DWIN Android LCD Screen Development Guide

(31 Series & 32 Series)

Contents

Chapter 1 Product Introduction

1.1 OS Version

linux 4.19 kernel, Android 11 version.

1.2 Development Method

Java development or installing and using existing Android applications (APKs)

1.3 Shipping List

- Standard screen*1
- Antenna*1

1.4 Optional Accessories

You can contact the DWIN sales to purchase the following accessories:

- Camera: support DWIN-defined mipi interface suitable for horizontal screen display, 5mp
  support DWIN-defined mipi interface suitable for vertical display, 5mp
- Speaker: 8Ω2W, cable length 320mm, front-facing sound output
  8Ω0.8W, cable length 180mm, side-facing sound output
- 4G module: China/India region version
  European region version
  Australian region version
- Power adapter: T050-32ZJB
  For use with DMG80480T050_32/40 only

1.5 Accessories Recommended for Self-Preparation

- 12V 2A power supply
- USB TYPE-A to TYPE-C or Micro-USB adapter cable (according to the type of USB debugging interface indicated in the device specification)
- USB flash drive
- SD card (Max 64GB)
- Network cable
- The adapter board and related wires for connecting your serial port or power supply device
- Microphone (with socket 2PIN_1.25)
- USB driverless camera

Chapter 2 Tool Introduction

2.1 The Tools Provided

- For development, refer to the DEMO source code DWAndroidLibraryDemo: Examples of calling common interfaces such as serial ports, GPIO, and CAN.
- Source code of the hardware testing tool APP: DWINTEST
- Burning tools: SD card burning tool: SDDiskTool_V1.69

  USB firmware burning tool: RKDevTool_v2.93 (There is a pre-installed ADB tool in the bin folder.)
- USB driver tool: DriverAssitant_v5.1.1
- Tool for modifying the boot animation and LOGO: FWFactoryTool_RK3566_v2.4

2.2 Tools Which Might Require Self-Downloading

- Android Studio (You can download it at http://developer.android.google.cn/studio/archive)

Chapter 3 Hardware Wiring

For the definition of the serial port interface, please refer to the product specification sheet, as shown in the following figure:

Peripherals and Interfaces

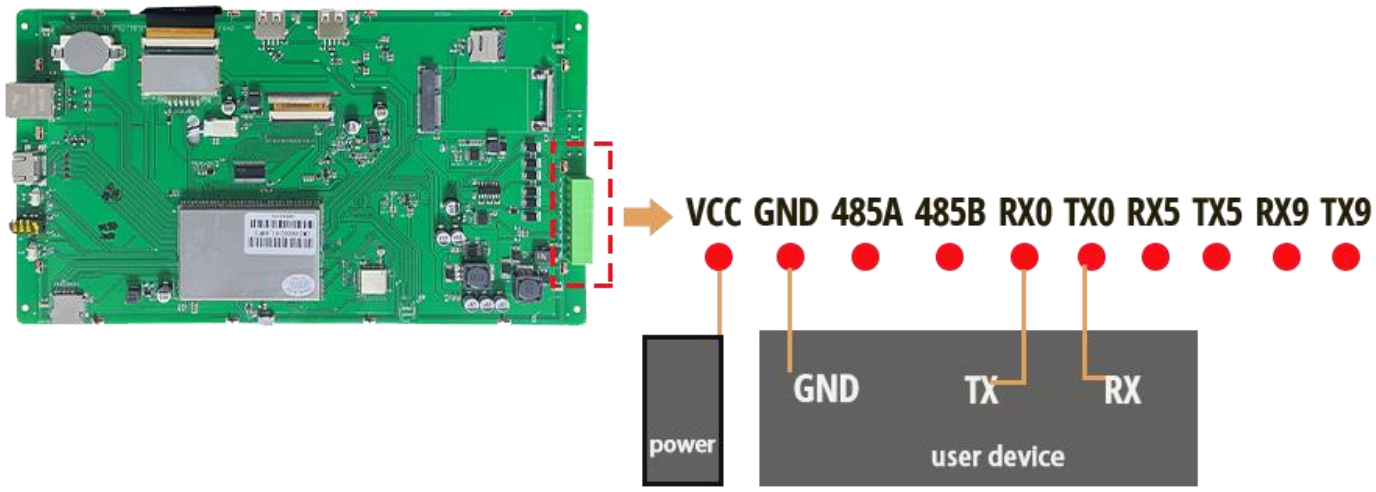
Properties	Parameters	Description
COM	2-way RS232	UART5 & UART9
	1-way RS485	UART8
	1-way TTL/COMS	UART0

3.1 Serial Port Parameter Configuration

GND: Ground, connect to GND pin of the user device.

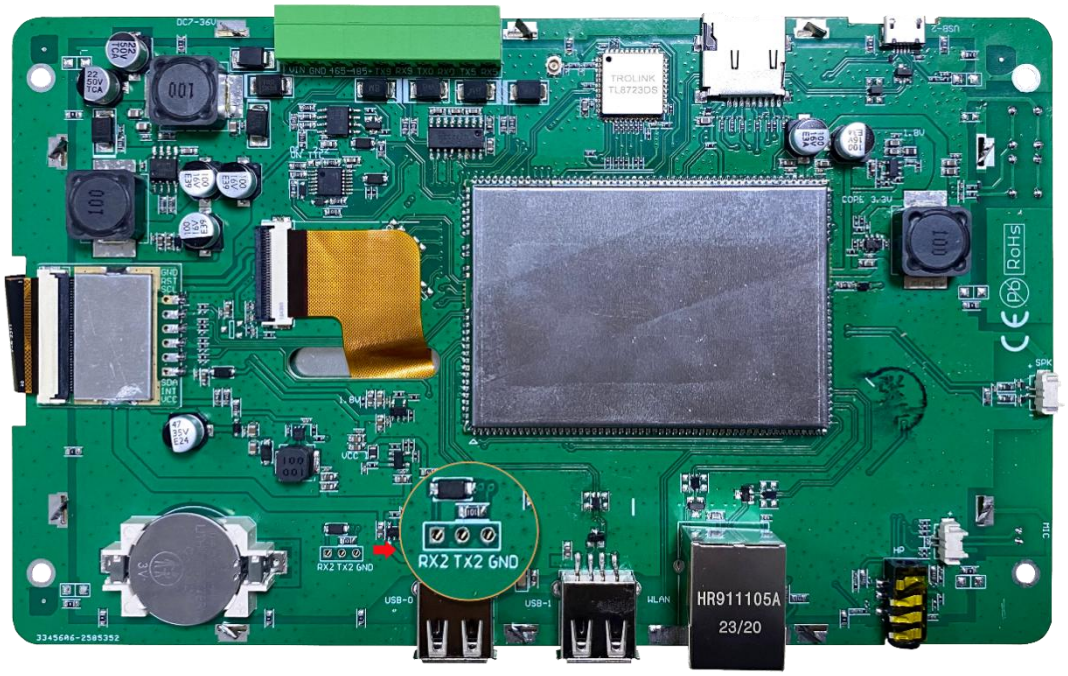
TXD: Transmit, connect to RX pin of the user device.

RXD: Receive, connect to TX pin of the user device.



3.2 Serial Parameter Settings

The baud rate of Serial Port 2 is 1500000, and the baud rate of the remaining serial ports is 115200.



3.3 Usage Precautions

- The standard firmware does not support the simultaneous use of keyboard input and barcode scanners when the android screen is connected to barcode scanner via USB. To use them simultaneously, please contact our sales for a customized firmware.
- To set a static IP address, please connect the device directly to the router using an Ethernet cable. Connecting the device to a computer for setup might lead to configuration failures.
- The Ethernet-related pages follow the official settings of RK3566 and are set to English by default. They will not change with the system language. If you need them to be displayed in Chinese or other languages, you can contact the sales for customized firmware.

Chapter 4 Firmware Burning

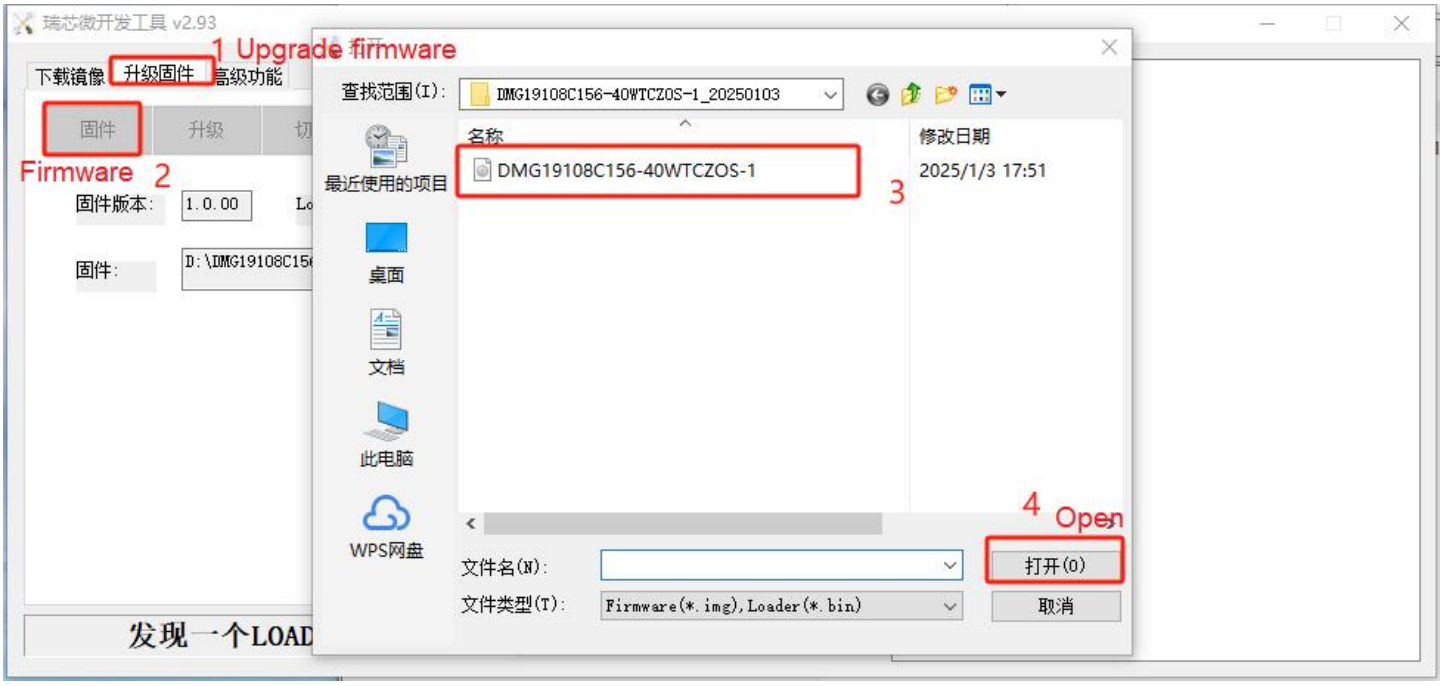
4.1 Firmware Burning via SD Card

- When upgrading the firmware using an SD card, you need to write the firmware to the SD card using a tool on a computer. Currently, this operation can only be completed on a Windows operating system.
- Insert the card reader with the loaded SD card into the USB port of your computer. Open SDDiskTool_v1.69, and first select this card reader. Check the "Firmware Upgrade" box, then click "Select Firmware" to find the firmware to be programmed.

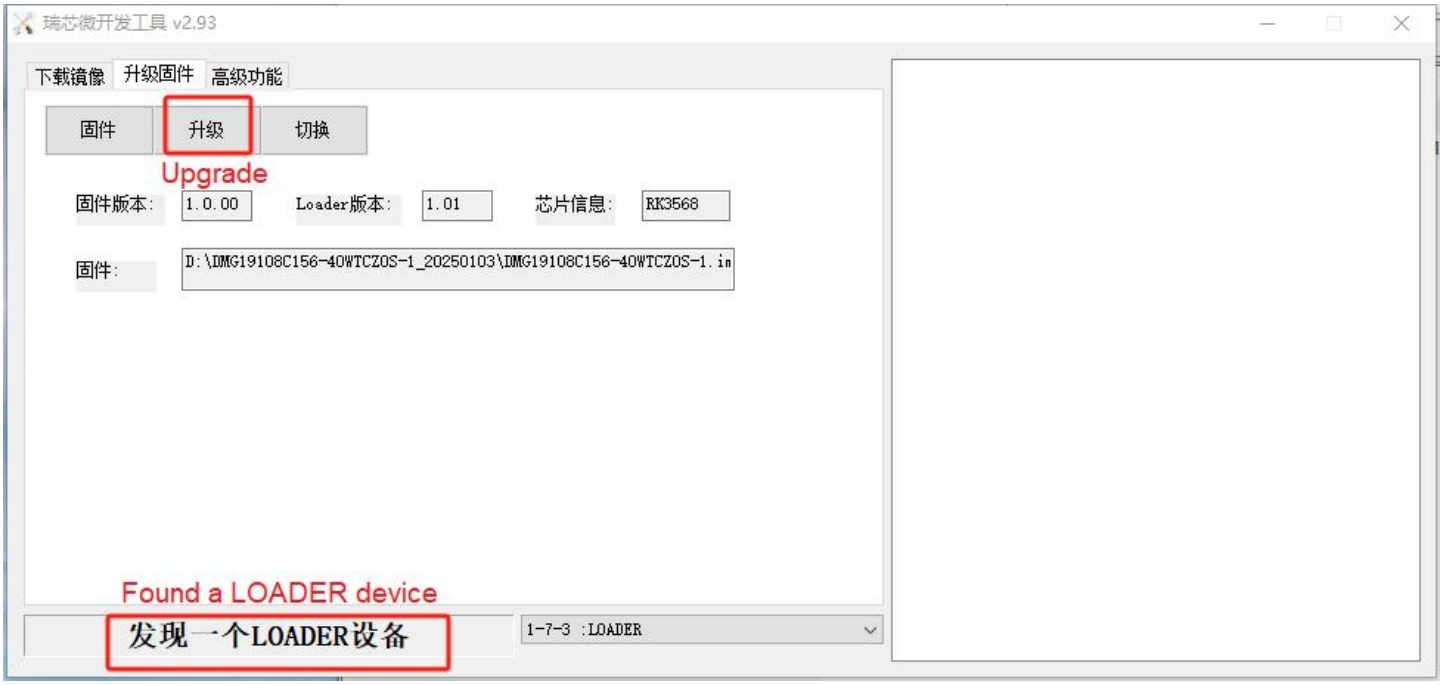
- After clicking "Create", just wait until the progress is completed.
- Remove the SD card and insert it into the SD card slot of the device. Power on the device with 12V DC. The screen will automatically start the upgrade. After the upgrade is completed, remove the SD card. The screen will automatically restart, indicating that the process is finished.

4.2 Firmware Burning via USB

- If it's the first time for the computer used for programming to perform the programming operation, you need to install the driver. Open the "DriverAssitant_v5.1.1" folder of the USB programming driver tool we provided, click on "DriverInstall.exe", and then complete the installation according to the prompts.
- Open RKDevTool_v2.93, click on the second tab "Upgrade Firmware", then click on "Firmware" and upload the img firmware package that needs to be programmed.



- Next, first use a USB cable to connect the device to the computer, and then power on the device with 12V DC. At this time, the RKDevTool will display the status "Found an ADB device".
- Click the switching function of the tool and wait until the update status of the tool shows "Found a LOADER device". At this time, you can click "Upgrade" and wait for the progress to be completed. After the burning process is finished, the device will restart.


瑞芯微开发工具 v2.93
下载镜像
升级固件
高级功能
固件
升级
切换
Upgrade
固件版本:
1.0.00
Loader版本:
1.01
芯片信息:
RK3568
固件:
D:\DMG19108C156-4OWTCZOS-1_20250103\DMG19108C156-4OWTCZOS-1.im
Found a LOADER device
发现一个LOADER设备
1-7-3 :LOADER

Chapter 5 Development Examples

5.1 Common Interface Invocation Examples

The following development can refer to the DEMO named DWAndroidLibraryDemo. Please contact the salaes or technical staff to obtain it.

5.1.1 Boot LOGO

The boot logos are divided into ubootlogo and kernellogo. Generally, they are replaced simultaneously. The image format is BMP. Please note the following two points:

- When replacing and compiling the boot logo in the system source code or replacing it using API interface, the image resolution should not exceed the screen resolution, and it should be controlled within 2M as much as possible.
- When using FWFactoryTool to modify the firmware package to replace the boot LOGO, the image resolution should not exceed 600*600 pixels, and the quality should be less than 1MB.

```
    * @param path  Logo path
    * @return  Return value of interface calling. Refer to DWErrorCode
    */
   int setBootLogo (String path);
```

Note: Re-burning firmware or restoring factory settings will not delete the logo. If you need to delete the logo during burning, please use the "erase" function of the burning tool first.

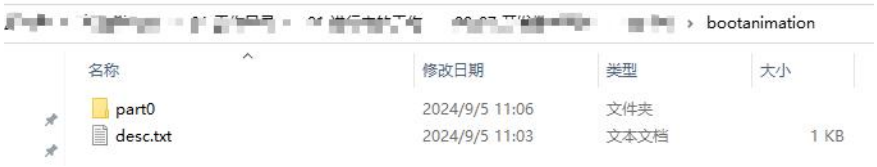
```
   /**
    * Delete boot logo
    *
    * @return  Return value of interface calling. Refer to DWErrorCode
    */
   int deleteBootLogo ();
```

5.1.2 Boot Animation (Multiple Images)

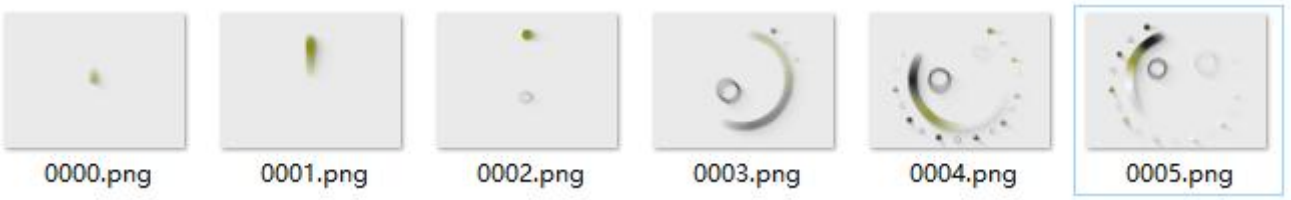
```
    * @param path  Boot animation path
    * @return  Return value of interface calling. Refer to DWErrorCode
    */
   int setBootAnimation (String path);
```

5.1.2.1 Create Bootanimation.zip

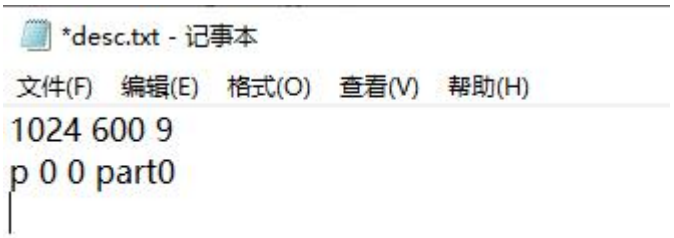
Bootanimation.zip contains part0 folder and desc.txt, or also can contain 2 folders as part0, part1, here we only take part0 as example.



Create a new folder and name it as part0, put the animation pictures in it (.png format), naming pictures with 000.png, 0001.png, 0002.png and so on. Please note that the image resolution should not exceed the screen resolution, and the memory for a single image should be controlled within 2M. If the images are too large or too many, it may cause the startup animation to be unsmoothly or freezed.



Create a new txt document and name it as desic.txt, Manually input the following content. (Please note that after the last line, enter a blank line and save the file. Otherwise, the device will not be able to parse it.)

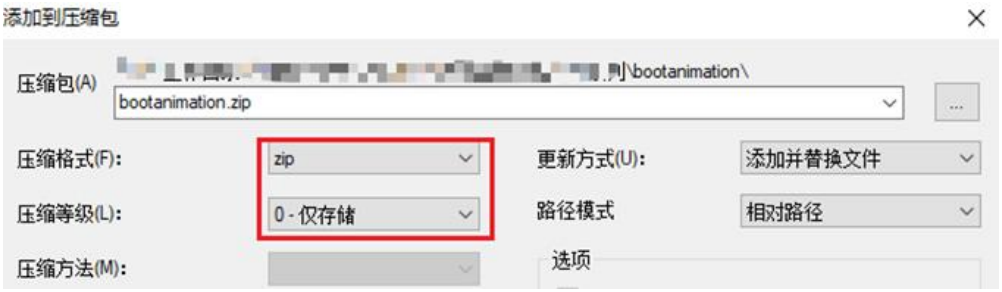


First line: 1024 600 9: 1024 and 600 means resolution is 1024*600p, 9 represent display 9 pictures every second;

Second line: pis a fixed starting point, The first number represent repeated times, 0 is infinite playback (If it is 3, it means it will play three times); The second 0 represents the interval time/frame rate between the two frames; The last part0 represents the animation folder.

Select both part0 and desc.txt simultaneously. Right-click the mouse and choose "Add to compressed file". Select "zip" as the compressed file format and "Store" as the compression method. After the

compression is completed, check that the compressed file does not contain the bootanimation folder.



5.1.2.2 Delete Bootanimation

Note: Re-burning firmware or restoring factory settings will not delete the boot animation. If you need to delete the bootanimaton during burning, please use the "erase" function of the burning tool first.

```
/**
 * Delete bootanimation (multiple pictures)
 *
 * @return Return value of interface calling. Refer to DWErrorCode
 */
int deleteBootAnimation ();
```

5.1.3 Boot Video

Boot video format: Modify the suffix of the video file to.ts, and the duration can vary from a dozen seconds.

If both the boot animation (multiple images) and the boot video exist simultaneously, the system will display the boot video by default.

```
 * @param path  Startup video path
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int setBootVideo (String path);
```

Delete the boot video as follows:

```
    * Delete the startup video
     *
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int deleteBootVideo ();
```

5.1.4 Receiving and Monitoring of Boot Broadcast

Regarding boot monitoring, the broadcast monitoring will make APP start automatically.

```
    public class SelfStartReceiver extends BroadcastReceiver {

    @Override

    public void onReceive(Context context, Intent intent) {

        //Android  A boot broadcast will be sent when the device is powered on: "android.intent.action.BOOT_COMPLETED"

        if (Intent.ACTION_BOOT_COMPLETED.equals(intent.getAction())) {

            Log.d("SelfStartReceiver", "The boot broadcast has been detected");



            Intent i = new Intent(context, MainActivity.class);

            i.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK);

            context.startActivity(i);

        }

    }

}
```

Please refer to the following code for broadcast settings and permission configurations:

MainActivity.java | AndroidManifest.xml | SelfStartReceiver.java

```
<?xml version="1.0" encoding="utf-8"?>
<manifest xmlns:android="http://schemas.android.com/apk/res/android"
    package="com.dwin.selfstartdemo">

    <uses-permission android:name="android.permission.RECEIVE_BOOT_COMPLETED" />
    <uses-permission android:name="android.permission.SYSTEM_ALERT_WINDOW"/>

    <application
        android:allowBackup="true"
        android:icon="@mipmap/ic_launcher"
        android:label="@string/app_name"
        android:roundIcon="@mipmap/ic_launcher_round"
        android:supportsRtl="true"
        android:theme="@style/Theme.SelfStartDemo">
        <activity android:name=".MainActivity">
            <intent-filter>
                <action android:name="android.intent.action.MAIN" />

                <category android:name="android.intent.category.LAUNCHER" />
            </intent-filter>
        </activity>

        <receiver
            android:name=".SelfStartReceiver"
            android:enabled="true"
            android:exported="true">
            <intent-filter android:priority="100">
                <action android:name="android.intent.action.BOOT_COMPLETED" />
            </intent-filter>
        </receiver>
    </application>

</manifest>
```

5.1.5 Top Status Bar

It can display and hide the top status bar, and read the status of the top status bar.

```
/**
 * Display the top status bar
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int showStatusBar ();


/**
```

```
 * Hide the top status bar
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int hideStatusBar ();

/**
 * Read the status of the top status bar, display or hide
 *
 * @return Return value of interface calling.1: display, 0: hide
 */
int isStatusBarShow ();
```

5.1.6 Bottom Navigation Bar

It can display and hide the bottom navigation bar, read the status of the bottom navigation bar, display or hide the screenshot button within it, and read the status of the screenshot button.

```
/**
* Display bottom navigation bar
*
* @return  Return value of interface calling. Refer to DWErrorCode
*/
int showNavigationBar ();

/**
* Hide bottom navigation bar
*
* @return  Return value of interface calling. Refer to DWErrorCode
*/
int hideNavigationBar ();

/**
* read the status of the bottom navigation bar, display or hide
*
* @return  Return value of interface calling.1: display, 0: hide
*/
int isNavigationBarShow ();

/**
* Display the screenshot button in the bottom navigation bar
*
* @return  Return value of interface calling. Refer to DWErrorCode
*/
int showScreenShotButton ();
```

```
/**
* Hide the screenshot button in the bottom navigation bar
*
* @return  Return value of interface calling. Refer to DWErrorCode
/**
int hideScreenShotButton ();

/**
 * Read the status of the bottom navigation bar, display or hide
 *
 * @return  Return value of interface calling.1: display, 0: hide
 */
    int isScreenShotShow ();
```

5.1.7 Top Dropdown Box

It can display and hide the top drop-down menu, and read the status of the top drop-down menu.

```
/**
 * Display the top dropdown box
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int showDropDownMenu ();

/**
 * Hide the top dropdown box
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int hideDropDownMenu ();

/**
 * Read the status of top dropdown box, display or hide
 *
 * @return  Return value of interface calling. 1: display, 0: hide
 */
int isDropDownMenuShow ();
```

5.1.8 Silent Installation of APK

```
    /**
     * Install APK silently
     *
```

```
     * @param path  APK path
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int installApp (String path);
```

5.1.9 Reading External Storage Path

```
    /**
     * Read external storage path
     *
     * @return  Return path collection
     */
    ArrayList<StorageBean> readExternalStoragePath ();
```

5.1.10 System Language Settings

```
    /**
     * Set system language
     *
     * @param locale  Language format Locale.SIMPLIFIED_CHINESE, Locale.ENGLISH etc.
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setLanguage (Locale locale);
```

5.1.11 System Time Settings

```
    /**
     * Set system time
     *
     * @param hour  Hour
     * @param minute  Minute
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setTime (int hour, int minute);


    /**
     * Set system time
     *
     * @param year  Year
     * @param month  Month
     * @param day  Day
     * @param hour  Hour
     * @param minute  Minute
     * @return  Return value of interface calling. Refer to DWErrorCode
```

```
     */
    int setTime (int year, int month, int day, int hour, int minute);

    /**
     * Enable automatic synchronization of time
     *
     * @param auto  1: Automatically synchronizing time, 0: Not automatically synchronizing time
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setTimeAuto (int auto);
```

5.1.12 System Date Settings

```
    /**
     * Set system date
     *
     * @param year  Year
     * @param month  Month
     * @param day  Day
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setDate (int year, int month, int day);
```

5.1.13 Time Zone and Time Settings

Set time zone, enable automatic time zone synchronization, check if automatic synchronization function is enabled, set 12 or 24-hour clock.

```
/**
 * Set time zone
 *
 * @param timeZone  Time Zone Name, such as Asia/Shanghai
 */
void setTimeZone (String timeZone);

/**
 * Enable automatic time zone synchronization
 *
 * @param auto  1: Automatically synchronize time zones, 0: Not automatically synchronize time zones
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
   int setTimeZoneAuto (int auto);
```

```
/**
 * Check if automatic time zone synchronization is enabled
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int checkTimeZoneAuto ();

/**
 * Set "12" or "24" hour clock
 *
 * @param value  "12" or "24"
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int setTime_12_24 (String value);
```

5.1.14 Ethernet MATIC Network Parameters and DHCP Settings

```
/**
 * Set ethernet MATIC network parameters
 *
 * @param address  IP
 * @param mask  Subnet mask code
 * @param gateway  Gateway
 * @param dns1  DNS1
 * @param dns2  DNS2
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int setEthernetStaticConfig (String address, String mask, String gateway, String dns1, String dns2);

/**
 * Set Ethernet DHCP
 *
 * @return  Return value of interface calling. Refer to DWErrorCode
 */
int setEthernetDynamicConfig ();
```

5.1.15 Wi-Fi STATIC Network Parameters and DHCP Settings

```
/**
 * Set WiFi STATIC parameters
 *
 * @param address  IP
 * @param mask  Mask
 * @param gateway  Gateway
```

```
     * @param dns1  DNS1
     * @param dns2  DNS2
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setWiFiStaticConfig (String address, String mask, String gateway, String dns1, String dns2);

    /**
     * Set WiFi DHCP
     *
     * @return  Return value of interface calling. Refer to DWErrorCode
     */
    int setWiFiDynamicConfig ();
```

5.1.16 Retrieval of Get IP, Gateway, DNS, Subnet Mask

```
    /**
     * Get IP
     *
     * @return  Return to IP collection
     */
    ArrayList<String> getNetWorkIP ();

    /**
     * Get gateway
     *
      * @return  Return to gateway collection
    */
    ArrayList<String> getNetWorkGateway ();

    /**
     * Get DNS
     *
     * @return  Return to DNScollection
     */
    ArrayList<String> getNetWorkDns ();

    /**
     * Get subnet Mask
     *
     * @return Return to subnet Mask collection
     */
    ArrayList<String> getNetworkMask ();
```

5.1.17 System Reboot

```
/**
 * Reboot System
 *
 * @return Return value of interface calling. Refer to DWErrorCode
 */
    int rebootSystem ();
```

5.1.18 Interface Invocation Return Value

Interface invocation return value reference: DWErrorCode, only for Android SDK.

```
/**
 * Interface calling return code
 */
public class DWErrorCode {

/**
 * Succeed
 */
public final static int DW_COMMON_SUCCESS = 0;

/**
 * unknown error
 */
public final static int DW_COMMON_ERROR_UNKNOUN = -1;

/**
 * Android SDK do not support it（perhaps due to firmware mismatch）
 */
public final static int DW_COMMON_ERROR_SDK_NOT_SUPPORT = -2;

/**
 * Settings.Global.putXXX Writing value failed
 */
public final static int DW_COMMON_ERROR_SET_SETTINGS_GLOBAL = -3;

/**
 * Settings.Global.getXXX Reading value failed
 */
public final static int DW_COMMON_ERROR_GET_SETTINGS_GLOBAL = -4;

/**
 * Settings.System.putXXX Writing value failed
 */
```

```
    public final static int DW_COMMON_ERROR_SET_SETTINGS_SYSTEM = -5;

    /**
     * Settings.System.getXXX Reading value failed
     */
    public final static int DW_COMMON_ERROR_GET_SETTINGS_SYSTEM = -6;

    /**
     * Path is empty or null
     */
    public final static int DW_COMMON_ERROR_PATH_INVALID = -7;

    /**
     * Path is not exist
     */
    public final static int DW_COMMON_ERROR_PATH_NOT_EXIST = -8;

    /**
     * Copy file error
     */
    public final static int DW_COMMON_ERROR_COPY_FILE = -9;

    /**
     * Deleting file failed
     */
    public final static int DW_COMMON_ERROR_DELETE_FILE = -10;

    /**
     * bootlogo is not a .BMP file
     */
    public final static int DW_BOOT_LOGO_ERROR_NOT_BMP_FILE = -100;

    /**
     * bootanimation is not a .zip or .ts file
     */
    public final static int DW_BOOT_ANIMATION_ERROR_NOT_ZIP_OR_TS_FILE = -101;

    /**
     * the installed file is not an APK file
     */
    public final static int DW_INSTALL_APP_ERROR_NOT_APK_FILE = -200;

    /**
     * installation failed
     */
```

```
    public final static int DW_INSTALL_APP_ERROR = -201;

    /**
     * Failed to read external file
     */
    public final static int DW_EXTERNAL_STORAGE_READ_ERROR = -300;

    /**
     * Failed to set system language
     */
    public final static int DW_LANGUAGE_SET_ERROR = -400;

    /**
     * Failed to set system time or date
     */
    public final static int DW_TIME_OR_DATE_SET_ERROR = -500;

    /**
     * Failed to configure Ethernet STATIC network
     */
    public final static int DW_ETHERNET_STATIC_SET_ERROR = -600;

    /**
     * Failed to configure Ethernet DHCP network
     */
    public final static int DW_ETHERNET_DYNAMIC_SET_ERROR = -601;

    /**
     * Failed to configure WiFi STATIC network
     */
    public final static int DW_WIFI_STATIC_SET_ERROR = -602;

    /**
     * Failed to configure WiFi DHCP network
     */
    public final static int DW_WIFI_DYNAMIC_SET_ERROR = -603;

    /**
     * System restart failed
     */
    public final static int DW_REBOOT_SYSTEM_ERROR = -600;
}
```

5.2 SerialPort

Serial port invocation method: SerialManage.getInstance().xxx, such as SerialManage.getInstance ().init

5.2.1 Serial Port Initialization

```
    /**
     *Serial port initialization
     *
     * @param serialInter Serial callback
     */
        public void init (SerialInter serialInter)
```

5.2.2 Serial Port Opening

```
    /**
     * Open serial port
     *
     * @param devicesPath      Serial port address
     * @param isReadLoop       Whether to continuously monitor the data returned by the serial port
     * @param baudrate         Baud-rate
     * @param dataBits         Data Bits
     * @param stopBits         Stop Bits
     * @param parity           Parity
     * @param readTimePeriod   ReadTimePeriod
     * @return                 Open successfully or not
     */
    public void open (String devicesPath, boolean isReadLoop, int baudrate, int dataBits, int stopBits, int parity, long
readTimePeriod)
```

5.2.3 Send Serial Port Data

```
    /**
     * Send serial port data
     *
     * @param msg Serial port data
     */
        public void send (byte[] msg)
```

5.2.4 Serial Port Closure

```
/**
 * Close serial port
 */
public void close()
```

5.2.5 Resources Release

```
/**
 * Release resources
 */
public void release ()
```

5.2.6 Obtain Supported Serial Ports

```
/**
 * Obtain supported serial ports
 *
 * @return Return to serial port collection

 */
public String[] getDriverList ()
```

5.2.7 Serial Callback

```
    /**
     * Serial callback
     */
    public interface SerialInter {

    /**
     * Connection result callback
     * @param path  Serial port address ( (when multiple serial ports need to be processed uniformly, addresses can be used to distinguish them)
     * @param isSuccess  Connection successful or not
     */
    void connectMsg (String path,boolean isSuccess);

    /**
     * Loop read, callback the data read
     * @param path  Serial port address ( (when multiple serial ports need to be processed uniformly, addresses can be used to distinguish them)
     * @param bytes  Read data
     * @param size  Data Length
     */
    void readData (String path, byte[] bytes, int size);
```

5.3 Gpio

Gpio interface invocation method: Gpio.xxxx, such as Gpio.initGpio

5.3.1 Gpio Initialization

```
    /**
     * Initialize GPIO
     *
     * @param gpioArr  GPIO port that needs to be configured, just a numerical number is enough
     * @param value  0:low, 1:high
     * @param direction  In:input, out:output
     * @param context  Above and follow context
     * @param gpioInitCallBack  Initialize callback interface
     */
    public static void initGpio (int[] gpioArr, int value, String direction, Context context, GpioInitCallBack gpioInitCallBack)
```

5.3.2 Value of GPIO Settings

```
/**
 * Set value of GPIO
 *
 * @param gpio  GPIO port, such as gpio100, value is 100
 * @param value  Set the voltage level, 0: low, 1: high
 * @return  Return value, 0: success, <0:fail
 */
public static native int setGpioValue (int gpio, int value);
```

5.3.3 GPIO Direction Settings

```
/**
 * Set GPIO direction
 *
 * @param gpio  GPIO port, such as gpio100, value is 100
 * @param direction  Set gpiodirection, 0:in; 1:out
 * @return  Return value, 0: success, <0:fail
 */
private static native int setGpioDirection (int gpio, int direction);
```

5.3.4 Read GPIO Direction

```
/**
 * Read GPIO  directio
 *
 * @param gpio  GPIO port, such as gpio100, value is 100
 * @return  Return value GPIO direction (in/out)
*/
private static native int getGpioDirections (int gpio);
```

5.3.5 Read GPIO Value

```
/**
 * Read GPIO value
 *
 * @param gpio  GPIO port, such as gpio100, value is 100
 * @return  Return value
 */
public static native int getGpioValue (int gpio);
```

5.3.6 Initialization CallBack

```
public interface GpioInitCallBack {
/**
 * Initialization callBack method
 *
 * @param success Initialization succeed
 * @param gpio Collection of successfully initialized GPIO ports
 */
 void initState(boolean success, List<Integer> gpio);
}
```

5.4 FAQs

- There is an error when running the DWINAndroidLibraryDemo:

Reason: The latest version of the firmware has not been burned.

Solution: Contact the sales to obtain the new version of the firmware and burn it.

- After the APP is downloaded to the screen, its size does not match that in the code.

Reason: The UI has not been designed according to the screen resolution.

Solution: Design the UI with a 1:1 ratio between px and dp. If the screen density (density) is 160, UI designers and Android engineers can calculate based on the ratio of px:dp = 1:1. If the screen density is not 160, Android engineers need to convert the lengths proportionally according to the actual design drawings.

- Error

Unable to find method "void org.gradle.api.internal.DefaultDomainObjectSet.<init>(java.lang.Class)"

'void org.gradle.api.internal.DefaultDomainObjectSet.<init>(java.lang.Class)'

Gradle's dependency cache may be corrupt (this sometimes occurs after a network connection timeout.)

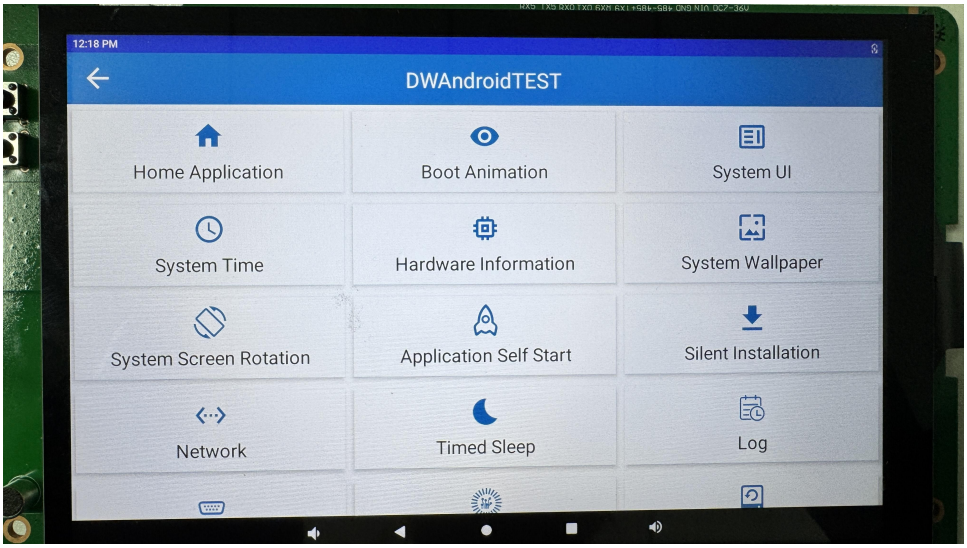
Reason: The development tool and the Gradle version are inconsistent.

Solution: Users can create a new project using their own tools, and then copy the code (such as the source code, lib library, and dependent libraries) to it.

5.5 DWIN Android Test APP

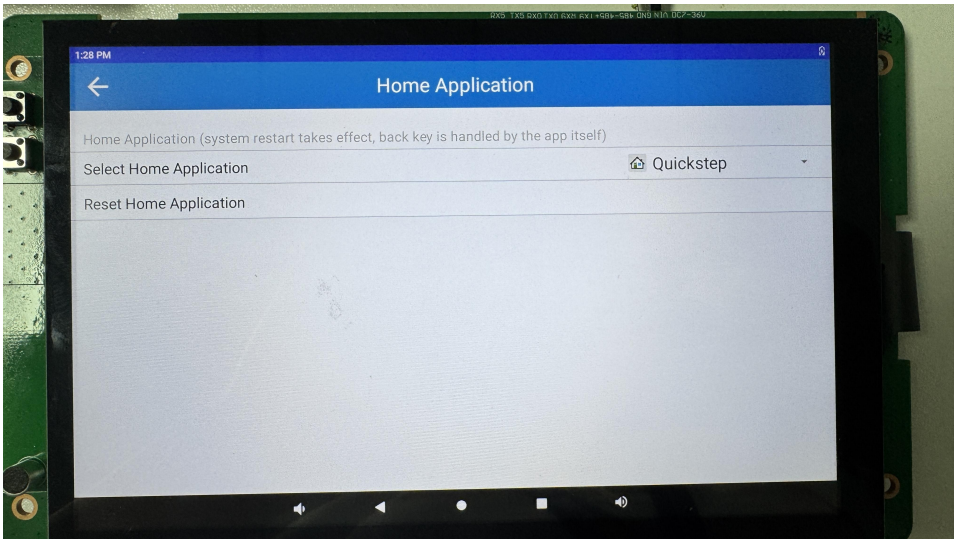
The APP includes 15 functional modules: System Desktop, Boot Animation, System Interface, System Time, Hardware Information, System Wallpaper, System Screen Rotation, App Auto-Start, Silent Installation, Network, Timed Sleep, Log, Serial Port, GPIO, and Factory Reset.

It is applicable to the standard products of the Android screen 32 series. Before use, please ensure that the screen has been upgraded to the firmware version 20250613.



5.5.1 System Desktop

Select the target application from the drop-down box. After setting, the system will restart automatically, and this application will become the default system desktop.



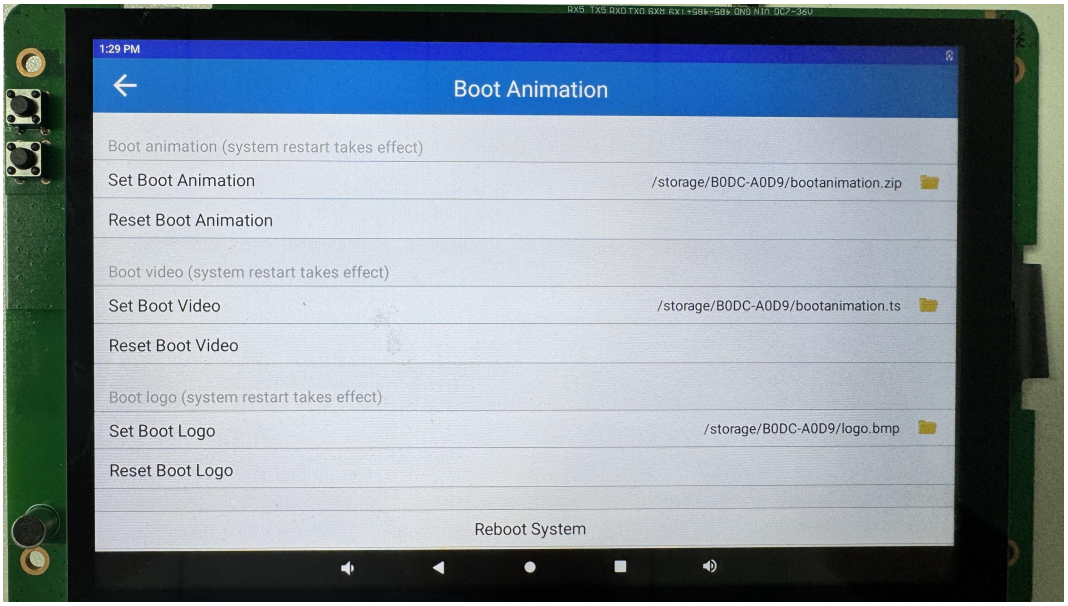
```
    /**
     * Set desktop application
     *
     * @param packageName Package name of the desktop application
     * @param className   Class name of the desktop application
     */
    private boolean setDefaultLauncherImpl(String packageName, String className);
```

5.5.2 Boot Animation

This section includes settings for boot animation, boot video, and boot logo. Among them, only one of the animation and video can be enabled. After setting, a manual restart is required for the changes to take effect.

Production steps:

- Copy the materials (LOGO / animation / video) to the root directory of the SD card.
- Select the target file via the drop-down box in the APP.
- Click the corresponding setting button and confirm.
- Manual restart of application settings.

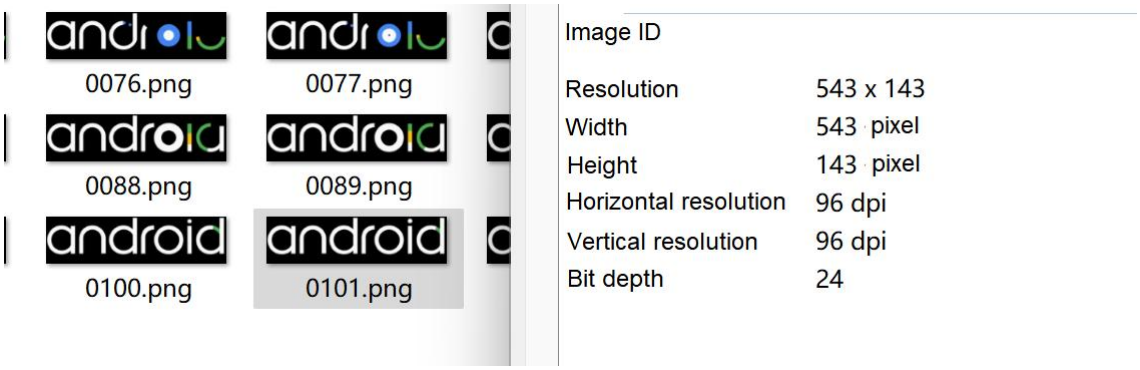


5.5.2.1 Boot Animation Bootanimation.zip

Please refer to Section 5.1.2.1 for production.

Notes:

- Normal boot startup consists of "pictures" + "animation", with the "animation" lasting approximately 15 seconds. It is recommended to control the number of pictures to avoid screen freezing caused by an excessive number.
- The first "0" in the "desc.txt" file cannot be set to any other number; otherwise, it will result in failure to boot.
- The image size can be smaller than the screen resolution. It is recommended to use a pure black background, as shown in the example below.



Set the boot animation as follows:

```
/**
 * Set the boot animation
 *
 * @param path  Animation path
 */
int setBootAnimation(String path);
```

Delete the boot animation as follows:

```
/**
 * Delete the boot animation (multiple images)
 *
 */
```

```
int deleteBootAnimation();
```

5.5.2.2 Production of boot video bootanimation.ts

Create an adaptation file that matches the screen resolution, change the suffix to .ts, and name it bootanimation.ts.

Set the boot video as follows:

```
/**
 * Set the boot video
 * @param path  Video path
 */
int setBootVideo(String path);
```

Delete the boot video as follows:

```
/**
 * Delete the boot video
 */
 int deleteBootVideo();
```

5.5.2.3 Production of boot LOGO

The image format should be .bmp. The image resolution should not exceed the screen resolution, and the file size should be controlled within 2MB as much as possible. Name the image logo.bmp.

Set the boot video as follows:

```
 /**
 * Set the boot logo
 *@param path  Image path
 */
int setBootLogo(String path);
```

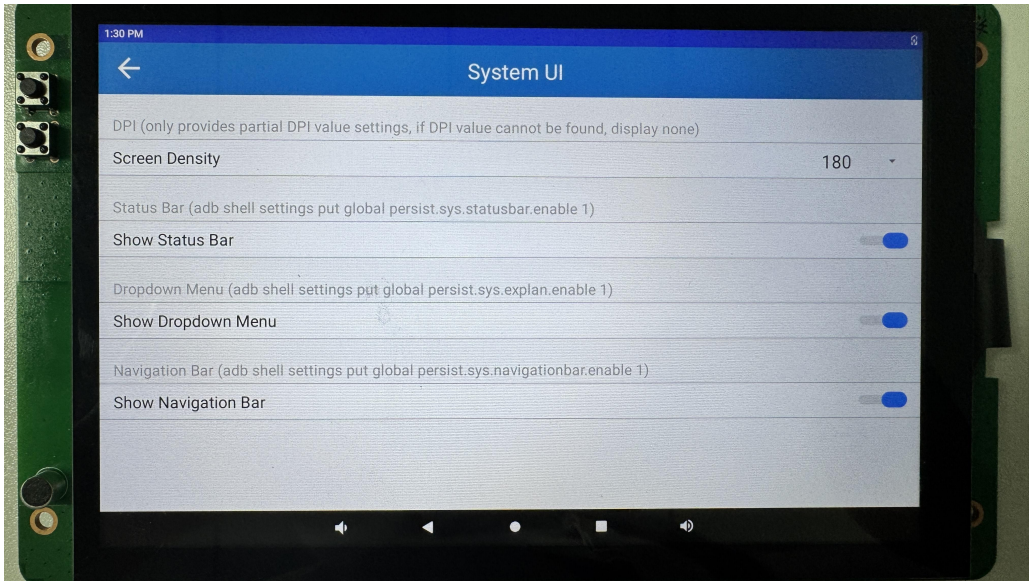
Delete the boot logo as follows:

```
 /**
 * Delete the boot logo
 *
```

```
 */
int deleteBootLogo();
```

5.5.3 System Interface

This section includes DPI (screen density) settings, showing/hiding the status bar, showing/hiding the drop-down box, and showing/hiding the navigation bar.

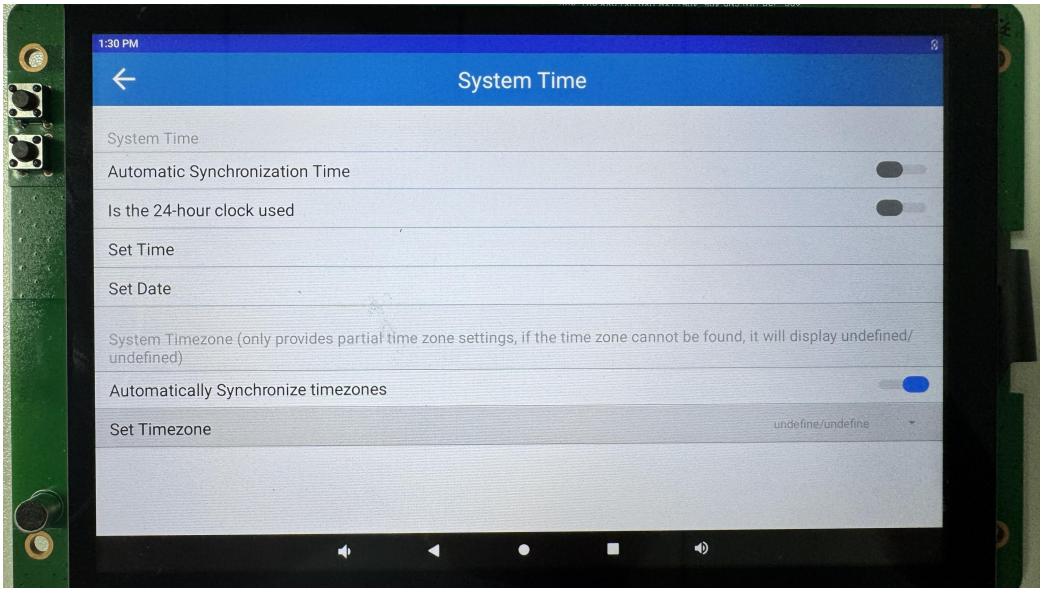



```
/**
 * Set the screen density
 *
 * @param  dpi Screen density
 */
int setSystemDensity(String dpi);


/**
 * Show the top status bar
 *
 */
int showStatusBar();


/**
```

```
    * Hide the top status bar
    *
    */
   int hideStatusBar();


   /**
    * Read the status of the top status bar (whether it is hidden or displayed)
    *
    */
   int isStatusBarShow();
```

5.5.4 System Time

Support setting the current time, date, 24 - hour format, and automatically synchronizing time and time zone.



Set the system time

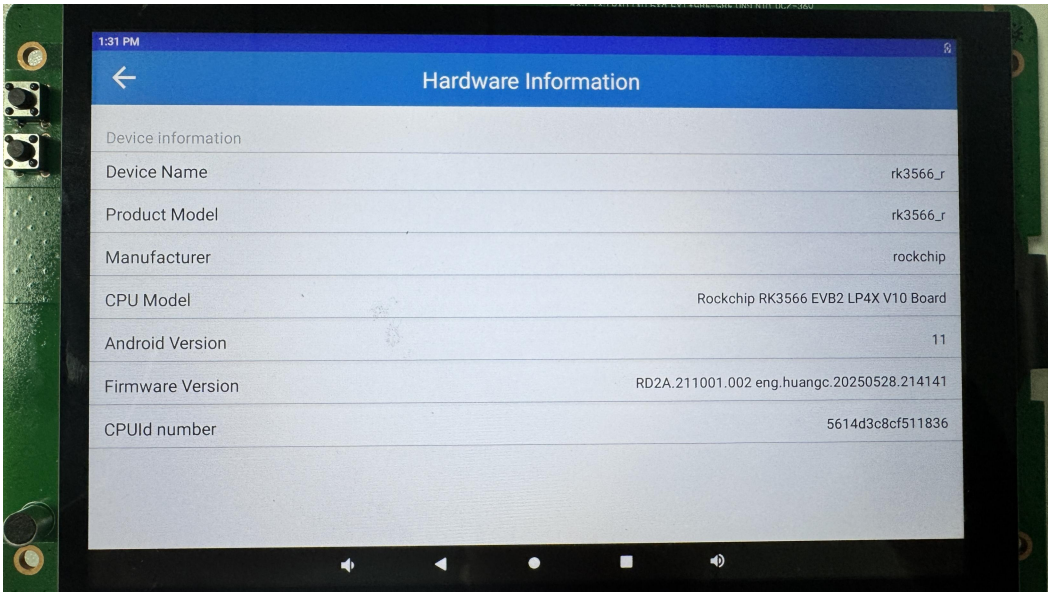
```
    /**
     * Set the system time
     *
     * @param hour   Hour
     * @param minute Minute
     */
```

```
    int setTime(int hour, int minute);


    /**
     * Set the system date
     *
     * @param year   Year
     * @param month  Month
     * @param day    Day
     */
    int setDate(int year, int month, int day);


    /**
     * Set whether the system automatically obtains the time
     *
  * @param context Context
     * @param auto    1: automatically obtain the time, 0: Do not automatically obtain the time
     */
    int setTimeAutoMode(Context context, int auto);


    /**
     * Set the system time zone
     * @param context Context
     * @param timeZone Time zone ID
     */
    void setTimeZone(Context context, String timeZone);


    /**
     * Set whether the system automatically obtains the time
     *
     * @param context Context
```

```
     * @param auto    1: automatically obtain the time, 0: Do not automatically obtain the time
     */
    int setTimeZoneAutoMode(Context context, int auto);


    /**
     * Set whether the system uses the 24-hour format
     * @param context Context
     * @param value   "24"、"12"
     */
     int setTime_12_24Mode(Context context, String value);
```

5.5.5 Hardware Information

View information such as screen name, manufacturer, and firmware version.

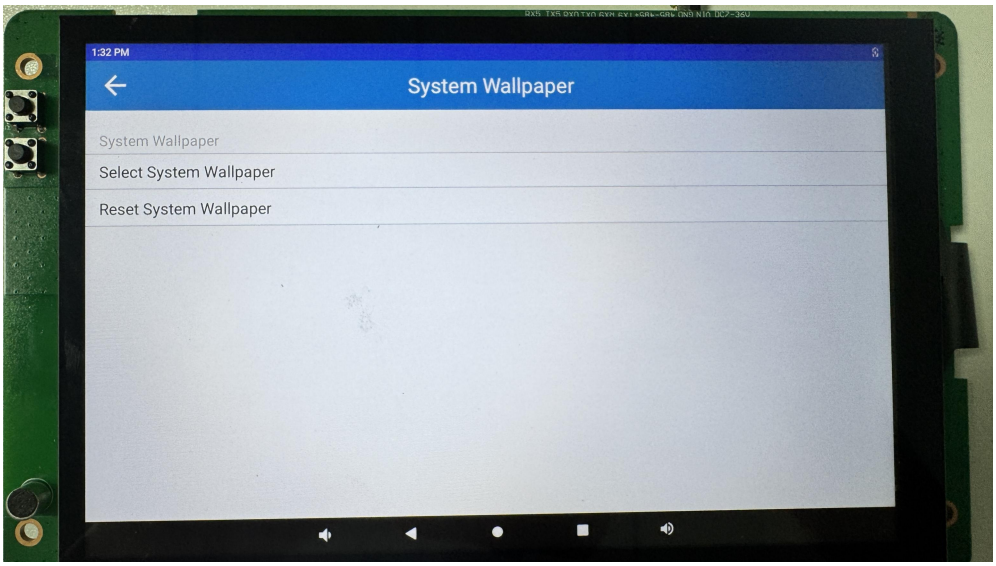



```
    /**
     * Obtain the device name
     *@param context Context
     */
    String getDeviceName(Context context);


    /**
     * Obtain the CPU model
```

```
 *
 */
String getCpuModelFromCpuinfo();


 /**
 * Obtain the CPU ID serial number
 *
 */
String getCPUID() ;
```

5.5.6 System Wallpaper

Select and set a wallpaper, or initialize it to the original wallpaper.



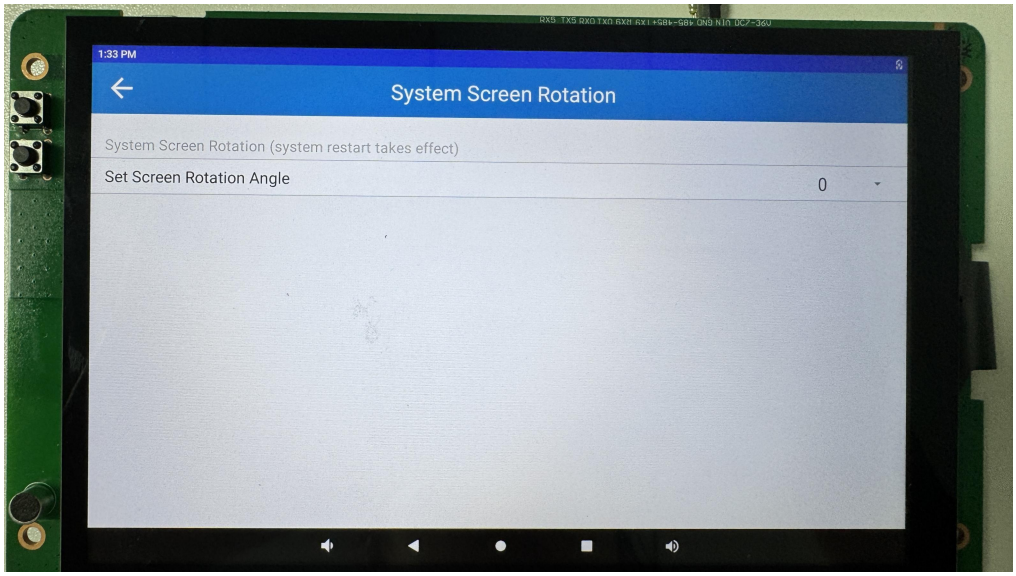

```
**
 * Set the system paper
 *@param imageUri Image source
 */
void setWallpaperFromUri(Uri imageUri);


 /**
 * Reset the system wallpaper
 */
```

```
void resetWallpaper();
```

5.5.7 System Screen Rotation

It is possible to select 0°, 90°, 180° or 270°. The setting will take effect after an automatic restart.

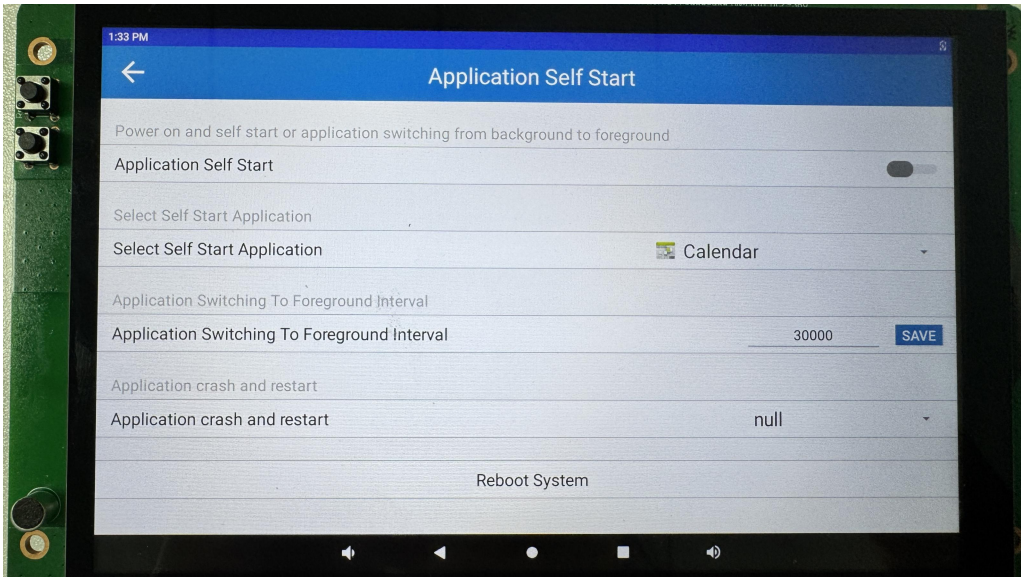
```
/**
* Set the screen rotation angle
*@param newValue The screen's new vaule
*/
void setScreenRotation(String newValue);
```



5.5.8 APP Auto-start

After turning on the "App Auto-start" switch, you can select a specified app (such as "Calendar"), and the app will run automatically. When you exit the app, the system will automatically reopen it within 1 second.

For "App Auto-restart on Crash", select any app, and the functionality is the same as "App Auto-start". When the app reports an error and crashes, it will automatically restart.



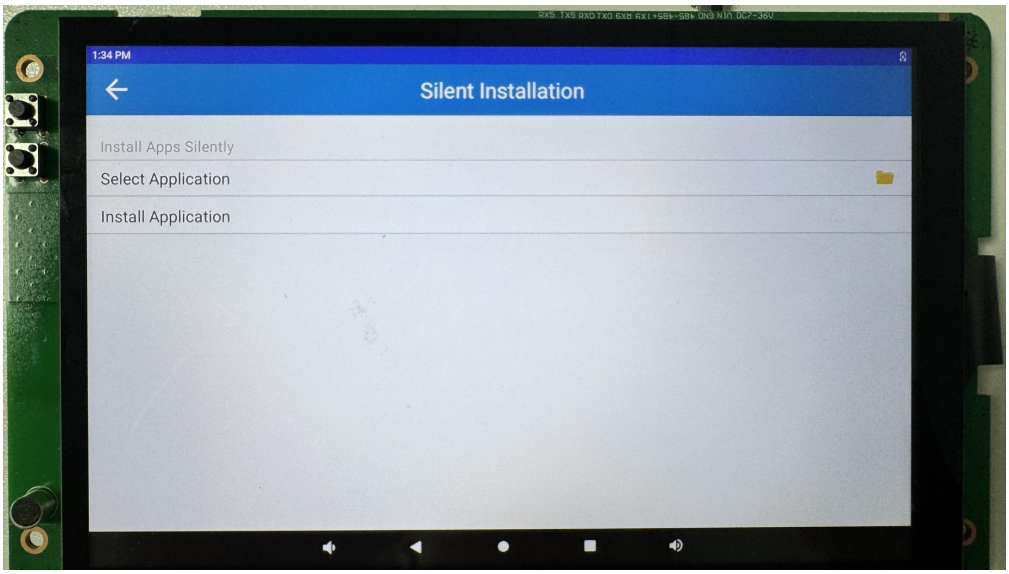

```
 /**
  * App auto-start switch
  *@ 0 indicates off, 1 indicates on
  */
Settings.Global.putInt(getContentResolver(), "allow_auto_start_custom_app", 0);


 /**
  * Set auto-start apps
   *@param  pkgcls indicates the package name and class name of the set auto-start app, separated by a comma
  */
Settings.Global.putString(getContentResolver(), "auto_start_custom_app_pkg", pkgcls);


 /**
  * Set the check time for auto-start apps
   *@param  intervalTime indicates how often to check whether the app is in the foreground
  */
Settings.Global.putLong(getContentResolver(), "auto_start_custom_app_check_time", intervalTime);


 /**
  * Set auto-restart for crashed apps
```

```
     *@param  pkg indicates the package name of the crashed app
     */
    int setProtectApp(String pkg);
```

5.5.9 Silent Installation

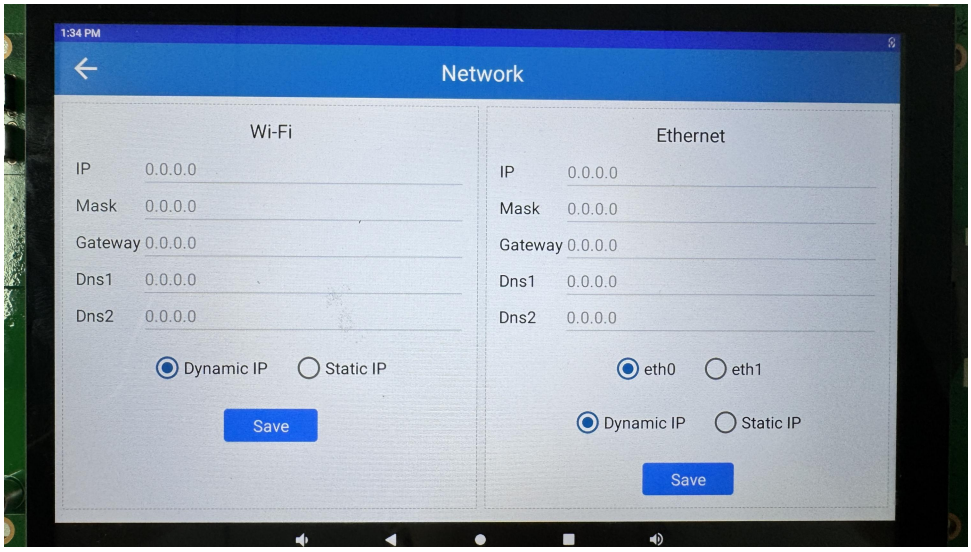
Select the APK file in the USB drive, then click "Install App" after selection, and it will be automatically installed to the system desktop.

```
    /**
     * Silent installation apk
     *@param path apk path
      *@param isStart true represents reading the package name of the APK to be installed and recording it.
     */
    int installApp(String path, boolean isStart);
```



5.5.10 Network

You need to connect to Wi-Fi or Ethernet, click on Static IP, then you can modify the IP and save it.




```
/**
 * Set Ethernet static network parameters
 *
 * @param address ip
 * @param mask    Subnet mask
 * @param gateway Gatewway
 * @param dns1    dns1
 * @param dns2    dns2
 * @return The return value of the interface call. Refer to DWErrorCode
 */
int setEthernetStaticConfig(String address, String mask, String gateway, String dns1, String dns2);


/**
 * Set Ethernet DHCP
 *
 * @return The return value of the interface call. Refer to DWErrorCode
 */
int setEthernetDynamicConfig();


   /**
    * Set Wi-Fi Static Network Parameters
```

```
     *
     * @param address ip
     * @param mask    Subnet mask
     * @param gateway Gateway
     * @param dns1    dns1
     * @param dns2    dns2
     * @return The return value of the interface call. Refer to DWErrorCode
     */
    int setWiFiStaticConfig(String address, String mask, String gateway, String dns1, String dns2);


    /**
     * Set WiFi DHCP
     *
     * @return The return value of the interface call. Refer to DWErrorCode
     */
    int setWiFiDynamicConfig();


/**
 * Get ip address
 *
 * @return Return a collection of IP addresses
 */
ArrayList<String> getNetWorkIp();


/**
 * Get gateway
 *
 * @return Return a collection of gateway addresses
 */
ArrayList<String> getNetWorkGateway();
```

```
/**
 * Get DNS
 *
 * @return Return a list of DNS servers
 */
ArrayList<String> getNetWorkDns();

/**
 * Get subnet mask
 *
 * @return Return a collection of subnet masks
 */
ArrayList<String> getNetworkMask();
```

5.5.11 Log

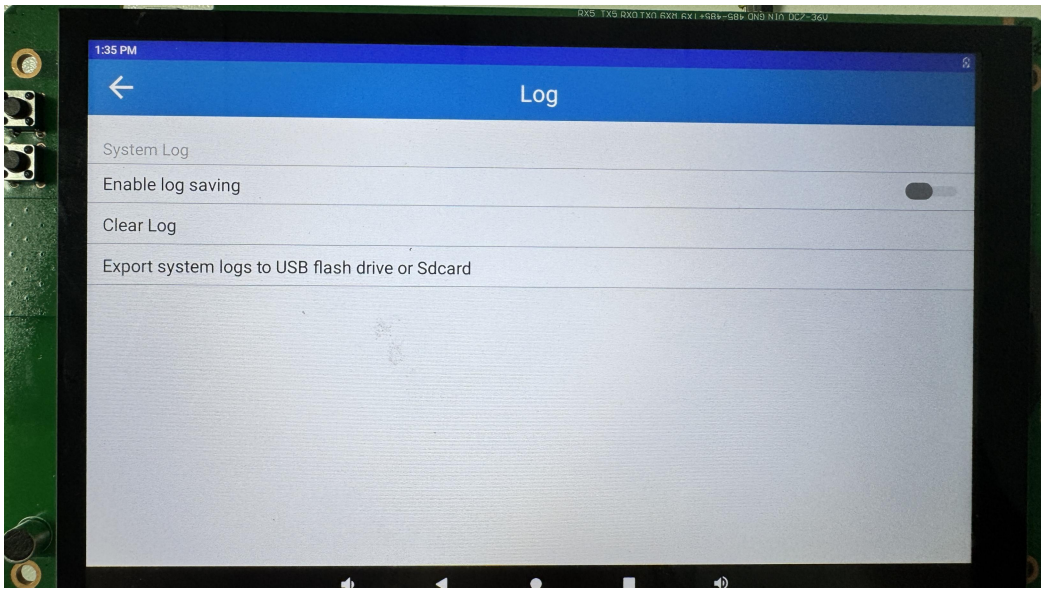
"Enable log saving": Output and save the device log information to a certain directory on the device.

"Clear logs": Delete the saved log information.

When a USB flash drive or SD card is inserted, logs can also be exported to the root directory of the USB flash drive or SD card. However, after enabling log saving, the log clearing function cannot be used.

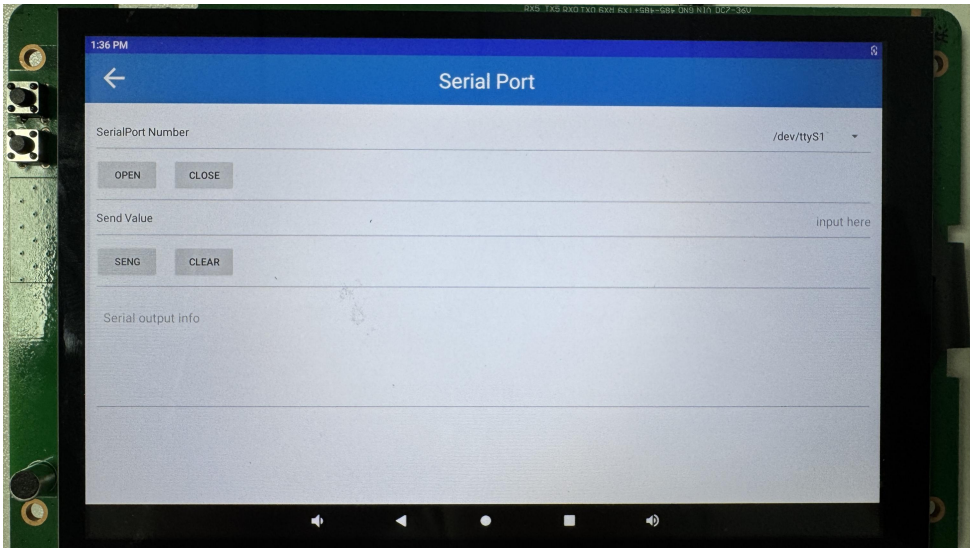
```
/**
 * Enable logging
 *@param r      Set the size of each log file (unit: KB)
 * The default value is 1024 KB Set the range to [64, 10240]
 * @param n      Set the number of log files to retain
 * The default value is 100    Set the range to [1, 256]
 */
 startLogSave(int r, int n);

/**
```

```
 * Stop logging
 */
 void stopLogSave();


/**
 * Clear logs
 */
 int clearLog();


/**
 * Export logs
 *@param path Indicates the export path
 */
 int copyLogToStorage(String path);
```



5.5.12 Serial Port

Open the serial port, input data, and you can send the data as well as clear it.

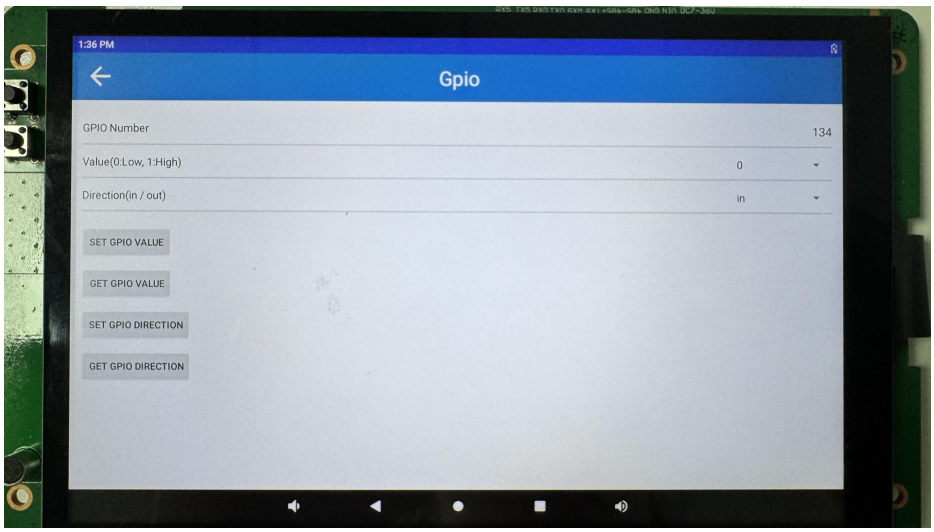



```
/**
     * Open the serial port
     * @param var1    Serial port address
     * @param var2    Baud rate
     * @param var3    Date bits
     * @param var4    Stop bits
     * @param var5    Parity
     * @param var6    Whether to continuously monitor the data returned by the serial port
     * @param var7    Data reading cycle
     *
     */
    void open(String var1, int var2, int var3, int var4, int var5, boolean var6, long var7);

    /**
     *
     */
    void close();

    /**
     * Send data via the serial port
     * @param var1 Serial port data
```

```
     */
    void send(byte[] var1);
```

5.5.13 GPIO

Set and get the value or pin direction of GPIO. Note that you need to click the "Set GPIO Level" button during initialization.



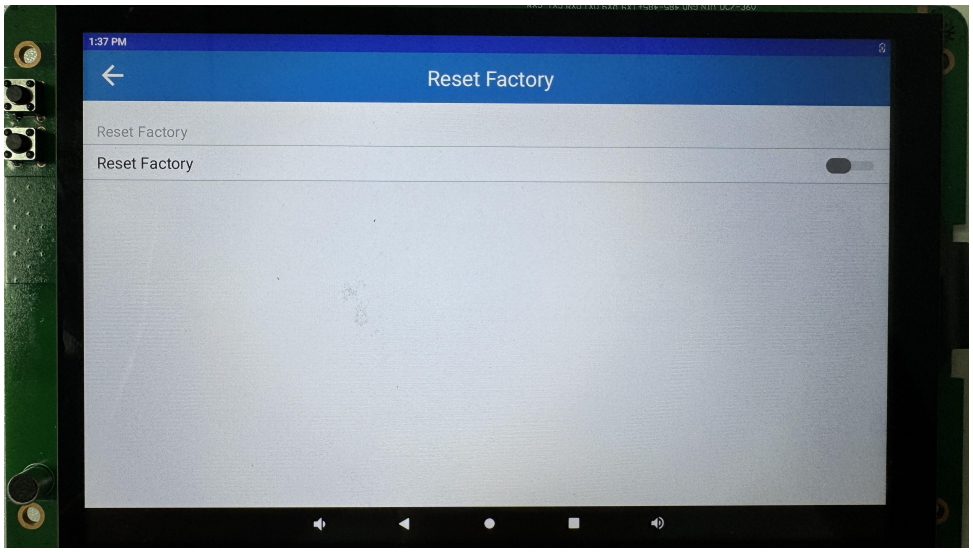

```
/**
    * Initialize gpio
    * @param var0    The GPIO ports that need to be configured only require a numerical number
    * @param var1    0: Low, 1: High
    * @param var2    in: Input, out: Output
    * @param var3    Context
    * @param var4    Initialize the callback interface
    */
    void initGpio(final int[] var0, final int var1, final String var2, Context var3, final GpioInitCallBack var4);


/**
 * Set the GPIO value
 *
 * @param var0  GPIO port number (e.g., 100 for GPIO100)
 * @param var1 Set the logic level: 0 = LOW, 1 = HIGH
 * @return Return value: 0 = Success, <0 = Failure
```

```
     */
    public static native int setGpioValue(int var0, int var1);


     /**
     * Set the GPIO direction
     *
     * @param var0      GPIO port number (e.g., 100 for GPIO100)
     * @param var1 Set the logic level: 0:in, 1:out
     * @return Return value: 0 = Success, <0 = Failure
     */
    private static native int setGpioDirection(int var0, String var1);



    /**
     * Read the GPIO value
     *
     * @param var0 GPIO port number (e.g., 100 for GPIO100)
     * @return Return the GPIO value
     */
    public static native int getGpioValue(int var0);


    /**
     * Read the GPIO direction
     *
     * @param var0 GPIO port number (e.g., 100 for GPIO100)
     * @return Return value: GPIO direction (in or out)
     */
    private static native int getGpioDirections(int var0);


    public interface GpioInitCallBack {
```

```
    /**
     * Initialize the callback method
     *
     * @param var1 Initialization successful
     * @param var2    The set of GPIO ports that have been successfully initialized
     */
    void initState(boolean var1, List<Integer> var2);
}
```

5.5.14 Factory Reset

Performing a factory reset will erase all user configurations and data, restoring the system to its initial state. Please exercise caution before proceeding.




```
/**
 * Factory reset
*/
void resetFactory();
```

5.6 Firmware Version Query

The firmware of the 32 series products has been uniformly upgraded since the batch of 20240904, optimizing some inconveniences that may occur in the old firmware.

Since the firmware of the new and old versions is not fully compatible, you can query the firmware version in the following ways:

1. Check the product model label. The product with a production date after 20240904 is the one with the new version firmware.

2. Check the firmware compilation date in the software. The firmware with a compilation date on or after 20240902 is the new version.

The new firmware provides a series of SDKs and interfaces that are convenient for secondary development. If you have received a product with the old firmware, you can contact our salesperson to obtain the new firmware for burning

Firmware Version Upgrade Records		
Firmware Name	Release Time	Contents
Update.img	2023.8.8	It only contains a simple example of hiding the status bar.
Update.img	2024.9.4	It includes general functions, such as APP examples and the usage methods of interface APIs.
Update.img	2024.11.3-2024.11.13	Update DWIN TEST and solve the problem of the boot animation stuttering.
Update.img	2025.7.16	The common function toolkit APP (DWIN Android Test APP) adapted to RK3566 standard products.

Chapter 6 Revision Records

Revision	Date	Description	Editor
00	2023.02.20	First release	Xu Jiayang
01	2024.08.15	Add Chapter 1	Chen Yan
02	2024.09.05	Add Chapter 7	Chen Yan
03	2024.10.31	Add a new speaker B01279 with a higher volume	Chen Yan
04	2024.11.07	Add boot broadcast receiving and monitoring.	Chen Yan
05	2024.11.15	Add the precautions for updating the boot logo in the new firmware.	Chen Yan
06	2024.11.20	Add the usage precautions for 1.3, as well as the firmware version upgrade records.	Chen Yan
V2	2025.04.11	Optimize the overall logic and expression of the development guide, and remove the descriptions of the old firmware versions.	Chen Xian
V3.0	2025.09.05	Add Introduction and Code for DWIN Android Test APP	Chen Xian