COMMUNICATION PROTOCOL

Version 1.21

COM port setting

2400-baud, 8 data bits, 1 stop bit, no verify.
NOTE: The signs count is no more than 128 in one network.

Frame format

Frame is the basic communication unit. One frame consists of one or more data packets. Serial Address Packet must be the first packet of every frame. When there are no more packets, use a binary 0x00 to end the frame. The size of a frame is limited to 8190 bytes.

Packet 1	Packet 2	…	Packet N	0x00

NOTE: Packet 1 must be Serial Address Packet

Packet types and formats

Serial Address Packet

0x00	Serial address	Clear Memory

Serial Address Packet begins with one byte binary 0x00. Field "Serial address" is a word (16 bits) represents the combinations of the 16 signs in the network. For example, Serial address 0x8003 is the combination of sign #0, sign #1 and sign #15. Field "Clear Memory" is one byte, binary 1 to clear all memory on the sign; any other value will not take effect.
NOTE: when signs number is greater than 16, set the "Serial address" field to 0xFFFF, and append an Expanded Serial Address Packet.

Expanded Serial Address Packet

0x0B	Serial address list	0xFF

Expanded Serial Address Packet begins with one byte binary 0x0B. Field "Serial address list" is a list of serial address, every serial address occupy one byte from 0x00 to 0x7F. Expanded Serial Address Packet ends with one byte binary 0xFF.
NOTE: this packet is use for 128 signs network only, and must be the second packet of the frame, and the "Serial address" field in the first Serial Address Packet must be 0xFFFF.

Text File Packet

0x01	File Number	File Data

Text File Packet begins with one byte binary 0x01. Field "File Number" is two ASCII characters '00'~'99'. Field "File Data" refer to "Text File Data Format".

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Sequence File Packet

0x02	Sequence File Number	Run Day	Begin Time	End Time	File Numbers

Sequence File Packet begins with one byte binary 0x02. Field "Sequence File Number" is one ASCII character '0'~'9'. Field "Run Day" is one byte, bit 0 to bit 6 represent Sunday to Saturday. Field "Begin Time" and "End Time" is four ASCII characters represent hour and minute, for example, 08:30 is '0830'. Field "File Numbers" is a list of file numbers, which end with one byte binary 0xFF. File number is two ASCII characters '00'~'99'. No separator is needed between file numbers. The amount of text files in one sequence file is limited to 100.

Alarm Packet

0x04	Alarm Count	Alarm Interval	0xFF

Alarm Packet begins with one byte binary 0x04. Field "Alarm Count" is one byte binary 0~255. Field "Alarm Interval" is one byte binary 0~255, in minutes. Alarm Packet ends with one byte binary 0xFF.

Hourly Alarm Packet

0x05	Hourly Alarm ON	0xFF

Hourly Alarm Packet begins with one byte binary 0x05. Field "Hourly Alarm ON" is one byte, binary 0x00 to turn the hourly alarm off, and any other value to turn the hourly alarm on. Hourly Alarm Packet ends with one byte binary 0xFF.

Time ON Packet

0x06	ON Time	0xFF

Time ON Packet begins with one byte binary 0x06. Field "ON Time" is 6 ASCII characters indicated hour, minute and second. For example, '083000' is 08:30:00. Time ON Packet ends with one byte binary 0xFF.

Time OFF Packet

0x06	OFF Time	0xFF

Time OFF Packet is similar to Time ON Packet.

Date and Time Packet

0x08	Day of Week	Hour Mode	Date and Time	0xFF

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Day of Week: 1 byte, ASCII character, '0'~'6' represent Sunday to Saturday.

Hour Mode: 1 byte, binary, 24 hour mode when zero, 12 hour mode when none zero.

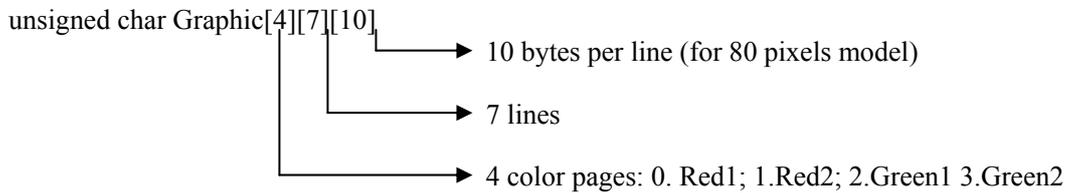Date and Time: 6 bytes, ASCII characters, order by year, month, day, hour, minute, and second. For example, ASCII characters '010628101105' means 28 June 2001, 10:11:05.

Graphic Packet

0x09	Graphic Number	DOT data

Graphic Number: 1 byte, ASCII characters, '0'~'7'

DOT data: 280 bytes (for 80 pixels model), binary, 4 color pages ordered in red1, red2, green1, and green2. The graphic structure can be described in C language as:

unsigned char Graphic[4][7][10]

→ 10 bytes per line (for 80 pixels model)

→ 7 lines

→ 4 color pages: 0. Red1; 1.Red2; 2.Green1 3.Green2

Command Packet

0x0A	Command	0xFF

Command: 1byte, binary

0x01: LED test. The sign's screen will display red, green, and yellow in turn for 5 second.

Text File Data Format

Method	Attribute	…	Character	…	Attribute	…	0xFF	Method	…	0xFF	0xFF

0x00 ~ 0x1F: Methods, 0x01 to 0x18 used for 24 display methods, others are reserved.

0x20~0xEE: Characters, Text witch will be displayed on the screen.

0xEF: Attributes, the following byte will indicate what attribute it is.

0xF0~0xFE: unused.

0xFF: End of a paragraph, the following byte must be a method. Two continuous 0xFF will end the file.

NOTE: a file must start with a method byte, and end with double 0xFF.

Attributes (begin with 0xEF) list

0x60~0x7D: 30 predefined symbols

0x80: Time

0x81: Date

0x90~0x97: 8 animations

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0xA0~0xA6: 7 types fonts
0xB0~0xBF: 16 color combinations
0xC0~0xC7: 8 speeds
0xC8~0xCF: 8 pauses
0xD0~0xD7: 8 user defined graphics
0xD8~0xDF: 8 predefined graphics
0xE0~0xE2: 3 beeps

Communication Examples

All Examples are decrypted in C style with explanations on the right side.

Text File Transmission

0,0xff,0xff,1	Frame begins with Serial Address Packet. Serial address 0xFFFF indicate that all 16 signs in the network will receive this frame. All memory will be cleared.
1,'01'	Text File Packet begins. File number is '01'.
1,0xef,0xb0,'SDV111 User\'s Guide',0xff	The first paragraph of file '01'. Display method is 'CYCLIC' (1). Color is bright red (0xef,0xb0).
8,0xef,0xb5,'easy to use',0xff	The second paragraph of file '01'.
15,0xef,0xb5,'give you power',0xff	The third paragraph of file '01'.
20,0xef,0xb5,'moving sign',0xff	The fourth paragraph of file '01'.
5,0xef,0xb7,'Your wise choice',0xff	The last paragraph of file '01'.
0xff	File '01' ends.
0	Frame ends.

Sequence File Transmission

0,0xff,0xff,1	Frame begins with Serial Address Packet.
1,'01',0xef,0xb0,'FILE 01',0xff,0xff	Text File '01'
1,'02',0xef,0xb5,'FILE 02',0xff,0xff	Text File '02'
1,'03',0xef,0xb7,'FILE 03',0xff,0xff	Text File '03'
2,'0',0x3e,'0800','1759','010203',0xff	Sequence File 'S0', run from Monday to Friday (0x3e), from 08:00 (0800) to 17:59 (1759), display text file '01', '02', and '03' in turn (010203).
0	End of frame.

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Adjust Time by PC Software

0,0xff,0xff,1	Serial Address Packet
8,'5',0,'980313173000',0xff	Date and Time Packet. '5' means Friday. 0 means 24-hour mode. '980313173000' means 13 March 1998, 17:30:00
0	End of frame

Communication in 128 signs network

0,0xff,0xff,1	Serial Address Packet
1,'01',3,'File 01',0xff,3,'is sent to all signs',0xff,0xff	Text File Packet. File '01' is sent to all signs
0x0b,0,1,2,3,4,0xff	Expanded Serial Address Packet. The following packets is sent to #0,#1,#2,#3, and #4 signs only.
1,'02',3,'File 02',0xff,3,'is sent to #0, #1,#2,#3,and #4 signs',0xff,0xff	Text File Packet. Limited by Expanded Serial Addess Packet, File '02' is sent to #0,#1,#2,#3 and #4 sings only.
0	End of frame

The Coding of Internationnal Characters

General characters is coding from 0x20 to 0x7f. For example, the code of character 'A' is 0x41. International characters is coding from 0x80 to 0xEE. See the following table.

English Character	International Characters
A	Ä(0x8E) Å(0x8F) Æ(0x92)
C	Ç(0x80) Ć(0xAE)
E	É(0x90)
N	Ñ(0xA5)
O	Ö(0x99) Ó(0xB2)
S	Ś(0xAD)
U	Ü(0x9A)
Z	Ż(0xA9) Ź(0xAA)
a	â(0x83) ä(0x84) à(0x85) å(0x86) æ(0x91) á(0xA0) ª(0xA6) ą(0xB0)
c	ç(0x87)
e	é(0x82) ê(0x88) ë(0x89) è(0x8A) ę(0xAF)
i	ï(0x8B) î(0x8C) ì(0x8D) í(0xA1)
n	ñ(0xA4) ń(0xAB)
o	ô(0x93) ö(0x94) ò(0x95) ó(0xA2) º(0xA7)
t	ŧ(0xAC)
u	ü(0x81) û(0x96) ù(0x97) ú(0xA3)
y	ÿ(0x98)
Space	α(0xE0) β(0xE1) Γ(0xE2) π(0xE3) Σ(0xE4) σ(0xE5) μ(0xE6) τ(0xE7) Φ(0xE8) θ(0xE9) Ω(0xEA) ∞(0xEB) δ(0xEC) φ(0xED)
?	¿(0xA8)

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$	¢(0x9B) £(0x9C) ¥(0x9D) Pts(0x9E) ƒ(0x9F) €(0xB1)