



Shenzhen Waytronic Electronic Co., Ltd

WT2606Bx-P001 Datasheet

Version: V1.05



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1. Product overview

The WT2606BX chip is specifically designed to meet the demands of high-end small appliances and large household electronics. It not only simplifies development processes but also significantly reduces development time. Our goal is to enhance product development efficiency through this chip, thereby creating greater value for customers. The launch of the "WT2606Bx Human-Machine Interaction Display Solution" precisely addresses the market's specific needs for high-performance, multifunctional chips.

2. Function Introduction

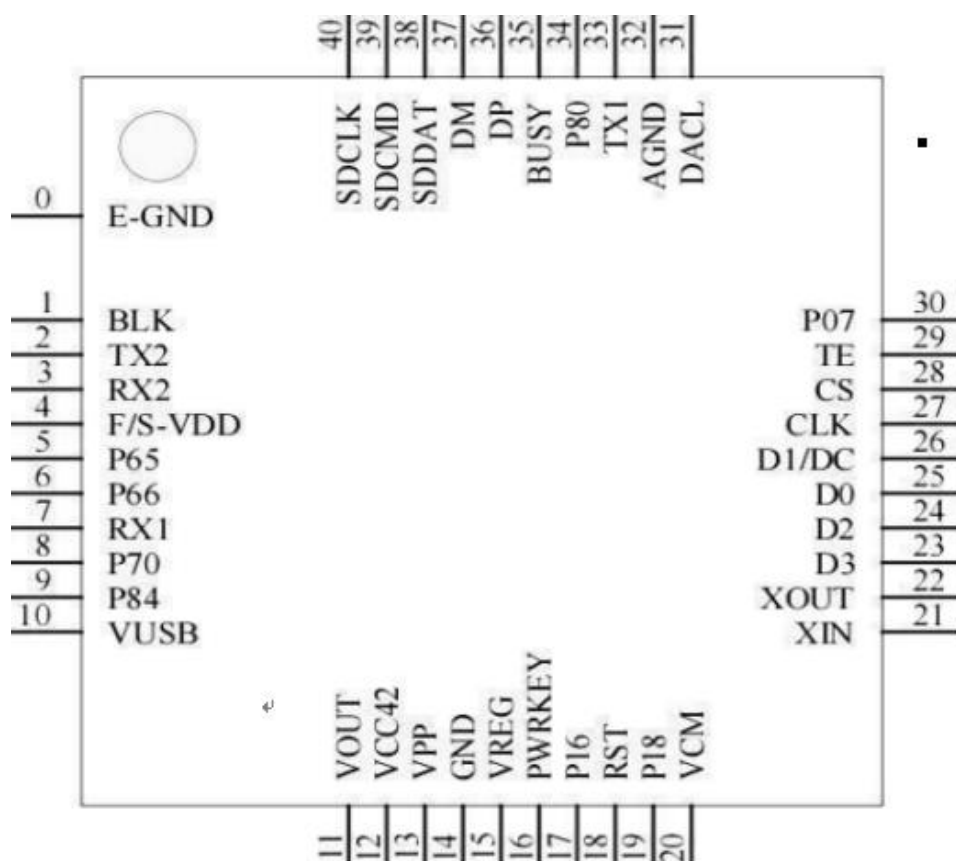
2.1. WT2606B function introduction

- To achieve serial-to-serial conversion: The device features dual serial ports for communication with the MCU. It includes RX (2606B input), TX (2606B output), INT1 (2606B input detection-triggers serial transmission at low level and activates control chip functions at high level), INT2 (default low level-indicates data transmission at high level), and BUSY signal.
- Serial command function: voice playback control, volume adjustment and combined playback commands.
- TFT Screen Display Driver: Controls image display via serial port, supporting multiple display modes (such as push-up, push-down, left-push, right-push, scrolling, gradient, refresh) and image stacking functionality. It enables full-screen, half-screen, partial display, jigsaw puzzle display, layered display, and multi-control overlay display. The interface is designed to be implemented in stages according to progress, allowing phased output iteration.
- TFT screen video playback: video playback is controlled through serial port, and the playback modes include single playback, single video loop playback and all video loop playback.
- Supports serial port update of video content in flash and OTA (Over-The-Air) update.
- Resolution support: up to 480*480*30 frames per second. Can be automatically configured by software
- There are two modes of sleep for serial port configuration chip, which can turn off the current less than 5UA or standby less than 100uA. It can directly receive instructions and quickly enter the working state. The initialization default standby state is available

2.2.Screen support table

Screen type	drive IC	resolution ratio	protocol
TFT	ST77916	320*385	QSPI
TFT	JD9853	240*296	SPI
TFT	JD9855	360*360	QSPI
AMOLED	ST7801	410*502	QSPI

3. Chip package pin description



WT2606B-40N

PIN-NO.	Name	Function Declaration
0	E-GND	Ground the bottom pad (must be grounded)
1	BLK	Control LCD backlight
2	TX2	UARTTX, voice chip data transmission
3	RX2	UARTTX, voice chip data reception
4	F/S-VDD	SD card power pins
5	P65	General IO port
6	P66	General IO port
7	RX1	Hardware DMA accepted
8	P70	General IO port
9	P84	General IO port
10	VUSB	USB power supply port, used to power the lithium battery
11	VOUT	Internal 3.3V output and power supply to the IO port
12	VCC42	Lithium battery power input port
13	VPP	Internal power supply voltage reduction output
14	GND	Power supply
15	VREC	Connect a 1uf capacitor to ground at the internal reference voltage pin
16	PWRKEY	Chip button wakes up the foot
17	P16	General IO port
18	RST	AMOLED reset foot
19	P18	General IO port
20	VCM	VCM
21	XIN	26M external crystal oscillator input pin
22	XOUT	26M external crystal oscillator output pin
23	D3	QSPI D3
24	D2	QSPI D2
25	D0	QSPI D0
26	D1/D2	QSPI D1 / LCD DC
27	CLK	QSPI CLK
28	CS	QSPI CS
29	TE	AMOLED TE interrupt signal
30	P07	General IO port
31	DACL	Audio left channel output
32	AGND	Modular
33	TX1	Hardware DMA sends
34	P80	General IO port
35	BUSY	Enable the control amplifier
36	DP	USBDP

37	DM	USBDM
38	SDDAT	SD card data pins
39	SDCMD	SD card command pin
40	SDCLK	SD card clock pin

4. Software description

The standard UART asynchronous serial interface belongs to the 3.3V TTL level interface. The communication data format is: start bit: 1 bit; data bit: 8 bits; parity bit: no; stop bit: 1 bit. When using the computer serial port debugging assistant, it is necessary to correctly set the baud rate of the serial port to 115200.

4.1. Version query (C0)

start code	length	continuation	deputy	order	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	C0	xx	EF

Instruction: Query the current program version number

Send → ◇7E 00 06 FF 02 C0 C7 EF

The sequence is: ◆7E 00 1D FF 02 C0 57 54 43 32 35 30 35 32 36 2D 31 35 46 2D 50 30 30 31 44 31 2E 30 30 EA EF

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.2. Play audio (A0)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	2byte	1byte	1byte
7E	xx	FF	02	A0	xx	xx	EF

Parameter description: The parameter is two bytes in big-endian format, and the index value starts from 1

Send → ◇7E 00 08 FF 02 A0 00 01 AA EF

Collect ← ♦ 7E 00 07 FF 02 A0 00 A8 EF

Reverse code description:

00: Execution successful

01: The index exceeds the number of files or the index value is 0, or the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.3. Volume Settings (AE)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	AE	xx	xx	EF

Parameter description: The parameter is a byte with a value range of 0 to 31.

Release → ♦ 7E 00 07 FF 02 AE 15 CB EF

Collect ← ♦ 7E 00 07 FF 02 AE 00 B6 EF

Reverse code description:

00: Execution successful

01: The parameter is out of range and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.4. Expression and picture playback (D0)

start code	length	continuation	deputy	order	Parameter 1	Parameter 2	Parameter 3	Parameter 4	check code	Enders
1byte	2byte	1byte	1byte	1byte	2byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	D0	xx	xx	xx	xx	xx	EF

parameter declaration :

Parameter 1: The expression index occupies two bytes (big endian).

Parameter 2: The playback speed of the emoji, a byte, parameter range 0-15 (parameter 0 does not change the speed)



Parameter 3: Picture playback mode (the way to display the next image), parameter range 0-4

0: Refresh the image directly

1: New images are displayed from bottom to top (bottom-in)

2: New images are displayed from top to bottom (upward)

3: The image is displayed from right to left (right in)

4: The image is displayed from left to right (left forward)

Parameter 4: The range of 0-10 is used to promote the refresh speed (parameter 4 is invalid when parameter 3 is 0)

Send → ◇7E 00 0B FF 02 D0 00 07 02 03 0A F2 EF

Collect ← ◆7E 00 07 FF 02 D0 00 D8 EF

Reverse code description:

00: Execution successful

01: The index is 0, the index exceeds the number of files, and the number of parameters is incorrect

02: The speed range of emojis is wrong

03: The expression data field in the index is incorrect

04: Parameter 3 parameter error

05: Parameter 4 parameter error

Length: length itself + extension + representation + command + parameter + check

Check code: the lower eight bits of the byte consisting of length + extension + representation + command + parameters (including parameters 1, 2, 3, 4)

4.5.Pause/Continue playing emoji (D2)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	D2	xx	xx	EF

Instruction: Pause or continue playing the emoji

Parameter description: A parameter is a single byte

Parameter: 1 play, 0 pause

Send → ◇7E 00 07 FF 02 D2 01 DB EF

Collect ← ◆7E 00 07 FF 02 D2 00 DB EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.6. Clear screen (D3)

start code	length	continuation	deputy	order	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	D3	xx	EF

Instruction: Stop the playing expression and enter the black screen state

Parameter description: The instruction does not carry parameters

Send → ◇7E 00 06 FF 02 D3 DA EF

Collect ←◆7E 00 07 FF 02 D3 00 DB EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: length + extension + low 8 bits of the byte representing + command

4.7. QR code display (D4)

start code	length	continuation	deputy	order	Parameter 1	Parameter 2	Parameter 3	check code	Enders
1byte	2byte	1byte	1byte	1byte	2byte	2byte	nbyte	1byte	1byte
7E	xx	FF	02	D4	xx	xx	xx	xx	EF

Instruction: Display the QR code

Parameter description: The value of parameter 1 is the total length of parameter 3, big end method

The value of parameter 2 is the size of the QR code. The current valid value is 1-2

The value of parameter 2 is the string of the QR code. The length of parameter 2 must not exceed 199

The sequence starts with ◇7E 00 20 FF 02 D4 00 16 00 B4 68 74 74 70 73 3A 2F 2F 77 77 77 2E 62 61 69 64 75 2E 63 6F 6D 2F BE EF

Collect ←◆7E 00 07 FF 02 D4 00 DC EF

Reverse code description:

00: Execution successful

01: The length of parameter 1 does not match the total length of parameter 2

The total length of parameter 2 is over 199

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.8. Occupancy ratio setting (D5) (There are three corresponding IO outputs PWM, which can be used for breathing effect)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	2byte	1byte	1byte
7E	xx	FF	02	D5	xx	xx	EF

Instruction description: The PWM frequency is 10K, and the duty ratio is adjusted by D5 instruction

Parameter description: The first byte indicates the PWM to be set, and the second byte indicates the duty cycle of the PWM. Single bytes are ANDed bit by bit

Parameter &0x1 is PWM1

Parameter &0x2 is PWM2

Parameter &0x4 is PWM3

Send → ◇ 7E 00 08 FF 02 D5 02 22 02 EF

Collect ← ◆ 7E 00 07 FF 02 D5 00 DD EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	D7	xx	xx	EF

4.9. Screen backlight switch (D7)

Instruction: Control the on/off of the screen backlight

Parameter description: A parameter is a single byte

Parameter: 1 Turn on backlight, 0 turn off backlight

Send → ◇ 7E 00 07 FF 02 D7 01 E0 EF

Collect ← ◆ 7E 00 07 FF 02 D7 00 DF EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command +

parameter

4.10. Custom icon location (D9)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	6*n byte	1byte	1byte
7E	xx	FF	02	D9	xx	xx	EF

Instruction: Custom icon position. The left vertex of the icon is displayed at the (x, y) coordinates on the screen

Parameter description: icon index (two bytes, big endian) + x (two bytes, big endian) + y (two bytes, big endian),

A maximum of 49 icons can be set on the background. The background can be a GIF, but the speed is not adjustable. The default is 8

Send → ◇ 7E 00 12 FF 02 D9 00 21 00 00 00 00 00 73 00 B6 00 B6 EC EF

Collect ← ◆ 7E 00 07 FF 02 D9 00 E1 EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.11. Single display of GIF (DA)

start code	length	continuation	deputy	order	Parameter 1	Parameter 2	Parameter 3	check code	Enders
1byte	2byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte
7E	xx	FF	02	DA	xx	xx	xx	xx	EF

Instruction: Play the GIF once

Parameter description: Parameter 1 Index of the GIF

Parameter 2: Playback speed, parameter range 0-15

Parameter 3 Single play mode, 1 black screen at the end of playback, 2 stop at the last frame at the end of playback

Send → ◇ 7E 00 0A FF 02 DA 00 01 00 02 E8 EF

Collect ← ◆ 7E 00 07 FF 02 DA 00 E2 EF

Reverse code description:

00: Execution successful

01: Length error or index error



02: Parameter 3 is not within the valid range

03: Parameter 2 is not within the valid range

04: The expression data field is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.12.Upgrade handshake information (FD)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	7byte	1byte	1byte
7E	xx	FF	02	FD	xx	xx	EF

Instruction description: The information and size of the firmware to be upgraded are returned, and the firmware data is pushed through the 0xF0 instruction after successful return

parameter declaration :

Firmware content	X	A single byte 001: Program 002: A single expression 003: All expressions + programs 004: All expressions
Emotion number	XX	Two bytes, big endian When the firmware content is 0x01,0x03,0x04, the parameter value is 0x00 0x00 When the firmware content is 0x2, the parameter value is the emoji pack position number
Firmware size	XXXX	The firmware package is in a large BYTE block mode

Send → ◇ 7E 00 0C FF 02 FD 01 00 00 00 09 60 00 74 EF

Collect ← ◆ 7E 00 07 FF 02 FD 00 05 EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.13. Get emoji size (FE)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	2byte	1byte	1byte
7E	xx	FF	02	FE	xx	xx	EF

Instruction: Get the space occupied by a certain expression

Parameter description: To obtain the space-occupied expression index (big-endian)

Send → ◇ 7E 00 08 FF 02 FE 00 07 0E EF □

Collect ← ◆ 7E 00 0A FF 02 FE 00 00 10 00 19 EF

Reverse code description:

Success: Return the size of the emoji package. The return code is four bytes in big-endian format. As in the above example, the size of the returned emoji package is 0x1000 in bytes

Failure: The returned size is 0

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.14. Firmware packet send (F0)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	2+512byte	1byte	1byte
7E	xx	FF	02	F0	xx	xx	EF

Instruction: Push firmware data after 0xFD upgrade information is confirmed

Parameter description: 2byte: packet sequence number (starting from 0) + 512byte: data

Send → ◇ 7E XX XX FF 02 F0 00 00 (starting with 0) (512 data) XX EF

Collect ← ◆ 7E 00 07 FF 02 F0 00 F8 EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.15. Serial port baud rate setting (FB)

start code	length	continuation	deputy	order	parameter	check code	Enders
1byte	2byte	1byte	1byte	1byte	1+3byte	1byte	1byte
7E	xx	FF	02	FB	xx	xx	EF

Parameter description: Serial port driver number: 1byte (default 1) corresponding baud rate: 3byte

Send → ◇ 7E 00 0A FF 02 FB 01 07 A1 20 CF EF

Collect ← ◆ 7E 00 07 FF 02 FB 00 03 EF

Reverse code description:

00: Execution successful

01: The parameter is not within the range value, and the number of parameters is incorrect

Length: length itself + extension + representation + command + parameter + check

Check code: a low eight-bit byte consisting of length + extension + representation + command + parameter

4.16. Overall program upgrades



Figure 4-1 Image conversion BIN file interface

- 1、Open the image file: currently supported formats (.gif.png.jpg) among which.gif is an animation
- 2、It is the choice of processing mode. For pictures and animations, opaque is selected to achieve high compression rate. Background pictures are not selected to be transparent. If it is an icon, transparent is selected because the overlay effect is transparent.
3. Start conversion: A BIN file will be generated in the folder of the current image as shown in Figure 4-2.

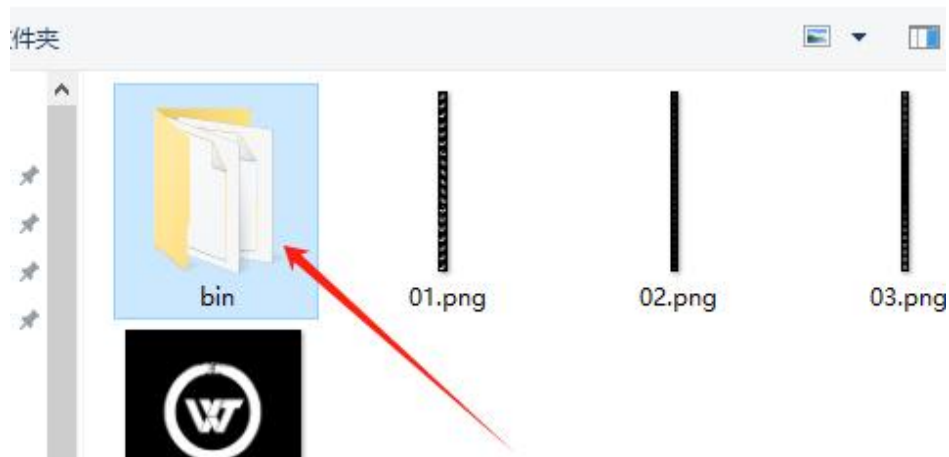


Figure 4-2 The generated bin folder

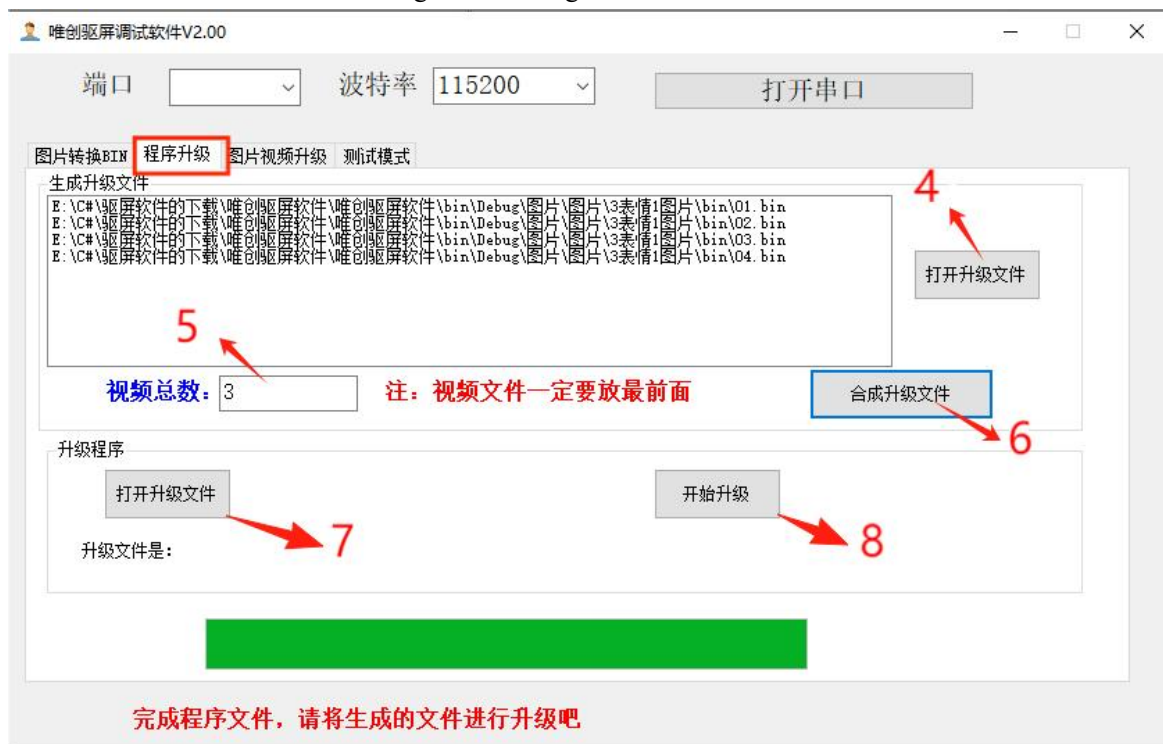


Figure 4-3 Program upgrade interface

4. Open the upgrade file: Select the BIN file generated in Figure 4-2. Note that it is very important to put the animation BIN file in front of the upgrade file. Therefore, the file name must be named in order to facilitate sorting and prevent upgrade failure.

5. Total number of videos: refers to the number of animation and GIF bin files. The first three files are GIF, so fill in 3. If there is no animation or GIF, fill in 0.
6. Synthesize and upgrade files: This will generate a "merged wtui" folder at the current time, and a ".wtui" file named after the time. This file is the overall program upgrade file, which cannot be larger than 14M. As shown in Figure 4-4.

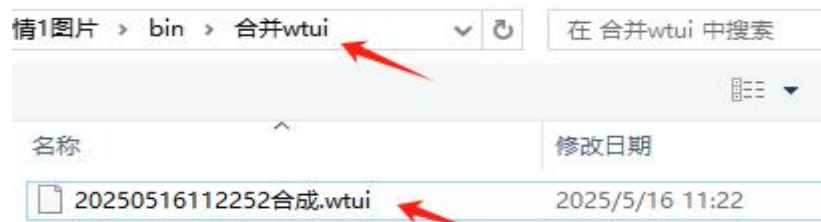


Figure 4-4 Naming of generation time.wtui

7. Open the upgrade file: The "Merge wtui" folder will be opened as shown in Figure 4-4. In this folder, select the composite file you generated with the extension ".wtui". The file name is named by time for easy selection.
8. Click "Start Upgrade", the whole program will start to upgrade, the previous files will not be retained, and the upgrade will be completed after a short while.

5.1.Video image upgrade



Figure 4-5 Image and video upgrade interface

1、Open the upgrade file: it will jump to the "bin" folder as shown in Figure 4-6. You can select the bin files of pictures and videos you want to update in the bin folder. You can place one or more files, but note that the number of files to be updated cannot be greater than the number of existing files.

2、Double-click the number column to change the upgrade number. The upgrade number can update the specified number of pictures. Note that the number should not be greater than the number of existing files. For example, if there are 100 files in a module, the upgrade file number should be 1-100, not greater than 100.

3、Upgrade a single data: The upgrade will be performed sequentially according to the order of the files you placed.

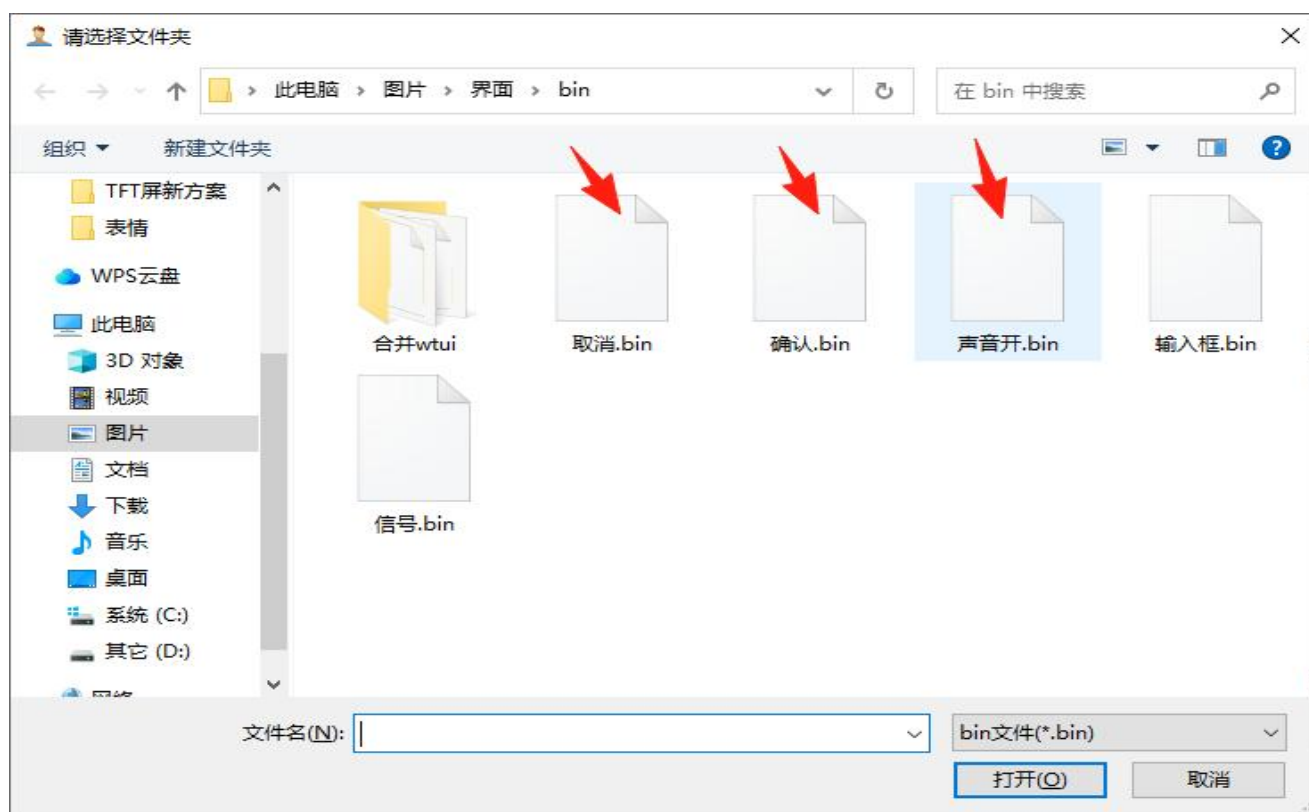


Figure 4-6 Select the bin file to upgrade

5.2. test pattern

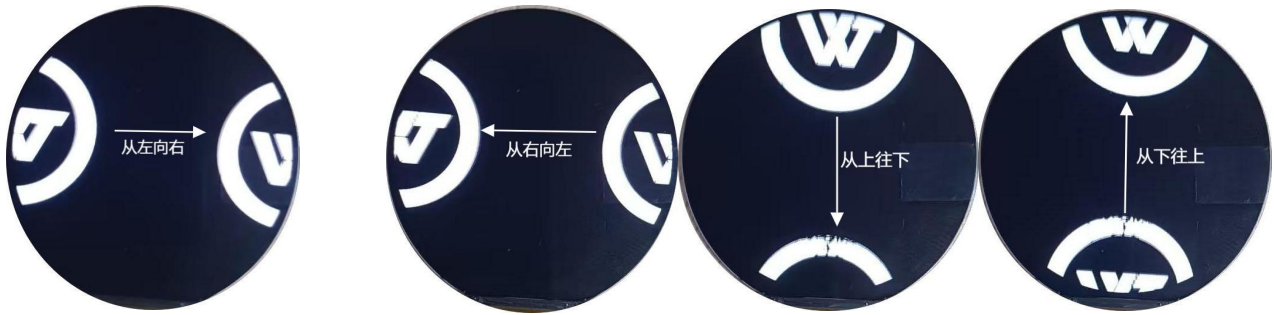


Figure 4-7 Test mode interface

1、Play Sequence: Designates the playback of a specific numbered image or video. Speed: Controls the playback speed of videos or animations, with no effect on individual images. Values range from 1 to 15 (from fastest to slowest). Display: Offers five modes as shown in Figure 4-8. Forward Speed: Controls left, right, top, and bottom scrolling speeds, with values ranging from 10 to 1 (from fastest to slowest).



Figure 4-8 shows the normal mode selection



- 1、Left forward,
- 2、right forward,
- 3、up and down

4、Icon display: You can specify that the icon is displayed from the (x, y) coordinates you fill in. The coordinate starting point is the upper left corner of the screen (0,0), and the icon number is the image number. For example, the overlay configuration and effect demonstration with the input box as the background are as follows:



Figure 4-9, configuration example

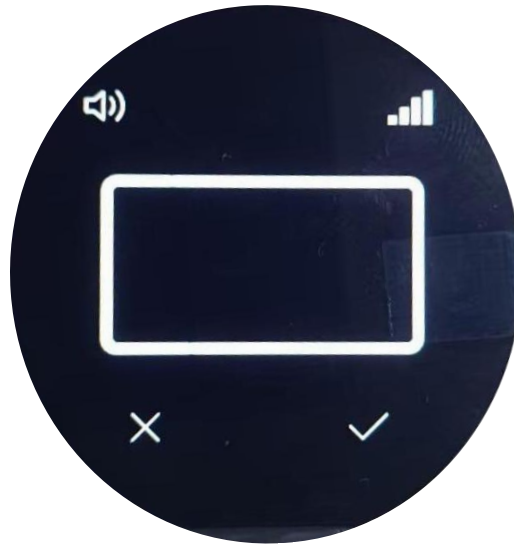


Figure 4-10 Effect demonstration

5、Data sent: is 1,2 Click to send the visual data window. Data received: is the return data visual data window of the module.

5.3.File filling (Weichuang filling tool)

5.4. introduction

To prepare for potential future image updates, this software generates a pre-estimated bin file size to temporarily occupy the designated image slots. For example, if the preset numbering range (1-16) was intended for GIFs but only numbers 1-10 were used, the software can create a bin file size estimate for subsequent updates. This allows new GIFs to be directly placed in the 11-16 range, enabling replacement through the "Image/Video Upgrade" feature during later updates. The software interface is illustrated in Figure 4-11.

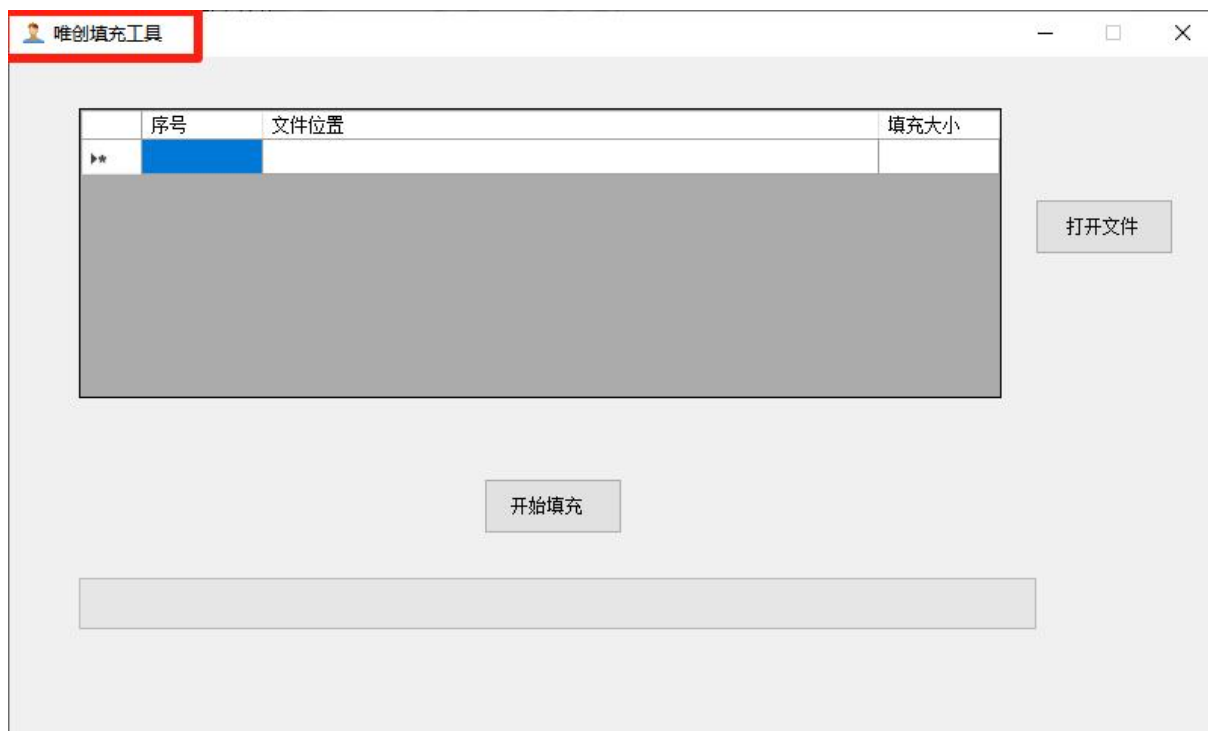


Figure 4-11 Weichuang filling tool

5.5. direction for use



Figure 4-12 Software interface

- 1、Open the file: Select the bin file you want to fill (expand), as shown in Figure 4-13. You can

select one or more. The serial number only represents the processing order of the bin file and has no effect on the final effect of filling.

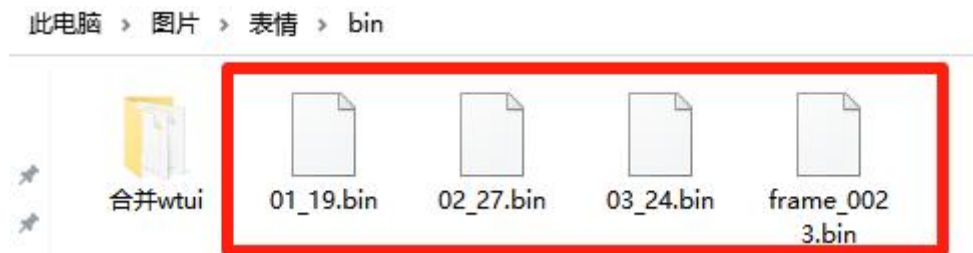


Figure 4-13 Select the filled bin file

2、 Fill size: Double-click to modify the fill size in bytes. As shown in Figure 4-12, the bin file of sequence number 1 is increased by 1024 bytes. The size of the filled bin file = the original file size + the fill size.

3、 Start filling: Wait a moment and a "Fill Bin" will be generated in the folder where you originally selected the bin file, as shown in Figure 4-14. Next, use these estimated-size bin files to package with the previous files and execute the program upgrade described in 4.16.

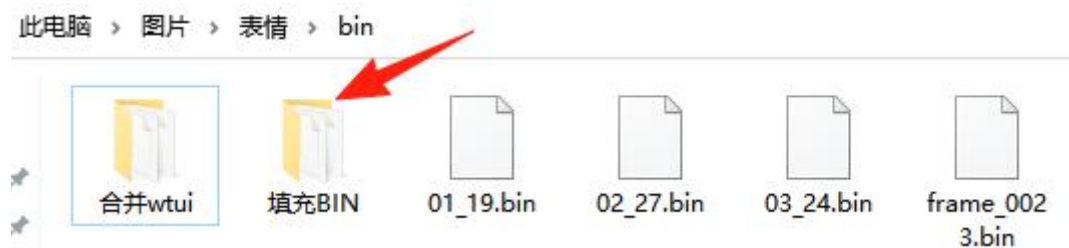
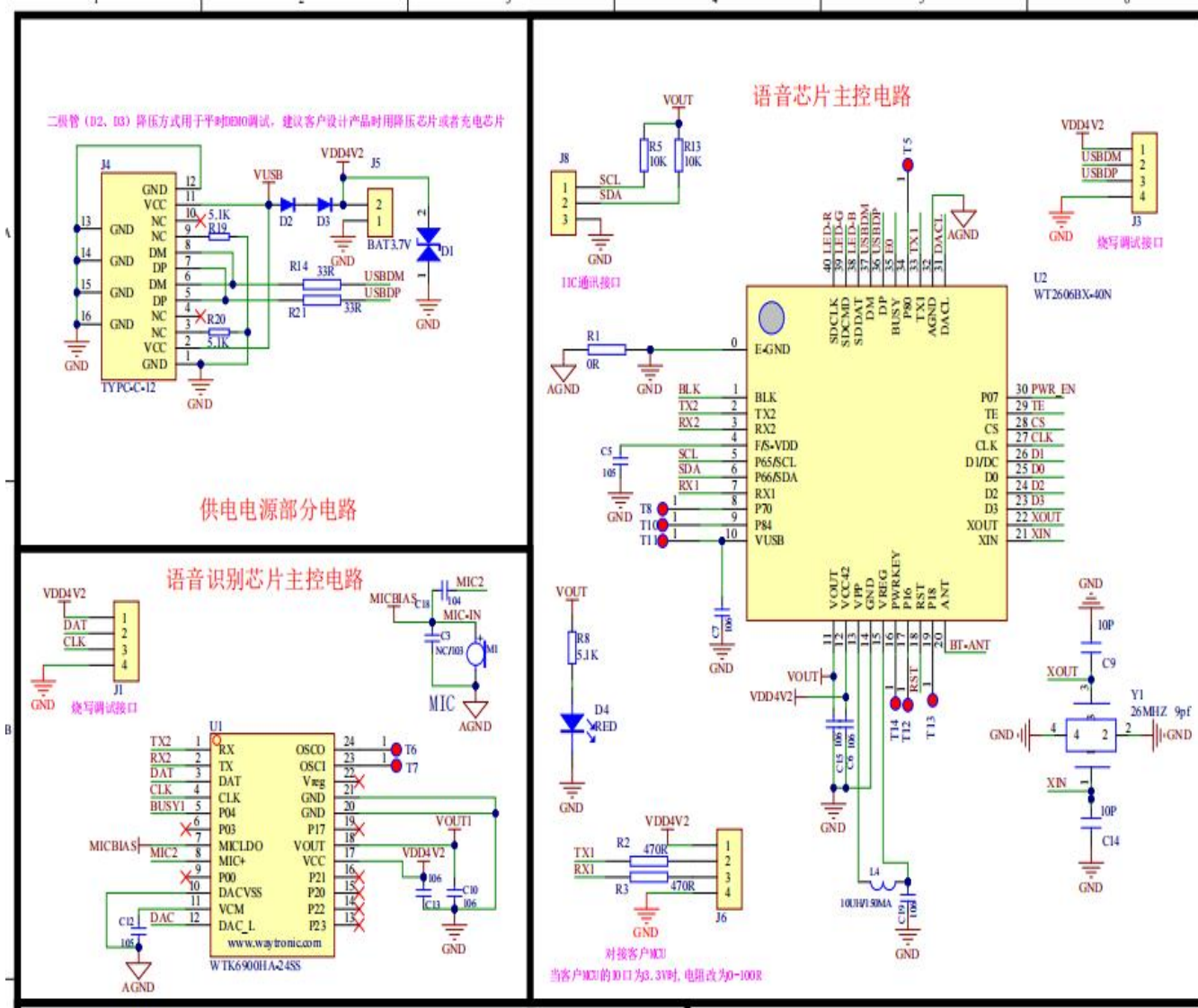
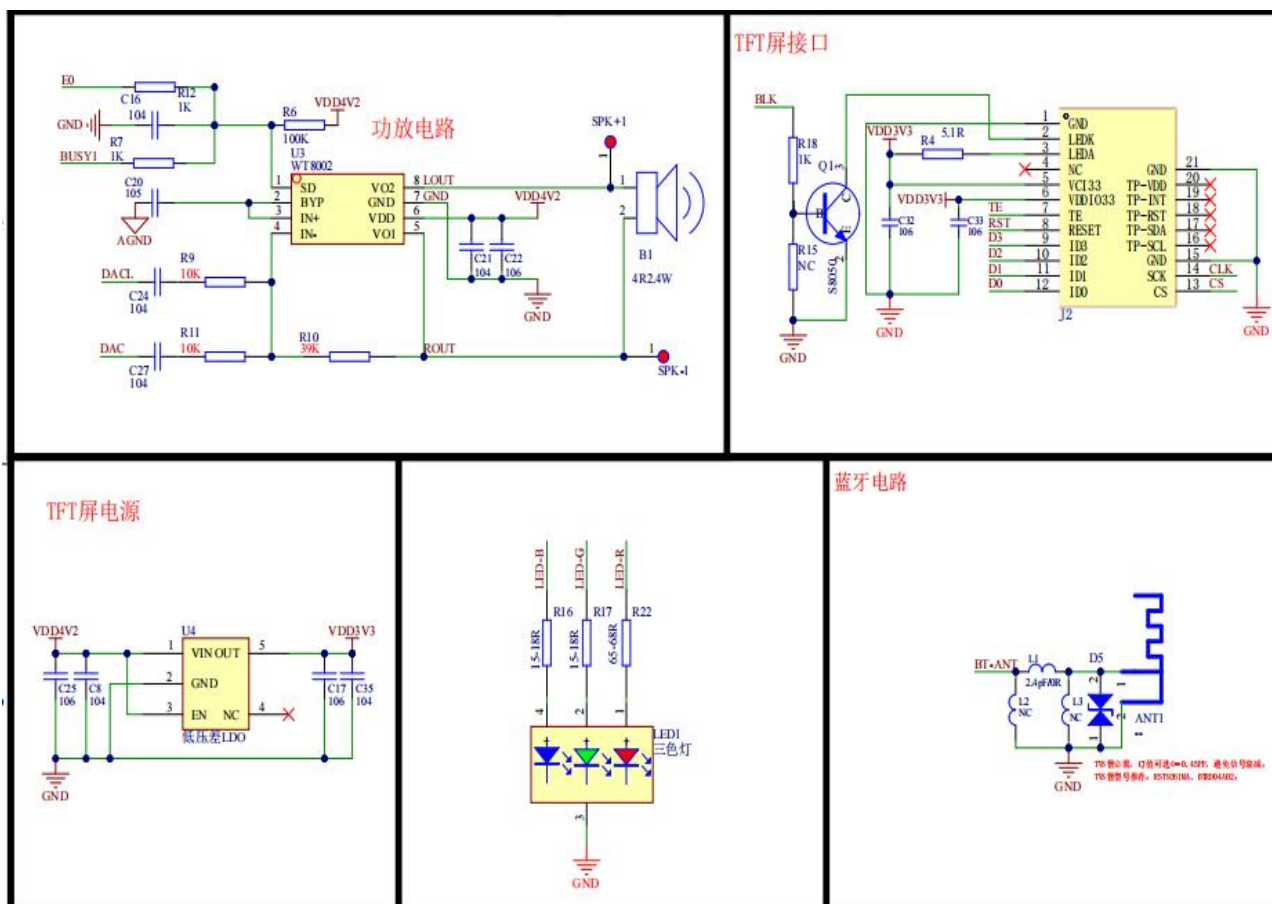


Figure 4-14 The generated fill bin

Note: The filled bin file will not lose the original display effect

6. Circuit design reference





7. Electrical parameters

Parameter	Value
CPU	RISC-V 140MHz
Flash	128Mbit
PWU	BUCK/LDO mode+Charger
Graphics Accelerator	DMA;Rotation;Bleding;Scale
Supply Voltage	2.8 ~ 4.5V
GPIO	27
Operating Temperature	-40~+85°C
Package Size	QFN40 5*5

		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	0.7	0.75	0.8
STAND OFF		A1	0	0.02	0.05
MOLD THICKNESS		A2	---	0.55	---
L/F THICKNESS		A3	0.203 REF		
LEAD WIDTH		b	0.15	0.2	0.25
BODY SIZE	X	D	5 BSC		
	Y	E	5 BSC		
LEAD PITCH		e	0.4 BSC		
EP SIZE	X	D2	3.3	3.4	3.5
	Y	E2	3.3	3.4	3.5
LEAD LENGTH		L	0.3	0.4	0.5
LEAD TIP TO EXPOSED PAD EDGE		K	0.4 REF		
PACKAGE EDGE TOLERANCE		aaa	0.1		
MOLD FLATNESS		ccc	0.1		
COPLANARITY		eee	0.08		
LEAD OFFSET		bbb	0.07		
EXPOSED PAD OFFSET		fff	0.1		

9. Version

edition	date	description
V1.00	2025-01-18	editio princeps
V1.01	2025-05-07	Add speed parameters to D0 command
V1.02	2025-05-12	1.FD directive adds full UI upgrade information 2. The new FE instruction query occupies space for expressions
V1.03	2025-05-15	Optimize and update the D0 instruction
V1.04	2025-5-28	Add instructions for using the Weichuang filling tool
V1.05	2025-06-07	1. Specify the A0 instruction to cause the initial value 2. Correct the instruction description of D4