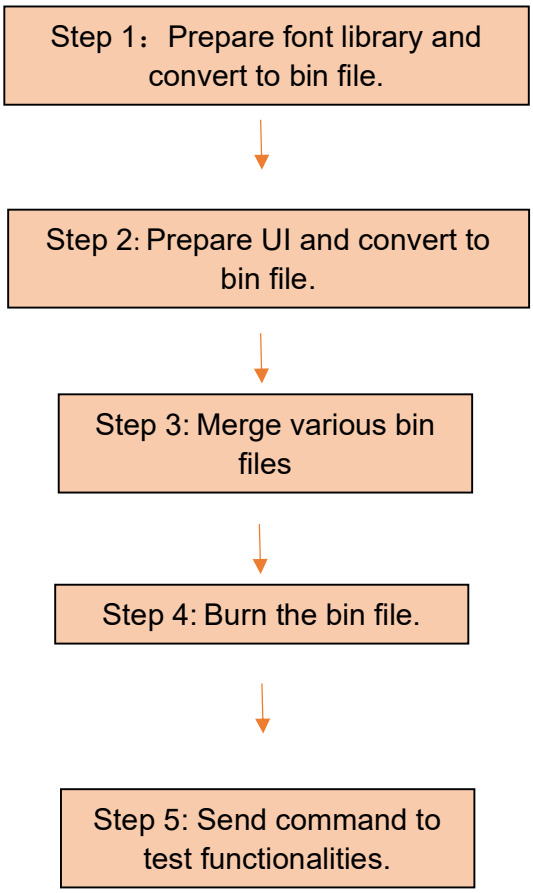
AGU Series Project Maker Guide

V1.0: 2/15/2024.

V2.0: 8/9/2024.



1. Prepare font library and convert to bin file

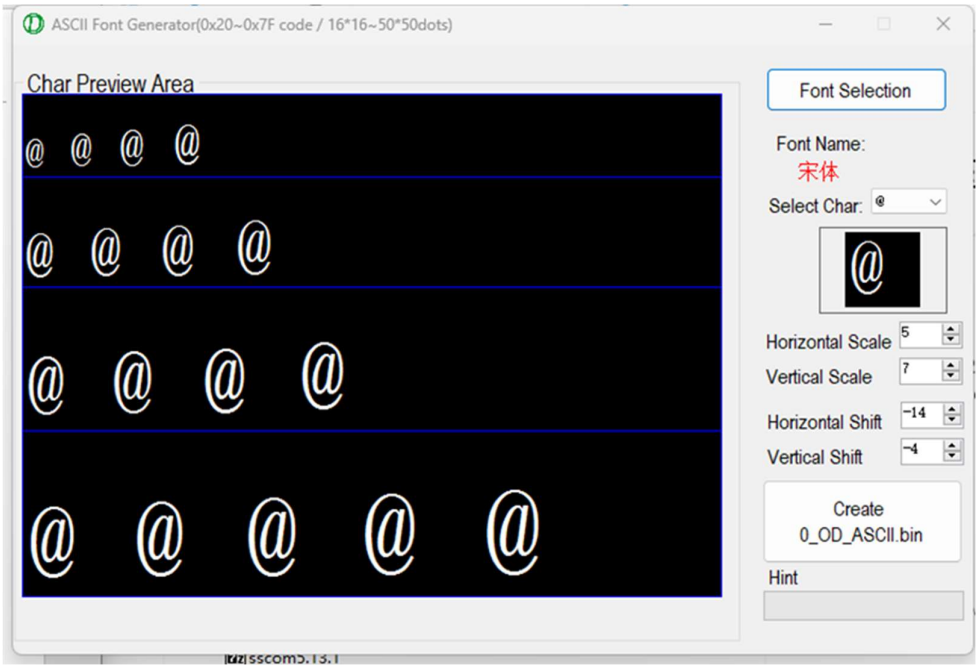
Generate a bin file for the standard 96 ASCII characters.

1.1 Generate a bin file for the 96 common ASCII characters：

“ !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~”

1.2 Open” OD_ASCII(0x20~0x7F code_ 16x16~50x50 dots).exe”

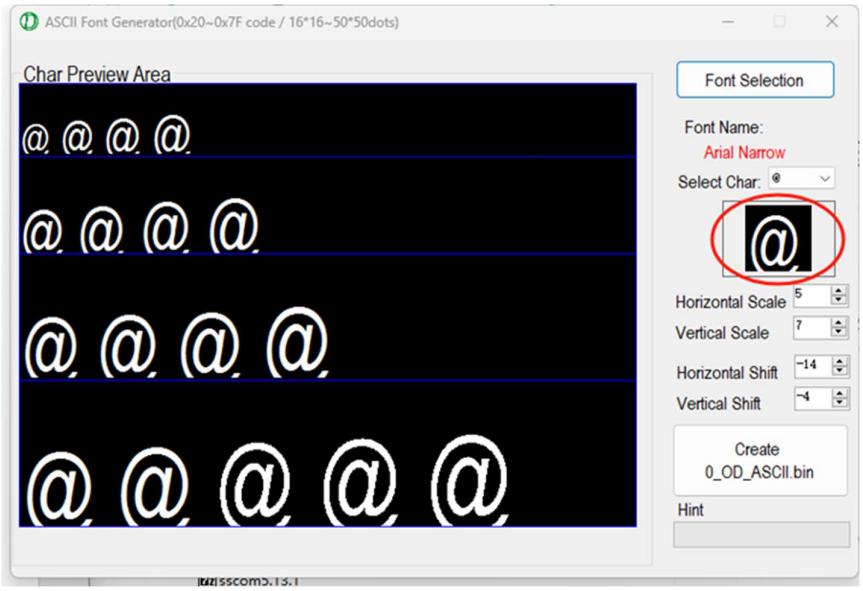
The characters generated by the tool range from 16x16 to 50x50 pixels (even-numbered pixels), with a total of 17 different sizes: 16x16, 18x18, ..., 48x48, 50x50.



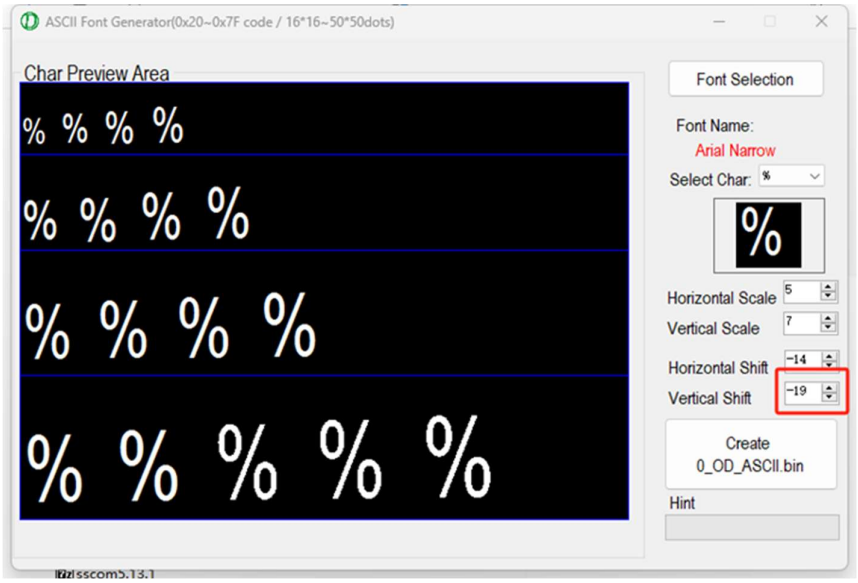
1.3 Use 'Font Selection' to choose the font that needs to be converted.

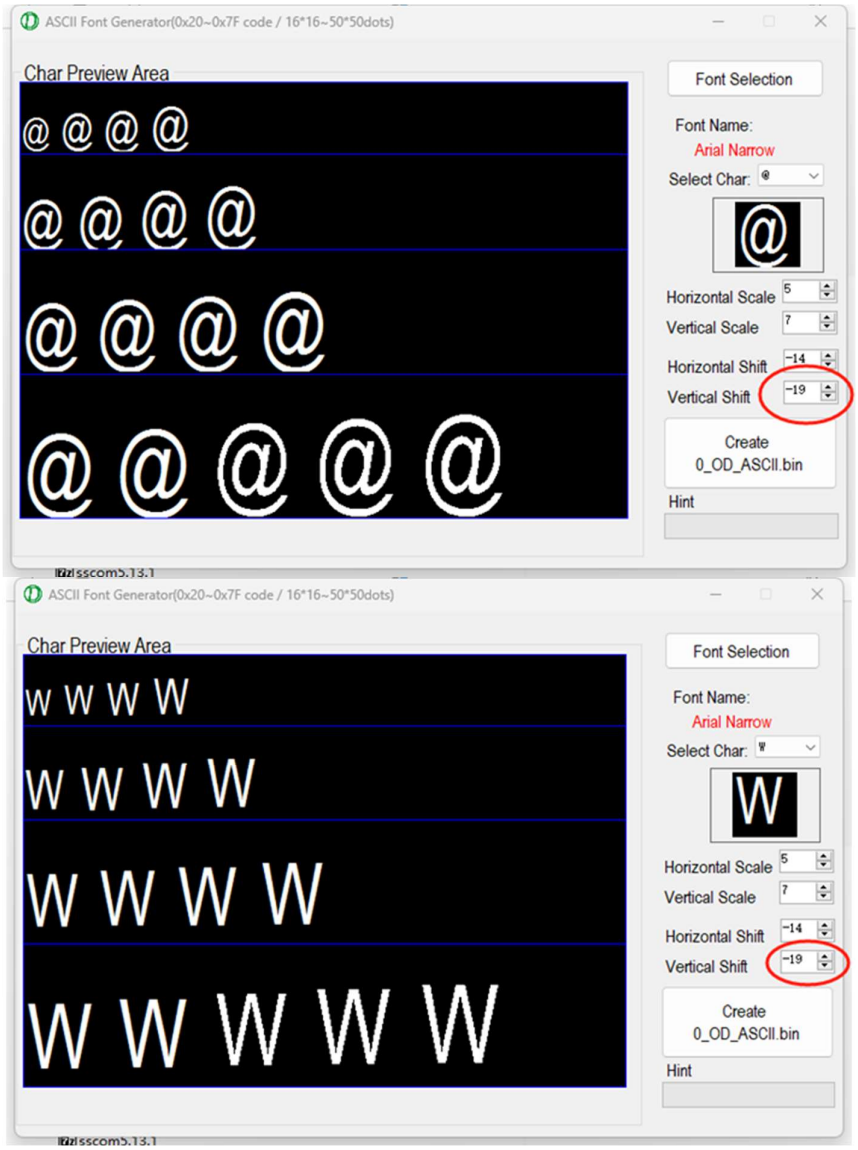
1.4 Adjust Characters

Scale is used to adjust character distortion (usually not necessary), while shift is used to move the character position. When adjusting, pay special attention to the character [%@W], as these are among the largest characters. If these three characters can be displayed completely, then the other characters can also be displayed completely. When making the final determination, it's advisable to browse through all characters. For example, in the Arial font, by default, the '@' character is not fully displayed and requires adjustment.



The following image shows that by adjusting the Vertical shift value to -19, all characters can be displayed properly. Try to maximize the font size within the black box as much as possible, so that it will look better on the LCD display.





1.5 Click 'Create 0_OD_ASC.bin' to generate the font needed for burning (into flash).

1.6 If the project will use different fonts at the same time, you can generate them using the OD_ASCII tool, and name each character accordingly with the corresponding name.

Note1: Here, you will obtain the bin file of the font library. Depending on the implementation method of the project, there might be more than one bin file.

Note2: If you find that the font generated by OD_ASCII(0x20~0x7F code_ 16x16~50x50 dots).exe does not meet the requirements, or if you need to generate more than 96 standard ASCII characters or non-English ASCII fonts, then professional software(Font Generator) is required for generation. Please contact Orient Display customer service or technical support, we

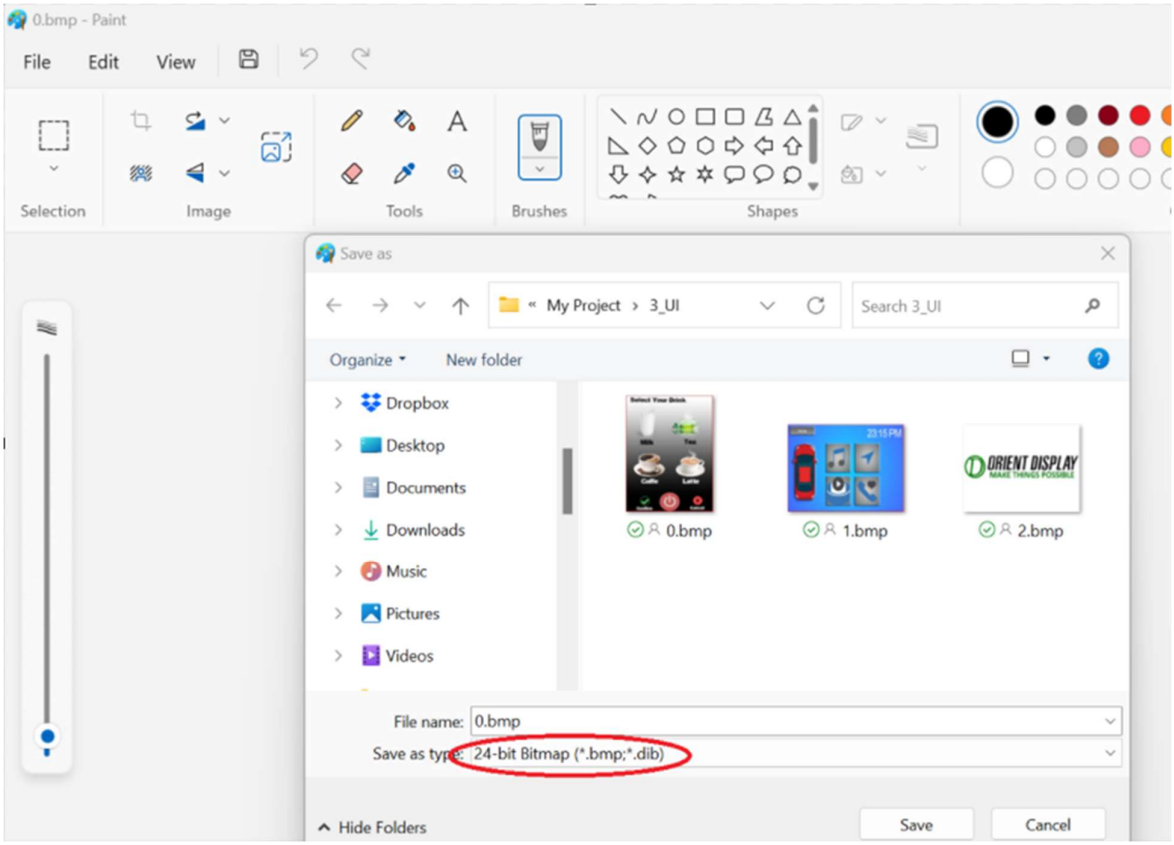
can assist you using the professional software to generate specific fonts or to provide the professional software free of charge.

Note 3: Character is left aligned, and the empty space to the right of the characters will be filtered out during display. For example, the red boxed area in the following image will not actually be displayed. If you need some spacing between the characters, you can leave a larger blank area on the left side of the characters.

2. Prepare UI and convert to bin file

Please hire professional UI designers to create the UI materials needed for the project: background images, icons, artistic text, animations, etc. The UI materials can be converted into the corresponding '.bin' files using OD_Bmp2Bin tool.

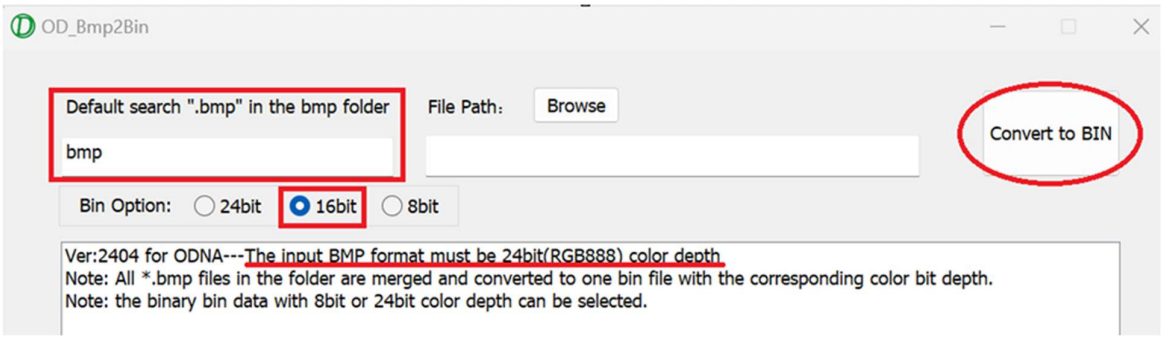
2.1 Place the images you want to convert in the bmp folder under the OD_Bmp2Bin directory. Please note that the conversion is arranged according to the file names, so if you want to adjust the order of the images, you need to determine it by the file names. Also, the images to be converted must be in BMP format with a 24-bit color depth, which can be converted using the free MS Paint software.

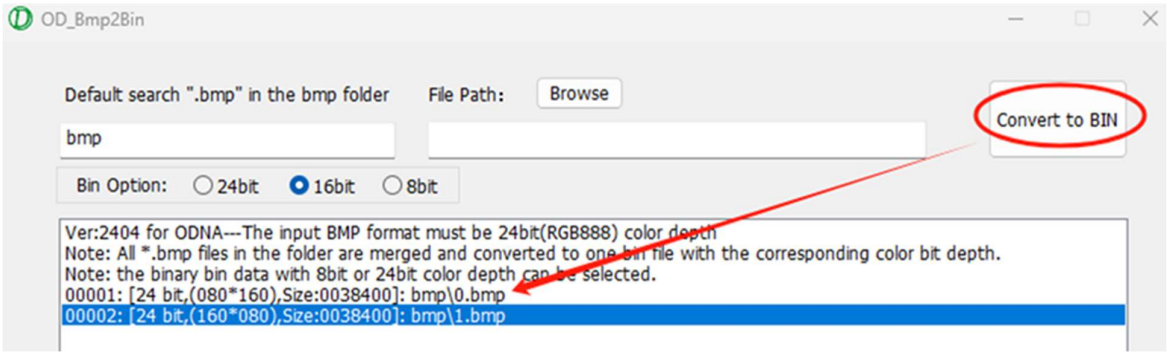


2.2 Open the OD_Bmp2Bin tool. By default, it converts images in the bmp folder, but you can also specify images from other folders using the 'browse' option. For AGU products, the bin option can only be set to 16-bit.

2.3 After processing as described above, click 'Convert to BIN', and the converted image files will be listed. Be sure to check if any images were not converted (because if the image format is incorrect, it won't be converted). The following useful files will be generated:

1. The xx.bin file is the programmed file after all images have been converted—this is the bin file that will be used.
2. The bmp.c file is an array file where the images have been converted into C language format—this will be used when updating the UI partially.
3. The xx.txt file contains data structures related to the images after conversion—this is the data structure file that will be needed (providing detailed information for addressing).





Note 1: Here, you will obtain the bin file(s) for the UI materials. Depending on the method of project implementation, there may be more than one bin file.

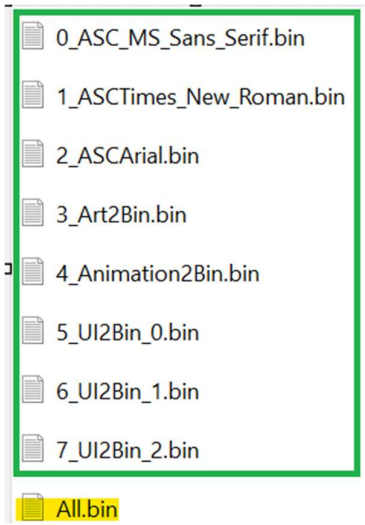
Note 2: Some computer systems might be missing DLL libraries:

1) Copy the DLL files from the folder [C-Windows-System32] to this directory: [C:\Windows\System32].
2) Copy the DLL files from the folder [C-Windows-SysWOW64] to this directory: [C:\Windows\SysWOW64]."

3. Merging Various Bin Files

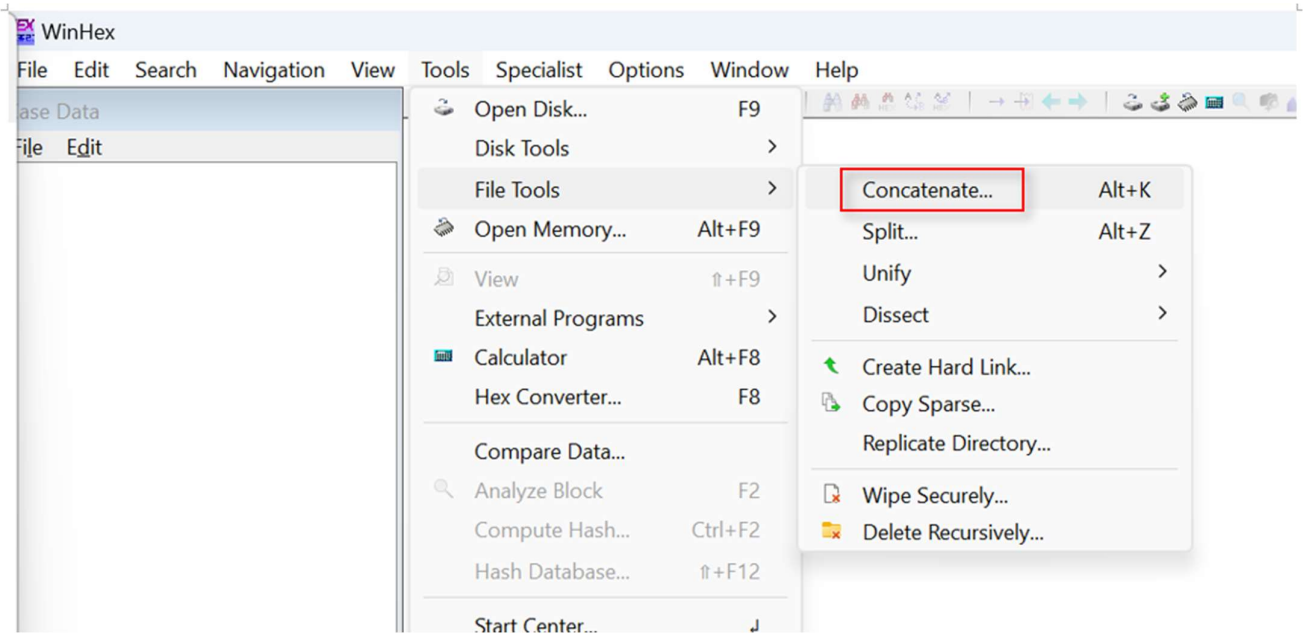
There are many software that can be used to merge bin files into one bin file. Here, we will explain how to merge them using the WINHEX software 1) the bin file of the font library; 2) the bin file of UI materials.

For example, the files to be merged are the bin files made for UI images and the font library as explained above. These bin files, when used, need to be written into the on-board SPI Flash for the main control MCU to read. Before writing to the Flash, these bin files need to be merged into one bin file for a one-time flashing process.



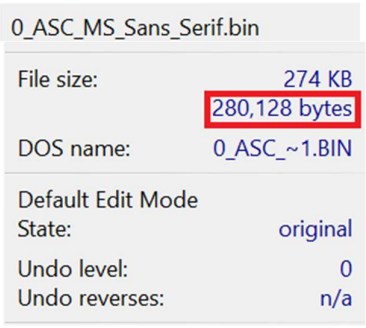
3.1 First, use one of the files mentioned above to create a new file, for example name it 'All.bin'

3.2 Use WINHEX's tools -> file tools -> concatenate, select the merged file (which is the 'All.bin' we just created above). The other seven files are merged into this file in the order we specified, connected end-to-end.



3.3 After completing the above steps and clicking 'Yes,' 'All.bin' will become a 0-byte file. Sequentially select and 'append' the seven files. After appending all seven files, click 'Done' and then confirm. This way, the
5 bin files will be merged into a single bin file.

3.4 Since the files are concatenated end-to-end, knowing the size of each file allows us to determine the address of each bin file in the flash memory. The file sizes can be confirmed by opening them with the WinHex tool, as follows:

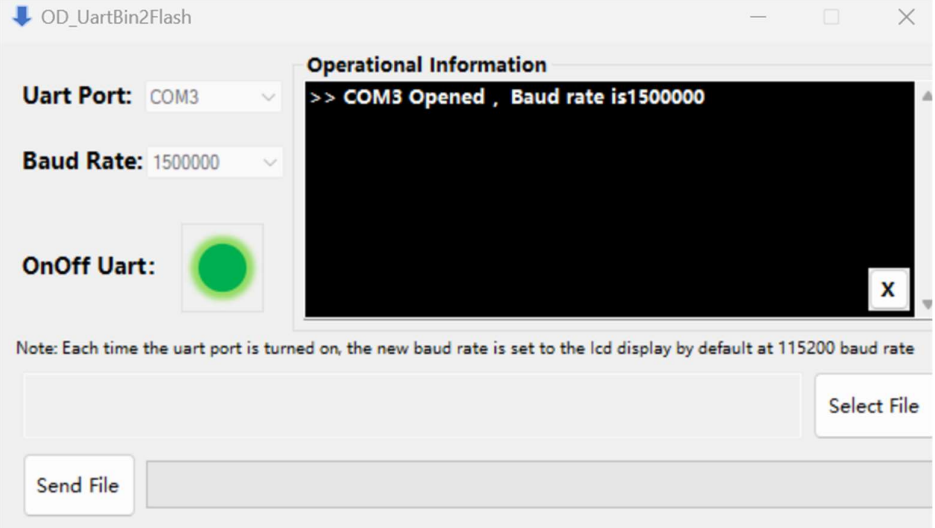


The addresses in the flash memory for the 5 bin files mentioned in the example above are as follows:

Base Address (Decimal))	Base Address (Hexadecimal))	File Size (Manual Input)	Font Library and UI Information
0	00000000	280128	0_ASC_MS_Sans_Serif
280128	00044640	280128	1_ASCTimes_New_Roman
560256	00088C80	280128	2_ASCArial
840384	000CD2C0	46080	3_Art2Bin
886464	000D86C0	53720	4_Animation2Bin
940184	000E5898	153600	5_UI2Bin_0
1093784	0010B098	153600	6_UI2Bin_1
1247384	00130898	153600	7_UI2Bin_2

4. Burn the bin file.

Use the OD_Uart_Bin2Flash_HEX-E.exe software to burn the 'All.bin' file into the AGU product's Flash through the product's UART interface.

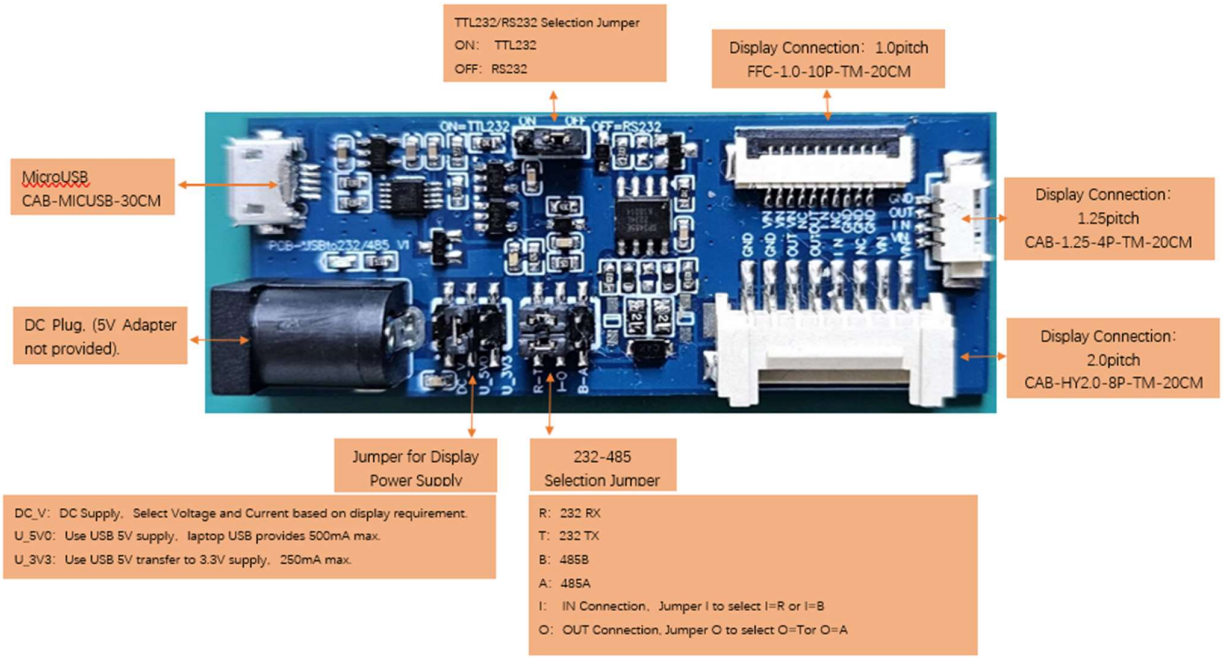


- Select Uart Port,
- Choose Baud Rate: 150000 or 921600,
- Select File,
- Click 'Send File' to proceed.

Note: Orient Display provides the following universal test boards kit PCB-USBto232/485 (including the cables) for customers to burn project files. In addition, Orient Display's factory can also assist customers in burning project bin files during mass production.

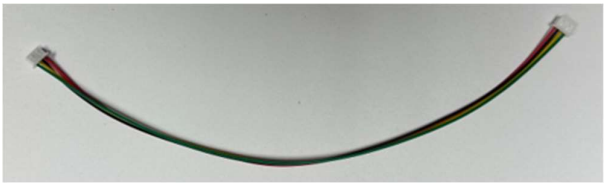
PCB-USBto232/485

PCB-USBto232/485 Burn-in, Testing and Evaluation Board

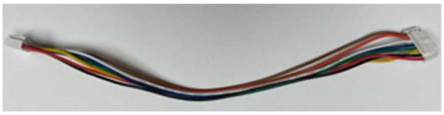


FFC-1.0-10P-TM-20CM

CAB-1.25-4P-TM-20CM



CAB-HY2.0-8P-TM-20CM



CAB-MICUSB-30CM

Example:

- Turn Off Backlight: 5AA5 80 00 5BB5 (Please note that if the backlight is turned off, the display will not be seen)
- Turn On Backlight：5AA5 80 ff 5BB5

- Set All Display in Pink: 5AA5 83 821F 5BB5
  Set All Display in White: 5AA5 83 FFFF 5BB5
  Set All Display in Black: 5AA5 83 0000 5BB5
  Set All Display in Red: 5AA5 83 F800 5BB5
  Set All Display in Green: 5AA5 83 07E0 5BB5
  Set All Display in Blue: 5AA5 83 00FF 5BB5
  Set All Display in Yellow: 5AA5 83 FFE0 5BB5
  Set All Display in Orange: 5AA5 83 FBE0 5BB5
  Set All Display in Gray: 5AA5 83 8410 5BB5
  Set All Display in Turquoise: 5AA5 83 07DF 5BB5
  Set All Display in Magenta: 5AA5 83 F81F 5BB5
  This command can also be used for clearing the screen.

- Draw a Filled Red Rectangle Starting at Coordinates (32,32) with a Length of 128 and a Width of 32：
  5AA5 87 0020 0020 0080 0020 F800 5BB5

- Draw a Solid Red Circle with Center at Coordinates (32,32) and Radius of 25：
  5AA5 89 0020 0020 0019 F800 5BB5

- Show Characters
  Set the Starting Address of the ASCII Font Library in Flash to 00000000, the Starting Address of the Chinese Font Library in Flash to 00000001, with ASCII Character Width of 24 and Height of 48：
  5AA5 8D 00000000 00000001 18 30 5BB5
  Show Welcome! in yellow character on blue background.
  5AA5 8F 0000 0064 07E0 00FF 00 57 65 6C 63 6F 6D 65 21 5BB5

  ASCII Text to Hex Code Converter

- Show Animation
  Display an Animated Image at Coordinates (0,0) with Length 68, Width 79, the First Image of the Animation Located at Flash Address 0014EF80, Composed of 5 Images：
  5AA5 94 0000 0000 0044 004F 0014EF80 05 00 5BB5

- Show Base Image0
  Display a Picture with Length 240 and Width 320 at Coordinates (0,0), with the Picture's Starting Address in Flash being 0015C158
  5AA5 92 0000 0000 00F0 0140 0015C158 00 5BB5

- Show Orient Display Logo
  Display Rotated by 90 Degrees
  5AA5 82 01 5BB5
  Display a Picture with Length 320 and Width 240 at Coordinates (0,0), with the Picture's Starting Address in Flash being 001A7158
  5AA5 92 0000 0000 0140 00F0 001A7158 00 5BB5

- Set the Boot Screen (Image 0) with the Top Left Corner at Coordinates (0,0), Picture Length 320, Width 240, with the Picture's Starting Address in Flash being 00130898：
  5AA5 93 0000 0000 00F0 0140 000E5898 5BB5