

Display Driver Board Protocol

-----Customized OEM Version-----

Control Board Version	EX-LED100 V2.3
Protocol Version	V1.3 (20210119)

2021.01

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I. Communication

The drive board uses RS485 communication, the communication parameters are as follows

Baud rate: 9600

Data bits: 8

Stop bit: 1

Check Digit: None

II. Content of the Protocol

The communication protocol format of the LED driver board and the voice board are the same, and they are distinguished by addresses and commands. The protocol format is as follows:

STX(1B) + ADDR(1B) + CMD(1B) + LEN(1B) + DATA(NB) + SUM(1B)

III. Protocol Description

STX: packet header, fixed as 0xFA, 1 byte

ADDR: Device address, fixed to 0x20 (compatible: 0x30 can also be used, the same effect as 0x20), 1 byte

CMD: Command, 1 byte

LEN: data length, that is, the length of the DATA section, 1 byte

DATA: data field, N bytes

SUM: Sum check, the result of byte accumulation from ADDR to DATA, 1 byte

IV. Command Description

4.1 0x01 0x02 0x03 0x04

0x01: Display content on the first line

0x02: Display content on the second line

0x03: display content on the third line

0x04: The fourth line of display content (display content on each line of LED does not exceed 80 bytes)

Example:

FA 30 04 08 BB B6 D3 AD B9 E2 C1 D9 62

The fourth line of the above data LED display shows "Welcome"

FA 30 01 08 31 32 33 34 35 36 37 38 DD

The above data displays "12345678" on the first line of the LED display

4.2 0x11 0x12 0x13 0x14

0x11: The first line shows the time + other content

0x12: The second line shows the time + other content

0x13: The third line shows the time + other content

0x14: The fourth line shows the time + other content

The effect of the 0x11-0x14 command is that the display scrolls to display the time and the content sent, and the format of the display time and date is controlled by a character string.

For example, if you want to scroll show the year, month, day, hour, minute, and second, the format is as follows:

`Y-`M-`D `H:`N:`S

-and: can be customized, the driver board will not change, if there are other text or characters to be displayed, just add it directly after the control string.

If you only need to display the time without scrolling, you can just send

`H:`N:`S

`H-Drive board will automatically convert to the current hour

`N-drive board will automatically convert to the current minute

`S-Drive board will automatically convert to the current second

`Y-drive board will automatically convert to the current year

`M-drive board will automatically convert to the current month

`D-drive board will automatically convert to the current day

`W-Drive board will automatically convert to the current week

Example:

FA 30 14 11 60 59 2D 60 4D 2D 60 44 20 60 48 3A 60 4E 3A 60 53 56

The above data scrolls show XXXX-XX-XX XX:XX:XX on the 4th line of the display

4.3 0x19: Control Display Content as a Format

0x19 control the format and content of one line at a time only.

The effect of the 0x19 command is that the display screen displays the content in the specified format and color, which is used for advanced display control (compared to the 0x1A command, the

display time control is added).

The format of the data content is as follows (that is, the format of the DATA field in the protocol):

LINE(1B)+COLOR(1B)+MODE(1B)+STAY(1B)+RETURN(1B)+STRING(NB)

LINE: The line to display the content, 1-4 respectively represents the first to the fourth line

COLOR: The color to be displayed (when displaying colors other than red, the support of the display module is required)

0x30-Default Color (Refers To Red Usually)

0x31-Red

0x32-Green

0x33-Yellow

0x34-Blue

0x35-Purple

0x36-Cyan

0x37-White

MODE: Display mode control

0x31-normal display (same display effect as 0x01-0x04 command)

0x36-Multi-screen switching display, 8 characters (4 Chinese characters) are displayed each time, with an interval of 2 seconds, automatic switching

0x3A-display time + content (same method and display effect as 0x11-0x14 command)

STAY: Stay time on the first screen (effective when the display mode is 0x31)

0x30-Do not stop, start scrolling directly

0x31-Stay for 2 seconds, then start scrolling

0x32- stay for 4 seconds, then start scrolling

0x33-Stay for 8 seconds, then start scrolling

RETURN: display time (seconds), after the display expires, the default display content will be automatically restored

STRING: display the content string, the content to be displayed; when the MODE is 0x3A, the format control string format is the same as the 0x11-0x14 command

Example:

FA 30 1A 0E 01 32 32 31 31 32 33 34 35 36 37 38 39 30 FB

The above data will display "12345678" in green (requires display module support) in the fourth line of the driver, and it will start scrolling after 2 seconds. After scrolling, the display will restart, and the default display will be restored after 10 seconds.

4.4 0x1A : Control Display Content as a Format

0x1A control the format and content of one line at a time only.

The effect of the 0x1A command is that the display screen displays content in the specified format and color for advanced display control.

The format of the data content is as follows (that is, the format of the DATA field in the protocol):

LINE(1B)+COLOR(1B)+MODE(1B)+STAY(1B)+STRING(NB)

LINE: The line to display the content, 1-4 respectively represent the first to the fourth line

COLOR: The color to be displayed (when displaying colors other than red, the support of the display module is required)

0x30-default color (usually refers to red)

0x31-red

0x32-green

0x33-yellow

0x34-blue

0x35-purple

0x36-cyan

0x37-white

MODE: Display mode control

0x31-normal display (same display effect as 0x01-0x04 command)

0x36-Multi-screen switching display, 8 characters (4 Chinese characters) are displayed each time, with an interval of 2 seconds, automatic switching

0x3A-display time + content (same method and display effect as 0x11-0x14 command)

STAY: Stay time on the first screen (effective when the display mode is 0x31)

0x30-Do not stop, start scrolling directly

0x31-Stay for 2 seconds, then start scrolling

0x32- stay for 4 seconds, then start scrolling

0x33-Stay for 8 seconds, then start scrolling

STRING: display the content string, the content to be displayed; when the MODE is 0x3A, the format control string format is the same as the 0x11-0x14 command

Example

FA 30 1A 0E 04 31 36 31 31 32 33 34 35 36 37 38 39 30 01

The above data will display "12345678" in red on the fourth line of the drive, switch to "90" after 2 seconds, and then switch back to "12345678" in 2 seconds, so as to cycle

FA 30 1A 0E 04 32 36 31 31 32 33 34 35 36 37 38 39 30 02

The above data will display "12345678" in green (requires display module support) on the fourth line of the drive, switch to "90" after 2 seconds, and then switch back to "12345678" in 2 seconds, and then cycle

FA 30 1A 0E 01 33 32 33 31 32 33 34 35 36 37 38 39 30 FE

The above data will display "12345678" in yellow (requires display module support) in the first line of the driver, and it will start scrolling after 8 seconds, and display again after scrolling.

4.5 0x1B QR Code Control

QR code display (full screen code)

The display effect of the 0x1B command is to display a full-screen QR code on the display

Example

FA 30 1B 0D 77 77 77 2E 62 61 69 64 75 2E 63 6F 6D 5D

The above data will display a QR code on the display screen, and the scanned content is www.baidu.com

Please Note:

1. The QR code is fixed in white and cannot be modified
2. The effective display content of the full-screen code does not exceed 52 characters, and the exceeding part will be truncated and displayed
3. After the QR code is displayed, the content of each line will be cleared. Therefore, after exiting this mode, you need to resend the data of each line to restore the display content before displaying the QR code
4. The full-screen code has a better scanning distance of 2-5 meters

4.6 0x1C QR Code Control (three-line code)

The display effect of the 0x1C command is to display three lines of QR code on the screen, and the fourth line can still display other content

Example: FA 30 1C 0D 77 77 77 2E 62 61 69 64 75 2E 63 6F 6D 5E

The above data will display a QR code on the display screen, and the scanned content is www.baidu.com

Please Note:

1. The QR code is fixed in white and cannot be modified
2. The effective display of the three-line code does not exceed 77 characters, and the excess part will be truncated and displayed
3. After displaying the QR code, the first three lines of content will be cleared. Therefore, after exiting this mode, you need to resend each line of data to restore the display content before displaying the QR code
4. The scanning distance of the three-line code is 0.5-2 meters.
5. When displaying a three-line code, the fourth line can still display other content, but currently the fourth line only supports displaying the length of 8 characters (4 Chinese characters), and the excess part cannot be displayed temporarily. This function needs to be improved.

4.7 0x20 Time Synchronization

The synchronization format is as follows (that is, the format of the DATA field in the agreement):

YEAR(1B)+MONTH(1B)+DAY(1B)+HOUR(1B)+MIN(1B)+SEC(1B)

YEAR: the current year, based on the year 2000, for example, in 2016, send 16 (0x10)

MONTH: current month

DAY: current date

HOUR: current hour, calculated in 24-hour format

MIN: current minute

SEC: current second

Example

FA 30 20 06 10 0B 0A 12 15 00 A2

The above data sets the drive board time to 18:21:00 on November 10, 2016

Please Note:

The time will not be saved when the LED driver board is powered off. After each power-on, time synchronization needs to be performed through commands.

The LED driver board will automatically determine the online status. If the correct command is not received for more than 50 seconds, it will automatically refresh the display as "License plate recognition slows down". Therefore, in order to prevent the display from refreshing automatically, the interval must be no more than 50 seconds. The LED driver board sends a command, generally sending a synchronization time command. It is equivalent to treating the time synchronization

command as a heartbeat.

4.8 0x21 QR Code Brightness Control

The 0x21 command controls the brightness of the QR code displayed on the screen when the QR code display command is sent subsequently. There are 8 levels, 1-8, of which 1-7 is the low-bright state level, and 8 is the highest brightness state.

Example: FA 20 21 01 03 45

The above data sets the brightness of the QR code to level 3. When the QR code display command is sent subsequently, it will be displayed on the display as level 3

Please Note:

The brightness controlled by this command will be lost after the control panel is restarted and needs to be re-sent. It is recommended to send this command to control each time before sending the QR code display. If the control board is powered on, before receiving the instruction, it will display the two-dimensional code display instruction with the brightest level (level 8).

4.9 0x22 Default Display Color And Content Setting

The color and content set by this command will be displayed when the drive board is powered on or when the display time reaches the default time.

Format:

line number (1B) + color (1B) + mode (1B) content (within 80 bytes)

Line number: 1-4, which means line 1 to line 4 of the display

Color: the default color, refer to the color control in the 0x1A command

Mode: display mode, the usable value is 0x31 (normal display) or 0x3A (time + content, content can be empty)

Content: The content displayed by default, up to 80 characters (including 1-byte terminator)

Example

FA 30 22 14 04 32 3A 60 48 3A 60 4E 3A 60 53 20 BB B6 D3 AD CA B9 D3 C3 7D

The above data sets the default color of the fourth line to green, and the content is "HH:MM:SS Welcome"

FA 30 22 0B 03 31 3A C7 EB CE F0 B3 AC CB D9 3E

The above data sets the default color of the third row to red, and the content is "Don't over speed"

Please Note:

The above content will be stored in the flash of the driver board and will not be lost after power

failure

4.10 0x23 Voice Broadcast Volume Setting

The volume set by this command will affect the volume of the subsequent voice broadcast. The setting range is 0-10, 0 is mute, and 10 is maximum volume

Example: FA 30 23 01 08 5C

The above data sets the voice broadcast volume to level 8

Please Note:

1. The above content will be stored in the flash of the driver board and will not be lost after power failure
2. The command is adjusted within the range of the hardware volume, and the maximum volume is affected by the volume adjustment of the potentiometer

4.11 0x30 Get IO Input Status

This command can get the IO status of the three IO input interfaces of the control board, 0 means invalid, 1 means valid, the default state is invalid when no input signal is connected, 0, if the IO is in a short-circuit state with GND, it is 1

Reply Format: IN1(1B)+IN2(1B)+IN3(1B)

INx:0-invalid (default state) 1-valid (input signal is in short-circuit state)

Example:

Send FA 30 30 00 60

Reply to FA 30 30 03 00 00 00 63

The above data indicates that all 3 IO inputs are in an invalid state

Reply to FA 30 30 03 01 00 00 64

The above data indicates that IN1 is valid, and IN2 and IN3 are invalid

Please Note:

1. IO input is non-isolated input, please do not connect input signal with voltage, it can only be used to connect dry node signal

4.12 0x31 Relay Output Control

This command can control the output status of 2 relays on the control board

Format: Relay number (1B) + state (1B) + closing time (1B)

Relay number: 1 means to control RELAY1, 2 means to control RELAY2

Status: 0-open relay 1-close relay

Closing time: the closing time of the relay. After the time is reached, the relay will automatically open. The unit is 0.1 seconds. When it is 0, the relay will not be automatically opened.

Example

FA 30 31 03 01 01 00 66

The above data control relay 1 is always closed and not open

FA 30 31 03 01 00 00 65

The above data control relay 1 will be disconnected immediately

FA 30 31 03 02 01 0A 71

The above data controls the relay 2 to be closed automatically after 1 second

4.13 0xA0 Voice Broadcast

Use this command to control the voice board for voice broadcast, and control the voice to be broadcast through the voice ID in the data field. Each packet of data can contain up to 32 voices.

When this command is commanded to broadcast, the previous voice will not be cleared, and the newly received voice data will be broadcast after the previous voice broadcast is completed.

Example

FA 20 A0 06 01 02 03 04 05 06 DB

The above data voice board will subsequently broadcast voices with IDs 1, 2, 3, 4, 5, and 6.

4.14 0xA1 Broadcast the Voice Immediately

This command is used in the same way as 0xA0. The difference is that when using this command to broadcast voice, it will immediately stop the voice being broadcast and switch to broadcast the newly received voice data.

Example

FA 20 A1 06 01 02 03 04 05 06 DC

The above data voice board will immediately broadcast the voice with ID 1, 2, 3, 4, 5, 6