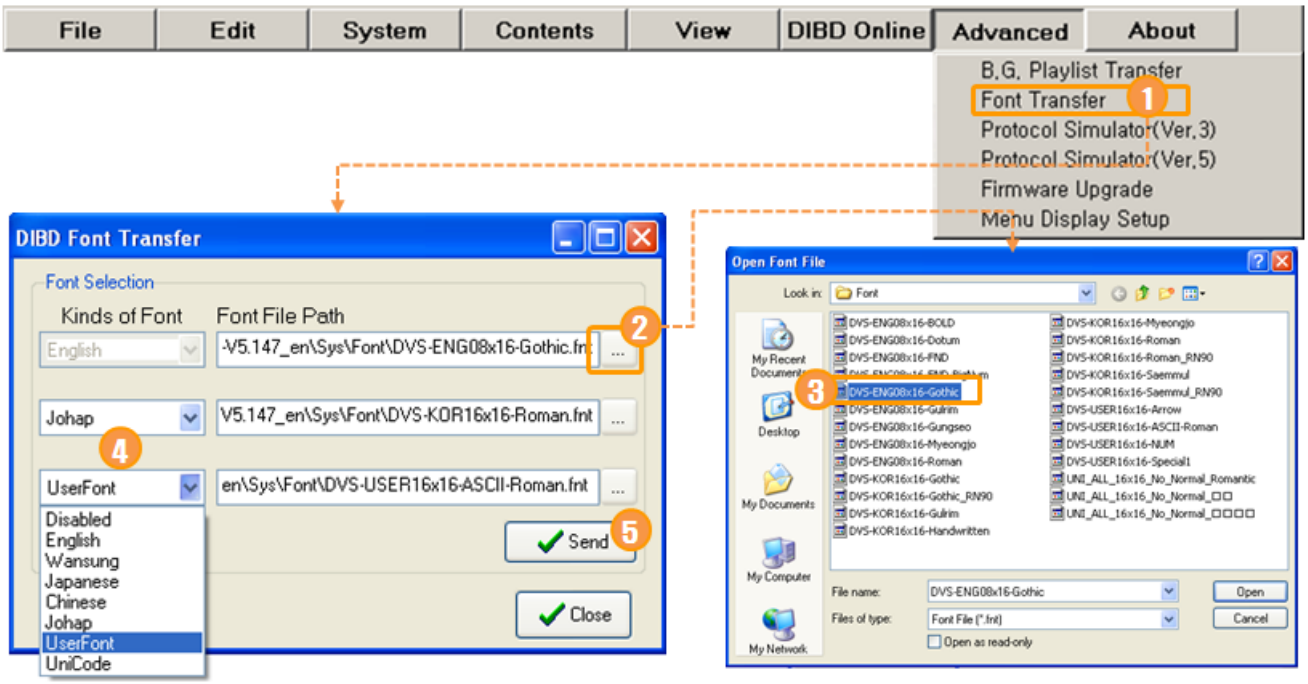
1.Page No.	Disabled	Disabled	Disabled
2.Section No.	**0**	**1**	**2**
3.Display Control	On	On	On
4.Display Method	Normal	Normal	Normal
5.Text Code	ASCII	ASCII	ASCII
6.Font	16	16	16
7.Entry Effect /Direction	Stop/NoDir	Blind/Left	Blink Text / Red
8.Exit Effect / Direction	Stop/NoDir	Stop/NoDi	Stop/NoDi
9.Assistant Effect	Disabled	Disabled	Disabled
10.Effect Speed	20	150	255(slowest)
11.Stay Time	4	4	4
12.X-Start Pos.[1]	**0**	**0**	**0**
13.Y-Start Pos[1]	**0**	**16**	**48**
14.X-End Pos.[1]	**192**	**192**	**192**
15.Y-End Pos.[1]	**16**	**48**	**64**
16.B.G. Image	1	-	-
17.1 Text Color	222222222222222 2221	3	2222221
17.2 Text Background Color	0	0	0
18. Text Message	**Bus Arrival Info. 13:30**	**243 15Min 102 12Min200 10Min 1200-1 7Min**	**Now!! 234,333,2400**

[1]XY start/end value for each Section



Attach.7. Uploading Font to DIBD

General text created at Image Editor of DavitChe is displayed using the font of Windows OS.
However, in order to display Information Text(Date/time, D-day count, temperature..) or the protocol messages from external system, it is necessary to upload the special font files to DIBD as follows.



① Select **[Advanced] > [DIBD Font]**, and "DIBD Font Transfer" window will pop up.

② Click on the 1st [Browse] button and import the font file("DVS-ENG08x16-Gothic.fnt" recommended) from "Davitche/Sys/Font" folder.

☞ "**ENG08x16-** " indicates the font file for English characters, numbers and ASCII symbols in the size of $08_{Width}x16_{Height}$ pixels.

③ At the 2nd /3rd font selection box, you can select other language font or User font.
This is set from the delivery. But you can change the font in consultation with the sign company.

④ Click on **[Send]**, **[Close]**.

※ Type of Font Files used at Davitche

☞ These files are at "Davitche/sys/font". If necessary, you can edit them by using any font editing program you use.

A. **ENG08x16(pixels)-** is to display English characters, numbers, or ASCII symbols. When receiving any hexadecimal code between 0x0000 and 0x007F, the DIBD will display the corresponding font among these.

B. **KOR16x16-** is to display Korean characters in Combination font. When receiving any code between 0x8861 and 0xD3BD, the DIBD will display the corresponding font. However, when receiving Completion font code between 0xAC00~0xD7A3, the DIBD will convert it into Combination font code and display it by Combination font among these.

C. **User16x16-** is to display special characters or symbols created by user. When receiving any code between 0xE000 and 0xE0FF, the DIBD will display the corresponding font among these. User can develop various fonts by using a font editing program(ex. Fontman.exe) at the size of 16x16 pixels.

D. **UNI_ALL-16x16** includes the following Unicode fonts. When receiving any code among the followings, the DIBD will display the corresponding font.
.0x0000~0x007F for ASCII(English, figures)
.0x3040~0x30FF for Japanese characters
.0x4E00~0x9FFF for CJK common Kanji

Note: As the DIBD supports Unicode also, it is possible to display most of texts in Chinese, Japanese, Arabic, etc. Unicode has more than 60,000 fonts and requires big memory capacity(2MBytes based in 16x16 font). So we provide an SD memory saving Unicode fonts only when requested from a customer.

Attach.8. Changing to One-way Communication Mode

The DIBD Sign Communication Protocol normally runs in two-way communication mode with command packet and replay packet. If your pc(or system) do not receive any replay packet after sending command packet, it judges that the communication is failed.

So, **when you try to do the messaging simulation by DavitChe software without connecting your PC to the LED sign, you need to change the communication mode into one-way mode(Command only),** as the following steps:

① Close the Davitche software.

② Double-click on "Davitche.ini" file in the Davitche folder, a notepad of "Davitche.ini" will open.

③ Find "FlagReplayPacket" and change the value of "**0**" into "**1**".

④ Save the "Davitche.ini" file and open the Davitche software again.

Differences under ONE-WAY/TWO-WAY Simulation Modes.

Simulation Mode	One-way communication mode	Two-way communication mode
When to do	While the PC is not connected to the sign.	While the PC is connected to the sign.
How to do	Set the value of "FlagReplayPacket" to "**1**"	Set the value of "FlagReplayPacket" to "**0**"
What can do.	To preview the message on the Preview screen. To read the command packet on the Log window.	To preview the message on the Preview screen. To read the Command/Replay packets on the Log window. To confirm the actual display image on the LED screen.
Indication in command packet	The forth code will be "**20**". **"10 02 00 20 27 94 00 00 01 01 00 03 01 01 00 32 08 00 00 00 00 00 01 01 01 01 02 02 02 02 03 03 03 31 32 33 20 41 42 43 20 61 62 63 10 03"**	The forth code will be "**00**". **"10 02 00 20 27 94 00 00 01 01 00 03 01 01 00 32 08 00 00 00 00 00 01 01 01 01 02 02 02 02 03 03 03 31 32 33 20 41 42 43 20 61 62 63 10 03"**

Note: When you connect your PC(or system) to the LED sign, you shall restore the value of "FlagReplayPacket" from "1" to "0".