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Chapter 1 Summarization

A. Summarization

LED sign allows ASCII Text/Graphics/Variable/Time/Countdown/Enter/Temperature/Inside Symbol input.

LED sign allow to set up display parameters by the protocol, include password setup, device number setup, turn on/off, time setup, display mode setup, system recover etc.

B. For the display text

Text file is including ASCII character/display mode/font value/color value/graphics file/time data etc files type.

1. Graphics file

The graphics file will be used in the text file, there only record the graphics file name in the text file.

The graphics will be stored in FLASH separately.

Each graphics file has 4K byte space; the max width dot is 240dots. Every byte records a dot color value, only allow 8 color value, the detail will be defined in “Write graphics command”.

2. Variable

The variable will be used in the text file, there only record the variable name in the text file.

The variable will be stored in RAM separately.

LED sign allow to be inputted 32 variable, the max character is 30 for each variable.

3. Time

The protocol defines 10 time display format, display hour/minute, year/moth/day, and week.

System will get current time when meeting time value, and change ASCII character according the stipulated format and insert text file.

4. Countdown

The LED sign provide hour/minute/second countdown function.

5. Temperature

The LED sign allow 2 ways to show the temperature (F & C).

6. Inside symbol

The LED sign provide some inside symbols.

7. ENTER

The LED sign allow to be inputted ENTER to change another line.

C. Serial communication setup

LED sign support three communication standards: RS-232 and RS-485 and Ethernet.

RS232 is available for the near communication distance; the communication distance is below 30M. RS232 can’t allow many LED signs to be connected at the same data line.

RS-485 is available for far communication distance & many LED signs; the communication distance is below 1500M.

RS-485 allows 128 LED sign to be connected at the same data line.

The communication cable’s port is different by RS-232 or RS-485, but the communication data line is the same.

You can select RS-232 or RS-485 or Ethernet on the control board.

LED sign communication baud rate is 9600BPS, 8 data bit, 2 stop bit, no efficacy.

D. The text file display stipulation

Text file default font is SS7, default color is AUTO.

After meeting font-setup value, ASCII characters display according to the font-setup until the next font setup value.

After meeting color-setup value, ASCII character display according to the color-setup until the next color setup value.

If the color value is AUTO then the display color is different each time.

Text display mode is set according to “display mode”, if display mode value is AUTO then every time the display mode is different.

Text display speed is according to “display speed value”, the speed value is from ‘1’ to ‘5’, the default value is ‘2’, ‘1’ is

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the fastest value.

Text pause time is according to “pause time value”, the range is from ‘1’ to ‘9’ and the default value is‘2’.

E. Communication protocol basic format

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	Checksum	<EOT> (0x04)
A	B	C	D	E	F	G	H	I	J

Item	Types	Length	Illustration
A	<NUL>	5 byte, 0x00	The start part of command
B	<SOH>	1 byte, 0x01	Start Of Head
C	Sender Address	2 byte ASCII	Sending address, appointed “FF” as pc address, “00” is as broadcast address which can’t be as sender address.
D	Receiver Address	2byte ASCII	Receiving address, “00” is broadcast address, all sign will receive data; “FF” appoint pc fixed address which is used when sign return data to pc. “?” is wildcard character, “1?” allows the signs between “10” to “1F” to receive data.
E	<STX>	1byte,0x02	ASCII character, “Start” of “TeXt”.
F	Command Code	1byte ASCII	Command code, 1-byte ASCII character shows different functions. ‘A’ Write text file command ‘C’ Write variable command ‘E’ Write graphics file command ‘W’ Write special function command ‘R’ Read special function command
G	Data Field	Unsure of Length	Data zone
H	<ETX>	1byte,0x03	End of TeXt
I	Checksum	4 byte ASCII	Efficacy code, the accumulative total from<STX> to <ETX>
J	<EOT>	1 byte,0x04	End Of Transmission

All the commands (including sending and receiving) should accord with the above protocol and use the same format.

The LED sign will judge whether allow LED sign receive the data after meeting STX, if allow to receive then save all the received data until meeting EOT, then judge “checksum” is right or not, if it is wrong then reject the command, if it is right then start to deal with received command.

According the above protocol, <NUL><SOH><STX><EOT> only appear in the stated position, the other positions will not be allowed to use these ASCII characters.

F. Efficacy code

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	Checksum	<EOT> (0x04)
A	B	C	D	E	F	G	H	I	J

The first efficacy value is 0x00, from <STX> (included) to <ETX> (included), add up to every byte, the effect is the efficacy value. For example, the accumulative total value is 0x013f then show “013F”.

G. Return data

When the LED sign receive all data correctly and confirm to allow receiving, return <EOT> after 50 ms, it shows the LED sign has received the command correctly.

Then the sign start to deal with the data according the command, after finish, then return <SOH>, it shows the LED sign has finished the command and allow to receive the next command.

During dealing with the command, there will not receive any data. The time is different according command types, usually between 10ms to 2000 ms.

Under the condition of single sign, the sign will return <EOT> after receive the command.

Under the condition of multi-signs, if the receive address is “00”, then only number 0x01 sign return <EOT>, but all signs receive and deal with the command.

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If the send command is for one group of sign, there will only the first sign return <EOT>, for example, the receive address is”1?”. Then only number 0x10(16) sign return <EOT>, but all the other signs from number 16 to number 31 receive and deal with command, the other signs don’t deal with the command.

If the receive address is for a certain sign, then only this sign return <EOT>. For example the receive address is “23”, then only number 0x23(35) sign return <EOT>, only this sign receive and deal with the command, the other signs don’t deal with the command.

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Chapter 2 Text command

Write text file command (A command)

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	Checksum	<EOT> (0x04)

Command Code	Data Field		
'A'	File name	Text file attribute	Text file data
A	B	C	D

Tab	Title		Illustration
A	Command Code		The fixed value is 'A'
B	Data Field	File name	The virtual value is '0'—'9','A'—'Z'
C	Data Field	File attribute	

Type	Length	Data
Display mode	1 byte	'A' 'B' 'C' 'D' 'E' 'F' 'G' 'H' auto flash hold interlock rolldown rollup Roll in rollout 'I' 'J' 'K' 'L' 'M' 'N' 'O' 'P' rollleft rollright rotate slide snow sparkle spray starburst 'Q' 'R' 'S' 'T' 'U' 'V' 'W' 'X' switch twinkle wipedown wipeup wipein wipeout wipeleft wiperight 'Y' 'Z' cyclecolor clock
Display speed	1 byte	'0' '1' '2' '3' '4' fastest faster normal slow slower
Pause time	1 byte	'0'—'9',show 0 second to 9 second.
Show date	2 byte	Two ASCII characters show HEX. If the date is allowed to display then the bit is '1',otherwise is '0'. For example, "13" shows Thursday & Monday & Sunday are allowed to display, the others can't display Bit7 Bit6 Bit5 Bit4 Bit3 Bit2 Bit1 Bit0 null Saturday Friday Thursday Wednesday Tuesday Monday Sunday
Start Show time	4 byte	Two ASCII characters show "start show hour", and another two show "start show minute". For example, "0323", show the sign begin to display from 3:23 AM.
End Show time	4 byte	Two ASCII characters show "end show hour", and another two show "end show minute". For example, "1536", show the sign finish display at 3:36 PM.
preparatave	3 byte	For the future application. Always '0'.
Align mode	1 byte	'1' '2' '3' Left align Right align Center align

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D | | File data

Text zone of text file is including

Font, color, graphics file, character string, time, ASCII character.

Type	Length	Additional character	Data
Font value	2 byte	0xFE	‘A’ ‘B’ ‘C’ ‘D’ ‘E’ ‘F’ ‘G’ ‘H’ SS5 ST5 WD5 WS5 SS7 ST7 WD7 WS7 ‘I’ ‘J’ ‘K’ ‘L’ ‘M’ ‘N’ ‘O’ ‘P’ SDS SRF STF WDF WSF SDF SS10 ST10 ‘Q’ ‘R’ ‘S’ ‘T’ ‘U’ ‘V’ ‘W’ ‘X’ WD10 WS10 SS15 ST15 WD15 WS15 SS23 SS31 ‘@’ SMALL
Color value	2 byte	0xFD	‘A’ ‘B’ ‘C’ ‘D’ ‘E’ ‘F’ ‘G’ AUTO LIGHT RED LIGHT GREEN RED GREEN YELLOW BROWN ‘H’ ‘I’ ‘J’ ‘K’ ‘L’ ‘M’ AMBER ORANGE MIXV1 MIXV2 MIXH BLACK
Graphics file	2 byte	0xFC	Graphics file name, the virtual value is ‘0’--‘9’,’A’--‘Z’
Variable	2 byte	0xFB	Variable name, the virtual value is ‘0’—‘9’,’A’—‘V’, total number is 32.
Time & Countdown	2 byte	0xFA	‘A’ hh:mm:ss ‘F’ yyyy-mm-dd ‘B’ hh:mm:ss A/PM ‘G’ dd.MM yyyy ‘C’ hh:mm ‘H’ mm’dd’yyyy ‘D’ hh:mm A/PM ‘I’ English week shortened form ‘E’ mm/dd/yyyy ‘J’ English week full form ‘K’ Count down (hh:mm:ss), after the ‘K’, 6 bytes show the start time, another 6 bytes show the end time. For example, “010030000130”, shows the start countdown time is 01:00:30, countdown time is 1 minute 30 second. ‘L’ Count down (date), after the ‘L’, 6 bytes show the end date For example, “051023”, shows the end date is 2005-10-23.
Temperature	2 byte	0xF9	‘A’ is Fahrenheit; ‘B’ is Celsius.
Enter	1byte	Null	0x7F
Inside symbol	1 byte	Null	From 0xd0 to 0xea. 26 types symbol.
ASCII	1byte	Null	The available character 0X20 – 0X7e in the ASCII character string table.

LED sign is power on, will show the content according the original display setup, there are 2 show types, 1 is show all the existent text file,2 is show according to time setup of text file;

When writing text file, LED sign will stop show until receiving and finishing deal with, LED sign will restart.

The LED sign will divide up word according blank (0X20), if a word can’t display wholly in one line, will change next line automatically. If a word length is over one line range, will display by roll left.

When LED sign meet ENTER, will change another line.

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Chapter 3 Variable Command

WRITE VARIABLE COMMAND (C command)

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	Checksum	<EOT> (0x04)

Command Code	Data Field		
'C'	Variable name	variable attribute	variable data
A	B	C	D

Tab	Title	Illustration
A	Command Code	Fixed is :'C'
B	Variable name	The virtual value '0'—'9','A'—'V'
C	Variable attribute	"XXC", 3 bytes to describe the variable width and color. "XX" is width, use 2 byte ASCII show HEX data. "C" is color value, the detail as below: 'B' LIGHT RED; 'C' LIGHT GREEN; 'D' RED; 'E' GREEN; 'F' YELLOW; 'G' BROWN; 'H' AMBER; 'I' ORANGE For example: "12B", show the variable use 18 character spaces, the color is red.
D	Variable data	Variable content, use ASCII. For each variable the max characters are 30.

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Chapter 4 Graphics command

WRITE GRAPHICS COMMAND (E command)

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	CheckSum	<EOT> (0x04)

Command Code	Data Field		
'E'	graphics file name	graphics attribute	Graphics data
A	B	C	D

Tab	Title	Illustration
A	Command Code	Fixed is :'E'
B	Graphics file name	The virtual value '0'—'9','A'—'Z'
C	Graphics attribute	"XX, XX" is for the graphics height and width. The height and width is 2 byte ASCII data. For example: "10,20",graphics height is 16dots, width is 32 dots "07,1F",Graphics height is 7 dots, width is 31 dots.
D	graphics data	Graphics dot color value, sending at first line then arrange.

	'B'	'C'	'D'	'E'	'F'	'G'
	LIGHT RED	LIGHT GREEN	RED	GREEN	YELLOW	BROWN
'H'	'I'				'M'	
AMBER	ORANGE				BLACK	

LED sign will send the dot's color value line by line, from the first line to the last line.

For each line, LED sign will send the dot's color value from the first dot to the last dot.

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Chapter 5 Control command

WRITE CONTROL COMMAND (W command)

Control Subcommand	Control command data	Illustration
'A'	"YYYYMMDDHHMMSSW"	Set up clock, 15 ASCII character.Year/month/day/hour/minute/second/week. For example"200404271020322",2004 year 04 month 27 day 10 hour 20 minute 32 second tuesday
'B'	Empty	software reset
'C'	"XXXXXX"	Set up password, 6 ASCII characters. The virtual value is '0'--'9','A'—'Z'
'D'	"XX"	Device number setup, 2 ASCII。Value is "01"—"FE" Using the command, Receiver Address is "00" The command only can set up single device and can't exist the same device number in same system, otherwise will appear immesurable fault
'E'	"SHSM,EHEM; SHSM,EHEM; SHSM,EHEM; SHSM, EHEM."	Four groups turn on/off time setup. Totally 40 ASCII characters. In turn, the first group: turn on hour minute, turn off hour minute; the second group: turn on hour minute, turn off hour minute.The third group: turn on hour minute, turn off hour minute; the fourth group: turn on hour minute and turn off hour minute.
'F'	'A' or 'T'	Display mode set up, totally 3 choices, 1 ASCII character. 'A'=Display all files; 'T'== Display according setup time.
'J'	'X'	Set up key cue voice,"1"== turn on, "0"== turn off.
'K'	'X'	Set up password input,"1"==Input password,"0"== needn't input password. After setup password input by remote, will appear password input frame, should input right password to edit.
'L'	Empty	Clear all data will delete all the display data and can't resume.
'P'	'A' or 'T' or '1' to '8'	Brightness control set up, totally 3 choices, 1 ASCII character. 'A' == Auto brightness; 'T' == Change brightness according the setup. '1' to '8' == Appoint brightness
'Y'	'X'	Set up key cue voice,"1"== turn on, "0"== turn off.
'Z'	"XXMCNL"	"XX" show LED sign width, use 2 ASCII show HEX value. "50" is 80 dots width; 'M' show storage location , '0' == FLASH; '1' == RAM; 'C' show LED sign color, '0' == MONO; '1' == TRICOLOR; 'N' show single sign or multi-sign, '0' == Single sign; '1' == Multi-sign, use 485. 'L' show whether need start message, '0' == no need, '1' == need;

READ CONTROL COMMAND (R command)

<NUL><NUL><NUL><NUL><NUL> (0x00,0x00,0x00,0x00,0x00)	<SOH> (0x01)	Sender Address	Receiver Address	<STX> (0x02)	Command Code	Data Field	<ETX> (0x03)	CheckSum	<EOT> (0x04)

Command Code	Data Field	
'R'	Control subcommand	data zone
A	B	C

TAB	Control Sub-command	Control command date zone	Illustration
B + C	'F'	NULL	Read equipment attribute, including press-key voice setup/ display way setup/ equipment number/password setup. Return at 'WF' command,"SRDDP" is 5 ASCII character. 'S' == '0' or '1'; 'R' == 'A' or 'T' "DD" == '"01" — "FE"; 'P' == '0' or '1'.

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Chapter 6 Example

A. Write text file to appointed display

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“03”	<STX>	“AA”	“A227F000024000001”	“HELLO”	<ETX>	“0564”	<EOT>
A	B	C	D	E	F	G	H	I	J	K

Tab	Title	data	illustration
A	**<NUL>**	0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**	0x01	“Start Of Head”.
C	Sender address	“FF”	PC address
D	Receiver address	“03”	Number 3 display
E	**<STX>**	0x02	“Start of TeXt”.
F	Command	‘A’	Write text file command
	File Name	‘A’	Text file name
G	Mode	‘A’	Auto mode
	Speed	‘2’	Normal Speed
	Pause	‘2’	Pause 2 seconds
	Date	“7F”	Every day show
	Start Time	“0100”	Start show from 01:00
	End Time	“1200”	End show at 12:00
	Preparatave	“000”	No use
	Align Mode	‘1’	Align left
H	Text	“HELLO”	Show “HELLO”.
I	**<ETX>**	0x03	“End of TeXt”.
J	**Checksum**	“0564”	Efficacy code
K	**<EOT>**	0x04	“End Of Transmission”.

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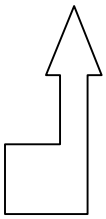
B. Write graphics to appointed display

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“12”	<STX>	“EB07,08”	…	<ETX>	“116A”	<EOT>
A	B	C	D	E	F	G	H	I	J

“B B M M M M B B ”
“B B M M M B B M ”
“M M M M B B M M ”
“M M M B B M M M ”
“M M B B M M M M ”
“M B B M M M B B ”
“B B M M M M B B ”

‘B’: LIGHT RED
‘C’: LIGHT GREEN
‘D’: RED
‘E’: GREEN
‘F’: YELLOW
‘G’: BROWN
‘H’: AMBER
‘I’: ORANGE
‘M’: BLACK



Tab	title		data	illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	Sender address		“FF”	PC address
D	Receiver address		“12”	Number 18 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘E’	Write graphics command
	Data Field	Dots Id	‘B’	Graphics file name
		Height & Width	“07,08”	Height 07dot, width 08 dot
G	Data Field	Color	“…”	“BBMMMMBB” “BBMMMBBM” “MMMMBBMM” “MMMBBMMM” “MMBBMMMM” “MBBMMMBB” “BBMMMMBB”
H	**<ETX>**		0x03	“End of TeXt”
I	**Checksum**		“116A”	Efficacy code
J	**<EOT>**		0x04	“End Of Transmission”

C. Write clock command

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“22”	<STX>	“WA200404021236235”	<ETX>	“038F”	<EOT>
A	B	C	D	E	F	G	H	I

Tab	Title		Data	illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	sender address		“FF”	PC address
D	receiver address		“22”	Number 34 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command
	Data Field	Sub Command	‘A’	Write clock command
		Clock Data	“200404021236235”	2004year 04 month 02 day 12hour 36minute23seconc Friday
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“038F”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

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D. Software reset

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“22”	<STX>	“WB”	<ETX>	“009E”	<EOT>
A	B	C	D	E	F	G	H	I

Tab	Title		data	Illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	sender address		“FF”	PC address
D	receiver address		“22”	Number 34 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command
	Data Field	Sub Command	‘B’	Software reset command
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“009E”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

E. Password setup

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“22”	<STX>	“WC123456”	<ETX>	“01D4”	<EOT>
A	B	C	D	E	F	G	H	I

Tab	Title		Data	Illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	sender address		“FF”	PC address
D	receiver address		“22”	Number 34 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command
	Data Field	Sub Command	‘C’	Password setup command
		Data	“123456”	Password data
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“01D4”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

F. Setup device number

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“00”	<STX>	“WD12”	<ETX>	“0103”	<EOT>
A	B	C	D	E	F	G	H	I

Tab	Title	data	illustration
A	**<NUL>**	0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**	0x01	“Start Of Head”
C	Sender Address	“FF”	PC address
D	Receiver Address	“00”	Random display can receive. The command can’t be used for many displays in general communication line system.
E	**<STX>**	0x02	“Start of TeXt”

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F	Command		'W'	Write special function command
	Data Field	Sub Command	'D'	Setup device number command
		Data	"12"	Device number, number 18 display
G	**<ETX>**		0x03	"End of TeXt"
H	**Checksum**		"0103"	Efficacy code
I	**<EOT>**		0x04	"End Of Transmission"

G. Setup turn on/off time

<NUL><NUL><NUL><NUL><NUL>	**<SOH>**	**"FF"**	**"08"**	**<STX>**	**"WE"**		**<ETX>**	**"0643"**	**<EOT>**
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**

"0600, 0700; 0900, 1030; 1200, 1425; 0000, 0000."

A B C D

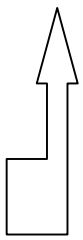
A: The first group on/off time. 6 hour 00 minute on,7hour 00 minute off

B: The second group on/off time 9 hour 00 minute on,10 hour 30 minute off

C: The third group on/off time 12hour 00 minute on,14 hour 25 minute off

D: The forth group on/off time 00 hour 00 minute on, 00 hour 00 minute off

Ending time setup is 00hour00minute, can ignore the setup.



Tab	Title		Data	illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	"Start Of Head"
C	Sender Address		"FF"	PC address
D	Receive Address		"08"	number 08 display
E	**<STX>**		0x02	"Start of TeXt"
F	Command		'W'	Write special function command
	Data Field	Sub Command	'E'	Set Turn on/off time.
G		Data	"0600,0700;0900,1030; 1200, 1425; 0000, 0000."	Turn on/off time.
H	**<ETX>**		0x03	"End of TeXt"
I	**Checksum**		"0643"	Efficacy code。
J	**<EOT>**		0x04	"End Of Transmission"

H. Setup display rule

<NUL><NUL><NUL><NUL><NUL>	**<SOH>**	**"FF"**	**"22"**	**<STX>**	**"WFA"**	**<ETX>**	**"00E3"**	**<EOT>**
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

Tab	title	data	illustration
A	**<NUL>**	0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**	0x01	"Start Of Head"
C	Sender address	"FF"	PC address
D	Receiver address	"22"	Number 34 display.
E	**<STX>**	0x02	"Start of TeXt"

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F	Command		‘W’	Write special function command
	Data Field	Sub Command	‘F’	Enact display mode command
		Data	“A”	Display mode choose Allowable choose is 2 types ‘A’ == Display all text files ‘T’ == Display text file according the time setup
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“00E3”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

I. Setup key-press cue voice

<NUL><NUL><NUL><NUL><NUL>	**<SOH>**	**“FF”**	**“10”**	**<STX>**	**“WJ1”**	**<ETX>**	**“00D7”**	**<EOT>**
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

Tab	title		data	Illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	Sender address		“FF”	PC address
D	Receiver address		“10”	Number 16 display.
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command.
	Data Field	Sub Command	‘J’	Setup key-press cue voice command.
		Data	“1”	On key-press cue voice, if “0” then off key-press cue voice.
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“00D7”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

J. Password input function

<NUL><NUL><NUL><NUL><NUL>	**<SOH>**	**“FF”**	**“10”**	**<STX>**	**“WK1”**	**<ETX>**	**“00D8”**	**<EOT>**
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

Tab	Title		data	Illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	Sender address		“FF”	PC address
D	Receiver address		“10”	Number 16 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command.
	Data Field	Sub Command	‘K’	Password input setup
		Data	“1”	Turn on password input function, if “0”then off password input function Turn on password input function by remote, should input right password to edit
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“00D8”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

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K. Delete all data

<NUL><NUL><NUL><NUL><NUL>	<SOH>	“FF”	“10”	<STX>	“WL”	<ETX>	“00A8”	<EOT>
A	B	C	D	E	F	G	H	I

Tab	Title		Data	illustration
A	**<NUL>**		0x00	〈NUL〉〈NUL〉〈NUL〉〈NUL〉〈NUL〉
B	**<SOH>**		0x01	“Start Of Head”
C	Sender address		“FF”	PC address
D	Receiver address		“10”	Number 16 display
E	**<STX>**		0x02	“Start of TeXt”
F	Command		‘W’	Write special function command
	Data Field	Sub Command	‘L’	Delete all data, the data can’t be resumed.
G	**<ETX>**		0x03	“End of TeXt”
H	**Checksum**		“00A8”	Efficacy code
I	**<EOT>**		0x04	“End Of Transmission”

L. Text file example

{“HELLO”, 0xFE,’A’ 0xFD,’B’, “YOU”, 0xFD,’D’, “ARE”, 0xFE,’F’, “WELCOME”}
A B C D E F G H

A: Default font is SS7, color is AUTO.
B: The font is changed as SS5
C: The color is changed as LIGHT RED
D: The font is SS5, LIGHT RED color is “YOU”
E: The color is changed as RED
F: The font is SS5, RED color is “ARE”
G: The font is changed as ST7
H: The font is ST7, RED color is “WELCOME”

{0xFE,’C’, 0xFD,’F’, “Today”, 0xFE,’G’, 0xFD,’H’, “is”, 0xFA,’E’}
A B C D E F G

A: Setup font is WD5
B: Setup color is yellow
C: The font is WD5, yellow color is “Today”
D: The font is changed as WD7.
E: The color is changed as AMBER.
F: The font is WD7; AMBER color is “is”
G: The font is WD7; AMBER color is “04/20/2004”.

{0xFE,’F’,”Dots”, 0xFE,’G’, 0xFD,’E’, ‘1’, 0xFE,’E’, 0xFD,’H’, “is”, 0xFC,’A’}
A B C D E F G H I

A: The font is ST7
B: The font is ST7, AUTO color is “DOTS”
C: The font is changed WD7
D: The color is changed GREEN
E: The font is WD7, GREEN color is “1”
F: The font is changed SS7

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G: The color is changed AMBER.

H: The font is SS7, AMBER color is “IS”.

I: Display graphics file named A

{“String”, 0xFE,’G’, 0xFD,’E’, ‘1’, 0xFE,’E’, “is”, 0xFB,’C’}
A B C D E F G

A: The font is SS7, AUTO color is “String”.

B: The font is changed WD7.

C: The color is changed GREEN.

D: The font is WD7, GREEN color is “1”.

E: The font is changed SS7.

F: The font is SS7, GREEN color is “is”.

G: The font is SS7, GREEN color is character string named “C”.

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