1 Overview

T5UID3 kernel is DGUS II software platform for high resolution application based on T5 CPU.

Features:

1) Dual core CPU, whose GUI and OS core both run at 250MHz and power consumption is extremely low.
2) 256Mbytes Flash,192Mbytes of that is used for picture memory unit.
3) The biggest font space is 64Mbytes, the last 32Mbytes font space of that can be used for front space and music space.
4) 256 sections (2.048s per section) 32KHz 16bit WAV music play.
5) 320Kbytes Nor Flash for user database.
6) 128Kbytes SRAM (data variable space).
7) Online upgrade of font library, music, icon is supported.
8) Support JPEG image decompression and updated.
9) Support standard T5 DWIN OS platform, and hardware can lead out 20 IO, 6 UART.
10) 40mS DGUS operating cycle, user interface effect is extremely fluent.
11) Display controls can be turned on/off or modified to realize complicated display effect.
12) Touch controls can be turned on/off or modified to realize complicated touch effect.
13) 255 display controls per user interface at most.
14) Support 1023*1023 resolution icon displayed at most.
15) Download files and configure hardware through SD card. The downloaded files will be counted and displayed for file check. The downloaded files can be encrypted.
16) Support DWIN DCS extended bus protocol.
17) Built-in RTC.

Support adjustment of capacitive touch panel responsiveness, which make the thickness of front toughened glass is up to 6 mm.

2 Function List

2.1 Display Control

No.	Function code	Function	Data length (Word)	Description
1	0x00	Variable Icon	1	Icon display is related with a variable. When variable changes, icon switches accordingly. This function is used for dashboard, progress bar, etc.
2	0x01	Animation Icon	2	3 icon status corresponding to a variable: no display, display selected icon, animation icon. This function is used for alarm, etc. Support animation speed set.
3	0x02	Slider Icon	1	Slider icon is related with a variable. This function is used for display liquid level, dial, progress bar.
4	0x03	Word Art	1/2/4	Use word art icon to display data.
5	0x04	Image Animation	none	Auto play an image sequence at selected speed. This function is used in welcome page or screensaver.
6	0x05	Rotation Icon	1	Transform variable range to angle data which linear with variable. Then display icon at corresponding angle. This function is mainly used for dashboard.
7	0x06	Bit Variable Icon	3	Every bit (0/1) of one variable data stands a status, and the status can be displayed via static icon or animation. This function is used to display on/off state.
8	0x10	Variable Data	1/2/4	Display a variable in specified format (integer, decimal, unit, etc), font type, and font size.
9	0x11	Text	2K at most	Display character string in specified format (font library) at selected area.
10	0x12_00	Digital RTC	none	Display digital RTC in customized format.
11	0x12_01	Analog Clock	none	Display analog clock via rotation icon.
12	0x15	Data Window	2	Display variable data sequence in specified window, highlight the selected data. Combined this function with sliding adjustment or increment adjustment, data sequence can scroll with finger touch. The scrolling speed can be controlled via DWIN OS. The variable occupy 2 word space, (VP+1) space is reserved.
13	0x20	Dynamic Trend Curve	2K per channel	Display real-time curve via data from curve buffer (auto match). The display area, central axis coordinates, display scale (zoom in/out), and curve direction of curve can be set.
14	0x21_01	Draw_Dot	User define	Dot set（x, y, color）
15	0x21_02	Draw_Line		Draw a line via dot connection (color, (x0, y0), …, (xn, yn))
16	0x21_03	Draw_Rectangle		Draw a rectangle. Color/area/size can be set.
17	0x21_04	Draw_ Fill Rectangle Area		Filling specified rectangle area with color. Color, area, size can be set.
18	0x21_05	Draw_Circle		Display entire arc. Color, area, size can be set.
19	0x21_06	Draw_Picture Copy&Paste		Copy a picture area and display it on current page.
20	0x21_07	Draw_Icon Display		Icon display. Icon library is optional.
21	0x21_09	Draw_ Frequency Spectrum		Display frequency spectrum (vertical line), line color and location can be set.
22	0x21_0A	Draw_Segment		Connect line segments. Endpoint and color can be set.
23	0x21_0B	Draw_Arc Display		Display arc. Radius, color and angle range can be set.
24	0x21_0D	Draw_XOR		Do XOR operation at selected rectangular area. Mainly used for highlight display.
25	0x24	Zone Scrolling	1	Loop shift of specified area, move direction can be set. Used for simple dynamic effect of flow chart and progress bar. The variable is occupied by system, user operation is forbidden.
26	0x25	QR Code Display	259 at most	Display QR code according to specified data.
27	0x26	Adjust brightness of selected area	1	Adjust the brightness of rectangular area to highlight or weaken background.

Remarks:

1. For more detailed function instruction, please refer to Development Guide of DWIN DGUS.

2. VP is a pointer, which points to the storage location of user variable memory space.

3. User can set SP (stack pointer) in DGUS tool, thus the configuration of display control will be write in to user variable memory space that the SP pointing to. User can operate configuration of display control via UART or DWIN OS to combine multi-controls.

2.2 Touch Control

No.	Function Code	Function	Data Length (Word)	Description
01	00	Variable Data Input	1/2/4	Input integer, fixed-point decimal via touch panel. The inputted data will be saved to variable space that user define.
02	01	Popup Window	1	Touch to active a popup window, return menu item key code of the window.
03	02	Incremental Adjustment	1	Touch button to do add/minus with variables. The adjustment step and range can be set. Set adjustment from 0 to 1 circularly, user can get the checkbox effect.
04	03	Slide Adjustment	1	Slide to adjust variable data. The adjustment range can be set.
05	05	Return Key Value	1	Return key code when touch the button on touch panel and write key code in variable space that VP point to. Support bit variable return.
06	06	Text Input	127 at most	Input ASCII character or GBK Chinese character, support cursor and edit during input process. (VP-1) space is reserved to save input status and inputted data length.
07	08	Return data based on touch status	User define	Return data to space that VP pointing to, the rule between data and touch status is set forward. Combining data auto-uploading function, the data can be returned to UART.
08	0A	Slide Adjust (gesture)	2	Adjust variable data based on slide range on X axis or Y axis within selected area. Combining data window to realize rolling adjustment. VP space is reserved, the data is saved in space that (VP+1) pointing to.
09	0B	Page Sliding (gesture)	None	Scrolling touch screen along X-axis to realize page scrolling. The next page and scrolling area can be set. Display control will move along gesture.

Remarks:

1. Refer to *DWIN DGUS Development Guide* for detailed description.
2. Touch configuration file(13*.BIN) can not be more than 256Kbytes.
3. The touch control interface is 0x00B0, user can operate touch control via UART or DWIN OS to nest or group functions.

2.3 Serial Port Communication Protocol

UART 2 can be used for system debug, whose mode is fixed at 8N1. Baud rate can be set, data frame is consist of 5 parts.

Data Block	1	2	3	4	
Definition	Frame Header	Data length	Instruction	Data	CRC (optional)
Data Length	2	1	1	N	2
Description	0x5AA5	Command+data+CRC	0x80/0x81/0x82/0x83		
Example (without CRC)	5A A5	04	83	00 10 04	
Example (with CRC)	5A A5	06	83	00 10 04	25 A3

CRC checker can be turn on/off at **0x2C.6** in T5UID1.CFG.

Description of UART2 instruction:

Instruction	Data	Description
0x80	Send: Register Page (0x00-0x08) + Register Address(0x00-0xFF) + Data to write	Write data string into register.
	Answer: 0x4F 0xaB	Answer of write instruction.
0x81	Send: Register Page(0x00-0x08) + Register Address (0x00-0xFF) + Data Length to Read (0x01-0xFB)	Read data from register.
	Answer: Register Page (0x00-0x08) + Register Address (0x00-0xFF) + Data Length + Data	Answer of read instruction.
0x82	Send: Start Address of SRAM (0x0000-0xFFFF) + Data to Write	Write data in to SRAM. Do not write data into space reserved for system.
	Answer: 0x4F 0xaB	Answer of write instruction.
0x83	Send: Start Address of SRAM (0x0000-0xFFFF) + Data Length to Read (0x01-0x7D)	Read data form SRAM.
	Answer: Start Address of SRAM + Data Length (word) + Data	Answer of read instruction.

Definition of Register page:

Register page ID	Definition	Description
0x00-0x07	Data Register	256 per group, R0-R255
0x08	Port Register	DR0-DR255 See 3.4 section of *DWIN OS development guide based on T5* for more.

3 System Variable Interface

Data with same background color in table need to be update at the same time.

VP	Definition	Length (Word)	Description
0x00	Device_ID	4	T5 CPU ID, each T5 CPU has a unique ID.
0x04	System_Reset	2	0x55AA 5AA5=Reset T5; 0x55AA 5A5A=Reset system (including /RST_OUT pin output).
0x06	OS_Update_CMD	2	D3: write 0x5A to enable DWIN OS once (write into 1MB Nor Flash), clear after operation. D2: Fixed at 0x10. DWIN OS program must start from 0x1000. D1:0: Start address of SRAM to save program to update, it must be even.
0x08	NOR_FLASH_RW_CMD	4	D7: Mode. 0x5A=read 0xA5=write, clear after operation. D6:4: Start address of Nor Flash. Must be even. 0x000000-0x02:7FFE, 160KWords. D3:2: Start address of SRAM. Must be even. D1:0: Data length to read/write. Must be even. (Unit: word)
0x0C	Reserved	3	
0x0F	Ver	1	Application software version. D1: GUI version, D0: DWIN OS version.
0x10	RTC	4	D7=Year (0-0x63) D6=month(0-0x0C), D5=day(0-0x1F), D4=week(0-0x6), D3=hour(0-0x17), D2=minute(0-0x3B), D1=second(0-0x3B), D0 undefined. Data format is HEX. If there is no RTC on hardware, user can write RTC data.
0x14	PIC_Now	1	Display current page ID
0x15	GUI_Status	1	GUI status feedback: 0x0000=free, 0x0001=processing 13.bin and 14.bin.
0x16	TP_Status	4	D7: 0x5A=touch screen data is updated, OS is clear. D6: Touch panel status. 0x00=release, 0x01=first press, 0x02=lift, 0x03=pressing D5:D4=X coordinate D3:D2=Y coordinate D1:D0=0x0000.
0x1A-0x2F	Reserved	22	Undefined
0x30	VCC_Now	1	Current 3.3V Voltage AD value, Voltage=AD value*4800/65532 mV.
0x31	LED_Now	1	D1: 0x5A = VCC_Now, backlight brightness value, AD0-AD1 instant value has updated. D0: Current backlight brightness value, 0x00-0x64.
0x32	AD0-AD1 Instantaneous value	2	Instantaneous value of AD0-AD1, 1 word per AD. Voltage=AD value*4800/65532 mV. Hardware support is needed.
0x34-0x7B	Reserved	66	Undefined.
0x7C	Folder Name	4	8 ASCII characters at most, like DWIN_SET. Read only.
0x80	System_Config	2	D3: Undefined, write 0x00. D2: Touch panel sensitivity configuration, read only. D1: Touch panel mode configuration, read only. D0: Set system status. .7: Reserved, write 0. .6: Display control number. 0=64 control/page, 1=128 control/page, read only. .5: Loading 22.bin to initialize SRAM. 1=Load 0=Not load, read only. .4: SD port status. 1=On 0=Ban, read and write. .3: Touch tone control. 1=On 0=Off, read and write. .2: Standby backlight control. 1=On 0=Off, read and write. .1-.0: display direction 00=0° 01=90° 10=180° 11=270°, read and write.

0x82	LED_Config	2	Set standby backlight. D3= brightness when system running, 0x00-0x64; When backlight standby control is off, D3 can be used for brightness adjustment via instruction. D2= brightness when system standby, 0x00-0x64; D1:0=wait time /5mS.
0x84	PIC_Set	2	D3: 0x5A = enable page operation once, clear after CPU operation. D2: Mode. 0x01=page switch (display the selected picture). 0x02=save page (save background of current page to picture memory). D1:D0: picture ID.
0x86-0x9B	Reserved	26	Undefined.
0x9C	RTC_Set	4	D7:D6= write 0x5AA5 to enable RTC setting once; D5:D0=year, month, day, hour, minute, second, all in HEX format. Need hardware support.
0xA0	Music_Play_Set	2	Music player setting: D3: Starting section of music to play, 0x00-0xFF. D2: Section number, 0x01-0xFF. Clear after DGUS operation. Under buzzer mode, it is buzz time, unit: 8 mS. D1: Volume, unit: 1/256. D0: Return the rest section numbers of music to play, 0x00-0xFF. D3:D2 both write 0x00 to stop music playing.
0xA2	BMP_Download	4	D7: 0x5A = enable once writing data in SRAM to picture buffer. D6:D5: Starting address of SRAM, must be even. D4:D3: Data length, unit: word. Must be even. D2:D1:D0: Picture buffer address, 0x000000-0x0257FF, 150Kwords.
0xA6	JPEG_Download	4	D7: 0x5A = enable JPEG picture/icon download operation once, clear after CPU operation. D6: download mode 0x01=Display JPEG picture on current page. (it will be covered when switch page). 0x02=Save JPEG picture to picture memory. (Operating backstage). D5:D4: starting address of SRAM to save JPEG file, must be even. 64Kbytes per JPEG file at most. D3:D0: 0x01 mode: D3:D2= top left corner coordinate of picture displayed on background. 0x02 mode: D3:D2= picture ID, 0x0000-0x00F0. The resolution of JPEG picture must not exceed screen resolution, set coordinate as 0° display. (for 90° display, users need to rotate picture and coordinate in advance.)
0xAA	Nand Flash_RW_CMD	6	D11: 0x5A= enable once read/write font library (64Mbytes) operation, clear after operation. D10: operation mode, 0x01= read font library, 0x02=write font library. When D10=0x01 D9: font ID, 0x40-0x7F, 256Kwords per font, 16Mbytes at most. D8:D6: starting address in font, unit: word. 0x00 00 00-0x01 FF FF. D5:D4: starting address of SRAM to write data, must be even. D3:D2: data length to read, unit: word. Must be even. D1:D0: undefined，write 0x00. When D10=0x02 Update font file (font library, icon, audio), 32Kbytes once.

			D9:D8 address of 32Kbytes font file, 0x0000-0x07FF, refer to the entire 64Mbytes font memory. D7:D6: starting address of SRAM to save updating data, must be even. D5:D4: fixed 0x0001. D3:D0: undefined, write 0x00.
0xB0	Touch Control interface	36	0xB0: 0x5AA5= enable accessing touch control interface once. Clear after CPU operation. 0xB1: Page ID of touch control. 0xB2: High byte: touch control ID (set in DGUS II development software), 0x00-0xFF; Low byte: touch control code, 0x00-0x7F. 0xB3: Access mode 0xB4-0xD3: data to modify of mode 0x02, 0x03. Mode 0x0000: turn off this touch control. Mode 0x0001: turn on this touch control. Mode 0x0002: Read this touch control and write it to SRAM that 0xB4 pointing to. Mode 0x0003: update current touch control with data that 0xB4 pointing to, the format and data length must be the same.
0xD4	Simulate touch panel operation	4	0xD4: 0x5AA5=enable the operation once, clear after operation. 0xD5: press mode. 0x0001=press, 0x0002=release, 0x0003=keep pressing, 0x0004=touch (press+release) 0xD6: X coordinate of press position. 0xD7: Y coordinate of press position. After simulating mode 0x0001 and 0x0003, must simulate 0x0002. (x,y) coordinate of TP must be set as 0°, CPU will auto-rotate coordinate.
0xD8-0xFF	Reserved	40	Undefined.
0x100-0x1FF	DCS_Bus_Data	256	DCS Bus interface, 32 word every device. Assign starting variable address: 0x100+device address*32. For example, the starting address of 0x02 device is 0x140. 8 devices at most.
0x200-0x2FF	Reserved	256	
0x300-0x37F	Dynamic curve interface	128	0x300-0x30F: feedback 8 channel of curve buffer (read only), 2 words per channel. High word: pointer of data (0x0000-0x07FF); Low word: data length of curve buffer (0x0000-0x0800). Write 0x0000 to hide curve. 0x310-0x311: enable writing curve buffer. D3:D2: 0x5AA5= enable writing curve buffer, clear after operation. D1: The number of data block, 0x01-0x08. D0: Undefined, write 0x00. 0x312-0x37F: The data block to send to curve buffer, 16bit unsigned number. Single data block defines as channel ID (0x00-0x07)+data word length(0x01-0x6E)+data. After adopting dynamic curve displaying, from 0x1000, setting data buffer for each curve,as per 2Kwords aisle. While dynamic curve display is enabled, data buffer is start from 0x1000, and 2Kwords every buffer. CHO buffer is 0x1000-0x17FF, CH1 buffer is 0x1800-0x1FFF, etc. Free buffer can be used for user variable area. User can also rewrite curve buffer data, then modify pointer and data length in 0x300-0x30F to make sure the curve display right.
0x380-0xFFF	Reserved	3K	Undefined

0x1000-0xFFFF SRAM is for user use.

4 SD Interface

Download and update file via SD/SDHC interface is support.

File Type	Name rule	Description
Core Program	T5UID3*.BIN	The GUI core program.
	T5OS_V*.BIN	Common T5 OS platform core program.
DWIN OS program	DWINOS*.BIN	DWIN OS program, code must begin from 0x1000.
NOR Flash database	ID+(Optional) file name.LIB	Each ID points to 2KWords memory, ID range is 0-79. The NOR Flash is inserted in T5 CPU, 160KWords. It can be used for save user data or DWIN OS program.
Font Library	ID+(Optional)file name.BIN/HZK/DZK	Generate by font generator.
DGUS Input File	12*.BIN	Save at fixed 12# font space.
DGUS touch File	13*.BIN	Save at fixed 13# font space, 32Kbytes at most.
DGUS variable File	14*.BIN	Save at fixed 14-17# font space
DGUS variable initialize file	22*.BIN	Save at fixed 22# font space, load data in 0x2000-0x1FFF address to initialize 0x1000-0xFFFF SRAM.
Icon file	ID+(optional)file name.ICO	Generate by DGUS tool. Save in font space.
Audio file	ID+(optional)file name.WAV	32KHz 16bit WAV format. Save in audio space.
BMP image file	ID+(optional)file name .BMP	24bit true color format.
Hardware Configuration File	T5UID3*.CFG	

64Mbytes font memory, font memory block is 256KB.

32Mbytes audio memory, audio memory block 128KB.

Audio memory covers last half font memory (128 blocks), each audio memory block covers half font memory block.

All the file must be put into **DWIN _SET** folder, and the folder must be set in SD card root directory. SD card must be 4KB sectors, FAT32 format.

When power up, DGUS check SD interface once, then check SD interface every 3 seconds.

5 Hardware Configuration File

T5UID3.CFG is hardware configuration file for T5UID3 platform. T5UID3 is binary, it can be edit by UltraEdit.

Type	Address	Length	Definition	Description
Identification Code	0x00	4	0x54 0x35 0x44 0x33	Fixed content.
Format Flash	0x04	2		Write 0x5AA5 to format NAND Flash.
System Clock Calibration	0x06	2		0x06: write 0x5A to enable system clock calibration 0x07: write 0xA5 is UART calibration mode. During the calibration process, set UART2 as 115200bps and 8N1 mode, send more than 30 0x55 data packages every 30 mS. Write 0xAA is RTC calibration mode. Apply the RTC hardware to calibrate. It is already be calibrated before sale.
System Configuration 1	0x08	1	System_Config1 (default value is 0x38)	.7: data auto-uploading. 0=On, 1=Off. .6: display control number. 0=64 control/page, 1=128 control/page. .5: initialize via 22.bin file. 1=On 0=Off .4: SD interface status. 1=on 0=ban .3: touch tone. 1=on 0=off .2: backlight system standby control. 1=on 0=off .1-.0: display direction 00=0° 01=90° 10=180° 11=270°
	0x09	2	UART2 Baud Rate	Baud rate set value=7833600/real Baud rate. 115200bps, set value=0x0044. Ser value is 0x03E7 at most.
Standby Backlight	0x0B	1	LED_Set_En	0x5A=enable standby backlight.
	0x0C	4	LED_Idle_Set	0x0C=brightness when TP is used, 0x0D=brightness when TP is not used. 0x0E:0F=waiting time, unit: 5mS.
LCD Configuration	0x10	2	Display_Config_En	0x5AA5=enable LCD configuration. Not for user.
	0x12	1	PCLK_PHS	Data latch phase: 0x00=PCLK Falling edge, 0x01=PCLK Rising edge
	0x13	1	PCLK_DIV	Pixels clock PCLK frequency set, PCLK frequency (MHz) =500/PCLK_DIV.
	0x14	1	H_W	
	0x15	1	H_S	
	0x16	2	H_D	Horizontal resolution of LCD (X direction).
	0x18	1	H_E	
	0x19	1	V_W	
	0x1A	1	V_S	
	0x1B	2	V_D	Vertical resolution of LCD (Y direction).
	0x1D	1	V_E	
	0x1E	1	TCON_SEL	0x00=do not configure TCON.
	0x1F	1	Reserved	0x00.
Boot Setting	0x20	1	PIC_Power_On_En	0x5A= enable this configuration.
	0x21	2	PIC_Power_On	ID of page to display when power on.
	0x23	1	Music_Power_On_En	0x5A= enable this configuration.
	0x24	3	Music_Power_On	Strat-up music:

				0x24=music ID, 0x25=memory block number that music file cover, 0x26=volume. 0x25=0x00, no strat-up music.
Touchscreen setting	0x27	1	TP_Set_En	0x5A= enable this configuration. Not for user.
	0x28	1	TP_Mode	TP mode. .7-.4 (high 4bit), TP type: 0x0*=resistance touch panel. 0x1*=Capacitive touch panel (driver: GT911, GT9271, GT9110). .3-.0 (low 4bit), TP mode: .3 reserved, wirte 0. .2 X axis data: 0=0 to Xmax, 1=Xmax to 0; .1 Y axis data: 0=0 to Ymax, 1=Ymax to 0; .0 X, Y exchange: 0=XY, 1=YX .
	0x29	1	TP_Sense	TP sensitivity: 0x00-0x1F, 0x00 is lowest, 0x1F is highest. Default value is 0x14.
TCON Set	0x2A	1	TCON_Set_En	0x5A= enable this configuration. Not for user.
	0x2B	1	TCON_Set	Set Tcon, 0x00: do not set Tcon.
System Configuration2	0x2C	1	System_Config2 (default value is 0x00)	.7: choose audio player/buzzer. 1=buzzer, 0=audio player. .6: CRC checker for UART2. 1=on, 0=off. .5: secondary hardware watch dog (WDT). 1=on, 0=off. .4: synchronous update of display content. 1=on, 0=off. .3-.0: reserved, write 0.
	0x2D	3	Reserved	Write 0x00
SD download check	0x30	2	SD_Check_En	0x5AA5=enable download file check via SD interface.
	0x32	1	.LIB file	0x00-0xFF
	0x33	1	.BIN font file	0x00-0xFF, OS program is not include.
	0x34	1	.DZK font file	0x00-0xFF
	0x35	1	.HZK font file	0x00-0xFF
	0x36	1	.ICO icon file	0x00-0xFF
	0x37	1	.WAV file	0x00-0xFF
	0x38	2	.BMP file	0x0000-0xFFFF
	0x3A	6	Reserved	0x00
SD encryption	0x40	2	SD_Encrypt_En	0x5AA5=enable SD encryption once. 0x5AAA=disable SD encryption. Folder name returns to DWIN_SET. The encrypted setting is saved in Flash, and will not be clear.
	0x42	1	Length of Folder name	0x01-0x08
	0x43	8	Folder name	8 ASCII characters at most (only 0-9, a-z, A-Z, and -, _). If folder name include invalid characters, default DWIN_SET will be used.
	0x4B	5	Reserved	0x00
	0x50	32	Decode key	
Undefined	0x70	16	Reserved	0x00

Attention：part of green background must be configured.

Display Configuration reference:

Resolution	T5UID3.CFG display Configuration（HEX format）													
	0x12	0x13	0x14	0x15	0x16	0x17	0x18	0x19	0x1A	0x1B	0x1C	0x1D	0x1E	0x1F
1024*600	01	0A	A0	88	00	04	00	00	18	06	1D	02	58	03
1024*768	00	09	20	40	00	04	00	00	20	04	08	03	00	04
1280*720	00	08	10	1C	00	05	00	00	10	08	20	02	D0	20
1364*768 (1366*768)	01	07	40	40	01	05	54	01	40	06	10	03	00	10

Revision Record

Date	Content	Software Version
2017.09.25	Publishing at the first time.	V1.0
2017.10.13	Add ASCII input function.	V1.0
2017.11.10	Add sensitivity modification of capacitive touch screen.	V1.3
2017.12.08	Support 256 control/ page. Support icon resolution over 255*255. Add drawing instruction.	V1.4
2018.02.28	Add choose between audio player and buzzer. ADD Chinese characters input (GBK code) via TP. Add dynamic curve display.	V1.5
2018.03.10	Add sliding (gesture) page switch, and auto-upload page ID after switching. Add touch control interface for on\off\read\edit. Add brightness adjustment of selected area, this function can be used to highlight or fade the area	V1.6
2018.04.11	Add UART2 CRC checker. Add SD interface download file count and check. Add modification of DWIN_SET folder name and encryption of entire program. Add icon animation speed adjustment. Add touch simulation (0xD4) for process control and keyboard UI operation.	V2.0

If there is any question when using this file or DWIN product, or willing to know more about DWIN product news, feel free to contact us:

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