PET_A133_P01 安卓主板
开发板系统开发手册

一、安卓系统开发

1、Uboot 研发

longan\brandy\brandy-2.0\u-boot-2018
详见开发文档目录下相关文件

2、Linux 内核研发

内核设备树文件位置：

longan/kernel/linux-5.4/arch/arm/boot/dts/sun50iw10p1.dtsi

longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts

longan/device/config/chips/a133/configs/b6/uboot-board.dts

默认内核配置 longan/kernel/linux-5.4/arch/arm/configs/sun50iw10p1smp_a100_android_defconfig

```
cd longan
./build.sh menuconfig          修改内核配置选项
./build.sh saveconfig          保存内核配置选项
```

其他内核相关研发请参考 开发文档目录下的相关文档

3、修改启动 logo

用新的 bmp 文件替换 I longan\device\config\chips\a133\configs\b6\android 目录下的 bootlogo.bmp，图片分辨率不要超过屏幕分辨率。

4、修改开机动画

用新的动画文件替换 device\softwinner\ceres\common\media\bootanimation 目录下的 bootanimation.zip 动画可以参考 bootanimation.zip 文件进行修改，需要注意以下几个问题：

1、 图片分辨率不要超过屏幕分辨率
2、 压缩 bootanimation.zip 文件是需要选择"存储"方式
3、 压缩后用 winrar 打开看一下，不能有 bootanimation 这个目录

修改 device\softwinner\ceres\common\media\config.mk 文件，去掉注释符号，将开机动画复制到系统内

```
PRODUCT_COPY_FILES += \
    $(BOOTANIMATION_CONFIG_PATH)/bootanimation.zip:system/media/bootanimation.zip
```

5、开机自启动 Launcher(不显示系统桌面)

首先在开发应用 APK 时，需要在应用程序 AndroidManifest.xml 的 Intent-filter 里添加下面几行

```
<intent-filter>
    <action android:name="android.intent.action.MAIN" />
    <category android:name="android.intent.category.HOME" />
    <category android:name="android.intent.category.DEFAULT"/>
</intent-filter>
```

可以参考源代码目录下的 OnlyLauncher.7z

6、内置其他应用

可参考 android\vendor\aw\public\prebuild\apk 下的相关目录创建新的应用 apk 目录并编写 Android.mk 文件

7、修改系统默认参数配置

系统参数配置文件位置　device/softwinner/ceres/ceres_b6.mk

是否关闭北斗/GPS 功能

config.disable_gps
默认值：false
可选值：false、true

是否关闭蓝牙功能

config.disable_bluetooth
默认值：false
可选值：false、true

自动休眠时间

sys.def_screen_off_timeout
默认值：0
可选值：0　　　　　永不休眠
　　　　1800000　　30 分钟
　　　　600000　　10 分钟
　　　　300000　　5 分钟
　　　　120000　　2 分钟
　　　　60000　　1 分钟
　　　　30000　　30 秒
　　　　15000　　15 秒

背光亮度

sys.def_screen_brightness
默认值：255
可选值：0～255

显示 LCD DPI 值调整

ro.sf.lcd_density
默认值　160
可选值：120、160、240、320

显示 LCD 默认显示方向

默认旋转 0 度，其他方向注意需要同时修改下面四个参数值

参数名	旋转 0 度	旋转 90 度	旋转 180 度	旋转 270 度
ro.surface_flinger.primary_display_orientation	ORIENTATION_0	ORIENTATION_90	ORIENTATION_180	ORIENTATION_270
ro.minui.default_rotation	ROTATION_NONE	ROTATION_RIGHT	ROTATION_DOWN	ROTATION_LEFT
ro.vendor.sf.rotation	0	90	180	270
ro.input_flinger.primary_touch.rotation	0	90	180	270

禁止屏幕旋转

persist.sys.forced_orient
当选择禁止屏幕旋转后，如果系统默认是横屏显示，即使启动竖屏应用，屏幕显示方向也不会改变

默认值 0
可选值：0、1

默认是否全屏显示（隐藏状态栏）

persist.sys.def_hidenavigation
persist.sys.def_hidestatusbar
默认值：0
可选值：0、1

默认是否打开 WIFI

sys.def_wifi_on
默认值：1
可选值：0、1

默认是否打开蓝牙

sys.def_bluetooth_on
默认值：0
可选值：0、1

系统默认音量

sys.def_volume_music=15	范围 0~15
sys.def_volume_ring=7	范围 0~7
sys.def_volume_system=7	范围 0~7
sys.def_volume_voicecall=5	范围 0~5
sys.def_volume_alarm=7	范围 0~7
sys.def_volume_notification=7	范围 0~7
sys.def_volume_bluetoothsoc=15	范围 0~15

长按电源键功能

sys.def_powerkey_long
默认值：1
可选值：0（无效）、1（显示关机菜单）、2（直接关机需确认）、3（直接关机无需确认）

是否禁用深度休眠

persis.sys.def_no_deepsleep
默认值：1
可选值：0（启用深度休眠）、1（禁用深度休眠）

默认 WIFI 自动连接 SSID 和密码

sys.def_wifi_ssid
默认值：PEITE-WIFI-WORK
sys.def_wifi_pass
默认值：peite-13579

默认 NTP 服务器地址

sys.def_ntp_server
默认值：ntp.aliyun.com

默认 NTP 超时时间

sys.def_ntp_timeout
默认值：10000

默认界面模式

sys.def_nightmode
默认值：2
可选值：0（自动模式）、1（普通模式）、2（黑夜暗黑模式）

二、安卓应用开发

1、GPIO 编程参考

通过 sysfs 方式控制 GPIO，GPIO 的操作接口包括 direction 和 value 等，direction 控制 GPIO 输入和输入模式，而 value 可控制 GPIO 输出或获得 GPIO 输入。

例如控制调试灯 GPIO 操作如下（串口终端命令行方式）：

调试灯 GPIO 设置为输出　　　echo out > /sys/class/gpio/gpio205/direction
调试灯 GPIO 输出高电平　　　echo 1 > /sys/class/gpio/gpio205/value
调试灯 GPIO 输出高低平　　　echo 0 > /sys/class/gpio/gpio205/value
调试灯 GPIO 设置为输入　　　echo in > /sys/class/gpio/gpio205/direction
读取调试灯 GPIO 输出输入电平　cat /sys/class/gpio/gpio205/value

当 GPIO 处于输出和输入模式时都可以读取，当设置为输入模式时读取的是 GPIO 实际电平，当设置为输出模式时读取的是设置的值（如果设置为高电平输出，外部将引脚电平拉低后，读取的值依然是 1）。

应用程序控制请参考源码下的 demo 程序源码

GPIO 对应控制目录列表			
丝印	接口	脚位	目录
LED2			/sys/class/gpio/gpio205
J26		2 脚	/sys/class/gpio/gpio131
J27		1 脚	/sys/class/gpio/gpio354
		2 脚	/sys/class/gpio/gpio355
		3 脚	/sys/class/gpio/gpio66
		4 脚	/sys/class/gpio/gpio235
		5 脚	/sys/class/gpio/gpio67
		6 脚	/sys/class/gpio/gpio236
		7 脚	/sys/class/gpio/gpio71
		8 脚	/sys/class/gpio/gpio238
		9 脚	/sys/class/gpio/gpio76
		10 脚	/sys/class/gpio/gpio239
		11 脚	/sys/class/gpio/gpio68
		12 脚	/sys/class/gpio/gpio240

		13 脚	/sys/class/gpio/gpio242
		14 脚	/sys/class/gpio/gpio241
4G_PWR	PG12-I2S1_DOUT0 《 ──4G_PWR──		/sys/class/gpio/gpio204
4G_RST	PL10-PLEINT10 《 ──4G_RST──		/sys/class/gpio/gpio362

2、串口 UART 编程参考

J19	串口/dev/ttyAS0	XH2.54 4Pin	标配	默认为 TTL 串口，调试串口
J20	串口/dev/ttyAS1	PH2.0 4Pin	标配	默认为 RS232，可修改电阻配置为 TTL 串口
J21	串口/dev/ttyAS2	PH2.0 4Pin	标配	默认为 RS232，可修改电阻配置为 TTL 串口
J23	串口/dev/ttyAS3	PH2.0 4Pin	标配	默认为 TTL 串口
J24	串口/dev/ttyAS4	PH2.0 4Pin	标配	默认为 TTL 串口，可补焊器件配置为 RS485
J25	RS485 /dev/ttyAS4	PH2.0 4Pin	非标配	补焊器件配置为 RS485，与 J24 功能复用

安卓系统串口编程请参考源码下的 demo 程序源码或以下链接：

https://github.com/Geek8ug/Android-SerialPort

3、WatchDog 看门狗编程参考

进入内核后默认会启动看门狗，内核崩溃等情况出现，会在 15 秒内自动复位主板。
上层应用程序打开看门狗后，内核将看门狗控制权交由上层应用程序控制，上层应用程序的喂狗间隔建议不大于 3 秒。

看门狗的使用流程为　打开看门狗➔循环喂狗➔停止喂狗➔关闭看门狗
　　　喂狗之前必须先打开看门狗，关闭看门狗之前需停止喂狗操作。
　　　打开看门狗后如果 15 秒内没有喂狗或关闭看门狗，系统会自动复位。

命令行测试：
　　　打开看门狗：echo 1 >/sys/class/gzpeite/user/watch_dog
　　　喂狗：　　　echo 2 >/sys/class/gzpeite/user/watch_dog
　　　关闭看门狗：echo 0 >/sys/class/gzpeite/user/watch_dog
应用程序控制请参考源码下的 demo 程序源码

4、获取 root 权限

系统默认已开启 root 权限，上层应用 app 可直接获取 root 权限并进行相关操作，可以参考源码目录下的 demo 程序

5、系统签名

系统签名文件位于源代码目录下，使用对应的文件对 APK 进行签名即可。

6、动态隐藏/显示系统状态栏和导航栏

隐藏状态栏和导航栏在应用 app 里面向系统发送广播
　　　gzpeite.intent.systemui.hidenavigation 和 gzpeite.intent.systemui.hidestatusbar
显示状态栏和导航栏在应用 app 里面向系统发送广播
　　　gzpeite.intent.systemui.shownavigation 和 gzpeite.intent.systemui.showstatusbar
测试命令如下：

```
am broadcast -a "gzpeite.intent.systemui.hidenavigation"
```

```
am broadcast -a "gzpeite.intent.systemui.hidestatusbar"

am broadcast -a "gzpeite.intent.systemui.shownavigation"
am broadcast -a "gzpeite.intent.systemui.showstatusbar"
```

请参考源码下的 demo 程序源码

7、静默安装/卸载应用

安装 APK 时，向系统发送 gzpeite.intent.action.install_apk 广播
卸载 APK 时，向系统发送 gzpeite.intent.action.uninstall_apk 广播
测试命令如下：

```
am broadcast -a "gzpeite.intent.action.install_apk" --es apk_path "/mnt/media_rw/0000-4823/GPSTest.apk"
am broadcast -a "gzpeite.intent.action.uninstall_apk" --es pkg_name "com.android.gpstest"
```

8、重启、关机操作

重启：向系统发送 gzpeite.intent.action.reboot 广播
关机向系统发送 gzpeite.intent.action.shutdown 广播
测试命令如下：

```
重启(有确认提示)：am broadcast -a "gzpeite.intent.action.reboot" --ez confirm true
重启(无确认提示)：am broadcast -a "gzpeite.intent.action.reboot" --ez confirm false
关机(有确认提示)：am broadcast -a "gzpeite.intent.action.shutdown" --ez confirm true
关机(无确认提示)：am broadcast -a "gzpeite.intent.action.shutdown" --ez confirm false
```

应用程序控制请参考源码下的 demo 程序源码

9、获取 MAC 地址

原生 Android12 系统默认禁止应用获取 MAC 地址，为了兼容更早期的应用程序，我司已对系统代码进行优化允许应用 app 获取 WIFI 及以太网的 MAC 地址，详见源代码目录下的 demo 程序源码。

三、常用 LCD 显示屏配置

longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts
longan/device/config/chips/a133/configs/b6/uboot-board.dts
注意以上两个文件需同时修改

1、7 寸 LVDS 显示屏(1024 x 600 贴合屏)

```
longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts
&lcd0 {
    status                = "okay";
    lcd_used              = <1>;
    lcd_width             = <135>;
    lcd_height            = <216>;
    lcd_pwm_used          = <1>;
    lcd_pwm_ch            = <0>;
    lcd_pwm_freq          = <50000>;
    lcd_gamma_en          = <0>;
    lcd_bright_curve_en   = <0>;
    lcd_cmap_en           = <0>;
```

```
        deu_mode            = <0>;
        lcdgamma4iep        = <22>;
        smart_color         = <90>;
        lcd_pwm_max_limit   = <255>;
        lcd_bl_0_percent    = <20>;
        lcd_bl_100_percent  = <100>;
        lcd_backlight       = <199>;

        lcd_power           = "lcd";
        lcd_pin_power       = "cldo3";
        lcd_bl_en           = <&pio PB 6 GPIO_ACTIVE_HIGH>;
        lcd_gpio_0          = <&pio PB 7 GPIO_ACTIVE_HIGH>;

        //lvds 单屏  1024*600
        lcd_if              = <3>;
        lcd_driver_name     = "default_lcd";
        lcd_pwm_pol         = <1>;
        lcd_dclk_freq       = <45>;
        lcd_x               = <1024>;
        lcd_y               = <600>;
        lcd_ht              = <1444>;
        lcd_hbp             = <290>;
        lcd_hspw            = <100>;
        lcd_vt              = <636>;
        lcd_vbp             = <24>;
        lcd_vspw            = <4>;
        lcd_frm             = <0>;
        lcd_lvds_if         = <0>;
        lcd_lvds_colordepth = <0>;
        lcd_lvds_mode       = <0>;
        lcd_power1          = "cldo1";
        pinctrl-0           = <&lvds0_pins_a>;
        pinctrl-1           = <&lvds0_pins_b>;
};

    gt9xx {
        status = "okay";
        compatible = "goodix,gt9xx";
        reg = <0x14>;
        vcc_i2c-supply;
        reset-gpios = <&pio PB 3 GPIO_ACTIVE_LOW>;
        irq-gpios = <&pio PB 2 GPIO_ACTIVE_LOW>;
        goodix,type-a-report = <0>;
        goodix,int-sync = <1>;
        goodix,pen-suppress-finger = <0>;
```

```
        goodix,esd-protect = <0>;
        goodix,auto-update-cfg = <0>;          第9页，共
        goodix,resume-in-workqueue = <0>;
        goodix,power-off-sleep = <0>;
        goodix,double-wakeup = <1>;
        goodix,swap-x2y = <0>;
        goodix,revert-x = <0>;
        goodix,revert-y = <0>;
        goodix,driver-send-cfg = <0>;
    };

longan/device/config/chips/a133/configs/b6/uboot-board.dts
&lcd0 {
    status                  = "okay";
    lcd_used                = <1>;
    lcd_width               = <135>;
    lcd_height              = <216>;
    lcd_pwm_used            = <1>;
    lcd_pwm_ch              = <0>;
    lcd_pwm_freq            = <50000>;
    lcd_gamma_en            = <0>;
    lcd_bright_curve_en     = <0>;
    lcd_cmap_en             = <0>;
    deu_mode                = <0>;
    lcdgamma4iep            = <22>;
    smart_color             = <90>;
    lcd_pwm_max_limit       = <255>;
    lcd_bl_0_percent        = <20>;
    lcd_bl_100_percent      = <100>;
    lcd_backlight           = <199>;

    lcd_power               = "cldo4";
    lcd_bl_en               = <&pio PB 6 1 0 3 1>;
    lcd_gpio_0              = <&pio PB 8 1 0 3 1>;
    lcd_gpio_1              = <&pio PB 7 1 0 3 1>;

    //lvds 单屏 1024*600
    lcd_if                  = <3>;
    lcd_driver_name         = "default_lcd";
    lcd_pwm_pol             = <1>;
    lcd_dclk_freq           = <45>;
    lcd_x                   = <1024>;
    lcd_y                   = <600>;
    lcd_ht                  = <1444>;
    lcd_hbp                 = <290>;
```

```
    lcd_hspw              = <100>;
    lcd_vt                = <636>;
    lcd_vbp               = <24>;
    lcd_vspw              = <4>;
    lcd_frm               = <0>;
    lcd_lvds_if           = <0>;
    lcd_lvds_colordepth   = <0>;
    lcd_lvds_mode         = <0>;
    lcd_pin_power         = "cldo3";
    lcd_power1            = "cldo1";
    pinctrl-0             = <&lvds0_pins_a>;
    pinctrl-1             = <&lvds0_pins_b>;
};
```

2、10.1 寸 MIPI 显示屏(800 x 1280 贴合屏)

注意 MIPI 显示屏需要根据显示屏的初始化代码在源码里面添加新的驱动，然后再修改 dts 文件

```
longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts
&lcd0 {
    status                = "okay";
    lcd_used              = <1>;
    lcd_width             = <135>;
    lcd_height            = <216>;
    lcd_pwm_used          = <1>;
    lcd_pwm_ch            = <0>;
    lcd_pwm_freq          = <50000>;
    lcd_gamma_en          = <0>;
    lcd_bright_curve_en   = <0>;
    lcd_cmap_en           = <0>;
    deu_mode              = <0>;
    lcdgamma4iep          = <22>;
    smart_color           = <90>;
    lcd_pwm_max_limit     = <255>;
    lcd_bl_0_percent      = <20>;
    lcd_bl_100_percent    = <100>;
    lcd_backlight         = <199>;

    lcd_power             = "lcd";
    lcd_pin_power         = "cldo3";
    lcd_bl_en             = <&pio PB 6 GPIO_ACTIVE_HIGH>;
    lcd_gpio_0            = <&pio PB 7 GPIO_ACTIVE_HIGH>;

    //MIPI 10.1
    lcd_driver_name       = "mipi_101_0";
    lcd_if                = <4>;
    lcd_pwm_pol           = <1>;
```

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```
        lcd_dclk_freq        = <72>;
        lcd_x                = <800>;
        lcd_y                = <1280>;
        lcd_ht               = <920>;
        lcd_hbp              = <100>;
        lcd_hspw             = <40>;
        lcd_vt               = <1334>;
        lcd_vbp              = <16>;
        lcd_vspw             = <4>;
        lcd_frm              = <0>;
        lcd_dsi_if           = <0>;
        lcd_dsi_lane         = <4>;
        lcd_dsi_format       = <0>;
        lcd_dsi_te           = <0>;
        lcd_dsi_eotp         = <0>;
        pinctrl-0            = <&dsi4lane_pins_a>;
        pinctrl-1            = <&dsi4lane_pins_b>;
    };

    gt9xx {
        status = "okay";
        compatible = "goodix,gt9xx";
        reg = <0x14>;
        vcc_i2c-supply;
        reset-gpios = <&pio PB 3 GPIO_ACTIVE_LOW>;
        irq-gpios = <&pio PB 2 GPIO_ACTIVE_LOW>;
        goodix,type-a-report = <0>;
        goodix,int-sync = <1>;
        goodix,pen-suppress-finger = <0>;
        goodix,esd-protect = <0>;
        goodix,auto-update-cfg = <0>;
        goodix,resume-in-workqueue = <0>;
        goodix,power-off-sleep = <0>;
        goodix,double-wakeup = <1>;
        goodix,swap-x2y = <0>;
        goodix,revert-x = <1>;
        goodix,revert-y = <1>;
        goodix,driver-send-cfg = <0>;
    };

longan/device/config/chips/a133/configs/b6/uboot-board.dts
&lcd0 {
    status               = "okay";
    lcd_used             = <1>;
    lcd_width            = <135>;
```

```
        lcd_height              = <216>;
        lcd_pwm_used            = <1>;
        lcd_pwm_ch              = <0>;
        lcd_pwm_freq            = <50000>;
        lcd_gamma_en            = <0>;
        lcd_bright_curve_en = <0>;
        lcd_cmap_en             = <0>;
        deu_mode                = <0>;
        lcdgamma4iep            = <22>;
        smart_color             = <90>;
        lcd_pwm_max_limit       = <255>;
        lcd_bl_0_percent        = <20>;
        lcd_bl_100_percent   = <100>;
        lcd_backlight           = <199>;

        lcd_power               = "cldo4";
        lcd_bl_en               = <&pio PB 6 1 0 3 1>;
        lcd_gpio_0              = <&pio PB 8 1 0 3 1>;
        lcd_gpio_1              = <&pio PB 7 1 0 3 1>;

        //MIPI 10.1
        lcd_driver_name         = "mipi_101_0";
        lcd_if                  = <4>;
        lcd_pwm_pol             = <1>;
        lcd_dclk_freq           = <72>;
        lcd_x                   = <800>;
        lcd_y                   = <1280>;
        lcd_ht                  = <920>;
        lcd_hbp                 = <100>;
        lcd_hspw                = <40>;
        lcd_vt                  = <1334>;
        lcd_vbp                 = <16>;
        lcd_vspw                = <4>;
        lcd_frm                 = <0>;
        lcd_hv_clk_phase        = <0>;
        lcd_hv_sync_polarity= <0>;
        lcd_pin_power           = "cldo3";
        lcd_dsi_if              = <0>;
        lcd_dsi_lane            = <4>;
        lcd_dsi_format          = <0>;
        lcd_dsi_te              = <0>;
        lcd_dsi_eotp            = <0>;
        pinctrl-0               = <&dsi4lane_pins_a>;
        pinctrl-1               = <&dsi4lane_pins_b>;
};
```

3、7 寸 RGB 显示屏(1024 x 600)

```
longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts
&lcd0 {
    status                = "okay";
    lcd_used              = <1>;
    lcd_width             = <135>;
    lcd_height            = <216>;
    lcd_pwm_used          = <1>;
    lcd_pwm_ch            = <0>;
    lcd_pwm_freq          = <50000>;
    lcd_gamma_en          = <0>;
    lcd_bright_curve_en = <0>;
    lcd_cmap_en           = <0>;
    deu_mode              = <0>;
    lcdgamma4iep          = <22>;
    smart_color           = <90>;
    lcd_pwm_max_limit     = <255>;
    lcd_bl_0_percent      = <20>;
    lcd_bl_100_percent   = <100>;
    lcd_backlight         = <199>;

    lcd_power             = "lcd";
    lcd_pin_power         = "cldo3";
    lcd_bl_en             = <&pio PB 6 GPIO_ACTIVE_HIGH>;
    lcd_gpio_0            = <&pio PB 7 GPIO_ACTIVE_HIGH>;

    //RGB 屏 1024*600
    lcd_if                = <0>;
    lcd_driver_name       = "default_lcd";
    lcd_pwm_pol           = <1>;
    lcd_dclk_freq         = <51>;
    lcd_x                 = <1024>;
    lcd_y                 = <600>;
    lcd_ht                = <1344>;
    lcd_hbp               = <160>;
    lcd_hspw              = <70>;
    lcd_vt                = <750>;
    lcd_vbp               = <23>;
    lcd_vspw              = <20>;
    lcd_frm               = <1>;
    lcd_hv_clk_phase      = <0>;
    lcd_hv_sync_polarity= <0>;
    pinctrl-0             = <&rgb18_pins_a>;
    pinctrl-1             = <&rgb18_pins_b>;
```

www.gzpeite.net

```
};

    gt9xx {
        status = "okay";
        compatible = "goodix,gt9xx";
        reg = <0x14>;
        vcc_i2c-supply;
        reset-gpios = <&pio PB 3 GPIO_ACTIVE_LOW>;
        irq-gpios = <&pio PB 2 GPIO_ACTIVE_LOW>;
        goodix,type-a-report = <0>;
        goodix,int-sync = <1>;
        goodix,pen-suppress-finger = <0>;
        goodix,esd-protect = <0>;
        goodix,auto-update-cfg = <0>;
        goodix,resume-in-workqueue = <0>;
        goodix,power-off-sleep = <0>;
        goodix,double-wakeup = <1>;
        goodix,swap-x2y = <0>;
        goodix,revert-x = <0>;
        goodix,revert-y = <0>;
        goodix,driver-send-cfg = <0>;
    };

longan/device/config/chips/a133/configs/b6/uboot-board.dts
&lcd0 {
    status                = "okay";
    lcd_used              = <1>;
    lcd_width             = <135>;
    lcd_height            = <216>;
    lcd_pwm_used          = <1>;
    lcd_pwm_ch            = <0>;
    lcd_pwm_freq          = <50000>;
    lcd_gamma_en          = <0>;
    lcd_bright_curve_en   = <0>;
    lcd_cmap_en           = <0>;
    deu_mode              = <0>;
    lcdgamma4iep          = <22>;
    smart_color           = <90>;
    lcd_pwm_max_limit     = <255>;
    lcd_bl_0_percent      = <20>;
    lcd_bl_100_percent    = <100>;
    lcd_backlight         = <199>;

    lcd_power             = "cldo4";
    lcd_bl_en             = <&pio PB 6 1 0 3 1>;
```

```
lcd_gpio_0              = <&pio PB 8 1 0 3 1>;
lcd_gpio_1              = <&pio PB 7 1 0 3 1>;


//   //RGB 屏  1024*600
lcd_if                  = <0>;
lcd_driver_name         = "default_lcd";
lcd_pwm_pol             = <1>;
lcd_dclk_freq           = <51>;
lcd_x                   = <1024>;
lcd_y                   = <600>;
lcd_ht                  = <1344>;
lcd_hbp                 = <160>;
lcd_hspw                = <70>;
lcd_vt                  = <750>;
lcd_vbp                 = <23>;
lcd_vspw                = <20>;
lcd_frm                 = <1>;
lcd_hv_clk_phase        = <0>;
lcd_hv_sync_polarity= <0>;
lcd_pin_power           = "cldo3";
pinctrl-0               = <&rgb18_pins_a>;
pinctrl-1               = <&rgb18_pins_b>;
};
```

四、汇顶 GT9xx 通用 I2C 接口配置

longan/device/config/chips/a133/configs/b6/linux-5.4/board.dts
通常情况只需要修改下面红色字体三项，调整触摸屏的默认方向即可正常使用

```
gt9xx {
    status = "okay";
    compatible = "goodix,gt9xx";
    reg = <0x14>;
    vcc_i2c-supply;
    reset-gpios = <&pio PB 3 GPIO_ACTIVE_LOW>;
    irq-gpios = <&pio PB 2 GPIO_ACTIVE_LOW>;
    goodix,type-a-report = <0>;
    goodix,int-sync = <1>;
    goodix,pen-suppress-finger = <0>;
    goodix,esd-protect = <0>;
    goodix,auto-update-cfg = <0>;
    goodix,resume-in-workqueue = <0>;
    goodix,power-off-sleep = <0>;
    goodix,double-wakeup = <1>;
    goodix,swap-x2y = <0>;
    goodix,revert-x = <0>;
```

```
    goodix,revert-y = <0>;
    goodix,driver-send-cfg = <0>;
};
```

五、动态修改开机 logo 和动画

将 bootlogo.bmp、bootanimation.zip，复制到系统 /mnt/logo 目录下即可

```
adb push bootlogo.bmp /mnt/logo/
adb push bootanimation.zip /mnt/logo/
```

logo 文件必须为 bmp 32bit 文件格式。
开机动画 bootanimation.zip 仅支持安卓系统，制作方式可以通过搜索引擎查询相关教程。

六、联系方式

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总公司网站：http://www.gzpeite.net
SMT 子公司：**广州佩特精密电子科技有限公司（全资子公司）**
子公司地址：广州市白云区人和镇大巷村顺景路 11 号
SMT 网站 ：http://www.gzptjm.com
官方淘宝店：https://shop149045251.taobao.com

微信扫描下方二维码联系支持人员：

广州佩特电子科技有限公司

2023 年 **2** 月