DIBD Protocol Manual(Ver.5) LED Sign Communication Protocol



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

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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.

Start Code ^A Sign Address ^B		Data Length ^c	Command Code ^D	Data F	End Code ^F					
10H 02H	16	Byte	2 Byte	1 Byte	Max 409	10H 03H				
Urgent Message	e(94H)	Dis (Font	blay Attibutes ^{E1}	Text	Text Color ^{E2}					
Normal Message	e(95H)	spee	d, stay time, etc)							
[Displa	y Imag	e]	[Packet Sa	ample] *Hexad	mple] *Hexadecimal codes for ASCII printable characters					
$\frac{10.02^{4}.00^{8}}{01.01.01.02} \frac{00.23^{\circ}}{02.02} \frac{94^{\circ}}{03.03} \frac{00.00}{03.01} \frac{00.00}{03.01} \frac{00.00}{01.01.00} \frac{10.00}{01.01.00} \frac{00.00}{01.01.00} \frac{00.00}{01.01.00} \frac{00.00}{01.00} \frac{00.00}{00.00} \frac{00.00}{0$										

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.





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 <u>Urgent Message code</u>.
 - 2 To display multiple set of message data in registered order by Normal Message code.
 - ③ To display message data by using both <u>Urgent & Normal Message codes.</u>
 - 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 Protocol¹ Packet²

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX
1	4	В	С	D	E	F	=

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

The numerals indicate hexadecimal.

```
A B C D E F
```

• Command Packet Format

Indication	Length	Description								
Α	2 byte	DLE(10H ^[3]) STX(02H) indicates Start of DIBD Protocol.								
		DST means D e ST ination to send the packet.								
D	1 buto	In case of using the single sign, address "00" shall be used for that.								
D	i byte	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).								
		LEN(length) indicates the total byte length from CMD to DATA inclusive.								
С		When receiving the command packet, the sign counts the number of bytes and compares								
	2 byte	with this number. If they are not the same, the transmission is considered to be failed.								
		With <u>Bit 0~11</u> , it can check up to $4096(2^{12})$ while <u>Bit 12~15</u> is used for other special								
		purposes like "Replay packet disabled", "CRC Error Detection", "byte Stuffing".								
		There are several kinds of Command codes as below:								
		Message Command Codes								
		• 94H - Urgent Message Command • 95H - Normal Message Command								
D	1 buto	Special Function Command Codes								
U	I Dyte	• 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								
	variable	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						
Α	2 byte	DLE(10H) STX(02H) indicates Start of DIBD Protocol Packet.						
D	1 h	DST means D e ST ination to send the packet.						
В	1 byte	II LED signs responds the Replay packet to the master "00".						
С	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".						

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- DIBD Protocol¹ Packet² 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 <u>davitsol@gmail.com</u>.

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

^[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. 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 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)

<u>Step2</u>: 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 30 101 00 32 04 00 00 00 00 00 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 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 37 38 39 47 48 49 10 03" // for page **02**

Fou 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)

Section 0	Section 0	Sec.0 Sec.1	Sec.0Sec.1 S	Sec.2
	Section 1 Section 2	Sec. 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.



Packet 🔻

Command: <u>10 02 00 00 27 94</u>° 00¹ 00² 01³ 01⁴ 00⁵ 03⁶ 01⁷ 01⁸ 00⁹ 32¹⁰ 08¹¹ 00¹² 00¹³ 00¹⁴ 00¹⁵ 00¹⁶ 01 01 01 01 02 02 02 02 03 03 03¹⁷ <u>31 32 33 20 41 42 43 20 61 62 63¹⁸ 10 03</u> 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	<u>94</u> 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)	<u>01 01 01 02 02 02 02 03 03 03 17</u>
	Text Message	11 bytes(Variable)	<u>31 32 33 20 41 42 43 20 61 62 63</u> 18

No	Items	Length					Desci	ription					
<u>94</u> º	Command Code	1 Byte	94H 95H	Corr Corr	mand command c	code for Urgent Message, Real-time display for a single page code for Normal Message, Sequential display for multi-pages							
<u>00</u> 1	Page Number	1 Byte	• Disable	ed(00	H) in Uı	rgent Messag	ge code						
00 ²	Section Number	1 Byte	• When you want to display different message in different position with different efferences 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.									ect ion	
_		,	Hex value Section number			ООН		01H 1		02	2H		
			For more details, refer to "Attach.1. Example of Section Division".										
			• This is how to display the section message. At OFF mode, the							e section wi	section will be disabled.		
	Display		Hex val	ue	00H	01H	02H	03H	~	62H	63H		
<u>01</u> ³	Control	1 Byte	Parame	eters	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". 								1.		
00 ⁴	Display	1 Byte	00H	No	ormal	This is to sta currently dis	art display playing m	ing the me essage.	ssage or	n completior	n of the		
	Method	,-,	01H	C	lear	This is to im and start dis	mediately splaying th	clear the one new me	currently ssage.	displaying r	nessage		

00 ⁵	Text Code	1 Bvte	00H	ASCI	П	To di ☞ Se	splay AS ee "Attac	CII Chara hment 2	acters(1 . ASCII C	byte) or Character	User Foi • Code"	nt(2 byte	s).	
_		,	01H	Unic	ode	To di For th	splay Ur nis applica	nicode Fo	ont(2 byte provide ac	es) for C dditional (:hinese, . guidance	lapanese on your r	, etc. equest.	
			• Font	size	indic	ates p	pixels i	n "Widt	th x H	Height"	based	on th	ie size	of
		1 Byte	Korean	/Chin	ese/Ja	apanese	e charact	er.						
03 ⁶	Font Size		ASCII	ASCII characters(alphabets, numerals, etc) are half of the pixel in width.										
			Ex.) Wł	nen "1	.6x16	font" s	elected,	numerals	and alp	habets l	has "08x	16 pixels		I
			Hex va	lue	02	2H	03H	04H	05H	06	H o	~	0FH	
			FONt(P	xei)	1	Ζ	10	20	24	Z	5	~	64	
<u>01</u> 7	Entry Effect	1 Byte	 This is "01H" See A text 	to set indica "Attao mess	: up t ites "S ch.3. age	he appe Stop eff Codes o longer	earing ef ect(Statio of Messa then the	fect of th c effect) v ige Displa e screen	ne messa with no o ay Effect width s	age to th direction ". hall be	ne sectio ". set up	n screen to " 06H	(Shiftin <u>c</u>	y to
			Left)" 1	for En	try Ef	fect.								
<u>01</u> ⁸	Exit Effect	1 Byte	 You ca "01H" See A text Left)" 1 	 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. 										
<u>00</u> 9	Assistant Effect	1 Byte	• Disable	• Disabled(00H)										
		1 Byte	• This is	to set	: up t	he relat	ive spee	d of effe	ct.					
32 ¹⁰	Effect Speed		The low	wer th	e nui	mber, th	ne fastes	t the spe	ed is.					1
			Hex valu	ie 00	0H 0	0AH	14H	1EH	28H	32H	3CH	~	FFH	
			speed		0	10	20	30	40	50	60	~	255]
			• This is	to set	t up t	the stay	time of	the mes	sage on	the scre	een after	appeari	ng onto	the
			sign w	ith Ent	try Ef	fect.	0411	0011	0.411		1 / 1 1		- FFLL	1
					0H 0	02H	04H	08H 8	10	0FH 15	14H 20	~	230	
<u>08</u> 11	Stay Time	1 Byte	<u>× 0.5 50</u>		0 			5011	10	15	20	6711	200]]
			Hex Valu		JH Ain	PTH 2Min	F2H	F3H	F4H	F5H	F6H	F/H	F8H	
			• A text		viin. ago la	Siviin.	Siviiri.	screen is	sulviin.			$rac{1}{2}$	$\frac{1900015}{100015}$] at it
			can mo	ove fro	om ri	ght-end	l to left-	end smoo	othly wit	hout sta	ying in t	he mid-	sentence	at it 2.
0012	V Start Desition	1 Byte	• This is	to cot	· un t	be coor	dinate v	alues for	each se	ction	, ,			
<u></u>		1 Dyte	Hex valu		он	01H	02H	03H	04H	05H	06H	07H	~	l
0013	Y-Start Position	1 Byte	Pixels		0	4	8	12	16	20	24	28		
<u>00</u> 14	X-End Position	1 Byte	• Each c	oordir	nate c	an be s	set by a	4-pixel u	nit from	top & le	eft end t	o the op	posite.	1
<u>00</u> 15	Y-End Position	1 Byte	☞ See • " 00H "	"Atta is a de	ch.1. efault	Example value f	e of Sect or the fu	ion Divis Ill screen	ion". not divi	ided.				
<u>00</u> 16	Background Image	1 Byte	• Once you ca	you re n set i	egiste up th	er backg	ground ground i	image(Te mage nu	ext/graph mber to	nic/video display) in BG together	Playlist(with tex	*.bgp), ł ‹t messa	here ge.

			See "Attach.5. How to Make the Background Playlist".										
			Hex value	00H	01	.H	02H	03H	04H	~	20H		
			Img number	Not use	ed #	1	#2	#3	#4	~	#20		
			• You can set	t the backg	round im	age n	umber or	nly at Seo	ction 0, no	ot at Sect	ion 1 or 2	2.	
			• This is to se	et up the co	olor or th	e bacl	kground (color of i	ndividual	text.			
			Bit7	Bit6	Bit5	Bit4	Bit	3 E	Bit2	Bit1	Bit0]	
			Dummy	Bits for bad	ckground	l colo	r Dum	my	Bits fo	or text co	lor		
<u>01</u>	Text Color		Example) "12H" indicates "1": red for background color of text, green for text color.										
<u>01</u>			"01H" indicates "T" : none for background color, red for text color.										
01			• Color code	0	1	n	2	1	г	6	7		
02			Color	Nono	I Pod (Z	3 Vollow	4 Blue) Maganta	0	/ White		
02		n Byte	• Longth of t	his color co	do(#17)	ic alw	reliow	biue mo with	that of T	Cyan ovt Moss	vvnite		
<u>02</u>		(Variable)	• Linder ASC		mode	the c	ays the sa	he with	bute for	alphabet	ige(#10). ic & nun	noric	
<u>02</u>			characters	• Under ASCII code (#5) mode, the color code has 1 byte for alphabetic & numeric characters 2 bytes for Liser's fort									
<u>03</u>	Text B.G. Color		Example) #	2 Dytes for 171 Text Cr	olor · "11	11122	223333"	#172 ⁻	Text BG C	olor · "0"			
0317			Sample Tex	t 1 2	3	A	в		a b	c			
<u> </u>			Color code	e 01 01	01 0	01 02	2 02 0	2 02	03 03	03			
			• Under Unic	code (#5) m	ode, the	color	code has	2 bytes	for every	font.			
			• When you	use "12" of	font size	(#6), c	option for	backgro	und colo	r will be o	disabled.		
			The actual text to be displayed on a sign. This could be one of the following font of									des.	
			• ASCII Character Code (See Attachment. 3)										
			Length	He	ex Value		Text Type						
			1 Byte	00H~	7FH	A	Alphabet,	Numera	ls, special	symbols			
			2 Byte	B0A1H	H∼C8FEH	ŀ	Korean character, KSC5601 Code						
<u>31</u>			Example) #	18 Text Me	ssage : "3	81 32	33 20 41	42 43 2	0 61 62	63″			
<u>32</u>			Sample Tex	t 1 2	3	A	АВО	C	a b	с			
<u>33</u>			Text Code	<u>31</u> <u>32</u>	<u>33</u> 2	<u>4</u>	1 42 4	3 20	<u>61</u> <u>62</u>	<u>63</u>			
<u>20</u>								_					
42	Text Message	n Byte	• Unicode (A	Additional g	guidance	to be	e provide	d on rec	uest)				
43		(Variable)	Length	He	ex Range			Te	xt Type				
<u>20</u>				0000F	1~00/FH	E .	nglish Al	phabet					
<u>61</u>				3040F	1~309FH	J	apanese	Hiragana					
<u>62</u>			2 Bytes	30A0F		J	apanese	Katakana					
<u>63</u> 18				4E00F	1~9FFFH		JK comm	ion kanji					
				ACOOF	H~D/A3F		Hangul(Ko	orean)	• • • •				
			Costume(u	iser) code (Addition	al gu	idance to	be pro	vided wh	en neces	sary)		
			Length	He				le Ie	xt lype	la la:			
			2 Bytes	E000F	1∼E0FFH		special m	arks & s	igns mac	ae by use	r can		
	1					k	de used.						

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, tricolor LED modules" as an example.



Note: You can download the software from <u>www.davitsol.com</u> > 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"

Char	t Carda	Sign	Data Lanath	Command	Data Fie	eld (Max. 4095 B	yte)	Enderda			
Star	t Code	Address	Data Length	Code	Display Attributes	Text Color	Text	End Code			
10	H 02H	1 Byte	2 Bytes	94H	16 Bytes	N bytes	N bytes	10H 03H			
	C	isplay Imag	ge	Section No.		Message Packets					
1	123			00	10 02 00 00 17 94 00 (01 01 31 32 33 10 03	00 <u>01</u> 00 00 03 <u>0</u>1	L 01 00 32 <u>08</u> 00 0	<mark>0 00 00</mark> 00 01			
2	123 456	ABC abo DEF de		00	10 02 00 00 41 94 00 0 01 01 01 01 01 01 01 0 33 20 41 42 43 20 61 6	0 63 01 00 03 01 0 1 01 01 01 01 01 0 2 63 20 34 35 36 2	01 00 32 00 00 00 0 01 01 01 01 01 01 01 0 20 44 45 46 20 64 65	0 00 00 01 01 1 01 01 31 32 5 66 20 10 03			
3	123 456	ABC abo DEF de		00	10 02 00 00 41 94 00 0 01 01 03 03 03 03 02 0 33 20 41 42 43 20 61 6.	0 <u>63</u> 01 00 03 <u>01</u> 2 02 02 01 01 01 2 63 20 34 35 36 2	<mark>01</mark> 00 32 00 00 00 0 01 03 03 03 03 03 02 0 20 44 45 46 20 64 6	0 00 00 01 01 12 02 02 31 32 5 66 20 10 03			
	012	3456789		00 (1 st line)	10 02 00 00 25 94 00 0 01 01 01 01 01 01 01 01 01	0 <u>63</u> 00 00 03 <u>01 (</u> 1 30 31 32 33 34 3	<mark>01</mark> 00 32 00 <u>00 00 1</u> 35 36 37 38 39 10 03	<mark>.8 04</mark> 00 01 01 3			
4	← ABCDEFGHI JKLMNO			01 (2 nd line)	10 02 00 00 43 94 00 0 02 02 02 02 02 02 02 02 02 042 43 44 45 46 47 48 44 10 03	1 <u>63</u> 00 00 03 06 (2 02 02 02 02 02 02 0 9 4A 4B 4C 4D 4E	06 00 32 00 00 04 1 02 02 02 02 02 02 02 02 4F 20 20 20 20 20 20 20	8 08 00 02 02 2 02 02 02 41 20 20 20 20 20 20			
5		-12	3 ABC	oo Cabo	10 02 00 00 2F 94 00 0 03 03 03 03 03 03 03 03 0 20 20 20 20 10 03	0 <u>63</u> 00 00 <u>07</u> <u>06</u> 3 03 03 03 03 03 03	<mark>0</mark> 6 00 32 00 <u>00 00 0</u> 31 32 33 20 41 42 4	00 00 00 03 03 3 20 61 62 63			

- "①" is to display a message, <u>one time(01H) only</u>, <u>without any effect(01H, 01H)</u>, for <u>4 seconds(08H)</u>, <u>on</u> <u>the full screen(00H 00H 00H 00H)</u>.
- "②③" is to display a message <u>until receiving another message packet(63H)</u>, <u>without any effect(01H</u>, <u>01H)</u>, <u>on the full screen(00H 00H 00H 00H)</u>.
- "(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 <u>until receiving another message packet(63H)</u>, <u>without any</u> <u>effect(01H, 01H)</u> <u>on Section 00(00H 00H 18H 04H)</u>.

- "Section 01(2nd line)" is to display a message longer than the screen width, <u>repeatedly until receiving</u> 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, <u>repeatedly until receiving another message</u> packet(63H), by <u>big font(07H)</u>, with effect with shifting to left(06H, 06H), on a full screen(00H 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.



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

		Total 39(27 H) bytes	
CMD		1 byte	<u>95</u> ⁰
	Display Attributes	16 bytes(fixed)	$00^1 \ 00^2 \ 63^3 \ 01^4 \ 00^5 \ 03^6 \ 01^7 \ 01^8 \ 00^9 \ 32^{10} \ 08^{11} \ 00^{12} \ 00^{13} \ 00^{14} \ 00^{15} \ 00^{16}$
DATA	Text Color	11 bytes(Variable)	<u>01 01 01 02 02 02 02 03 03 03 17</u>
	Text Message	11 bytes(Variable)	<u>31 32 33 20 41 42 43 20 61 62 63 18</u>

No	Items	Length			Des	cription			
<u>95</u> º	Command Code	1 Byte	94H 95H	Command Command	code for Urgent Mess code for Normal Mess	age, Real- sage, Sequ	time display uential displa	for a single page ay for multi-pages	
<u>00</u> 1	Page Number	1 Byte	• You can display Hex valu Page nu	n set up to ed on the s ue imber	^o "three" to send mult ign according to this p 00H 0	tiple mess page num	sage packets ber sequent 01H 1	at a time. They will ially and repeatedly. 02H 2	be
<u>00</u> 2	Section Number	1 Byte	When you want to in the same screen, Number and setting Hex value Section number		o display different mes n, you can divided the ng the X/Y coordinate 00H 0 s, refer to "Attach.1. Ex	ssage in d screen in values as (kample of	lifferent pos nto sections Items #12~: 01H 1 Section Divi	ition with different eff by assigning the Sect 15 below. 02H 2 sion".	fect ion
<u>63</u> ³	Display Control	1 Byte	• This is t Hex valu Paramet	to determin ue ers	e whether the section 00H OFF (no displa	shall be o	displayed or ON (a	not. 63H always display)]
<u>01</u> 4	Display Method	1 Byte	00H	Normal	This is to start displa the currently displayi	ying the r ing messa	nessage who ge.	en completion of	

			01H	Clea	r Th an	is is to im d start dis	mediately playing th	clear the	e current iessage.	tly displ	aying m	lessage	
<u>00</u> 5	Text Code	1 Byte	00H 01H	ASCII	de To	display A See "Atta display U r this applie	SCII Chara chment 2 nicode Fc cation, we p	acters(1 b . ASCII Cl ont(2 byte provide ad	yte) or naracter s) for C ditional g	User Fo Code" hinese, guidance	nt(2 byt Japanes on your	es). e, etc. request.	-
<u>03</u> 6	Font Size	1 Byte	Font Korean ASCII (Ex.) Wh Hex va Font(Pi	size ir /Chines :haract nen "16: Ilue xel)	ndicates e/Japan ers(Alph x16 font 02H 12	pixels ese charac nabets, nu " selected 03H 16	in "Widt ter. merals, e alphabet 04H 20	th x H tc) are h s and nu 05H 24	leight" alf of th merals h 06 28	based ne pixel nas "08× H	on t in widt 16 pixe ~ ~	he size : h. ls 0FH 64	of
<u>01</u> 7	Entry Effect	1 Byte	 This is "01H" "> See A text Left)" f 	 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. 									
<u>01</u> ⁸	Exit Effect	1 Byte	 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. 										
<u>00</u> 9	Assistant Effect	1 Byte	• Disable	ed(00H)									
<u>32</u> 10	Effect Speed	1 Byte	• This is The low Hex valu Speed	to set u ver the e 00F 0	up the re number 1 0AI 10	elative spe ; the faste H 14H 0 20	ed of effe st the spe 1EH 30	ct. ed is. 28H 40	32H 50	3CH 60	~ ~	FFH 255]
<u>08</u> 11	Stay Time	1 Byte	This is sign wi Hex valu x <u>0.5 Se</u> Hex Valu A text can mo	to set i th Entry e 00F c 0 le FOF 2Mi messag ove fror	up the s y Effect. H 02H 2 H F1H n. 3Mi le longe n right-e	tay time c H 04H 4 H F2H in. 5Min r then the end to left	f the mes 08H 8 F3H 10Min. screen is eend smoo	0AH 10 F4H 30Min. Fecommothly with	0FH 15 F5H 1Hour ended	14H 20 F6H 3Hours to set u ying in	r appea ~ F7H 5Hour p to "00 the mid	EFH 239 F8H s 9Hours OH" so th -sentence	the
<u>00</u> 12	X-Start Position	1 Byte	• This is	to set ι	ip the co	oordinate	values for	each sec	tion.				
<u>00</u> 13	Y-Start Position	1 Byte	Hex valu	e 00H	I 011	H 02H	03H	04H	05H	06H	07H	~	
<u>00</u> 14	X-End Position	1 Byte	• Each co	0 pordina	4 te can b	e set by a	12 4-pixel u	16 nit from 1	20 top & le	24 eft end 1	28 :o the o	pposite.]
<u>00</u> 15	Y-End Position	1 Byte	☞ See • "00H"	"Attach is a def	n.1 Exam ault valu	ple of Sec le for the	tion Divisi full screen	ion" 1 not divid	ded.				

<u>00</u> 16	Background Image	1 Byte	 Once you r you can set See "Atta Hex value Img number You can set 	egister backgr up the backgr ch.5 How to M 00H Not used the backgroun	round im ound im 1ake the 01H #1 d image	nage(Text/g age numbe Backgroun 02H #2 number o	graphic/vi er to disp id Playlist 03H #3 nly at Sec	deo) in E lay togetl ". 04H #4 ction 0, n	BG Playlis her with to ~ ~ ot at Sect	t(*.bgp), here ext message. 20H #20 ion 1 or 2.
01 01 01 02 02 02 02 02 03 03 03 ¹⁷	Text Color	n Byte	This is to set Bit7 I Dummy Example) "12 "C Color code Code Color	up the color Bit6 Bit5 its for backgr 2H" indicates " 1H" indicates 0 1 none Red	or the ba Bi ound co A": red f "A" : nor 2 Green	ackground t4 Bi lor Dun or backgro ne for back 3 n Yellow	color of i t3 I nmy und color ground c 4 Blue	Bit2 Bits for r of text, g olor, red f 5 Magenta	text. Bit1 green for for text co 6 Cyan	Bit0 lor text color. olor. 7 White
	Text B.G. Color	(Variable)	Length of th Under ASCI characters, 2 Example) #1 Sample Text Color code Under Unicc When you u	is color code(# code (#5) m bytes for Use 7.1 Text Color 1 2 01 01 0 01 01 0 04e (#5) mode, se "12" of fort	 #17) is all ode, the code, the r's font. : "11111 01 0	ways the s color cod .22223333 A -8 02 02 02 02 02 02 03 -05 04 -65 05 -06 05 -07 06 -02	ame with le has 1 " #17.2 02 02 s 2 bytes r backgro	that of T byte for Text BG C a b 03 03 for every pund colo	ext Messa alphabet Color : "0" c 03 font. r will be c	ıge(#18). ic & numeric disabled.
$ \begin{array}{r} 31 \\ 32 \\ 33 \\ 20 \\ 41 \\ 42 \\ 43 \\ 20 \\ 61 \\ 62 \\ 63^{18} \end{array} $	Text Message	n Byte (Variable)	The actual text • ASCII Chara Length 1 Byte 2 Byte Example) #1 Sample Text Text Code • Unicode (Ad Length 2 Bytes • Costume(us Length 2 Bytes	to be displayed cter Code (Se Hex Va 00H~7FH B0A1H~Ca B0A1H~Ca Text Messag 1 2 3 31 32 3 dditional guid Hex Ra 0000H~00 3040H~30 3040H~30 4E00H~9F AC00H~D er) code(Addi Hex Va E000H~EC	ed on a set of the set	sign. This comment. 3) Alphabet Korean cl 2 33 20 4: A 8 41 42 be provide English A Japanese Japanese CJK comm Hangul(K uidance to Special n be used.	ould be o Te , Numera haracter, I 1 42 43 2 C 43 20 ed on red 43 20 ed on red Te Iphabet Hiragana Katakana Mon kanji orean) o be prov Te harks & s	ext Type ls, special KSC5601 20 61 62 a b 61 62 quest) ext Type a a i ided who ext Type signs mac	e following I symbols Code 63" 63 63 en necess de by use	g font codes.

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	H : Command code for this function							
DATA	1 byte	01H/02H/03H : The total number of page you want to register.							
Example	9:								
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	CMD 1 byte 4BH : Command code											
DATA	80H: To delete all Normal Message data											
DAIA	T Dyte	00H/01H	I/02H : To	selected page data only								
Example	e:											
Com	Command Packet: 10 02 00 00 02 4B 80 10 03											
Retu	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 "<u>www.davitsol.com</u> > 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".

File	Edit	System	Contents	View	DIBD Online	Advanced	About
) 📄 ıylist (DIBD Protocol Simulato	r(Ver.5) IMessage Others			ي ع + -	DIBD BG Pla DIBD font DIBD Protoc	iylist Transfer :ol-V3
0.	Page No. Section No. Display Control Oisplay Method Text Code Font Size(Pisel) Entry Effect Assistant Effect OEffect Speed I.Stay Time(x500ms) I2X Start Pos.(Pisel) I4X End Pos.(Pisel) I6.B.G. Image I7.1.Text Color	0 0 1 2 0 0 1 2 0 0 1 2 0 0 0 1 2 0 0 0 1 0 2 0 0 0 1 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	NoDir NoDir NoDir Pos.(Pixel) 0		Stay Time(S) 2	DIBD Protoc	are Upgrade
mmun. -08 11:15 -08 11:15 -08 11:15	17.2.Text B.G. Color 18.Text Message 19. Preview Note: Please be sure to c from which some preview 12.3 AFFC 251 COM3 : 11 32.33 20 41 42 43 Receive : 32.51 COM3 CL0	0 123 ABC abc onlim the actual display image on L mage could differ, depending on the abc 5.200bps, 8, 1, N - OF essage [OK] 10 02 00 3.20 61 62 63 10 03 10 02 00 00 02 95 00 OSE : [OK]	5 Send ED screen parameter. PEN [OK] 00 27 95 00 00 63 0 10 03	1 00 03 01 01	00 32 08 00 00 00 0	0 00 01 01 01 01 0	D2 02 02 02

- 1 At Davitche, select [Advanced] > [DIBD Protocol-V5], and "DIBD Protocol Simulator(Ver.5)" will open.
- Click on "Normal Message" tab.
- ③ Set up the parameters and input the texts for "Page Number 00" as below.

		0	
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 <u>only your reference</u> 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 :	AH : Command code									
DATA	10 byte	30H 3	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".

File Edit System Content	nts DIBD 00 Comm. Set
Playlist Setup (Default.pla) Brightness	
No. Content Name 1 Info.01- Other Setting Temperature	Comm.Port CUM3
L.	192.168.0.75 Port : Dynamic DNS
Display Image of Content (2R x 6C)	Connect DIBD
Communication Log	
[02-13 18:10:35] COM3 CLOSE : [OK] [02-13 18:10:53] COM3 : [15200bns, 8, 1, N - OPEN [OK] [02-13 18:10:53] DIBD Connecting [02-13 18:10:53] COM3 CLOSE : [OK] [02-13 18:10:53] COM3 CLOSE : [OK]	x 30 31 32 33 34 35 36 37 38 39 10 03 4 35 36 37 38 39 10 03

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 by	rte 4A H	4AH : Command code							
	1 by	rte Bit F	Bit Per Pixel : 02H(2 Bit_3Color), 18H(24 Bit_FullColor)							
DATA	1 by	rte 00H	00H~F0H : the number of module in row.							
	1 bv	rte 00H	00H~F0H : the number of module in column.							

[Example of Packet]

Command: "10 02 00 00 04 4A 02 02 06 10 03 "
\implies 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 <u>4A</u> <u>00</u> 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].

Davitche - 3Color [Ve	r 5.34]							- • 🔀
File	Edit	System	Contents	,	View	DIBD Online	Advanced	About
	l 🗟 🧴	ComPort Screen		0		् २		8
Playlist Setup (De	etault.pla; t Name ,01-	Brightness Power Other Setting Temperature	ction Dir	•	Screen St Screen Height Width : Bit Per Screen	et Size : : Pixel(BPP) : n Direction :	2 6 2Bit(3Cole Horizonta	× 16 × 16 × 16
Display Image of	Content (2	R x 6C)		ł	ſ	Only Set Pro	gram ₃	Send
								Close
Communication L	og							1
[02-13 18:56:47]	Setting Receive	DIBD Screen 9 : 10 02 00 00	Size(2 × 6) 0 02 4A 00 10	[OK] 03	10 02 0	0 00 05 4A 02	02 06 00 10	⁰3
DIBD Version - [DIBD	220P]-02x00)6-003-SD V05.3	4, 2BPP(Bit Pe	Pixe)			

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 by	te 41 H	41H : Command code				
DATA	ATA 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 <u>once a month</u> or <u>after days of downtime</u> to correct any possible time deviation.

DLE	STX	DST	LEN	CMD	DATA	DLE	ETX				
CMD	1 byte	47H : Co	7H : Command code								
	1 byte	00H~99H	0H~99H : YEAR, in BCD format								
	1 byte	01H~12H	01H~12H : MONTH, BCD								
	1 byte 01H~31H : DATE, BCD										
DATA	1 byte	• 00H (Sunday)~ 06H (Saturday) : DAY of the week									
	1 byte	01H~23H : HOUR, BCD									
	1 byte										

[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 : Co	6H : Command code					
	1 byte	00H~99	JH~99H : YEAR, in BCD format					
	1 byte	01H~12	D1H~12H : MONTH, BCD					
DATA	1 byte	01H~31	01H~31H : DATE, BCD					
(Return	1 byte	00H (Sur	00H(Sunday)~06H(Saturday) : DAY of the week					
Packet)	1 byte	01H~23	01H~23H : HOUR, BCD					
	1 byte	e 01H~59H : MINUTE, BCD						
	1 byte 01H~59H : SECOND, BCD							
[Example	Example of Packet]							

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

[How to simulate from Davitche Software]

- (1) Click on $\mathbb{N}_{[setting tools]}$ 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	byte 4EH : Command code							
		No.1 Outp	No.1 Output signal for J7						
	2 bytes	ways ON, 00H F1H : The status	s Quo						
DATA		01H 00H ~ FFH EFH : Keeping ON signal for " x 100ms".							
DAIA		No.2 Outp	ut signal fo	r J8					
	2 bytes	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 FO 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 <u>4E</u> 00 10 03"

[How to simulate from Davitche Software]

- 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.

DIBD Protocol	Simulator(Ver.5)	
Urgent Message	e Normal Messag	e Others
Delete Normal	Message Memory	
All Check	• 🗸	Send
Register Norm	al Message Numbe	Brs
1	• 🗸	Send
Select B.G. Im	age	
Disabled	• 🗸	Send
Send Output S	Signal	
1. 30	x 100ms	Send
2. 📴	x 100ms	

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	1 buto	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 6 th 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.

rgent Message	Normal N	lessage Other:
Delete Normal	Message N	femory
All Check		Send
Register Norma	al Message	Numbers
1		Send
Select B.G. Im	age	
Disabled		🗸 Send
Distant and		
Disabled	and the second s	
Uisabled 1 2		
1 2 3	ns	
Disabled 1 2 3 4 5	ms	Send

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 "2x16 in Height, 6x16 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
0123456789	00 (1 st line)	10 02 00 00 25 94 00 00 63 00 00 03 01 01 00 32 00 00 01 8 04 00 01 01 01 01 01 01 01 01 01 30 31 32 33 34 35 36 37 38 39 10 03
← ABCDEFGH I JKLM	NO	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 0
	UL (2 nd line)	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.
- 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.
- 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(D		Screen B				Screen C				Screen D		
Section 0	Sec Sec	c.0 Sec.: c. 2	1		Section 0 Section 1				Sec.0 Se	<i>c.1</i>	Sec.2	
Itoms	S	creen	A	5	creen	В	So	reen구	С	S	creen l)
items	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	<i>96</i>
13. Y-start	0			0	0	32	0	16		0	0	0
14. X-end	0			32	128	128	128	128		32	<i>96</i>	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	:	;	<	=	>	?	0
Hex	30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F	40
Char	A	В	С	D	E	F	G	Н	Ι	J	К	L	М	Ν	0	Р	Q
Hex	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F	50	51
							1			1		1	1	1			
Char	R	S	Т	U	V	W	Х	Y	Z	[₩]	^	-	``		
Hex	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F	60		
Char	а	b	С	d	е	f	g	h	i	j	k	Ι	m	n	0	р	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	х	У	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" \rightarrow "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		NoDir.	No Effect
02		Bright On	Brightness to be increased from 10 to 250 in relative level.
03	STOP	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
05		Vertical Mirrow	(by a mirror), five times alternately.
06		Left	
07		Right	To display the text/image scrolling to the direction
08	SHIFT	Up	
09		Down	
OB		UpDown	To display the text/image scrolling up & down twice.
0C		Left	
0D	\\/IDE	Right	To display the text/image writing on the screen to the direction
0E		Up	To display the text/inlage withing on the screen to the direction.
0F		Down	
12		Left	
13	BLIND	Right	To display the text/image like opening the blind to the direction
14	DEIND	Up	
15		Down	
18		Horizontal Side	
19	CURTAIN	Horizontal Center	To display the text/image like opening the curtain to the direction
1A	contrait	Vertical Side	
1B		Vertical Center	
1E		Left Up	
1F		Left Down	
20	Zoom Out	Right Up	To display the text/image being reduced to the direction.
21		Right Down	
22		Center	
23		Left Up	
24		Left Down	
25	Zoom In	Right Up	Io display the text/image being enlarged to the direction.
26		Right Down	
27		Center	
28	ROTATE	Counterclockwise	To display the text/image rotating to the direction.
29		Clockwise	
2C		Red	
2D		Green	To blink the background with selected color.
2E	blink B.G.	Blue	
2F		Yellow	
30		All	IO DIINK the background with all colors alternatively.
31		Red	
32		Green	To blink the selected color of the text to highlight.
33	BLINK TEXT	Blue	
34		Yellow	
35		Every Color(sequentially)	To blink the red/green/yellow color 8 times sequentially and repeatedly.
37		All Colors	To mink all text colors simultaneously.
36	3D Effect	Left	I I o 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:

- \checkmark 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 Regulation [mage Editor], and you can create/edit text image files with graphic background image.

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

Click on EVICIDE 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 **23**, "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 \checkmark , 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 Θ 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 <u>old version(5.5)</u> 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(0000000), 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 ket 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.
- Import the message file that you want to display for number 1 switching signal from PLC.
 Ex.) 2x6-2B-Message01.dat

	🚔 🖃 😓 🖪 🗖	😭 🔍	DIBD 00	•	E	3-08-30 (금) 13:30:14
Playli	st Setup (Default.pla)				5+	- 🖪 🔊 -	23
No.	Content Name	MainEffect	Direction	Speed	Stay Time(S)	Div.Effect	Direction
1	2x6-2B-Message01.dat	Stop	NoDir	50	2	None	None
2	2x6-2B-Message02,dat	Stop	NoDir	50	2	None	None
3	2x6-2B-Message03, dat	Stop	NoDir	50	Click	None	None
4	2x6-2 6 Message04.dat	Shiff Double	NoDir	50	0	None	None
5	2x6-2B-Message05.dat	Stop	NoDir	50	2	None	None
6	2x6-2B-Message06.dat	Bandom	NoDir	50	4	None	None
7	2x6-2B-Message07,dat	Sali	NoDir	50	8	None	None
8	2x6-2B-Message08,dat	Wino	NoDir	50	15	None	None
		Blind			20		
		Curtain			30		

- 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 23[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].
- ③ Select BG Playlist(*.bgp) for file type.
- Save it as a proper name. Ex.) 2x8-plc sample.bgp
- ① Click on [Save], and the file shall be saved at "DavitChe/Data/Playlist" folder.



3) Uploading The BG Playlist

F	ile 🛛	Edit	System	Contents	View	DIBD Online	Advanced	About		
	<u>i -</u>	le 🔓 🗶	<mark>.</mark> (9	🔍 👔 dibd	00 🔹	E /	B.G. Playli Foot Trans	st Transfer for		
Playli	ist Setup) (2x6-Messa	ges.bgp)			/-	Protocol Si	mulator(Ver, 3)		
No.	Co 2x6-2B	ntent Name -Message01.	MainEffe	ct Direction NoDir	Speed 50	Stay Time(S	Protocol Si Firmware L Menu Disn	mulator(Ver,5) Jpgrade Iau Setun		
2 3 4	2x6-2B 2x6-2B 2x6-2B	-Messageuz, -Message03, -Message ⁰⁴	dat Stop dat Stop dat Stop	NoDir	50 50 50	2	None	None		
5	2x6-2B 2x6-2B	-Messag -Messag	3D BG Playlist	Transfer			None None	None None		
8	r 2x6-2D-Messag None None 8 2x6-2B-Messag DIBD BG Playlist (.bgp) None None D:\Davitche V5.51\Data\Playlist\2x6-Messages.bgp									
	D:\Davitche V5.51\Data\Playlist\2x6-Messages.bgp 2 ✓ Send									
Conte	ents' Pre	view (2F			 ✓ 	Close				
			M	essag	je No.	8				

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 <u>old version(5.3)</u> 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 "4x16 Height, 12x16 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)

N

- 1) Click on Rec to open Image Editor window.
- ② Click on _____ of Main Screen at Import BG Image, search/import the BG image file(Ex. Busarrival_time.bmp), and the image will be displayed at the Preview screen at the bottom.
- (3) Click on \Box and save it as a new name with "*.dat" format at "Divitche/Data/ Image" folder.

D mana	ger						
File	Edit	System	Contents	View	DIBD Online	Advanced	About
1 🚔	👌 🔜 🖫 🎴	 (<u>Q</u>	DIBD	00 🖃 🔍	≪		8
vlist Se	nage Editor – Ur	titled rtf					
·	File Edit	1000,10					
- []	🗅 🖻 🚚	1 9 @ >	🗇 🤌 I	3 Z U			
1	MS Sans Serif	9 1 Text	F	BG	B		
	Screen Type : @	 Simple Screen 	C Hori, Split	: Screen 🔿 Vert	, Split Screen		
	Screen Size : Ho	rizon, Count : 1	+ Vertical Co	unt : 1 🚔 S	olit Screen : 12	t × 16 Veric	al Offset : 🛛 🚔
	Import BG Image			6			
N	1ain Screen : V5.1	47(demo)₩Data¥	flmage₩bus-an	rival_time, bmp	© Original	C Fit to Scre	en C Fit to Ratio
5	Split Screen :				🖸 Original	C Fit to Scre	een C Fit to Ratio
		Q Preview 10	0% 🗐 🛛 🔖 E	Exit			
-					-		
2					<u>.</u>		

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

- (13) Click on New.
- Double-click on the default (14) cell(Info.01-) just below Content Name.
- Select **Image** as the file type. (15)
- 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].



4x12-BG demo.bgp

BG Playlist (*.bgp)

Playlist File (*.pla) BG Playlist (*.bgp

36

Save

Cancel

~

DIBD Protocol Manual(Version 5)

www.da

My Documents

My Computer

•

My Net

File name

Save as type

- 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

 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

F	ïle	Edit	Syster	n Contents	View	DIBD Online	e Advanced	About
Playli: No.	≓ 📑 st Setur	o (4x12-BG de Content Nam	🔂 强 emo.bgp) e	DIBD	00 💽 🔍 🔪	Contraction	DIBD BG DIBD font DIBD Prot DIBD Prot	Playlist Transfer ocol-V3 ocol-V5
1 2 3	4x12-2 4x1 4x1 4x1	8-bus-arrival 2-28-Bunkerir 12-28-Parking	time dat ng.d g.da	Stop MoDi BG Playlist Trans VED BG Playlist (.bgp) V5.147(demo)\Data\Playl	ist\4x12-BG demo.b	Alono ap nd Close	20 20 20	2 2 2
o for	VOUR	alf						

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

- Run "DIBD Protocol V5" 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.

1. Page N 2. Section 3. Display 4. Display 5. Text Co 6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 5 11.Stay Ti 12.X Start	lo. 1 No. 2 1 Control 1 Method ode ze(Pixel) ffect ect	On Normal ASCII 16 Stop	2 Direction		
2. Section 3. Display 4. Display 5. Text Co 6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 5 11.Stay Ti 12.X Start	n No. 2 Control Method de ze(Pixel) ffect ect	0 0 0 0 0 Normal ASCII 16 Stop 0	1 2		
3. Display 4. Display 5. Text Co 6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 9 11.Stay Ti 12.X Start	o Control o Method ode ze(Pixel) ffect ect	On Normal ASCII 16 Stop	Direction		
4. Display 5. Text Co 6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 5 11.Stay Ti 12.X Start	Method ode ze(Pixel) iffect ect	Normal ASCII 16 Stop	Direction		
5. Text Co 6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 9 11.Stay Ti 12× Start	ode ze(Pixel) ffect ect	ASCII 16 Stop	Direction		
6. Font Siz 7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect S 11.Stay Ti 12.X Start	ize(Pixel) ffect ect	16 Stop	Direction		
7. Entry Ef 8. Exit Effe 9. Assistar 10.Effect 9 11.Stay Ti 12.X Start	ffect ect	Stop	Direction		
8. Exit Effe 9. Assistar 10.Effect 9 11.Stay Ti 12.X Start	ect	0	Sec. 2	NoDir	-
9. Assistar 10.Effect 9 11.Stay Ti 12.X Start		Stop	Direction	NoDir	
10.Effect 9 11.Stay Ti 12.X Start	nt Effect	Disabled	R		
11.Stay Ti 12.X Start	Speed	20	R		
12.X Start	ime(x500ms)	4	R		
	t Pos.(Pixel)	0	13.Y Start Pos.(Pixe	el) 0	R
14.X End	Pos.(Pixel)	192	15.Y End Pos.(Pixe	1) 16	•
16.B.G. In	nage	1			
17.1.Text	Color	222222222222	22222221		
17.2.Text	B.G. Color	0			
18.Text M	lessage	Bus Arrival Infe	o. 13:30		

Table 1 Setting Parameters of each section for the sample Image

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	2222222222222222 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

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

[1]XY start/end value for each Section

		Pixels : (Xstart, Ystart) ~ (X e	end, Y end)
Bus	Section0 (0, 0) ~ (192, 16) 13	:30
243 200	Section1 (0, 10	5) ~ (192, 48) ¹²	Min Min
Now!	Section2 (0, 48	3) ~ (192, 64)	

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.

File	Edit	System	Contents	View	DIB	D Online	Advanced	About	
		,					B.G. Play Font Tran Protocol S Protocol S Firmware Mehu Dis	list Transfer sfer 1) Simulator(Ver,3) Simulator(Ver,5) Upgrade plav Setup	
DIBD Font Trans	sfer				n Fant Eile		+		
Font Selection Kinds of Fo English Johap	nt Font File F	Path \Sys\Font\DVS-EN(\Sys\Font\DVS-KOF	308x16-Gothic.fr	2	Look in: My Recent Accument Desktop	Font DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-0 DVS-ENGOBX16-4 DVS-ENGOBX16-4 DVS-ENGOBX16-4 DVS-ENGOBX16-4	CLD The second s	W5-KORLISK16-Ameongia W5-KORLISK16-AmangN90 W5-KORLISK16-AmangN90 W5-KORLISK16-AmangN90 W5-KORLISK16-AmangN90 W5-KORLISK16-AmeongN9-KORLISK16-AmangN9-KORLIS	
UserFont Disabled English Wansung Japanese Chinese Johap <u>UserFont</u>	en\Sys\For	#\DVS-USER16x16	ASCII-Roman.Int	5)	Documents	File name:	oonic pN90 millionic pN90 millionic pN90 millionic pN90 millionic pN90 millionic pNVS-ENG08x16-Gothic Fort File (".f.rk)	NL_ALL_16x16_No_Mormal_Co NL_ALL_16x16_No_Mormal_Cl	Open Cancel

- 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].

X 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.

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 " ${f 1}$ "	Set the value of "FlagReplayPacket" to " 0 "
What can do.	To preview the message on the Preview	To preview the message on the Preview
	screen.	screen.
	To read the command packet on the Log	To read the Command/Replay packets on the
	window.	Log window.
		To confirm the actual display image on the
		LED screen.
Indication in	The forth code will be " 20 ".	The forth code will be " 00 ".
command packet	*10 02 00 20 27 94 00 00 01 01 00 03 01 01 00 32	"10 02 00 20 27 94 00 00 01 01 00 03 01 01 00 32 08
	08 00 00 00 00 00 01 01 01 01 02 02 02 02 03 03	00 00 00 00 00 01 01 01 01 02 02 02 02 03 03 03 31
	03 31 32 33 20 41 42 43 20 61 62 63 10 03″	32 33 20 41 42 43 20 61 62 63 10 03"

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

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