

1 Overview

T5UID1 is DGUS II software platform based on T5 CPU, it is design for low resolution UI application.

Features:

- (1) Dual core T5 CPU, GUI core and OS core both run at 250MHz and power consumption is extremely low.
- (2) 128Mbytes NAND Flash, 64Mbytes for picture memory, which can store 250 pictures of 480*272 resolution (full screen).
- (3) Font memory is 64Mbytes, font file and audio file share the back half (32 Mbytes) of Font Space.
- (4) 256×2.048 seconds 32KHz 16bit WAV audio player.
- (5) 320Kbytes Nor Flash for user database.
- (6) 128Kbytes variables space.
- (7) Support upgrade of font, audio, icon and other software.
- (8) Support JPEG image decompression and upgrade.
- (9) 255 display variables per user interface at most.
- (10) Support standard T5 DWIN OS platform and hardware customization. Interface of 20 IO, 6 UART, several AD and PWM can be expanded on hardware.
- (11) 40mS DGUS operating cycle, user interface effect is extremely fluent.
- (12) Display variables can be turned on/off or modified to realize complicated display effect.
- (13) Touch controls can be turned on/off or modified to realize complicated touch effect.
- (14) 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.
- (15) 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. Support superposition of background and transparency set. |
| 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 superposition of background and transparency set. 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. Support superposition of background and transparency set. |
| 4 | 0x03 | Word Art | 1/2/4 | Use word art icon to display data. Support superposition of background and transparency set |
| 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. The transparency of popup keyboard can be set. |
| 02 | 01 | Popup Window | 1 | Touch to active a popup window, return menu item key code of the window. The transparency of popup window can be set. |
| 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 32Kbytes.
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 0xA B | 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 0xA B | 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 <i>DWIN OS development guide based on T5</i> 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 an 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 stands for GUI version, D0 stands for 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-AD3 Instantaneous value | 4 | Instantaneous value of AD0-AD3, 1 word per AD. Voltage=AD value*4800/65532 mV. Hardware support is needed. |
| 0x36 | AD compute update mark | 1 | D0=0x5A means temperature data and AD0-AD7 compute data is updated. Clear OS. Hardware support is needed. |
| 0x37 | T_Core | 1 | CPU core temperature, temperature=T_Core*240/929. Unit: 0.1°C (+/-0.1°C). |
| 0x38 | AD0-AD7 compute value | 16 | 16-bit AD compute value of AD0-AD7, reference voltage is 4800mV. 2 words for each AD channel, high word is average value (DC component), low word is root mean square value (AC component). Sample rate is 5 KSPS, compute based on 256 sample data. |
| 0x48 | IRDA_Data | 4 | Decode data of IRDA interface, need IRDA hardware. D7: 0x5A=IRDA key code is updated, clear after OS read the data. D6: Button mode, 0x01= first press, 0x02=long press D5:2: 4 bytes remoter decode data. D1:D0: Count remote single, 0x0000-0xFFFF (cycle). |
| 0x4C-0x7B | Reserved | 46 | 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 | PWM1_Set | 4 | D7= write 0x5A to enable PWM1 setting once, clear after operation. D6= division factor, D5:D4= PWM1 accuracy, PWM1 carrier frequency =501.35MHz/(division factor*PWM1 accuracy). D3:D0 reserved. |
| 0x8A | PWM2_Set | 4 | Set PWM2. |
| 0x8E | PWM3_Set | 4 | Set PWM3 |
| 0x92 | PWM1_Out | 1 | D1:D0=PWM1 output high level width, 0x0000-PWM1 accuracy. Need hardware support. |
| 0x93 | PWM2_Out | 1 | D1:D0=PWM2 output high level width, 0x0000-PWM2 accuracy. Need hardware support. |
| 0x94 | PWM3_Out | 1 | D1:D0=PWM3 output high level width, 0x0000-PWM3 accuracy. Need hardware support. |
| 0x95 | PWMV1_Out | 1 | D1:D0=PWMV1 output ratio, 0x0000-0x3E8, output is synchronous with 50Hz pin input pulse. Need hardware support. |
| 0x96 | PWMV2_Out | 1 | D1:D0=PWMV2 output ratio, 0x0000-0x3E8, output is synchronous with 50Hz pin input pulse. Need hardware support. |
| 0x97-0x9B | Reserved | 5 | 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 | <p>D7: 0x5A = enable once writing data in SRAM to picture buffer.</p> <p>D6:D5: Starting address of SRAM, must be even.</p> <p>D4:D3: Data length, unit: word. Must be even.</p> <p>D2:D1:D0: Picture buffer address, 0x000000-0x0257FF, 150Kwords.</p> |
| 0xA6 | JPEG_Download | 4 | <p>D7: 0x5A = enable JPEG picture/icon download operation once, clear after CPU operation.</p> <p>D6: download mode</p> <p> 0x01=Display JPEG picture on current page. (it will be covered when switch page).</p> <p> 0x02=Save JPEG picture to picture memory. (Operating backstage).</p> <p>D5:D4: starting address of SRAM to save JPEG file, must be even. 64Kbytes per JPEG file at most.</p> <p>D3:D0:</p> <p> 0x01 mode: D3:D2= top left corner coordinate of picture displayed on background.</p> <p> 0x02 mode: D3:D2= picture ID, 0x0000-0x00F0.</p> <p>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.)</p> |
| 0xAA | Nand Flash_RW_CMD | 6 | <p>D11: 0x5A= enable once read/write font library (64Mbytes) operation, clear after operation.</p> <p>D10: operation mode, 0x01= read font library, 0x02=update font library.</p> <p>When D10=0x01</p> <p>D9: font ID, 0x40-0x7F, 256Kwords per font, 16Mbytes at most.</p> <p>D8:D6: starting address in font, unit: word. 0x00 00 00-0x01 FF FF.</p> <p>D5:D4: starting address of SRAM to write data, must be even.</p> <p>D3:D2: data length to read, unit: word. Must be even.</p> <p>D1:D0: undefined, write 0x00.</p> <p>When D10=0x02</p> <p>Update font file (font library, icon, audio), 32Kbytes once.</p> <p>D9:D8 address of 32Kbytes font file, 0x0000-0x07FF, refer to the entire 64Mbytes font memory.</p> <p>D7:D6: starting address of SRAM to save updating data, must be even.</p> <p>D5:D4: fixed 0x0001.</p> <p>D3:D0: undefined, write 0x00.</p> |
| 0xB0 | Touch Control interface | 36 | <p>0xB0: 0x5AA5= enable accessing touch control interface once. Clear after CPU operation.</p> <p>0xB1: Page ID of touch control.</p> <p>0xB2: High byte: touch control ID (set in DGUS II development software), 0x00-0xFF; Low byte: touch control code, 0x00-0x7F.</p> <p>0xB3: Access mode</p> <p>0xB4-0xD3: data to modify of mode 0x02, 0x03.</p> <p>Mode 0x0000: turn off this touch control.</p> <p>Mode 0x0001: turn on this touch control.</p> <p>Mode 0x0002: Read this touch control and write it to SRAM that 0xB4 pointing to.</p> <p>Mode 0x0003: update current touch control with data that 0xB4 pointing to, the format and data length must be the same.</p> |
| 0xD4 | Simulate touch panel operation | 4 | <p>0xD4: 0x5AA5=enable the operation once, clear after operation.</p> <p>0xD5: press mode. 0x0001=press, 0x0002=release, 0x0003=keep pressing, 0x0004=touch (press+release)</p> <p>0xD6: X coordinate of press position.</p> |



| | | | |
|--------------------|-------------------------|-----|---|
| | | | 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. |
| 0x100-0x2FF | Reserved | 512 | |
| 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 | T5UID1*.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 to 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 | T5UID1*.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

T5UID1.CFG is hardware configuration file for T5UID1 platform. T5UID1 is binary, it can be edit by UltraEdit.

| Type | Address | Length | Definition | Description |
|---------------------------------|---------|--------|---|---|
| Identification Code | 0x00 | 4 | 0x54 0x35 0x44 0x31 | 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, write 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. |
| Undefined | 0x2A | 2 | Reserved | Write 0x00. |
| 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 | 17 | Reserved | 0x00 |

Attention: part of green background must be configured.



Display Configuration reference:

| Size_Resolution | T5UID1.CFG display Configuration (HEX format) | | | | | | | | | | | | | |
|---------------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 0x12 | 0x13 | 0x14 | 0x15 | 0x16 | 0x17 | 0x18 | 0x19 | 0x1A | 0x1B | 0x1C | 0x1D | 0x1E | 0x1F |
| 2.4_240*320 | 00 | 50 | 0A | 14 | 00 | F0 | 0A | 02 | 02 | 01 | 40 | 02 | 05 | 00 |
| 2.8_240*320A | 00 | 50 | 0A | 14 | 00 | F0 | 0A | 02 | 02 | 01 | 40 | 02 | 03 | 00 |
| 2.8*240*320B | 00 | 50 | 10 | 20 | 00 | F0 | 20 | 02 | 0E | 01 | 40 | 08 | 01 | 00 |
| 3.5_320*240 | 00 | 46 | 11 | 14 | 01 | 40 | 40 | 03 | 0F | 00 | F0 | 10 | 02 | 00 |
| 3.5_320*480 | 00 | 2C | 0A | 04 | 01 | 40 | 0A | 02 | 02 | 01 | E0 | 02 | 04 | 00 |
| 4.3*480*272 | 00 | 30 | 29 | 02 | 01 | E0 | 02 | 0A | 02 | 01 | 10 | 02 | 00 | 00 |
| 5.0*480*272 | 00 | 30 | 29 | 02 | 01 | E0 | 02 | 0A | 02 | 01 | 10 | 02 | 00 | 00 |



Revision Record

| Date | Content | Software Version |
|------------|--|------------------|
| 2017.06.13 | Publishing at the first time. | V1.0 |
| 2017.09.02 | Add UART2 data auto-update by touch. User need to edit T5UID1.CFG to 0x0008.7=1, touch control code is 0xFE**, and update T5 OS to V1.2 or above. | V1.1 |
| 2017.09.23 | Add real-time update of JPEG icon. | V1.1 |
| 2017.10.13 | Add ASCII input function. | V1.2 |
| 2017.12.01 | Add sensitivity modification of capacitive touch screen. Set at 0x27-0x29 in T5UID1.CFG | V1.3 |
| 2017.12.18 | 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 |
| 2018.04.08 | 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 background transparency set of all icon. Add icon animation speed adjustment. Add transparency set of popup area. Add touch simulation (0xD4) for process control and keyboard UI operation. | V2.0 |
| 2018.05.10 | Add secondary hardware watch dog (WDT) choice. Add real-time update of display content. | V2.1 |

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:

Service call: 400 018 9008

E-mail: dwinhmi@dwin.com.cn