Display Voice Control Card
（Landscape screen, small portrait screen）
Serial Port Protocol

Default baud rate: 9600 N 1

1. The interval between data bytes of each packet should not b e greater than 10ms;

2. The maximum length of a single packet is 255 bytes;

3. Download fixed display content instructions, paremeter configration and modification instructions, these two kinds of instrucions sent after the interval of more than 50ms, then send the next instruction, other wise there may be data loss, or crash. And this type of in struction can not be automatically sent by the software, otherwise it will cause permanent damage to the hardware.
Other in structions are not required.

Protocol Parsing:

Single packet data format issued by host computer：

Fields	Packet header	Serial number	Address	Reservations	Command value	Length	Data	Check	End character
Length	2	1	1	1	1	2		2	1

Baotou: fixed as: 0xAA, 0X55
Serial number: The business serial number determined by the upper computer, when the lower computer returns a response, the original number of the serial number is returned, which can be all 0
Address: 485 address of the lower computer, factory default 100 = 0X64
Reserved: Reserved
Command: CMD reference command set
Length: 2 bytes, specify the length of the data content, the high byte comes first, and the low byte follows, for example, the length of 255 bytes should be expressed as 0x00 0xff
Data content: N bytes
Checksum: CRC16, 2 bytes, please refer to the attachment for the specific algorithm
End: Fixed 0xAF

Command	Paraphrase	Remark
0x01	Query Version	
0x10	Set Date Time	
0x12	Traffic Light Control 1	Without delay management
0x13	Traffic Light Control 2	With delay managementafter
0x21	Cancel Prompt Command	
0x22	Announce Voice 1	Broadcast now
0x25	Load Ad Command	Sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered
0x27	Load Prompt	Commonly used
0x28	Load Qr Code Command	
0x29	Load Pop-up 2	Not commonly used, can load 4 lines at the same time, complex package, error-prone, not recommended
0x32	CacheVoice Commands	
0x56	Do Not Disturb Settings	After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered
0xF0	Set Volume	
0XF1	Set Speed	
0XF2	Encrypt And Decode	
0XF3	Modify Address 1	
0XF4	Modify Address 2	
0XF5	Adjust Polarity	
0XF6	Time Display	
0XF7	Set Single And Double Color Mode	
0XF8	Set Baud Rate	
Other	Reserve	

Command Details:

1. Query Command

Field	Command Value	Length	Content
Value	0x01	0	None

Description: This command queries version information and other content. This command has mandatory return data, which can be used as a heartbeat packet.

2. Setting Time

Field	Command Value	Length	Content
Value	0x10	0x06	年(后两位) 、月、 日、时、分、秒

Description: The value of the content, in hexadecimal format

3. Traffic light (relay) control 1

Field	Command Value	Length	Content
Value	0x12	0x01	0 or 1

Note: 0 means release the relay, 1 means pull in the relay, generally 0 means red light, 1 means green light.

4. Traffic Llight (relay) Control 2

Field	Command Value	Length	Content
Value	0x13	0x01	1~255

Description: The content parameter indicates the duration of the pull-in relay. When the time is up, the relay will be released automatically. Unit: second

5. Cancel the temporary display (immediate display) content command

Field	Command Value	Length	Content
Value	0x21	0x01	data

Description: data data is operated by bit, bit7...bit0

Bit0 = 1, means to cancel the temporary display of the first line and return to the advertisement content

Bit1 = 1, indicating that the second line of temporary display is canceled and the advertisement content is restored

Bit2 = 1, means to cancel the third line of temporary display and restore to the advertisement content

Bit3 = 1, means to cancel the temporary display of the fourth line and return to the advertisement content

Other digits are reserved

6. Voice play command

Field	Command Value	Length	Content
Value	0x22	1~100	Numbers of data

Note: The data content indicates the agreed voice content, please refer to the voice catalog for details. When the command is issued, the original voice will be interrupted directly, and the latest content will be broadcast immediately.

To this end, a new 0X32 instruction is added to cache the voice content, and the cache area is 100 voices. After exceeding, press the first Covered by the in-first-out principle. The 0X32 command is exactly the same as the 0X22 format. 0x32 command is not valid for universal voice.

7. Instructions to load advertising content

Field	Command Value	Length	Content			
Value	0x25	3~63	Control 1	Control 2	Control 3	Content (0~60 bytes)

Note: This command is used to load the advertisement content. After sending this command, it is necessary to send the next command at an interval of 50ms. This instruction must be manually triggered.

Control word 1: Define the line number of the loaded content, the valid value is 1-4, other values are invalid, the line number is shown as shown below

Control word 2: Define the display color of the loaded content, validity period 1-3, 1=red, 2=green, 3=yellow, other values are 1 by default.

Control Word 3: Reserved

8. Issuing temporary display content instructions

Field	Command Value	Length	Content				
Value	0x27	4~63	Control 1	Control 2	Control 3	Control 4	Content (0~60 bytes)

Description: This command is used to issue temporary display content

Control word 1: Define the line number displayed in the issued content, the line number can only be 1~4, and other parameters are invalid

Control word 2: Define the display duration of the temporary display content, the unit is second. When this parameter is 0, it means long-term display, and the advertisement content will be resumed only after power failure or receiving the "cancel temporary display command".

Control word 3: Define the display color of the temporary display, 1-3 are valid, 1=red, 2=green, 3=yellow, others default to 1 Control word 4: Reserved.

9. QR code display command

Field	Command Value	Length	Content			
Value	0x28	4~199	Control 1	Control 2	Control 3	Content (0~60 bytes)

Description: This command is used to display the QR code

Control word 1: QR code display mode, effective value 0-2, when =0 means that the QR code is displayed as two-line centered mode, 1=QR code is displayed as two-line left mode with 4 Chinese characters (8 bytes), =2, it means that the two-dimensional code is displayed in three-line mode. In the two-line mode, the maximum character capacity of the two-dimensional code image is 49 bytes, and in the three-line mode, the maximum character capacity is 180 bytes.

Control word 2: Indicates the display duration of the QR code, in seconds, when =0, long-term display. The line corresponding to the QR code can be canceled by "cancel temporary display command".

Control word 3: Indicates that the color of the QR code itself is red when =1, green when =2, yellow when =3, and others are invalid

Content: When the control word 1 = 1, the last 8 bytes of the content do not participate in image drawing, so when sending the content, you must pay attention to adding 8 bytes of content, and use 0x20 to make up for the shortage together.

Note: After the QR code is displayed, it is recommended to install the display in an iron box and test the scanning effect through the black glass.

10. Load temporary display instruction 2

Field	Command Value	Length	Content										
Value	0x29	12~244	A1	A2	A3	A4	B1	...	C4	D1	D2	D3	D4

Description: This command is used to send 4 lines of temporary display at the same time.

A field is used for the first row to control

A1 = the duration of the first row,

A2=the color of the first row,

A3=the length of the data (A4 part) of the first row,

A4=the content displayed in the first row,

if A3=0 , then A4 does not occupy a byte.

The B\C\D fields are used for the second, third, and fourth row controls.

The method is the same as the first row.

Single-line data content (such as A4 part), cannot exceed 60 bytes.

The data length of the whole packet (including header AA55 and tail AF) cannot exceed 255 bytes.

11. Set the Do Not Disturb volume

Field	Command Value	Length	Content					
Value	0x56	6	A	B	C	D	E	F

Description: This command can set the volume of different time periods (2 time periods) every day. After sending this command, send the next command at an interval of 50ms. This instruction must be manually triggered.

This command does not take effect with the universal voice module.

A = 0, cancel the Do Not Disturb mode, =1, enable the Do Not Disturb mode, other values are invalid

B = 0~9, the volume of the Do Not Disturb period, all values greater than 9 are written as 9, and 0 is mute.

C = starting hour, hexadecimal, 0X16 = 22 points

D = starting minute, hexadecimal, 0x30 = 48 minutes

E = end of hours, hexadecimal, 0X16 = 22 points

F = end of minutes, hexadecimal, 0x30 = 48 minutes

Values larger than normal, such as hours greater than 0x17, or minutes greater than 0x3B, can cause unpredictable errors.

12. Set the volume command

Field	Command Value	Length	Content
Value	0xF0	0x01	0-9

Description: Content 0-9, 0 means mute, 9=maximum volume. After sending this command, it needs to wait 50ms before sending the next command. This instruction must be manually triggered.

13. Encryption and decryption instructions

Field	Command Value	Length	Content
Value	0xF2	0x04	Data1，data2，data3，data4

Description: The first two bytes are the original password data1 data2 high byte first

The last two bytes are the new password Data3 data4 high byte first

After the encryption is successful, the encryption indicator light is on, and the new password is 0000, indicating decryption

After sending this command, it needs to wait 50ms before sending the next command. This instruction must be manually triggered.

14. Super modify address instruction

Field	Command Value	Length	Content
Value	0xF3	0x01	新的地址 0-255

Description: This command does not need to verify the original address, the first line generates a prompt for 10 seconds, and the original temporary information is cleared

After sending this command, it needs to wait 50ms before sending the next command. This instruction must be manually triggered.

15. Modify address command

Field	Command Value	Length	Content
Value	0xF4	0x01	New address 0-255

Description: This command needs to verify the original address, the first line will generate a prompt for 10 seconds, and the original temporary information will be cleared

After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered

16. Modify display drive polarity

Field	Command Value	Length	Content
Value	0xF5	0x01	0=drive constant current screen, 1=drive constant voltage screen, other values are invalid

Description: This setting can be modified by pressing the button.

After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered

17. Modify time display position and color

Field	Command Value	Length	Content
Value	0xF6	0x03	Data1 ，data2 ，data3

Description: data1: indicates the line number of the time display, the line number is 0 and the time is not displayed

Data2 , indicates the color of time display, 1=red, 2=green, 3=yellow, others default to red. Data3: reserved

After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered

18. Modify the display color

Field	Command Value	Length	Content
Value	0xF7	0x01	1=single-color mode, 1=two-color mode, other values are invalid

Note: This setting can be modified by pressing the button.

    The upper red and lower green modules need to be configured in monochrome mode.

After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered

19. Modify the control card baud rate

Field	Command Value	Length	Content
Value	0xF8	0x01	0~7

Description：0 = 4800 ，1 = 9600(default)，2=14400，3=19200，4=38400，5=56000，6=56700,7=115200

After sending this command, it needs to wait 50ms before sending the next command. This command must be manually triggered