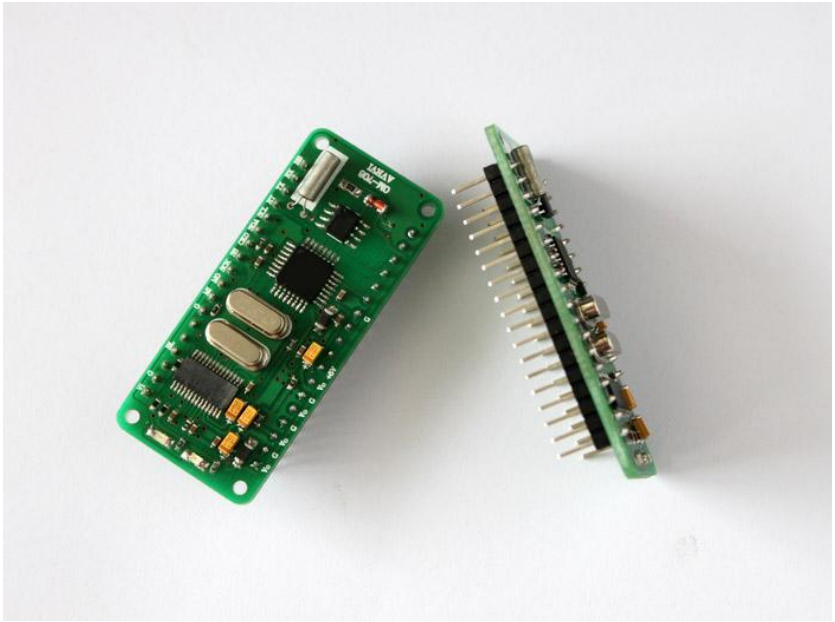
Video character generator OM708

Hardware Version: V1.0

File Version: V1.3



Application areas:

- Safety monitoring system
- Security monitoring cameras
- Industrial applications
- Room entertainment system
- Consumer electronics
- Toll Station information display
- Building intercom information Publishing
- Elevator floor information display

Contact:

- Company: EasyElectronic Technology Co., Ltd. Jinan,Shandong,China
- Address: Room NO.602, Building NO.14, unit 5, shengfu Garden, Gaoxin District, Jinan, Shandong, China.
- TEL:0086-531-62327572
- Fax : 0086-531-80879869
- AVRVi Website: www.easyele.com

You can get discount if the order quantity more than fifty and we provide customized services, please contact us.

Contents

1. Product introduction

1.1 Introduction

OM708 Video character generator module is highly integrated and low-cost general-purpose equipment for video overlay; it suitable to display Chinese characters is not too many occasions and static video overlay.

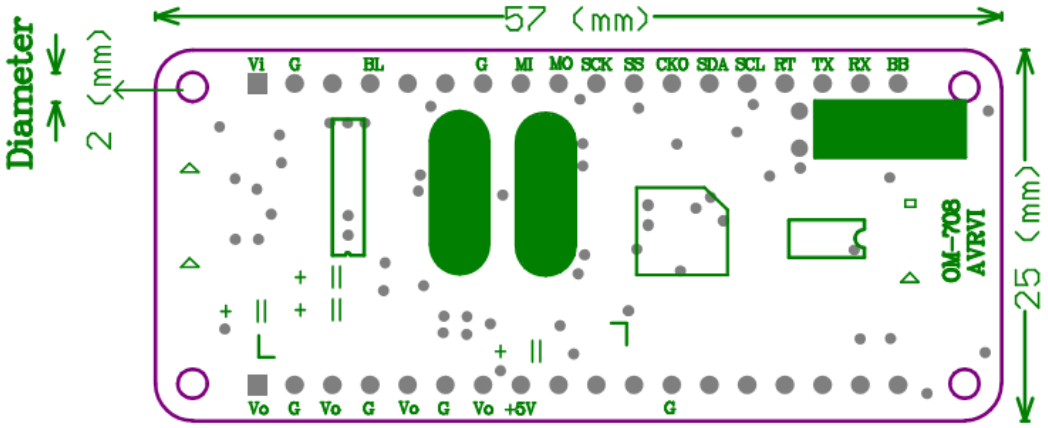
OM708 is a single road OSD module, can operate in the internal mode and external mode, Support the PAL and NTSC standard composite video, Support blinking characters, anti-color display, and supports the character background display, the font have 256 characters, providing software, the font can be edited, the model have RTC clock function .

1.2 Features

- Built-in font with two hundred fifty-six 12 * 18 dot character
- The font can be modified at any time by using our provide the software and the commands
- Succinct commands, the display position can be arbitrarily defined
- Display has three effects: can setting the overlay background, character blinking and anti-color display
- Integrated amplify video signal function, can drive two-way video output
- Can display up to 16 rows, 26 characters per row
- You can define a static overlay mode, it is not lost when power-on
- Onboard real-time clock
- Communication interface has RS232/RS485/TTL/SPI/IIC, the default is RS232 mode
- Ultra-small size: 57 * 25mm

1.3 Shape and size information

Dimensions: 57mm * 25mm, the diameter of the Positioning hole is 2mm, pin is DIP36, standard pin spacing is 100mil (2.54 mm), and the model width is 700mil.



1.4 Order model

Product type	The level for serial communication
NEOM708-2	RS232
NEOM708-T	TTL
NEOM708-4	RS485

2. Definition about connection

Interface definition as shown:

Pin	Function	Explanation	Pin	Function	Explanation
1	Vo	The first video output	19	BB	RTC reserve battery Positive
2	G	Analog ground (video ground)	20	RX	UART Data in
3	Vo	The second video output	21	TX	UART Data out
4	G	Analog ground (video ground)	22	RT	Chip reset pin RST
5	Vo	The third video output	23	SCL	TWI bus clock pin
6	G	Analog ground (video ground)	24	SDA	TWI bus data pin
7	Vo	The fourth video output	25	CKO	System test
8	+5V	Power	26	SS	SPI select function enable pin
9	TST	System test	27	SCK	SPI bus clock pin
10	Updata	System upgrade pin	28	MO	SPI MOSI

11	TST	System test	29	MI	SPI MISO
12	G	Digital ground (power ground)	30	G	Digital ground (power ground)
13	TST	System test	31	NC	No actual pin
14	TST	System test	32	NC	No actual pin
15	TST	System test	33	BL	Communication indicator light (green)
16	TST	System test	34	PL	Video indicator light (red)
17	TTX	System test	35	G	Analog ground (video ground)
18	TRX	System test	36	Vi	Video input pin

3. Fast hardware connection

3.1 Power Connector

OM708 supply voltage is DC5V ± 5%, itself havn't voltage regulator function; the system can not work, if the supply voltage is lower than 4.5V or higher than 5.5V. OM708 8-pin is +5 V input (positive), 12 pins and 30 pins are the power ground (negative).

3.2 Composite video signal

OM708 accept the P / N standard composite video, the default is PAL format (N format need to customize), composite video input should meet 75Ω1V (Vp-p). The PAL standard composite video signal input to the 36th pin of the OM708, superposed composite video have four road outputs, you can choose two outputs to the display device.

3.3 Data signal superimposed

OM708 according to the user customization, support RS232, RS485, TTL, SPI and IIC mode, and the factory default mode is RS232 standard, can with the computer or other data sources directly connected.

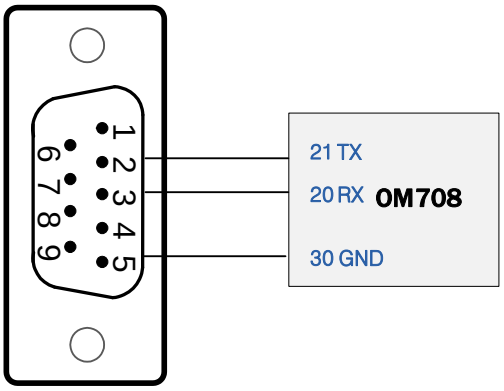
3.3.1 Serial communication

The OM9024's RXD is the RS232 level data receiver, TXD is the RS232 level data sender. Respectively connecting with the computer or other data source TXD and RXD, Also note that common ground connection.

OM708 20-pin (RX) is the RS232 level data receiver, 21-pin (TX) is the RS232 level data sender, respectively connecting with the computer or other data source TXD and RXD, Also note that common ground connection.

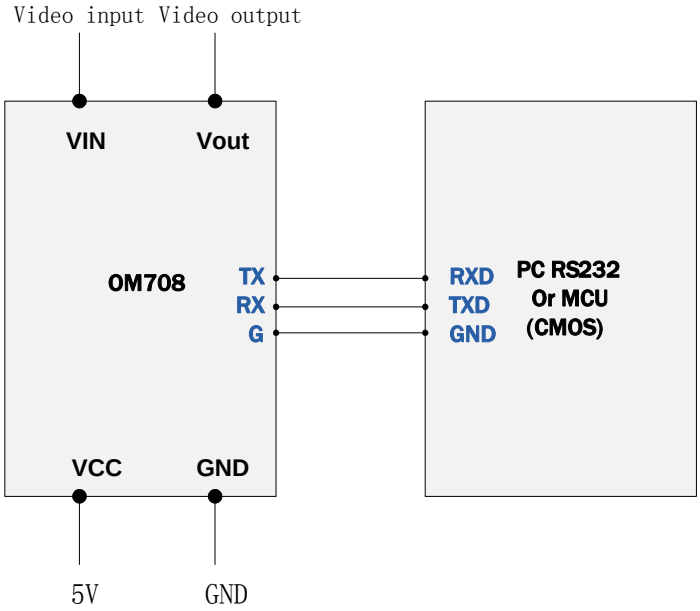
Communication baud rate: 9600, 8, N, 1

Standard DB9 serial connection as follows:



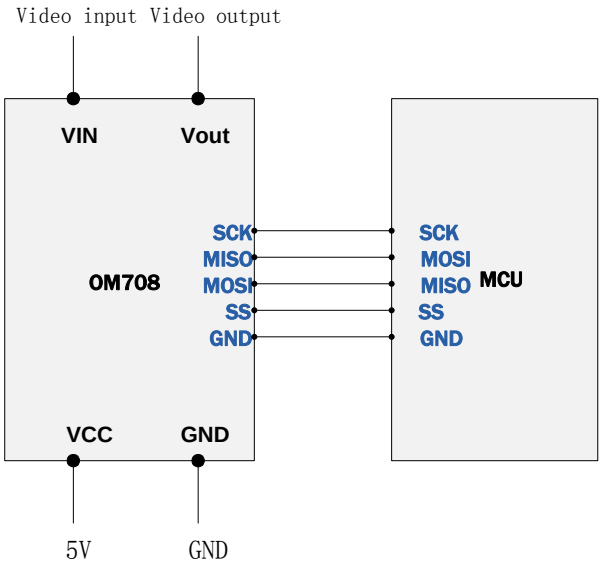
DB9	----	OM708
2	----	21 TX
3	----	20 RX
5	----	30 G

Note: If you connect with other MCU devices, you can choose NEOM708-T or NEOM708-4, using TTL or RS485 communication, and communication interfaces are as follows shown.



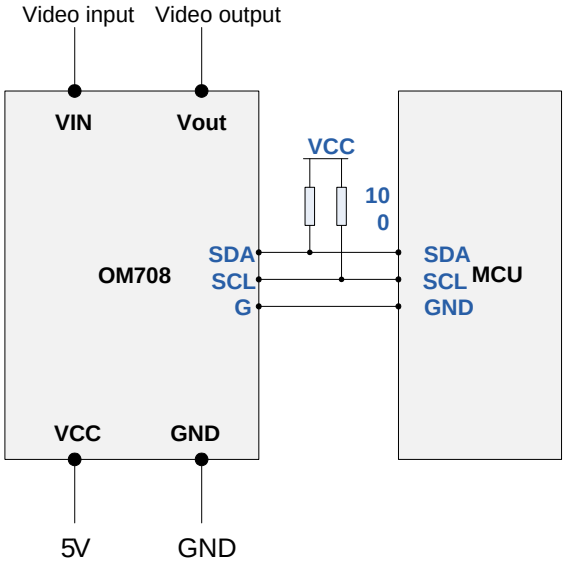
3.3.2 SPI mode

OM708 can support the SPI interface communication, the standard 4-wire connection, if you do not need to return data, you can remove the module's output line, note to common ground; in order to work properly, need to set the communication mode for the S, Please refer to module communication protocol.



3.3.3 IIC mode

OM708 can support the IIC interface communication, the bus need to pull 100 ohm resistor, in order to work properly, in order to work properly, need to set the communication mode for the IIC, in this mode, the onboard RTC functions are no longer available.



3.4 Treatment of unused pins

The unused pins need to floating, don't connect to the GND or VCC.

4. Communication protocol and the command

4.1 Communication data packet format

- ✧ Header is two bytes: 0x55 0xAA
- ✧ Data length: NUM one byte, the length of the command plus parameters.
- ✧ Command type: CMD one byte
- ✧ Command parameters: N bits, N = NUM-1
- ✧ Parity bit: CRC8 computing (packet length + command type + parameters)

Header	Data length	Command	Parameters	Parity bit
0x55 0xAA	NUM	Command type	Parameter length is Num-1	CRC8
		NUM contains byte		
	CRC8 computational domain			

4.2 Data Return

OM708 receive and process the packet, it will return the command's ID and status. According to different working modes, the return mode are different, can be RS232, SPI and TWI.

- ✧ If performed correctly, return K Express ACK
- ✧ If the command or parameter error, return E Express Error
- ✧ If receive an unknown command, return U Express Unknown command
- ✧ Packet checksum errors, sends R, Resend request, and follow the correct CRC8 checksum value in the R behind, which is very useful when debugging.

4.3 Command List

The following table describes the command and data parameters, in practice, need to add a header (here is the 0x55 and 0xAA) and a length bit and one parity bit.

Command	Parameter	Function	Explanation
0x01	NO	Communications test	If the communication is correct, return OSD_OK!
0x02	NO	Clear the screen	Clear the screen
0x03	NO	Display Font	Display all fonts
0x04	NO	Display logo	Display the logo information of the manufacturers
0x05			reservation
0x06	Mode	Setting the working mode	The mode's value corresponding working mode: 0: RS232 1: SPI 2: IIC In this mode, the onboard RTC functions are no longer available 3: RS485
s0x07	Row	Row Set	Set the display row position, the range is 0-0x0E
0x08	Row , Col	Row and column Set	Set the display row and column position; the row range is 0-0x0E; the column range is 0-0x17
0x09	String	Content display	Beginning to display the characters of the font at the already set position; the byte range is 0x20 ~ 0xFF
0x0A	Row	Clear line	Clear the corresponding row, the row range is 0-0x0E

0x0B	X,Y,*buf	Content display	Begin to display the followed contents at the X row, Y column
0x0C	ID	Set the module's ID	Set the slave machine's ID number at the RS485 and TTL working mode; the range is 0 ~ FF, the default is FF
0x0D	X,Y,Mode	Date display settings	Set the date display position and display mode, Mode's value corresponds to the relationship: 0xFF Does not display 0x01 20100402 0x02 2010-04-02 0x03 2010.04.02
0x0E	X,Y,Mode	Time display settings	Set the time display position and display mode, Mode's value corresponds to the relationship: 0xFF Does not display 0x01 21:35 0x02 21:35:22 0x03 09:35:22 PM 0x04 09:35 AM
0x0F	RTC's data group	Set the date and time	Set the current date and time; the parameters is Hex; Time format: time[7]={ 0x40/* seconds */, 0x59/* minutes */,0x23/* hours */,0x29/* days */,0x05/* weeks */,0x02/* months / century */,0x08/* years */};
0x10	X,Y, String	Set the boot display	Set the boot display(Static display) , Can be called multiple times, can set the different address, up to 300 characters can be set (Contains the coordinate information), Automatically covered if out of range
0x11	NO	Clear boot display	Clear boot display
0x12	NO	Read serial number	Serial number will be displayed on the screen and return the serial number from the specified channel according to the settings mode
0x13	NO	Read the RTC clock time	Return the RTC time data Please refer to the data format of the PCF8563

0x14	NO	Time Ascii code	Return time ascii code As 10:30:21
0x15	NO	Date Ascii code	Return date ascii code As 2010-09-01
0x16	NO	Display the boot screen	Display the boot screen If you have set the static display, which is equivalent to a soft reset.
0x17	X,Y,Len,Data	Set display effects	Set special effects; len characters display with effects from the coordinates(X, Y)start, data bit 7 6 5 respectively: display background, blinking, inversion
0x18	X,*data	Update font	Update font once update a word
0x19	Top,Left	Setting Margins	Set the top margin, left margin

4.4 Command application examples

Command	Specific code (hex) Header Length Type Parameters Calibration	Explanation
0x01	0x55 0xAA 0x01 0x01 0x9A	Communications test
0x02	0x55 0xAA 0x01 0x02 0x78	Clear the screen
0x03	0x55 0xAA 0x01 0x03 0x26	Display all fonts
0x04	0x55 0xAA 0x01 0x04 0xA5	Display the logo
0x06	0x55 0xAA 0x02 0x06 0x01 0xBB	setting the communication mode is SPI
0x07	0x55 0xAA 0x02 0x07 0x05 0x1E	Move the cursor to the fifth line
0x08	0x55 0xAA 0x03 0x08 0x05 0x08 0x90	Move the cursor to the fifth line, eighth column
0x09	0x55 0xAA 0x03 0x09 0xC0 0x28 0x53	Display two characters(0xC0 and 0x28 positions of the font) at the cursor position

0x0A	0x55 0xAA 0x02 0x0A 0x02 0x14	Clear the second line
0x0B	0x55 0xAA 0x08 0x0B 0x00 0x08 0x41 0x56 0x52 0x56 0x49 0xD5	Begin to display “AVRVI” in the X = 0, Y = 8 position.
0x0C	0x55 0xAA 0x02 0x0C 0x50 0xD9	Change slave address is 0x50
0x0D	0x55 0xAA 0x04 0x0D 0x00 0x03 0x02 0x6B	The date display mode set for 2, display position for the x = 0, y = 3
0x0E	0x55 0xAA 0x04 0x0E 0x00 0x08 0x01 0x22	The time display mode set for 1, display position for the x = 0, y = 8
0x0F	0x55 0xAA 0x08 0x0F 0x55 0x30 0x11 0x20 0x05 0x05 0x10 0x29	Set the current time: 55 seconds 30 minutes 20 Day 5 Thursday May 10 year
0x10	0x55 0xAA 0x05 0x10 0x02 0x02 0xEE 0xDD 0xDC	Re-power after complete set , display two characters(0xEE and 0xDD positions of the font) in the X = 0x02, Y = 0x02 position
0x11	0x55 0xAA 0x01 0x11 0x07	Clear boot display
0x12	0x55 0xAA 0x01 0x12 0xE5	Get the serial number for display

4.5 CRC8 with examples

Command packet checksum by CRC8, ensure transmission reliability, here are some examples.

1 C language:

```
unsigned char crc8(volatile unsigned char *ptr, unsigned char len)
{
  unsigned char i;
  unsigned char crc=0;
  while(len--!=0)
  {
   for(i=1; i!=0; i*=2)
     {
      if((crc&1)!=0) {crc/=2; crc^=0x8C;}
      else crc/=2;
      if((*ptr&i)!=0) crc^=0x8C;
     }
     ptr++;
  }
```

```
    return(crc);
}
```

2 VB:

```
Function CRC8(ptr() As Byte) As Byte

    Dim i As Byte
    Dim CRC As Byte
    CRC = 0
    Dim iLen As Integer
    For iLen = LBound(ptr) To UBound(ptr)
        i = 1
        If ((CRC And 1) <> 0) Then
            CRC = CRC \ 2
            CRC = CRC Xor &H8C
        Else
            CRC = CRC \ 2
        End If
        If ((ptr(iLen) And i) <> 0) Then CRC = CRC Xor &H8C
        Do
            i = i * 2
            If ((CRC And 1) <> 0) Then
                CRC = CRC \ 2
                CRC = CRC Xor &H8C
            Else
                CRC = CRC \ 2
            End If

            If ((ptr(iLen) And i) <> 0) Then CRC = CRC Xor &H8C
        Loop Until (i = &H80)
    Next iLen
    CRC8 = CRC
End Function
```

3 Delphi:

```
Function Crc_8n(p : array of BYTE; len : BYTE) : Byte;
Var
    j, cbit, aout, crc, crc_a, crc_b : Byte;
    i : integer;
begin
```

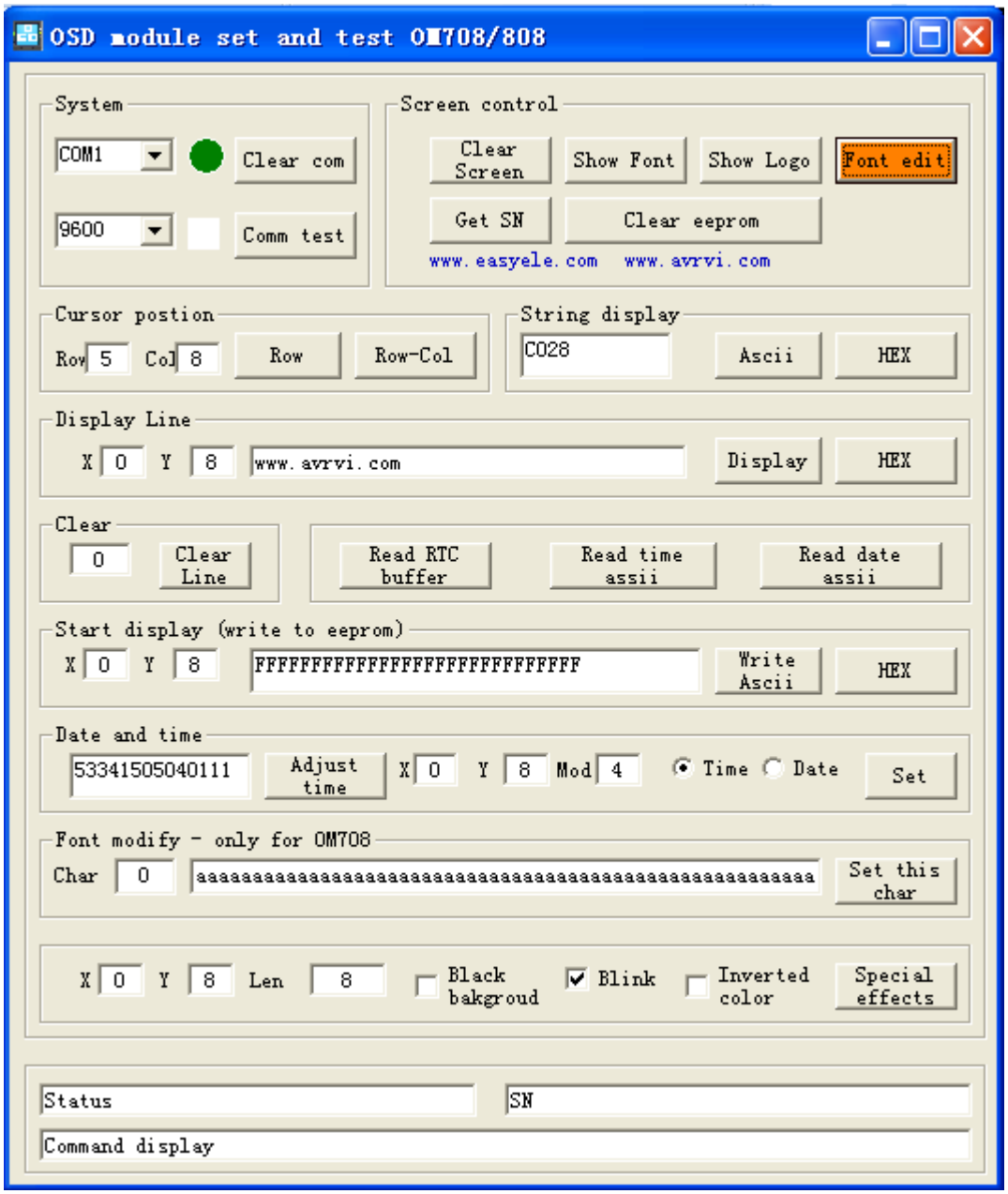
```
  crc := 0;
  i := 0;
  repeat
    crc_a := p[i];
     inc(i);
    j := 8;
    cbit := 1;
     repeat
        crc_b := crc_a;
      crc_b := crc_b xor crc;
      aout := crc_b and cbit;
      if aout<>0 then begin
           crc := crc xor $18;
           crc := crc shr 1;
           crc := crc or $80;
      end else begin
         crc := crc shr 1;
      end;
      crc_a := crc_a shr 1;
       dec(j);
    until j = 0;
    dec(len);
  until len = 0;

  result := crc;
end;
```

5. PC program resources

5.1 VB demo code and the secondary development code

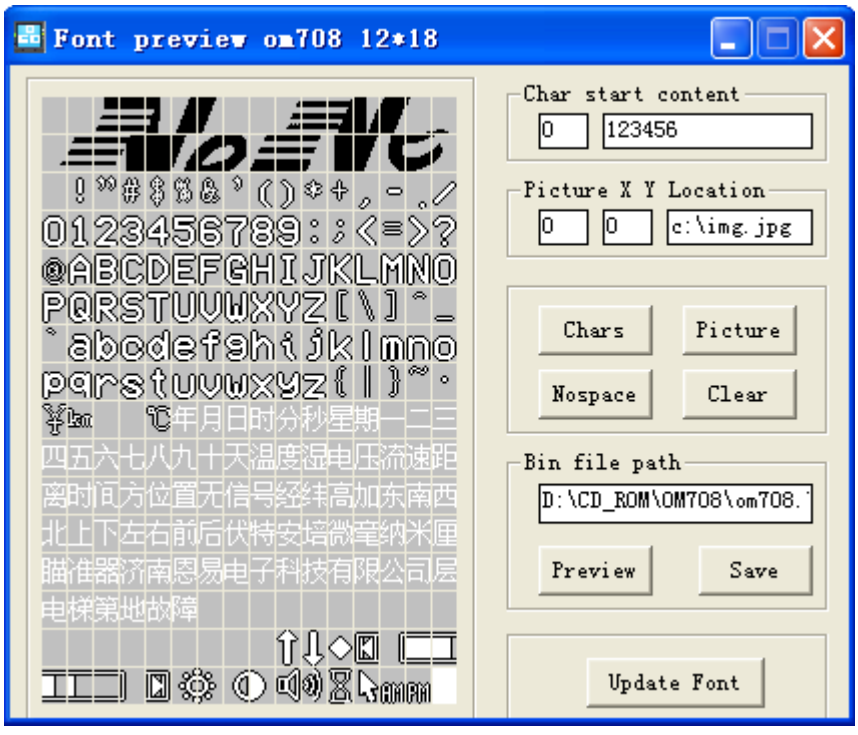
OM708 module provide a PC demo program, and provide source code to facilitate the secondary development, customers can easily define and implement the functionality required, each command are shown below, user-friendly debugging.



6. Font settings software

OM708 provide a free software for using set font, pay attention: the 0 to 31 characters of the font were takes for the system logo, you can edit these characters to change the logo displayed when the system is re-power, and please note that the first 32 characters must be a space, the system screen is cleared, the actual is to display this character.

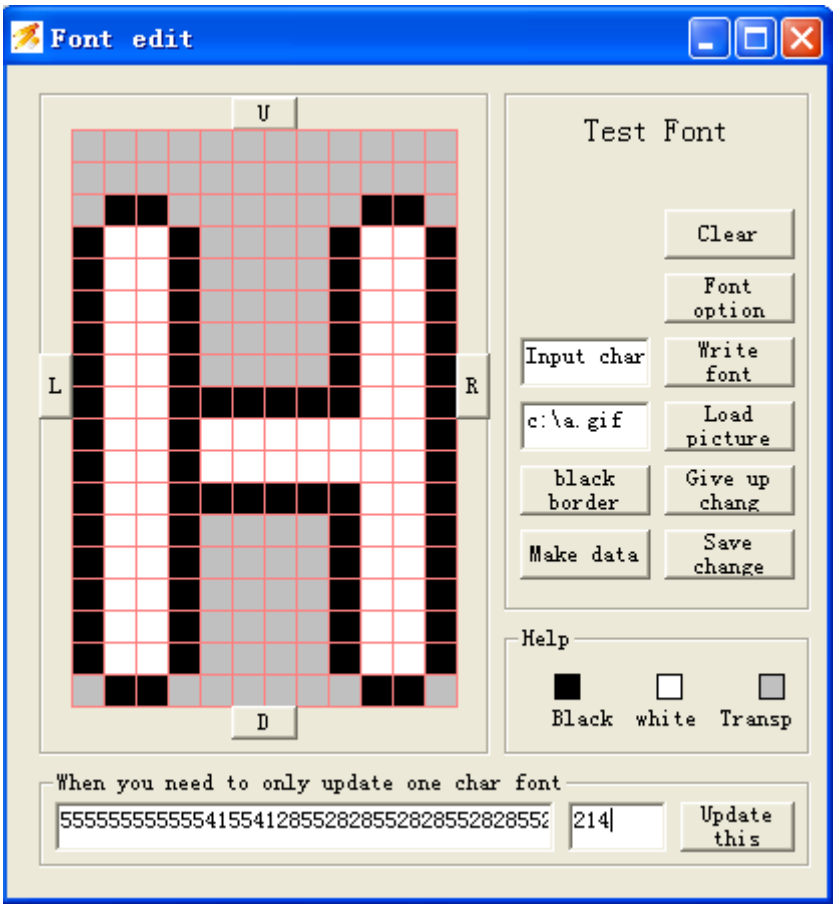
We default with a font file is om708.bin, If the software and om708.bin into the same directory, open the setup software, the effect is as follows, you can by hover mouse to see the location of each character



a) Clear
Click Clear to get an empty font editor

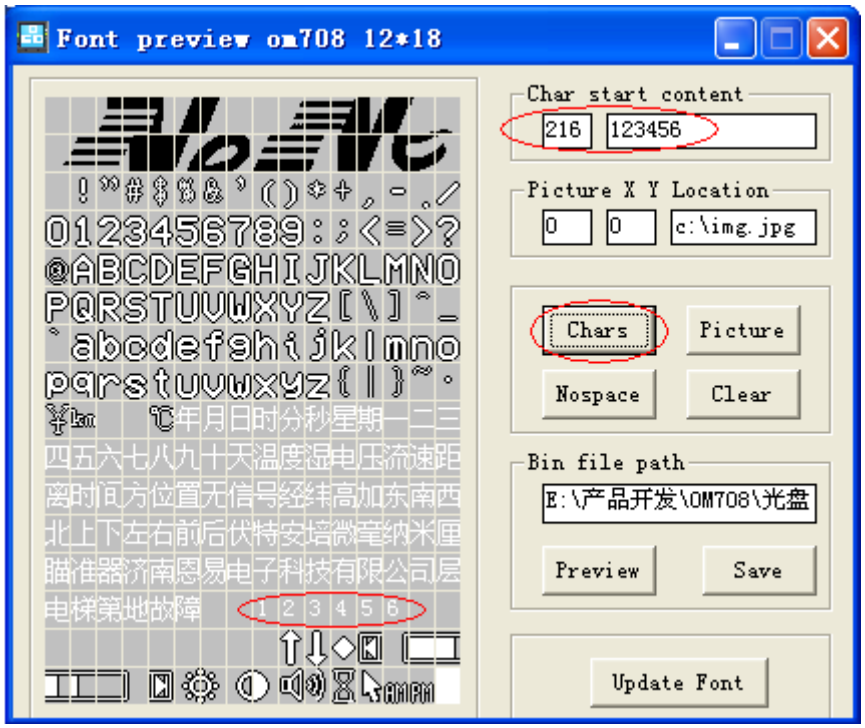
b) Text Editor

Drag the character can adjust the position of the character in the font, double-click to open the detail edit page, after editing you can click on the "upgrade" will the character font upgrade to specified location, and customers can integrated this command into products to dynamically change the font, as follows:



c) Input text

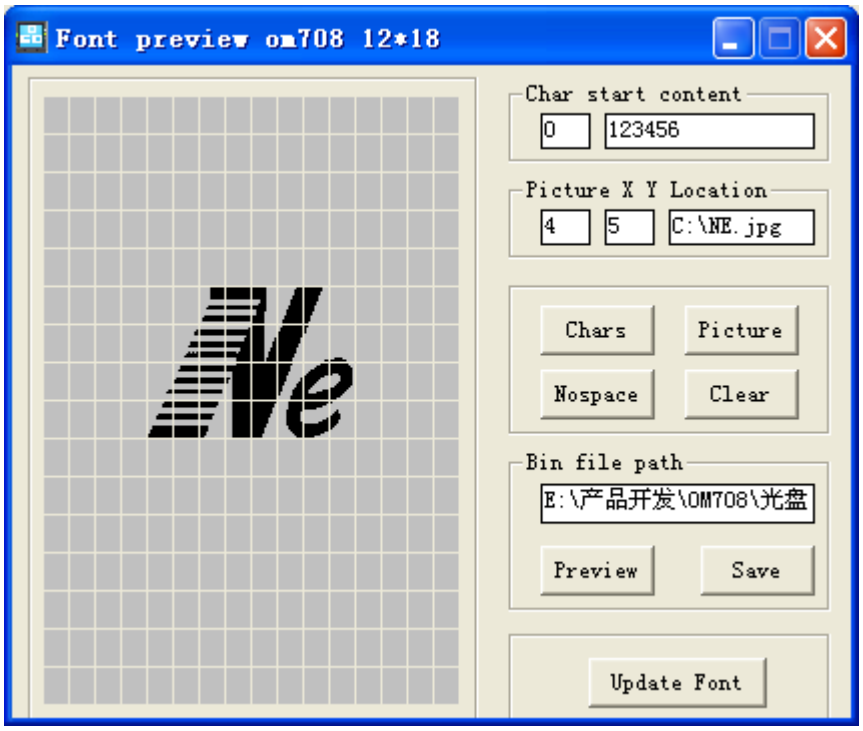
Fill the text start address in the "Text Start content" area , such as the input "216" and "OSD device", click the "text" button, you can edit the text and stored in the font, as shown.



d) Input image

Fill the upper left corner coordinates of the picture;

Click the Image button and browse an image, support BMP JPG GIF PNG and other image formats, click YES, you can edit the picture and written to the character area, as shown



e) Save the file

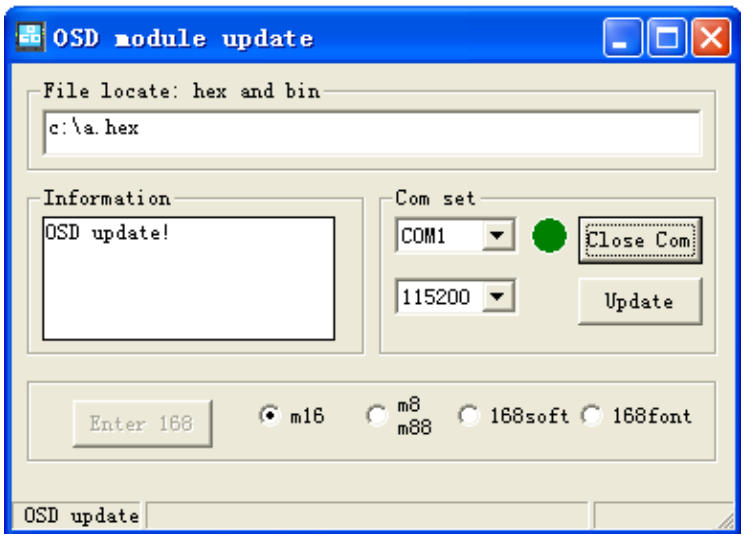
After editing is complete, click Save to store the font file, you can upgrade the font to the module by click the upgrade font.

7. Application update

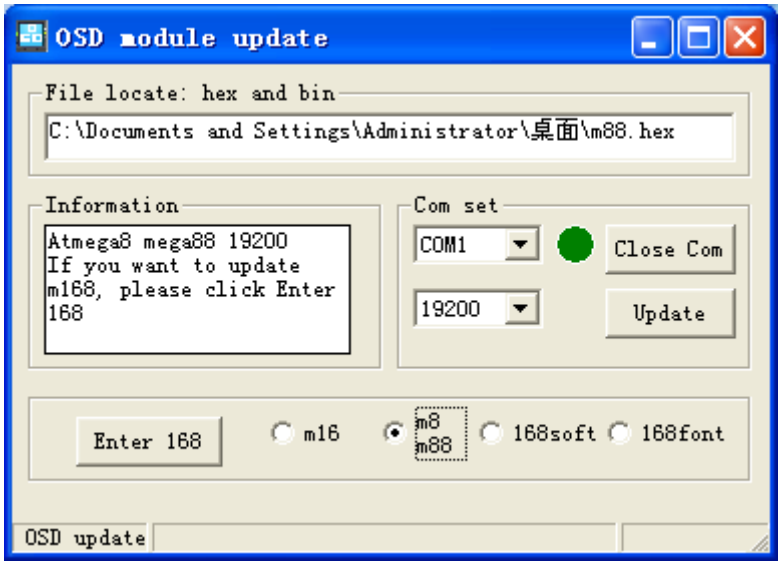
In order to facilitate user customization and system kernel update, we also provide software update, if the model has problem or user need some special features, you can contact to us.

7.1 Upgrading the master control program of the system

a) Hardware connection, please reference RS232 connect with the computer of the OM708's manual
b) Open the OSDupdatev1.02.exe procedures, as shown in Figure



c) Click M8/88 options, select m88.hex file, as shown, click on the upgrade
d) The OM708 module's update pin connect with ground, and reset OM708



e) The update is complete

8. Contact

Company: EasyElectronic Technology Co., Ltd. Jinan, Shandong, China

Address: Room NO.602, Building NO.14, unit 5, shengfu Garden, Gaoxin District, Jinan, Shandong, China.

TEL: 0086-531-62327572

Fax: 0086-531-80879869

AVRVi Website:www.easyele.com

9. Update History

2010-04-10: V1.0 has been created

2010-05-17: V1.1 Increase the description of the make font process and increase the upgrade instructions

2010-05-20: V1.2 Increase the command examples, increased CRC8 function examples

2010-09-01: V1.3 Increase the OM708-specific commands and the new description of the font