



功耗调整指引

更新日期: **11/08/2018**



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REVISION HISTORY

Revision No.	Description	Date
0.1	<ul style="list-style-type: none">Initial release	10/31/2018
0.2	<ul style="list-style-type: none">Update USB ON/OFF procedure	11/08/2018



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1. 打开/关闭 组件

1.1. 可选的组件

在 Infinity-6 上可选使能的组件有：ETH 和 USB

1.2. ETH

需要在 U-Boot 及 Linux Kernel 进行调整才能完全关闭该组件

1.2.1 调整 U-Boot

Step1. 取消 MSTAR EMAC 的选项

```
.config - U-Boot 2015.01 Configuration
-> Device Drivers -> MStar drivers

MStar drivers
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are
hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for
Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module < > module capable

--- MStar drivers
[*] MSTAR ISP NOR FLASH
[*] Save environment to ISP NOR FLASH
[ ] MTD device for ISP NOR FLASH
[*] Enable Mstar partition support
[*] MSTAR SDMMC
[ ] MSTAR eMMC
[*] MSTAR Gpio
[ ] MSTAR NAND
[ ] MSTAR USB
[ ] MSTAR EMAC
[ ] Enable AESDMA
[ ] MSTAR SPINAND
() Append postfix name to compressed file

<Select> < Exit > < Help > < Save > < Load >
```

1.2.2 调整 Linux Kernel

Step1. 取消 EMAC 的选项



```
.config - Linux/arm 4.9.84 Kernel Configuration
-> Device Drivers -> MStar SoC platform drivers

MStar SoC platform drivers
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are
hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for
Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module < > module capable

(2) Mstar PAD Select Order of SD/MMC3
[ ] Mstar SD/MMC Reverse CDZ Pin
[*] Mstar SD/MMC T-Flash Card Using
(48000000) Mstar SD/MMC1 Maximum Clock
(0) Mstar SD/MMC1 Maximum DownLevel
(0) Mstar SD/MMC1 Pass Level
[*] Mstar SD/MMC1 Int CDZ Support
(48000000) Mstar SD/MMC2 Maximum Clock
(0) Mstar SD/MMC2 Maximum DownLevel
(0) Mstar SD/MMC2 Pass Level
[*] Mstar SD/MMC2 Int CDZ Support
(48000000) Mstar SD/MMC3 Maximum Clock
(0) Mstar SD/MMC3 Maximum DownLevel
(0) Mstar SD/MMC3 Pass Level
[*] Mstar SD/MMC3 Int CDZ Support
< > EMAC
< > IR Remote Control Receiver
<*> Mstar I2C driver
<*> I2C driver support for infinity5
<*> GPIO driver
<*> SW I2C via GPIO support
<*> watchdog driver
<*> sar driver
< > ircut driver
[*] MS_RTC
< > Mstar RTC driver
<*> Mstar RTCWC driver
[*] Serial Flash driver

[Select] < Exit > < Help > < Save > < Load >
```

Step2. 取消 Networking support 的选项

```
.config - Linux/arm 4.9.84 Kernel Configuration

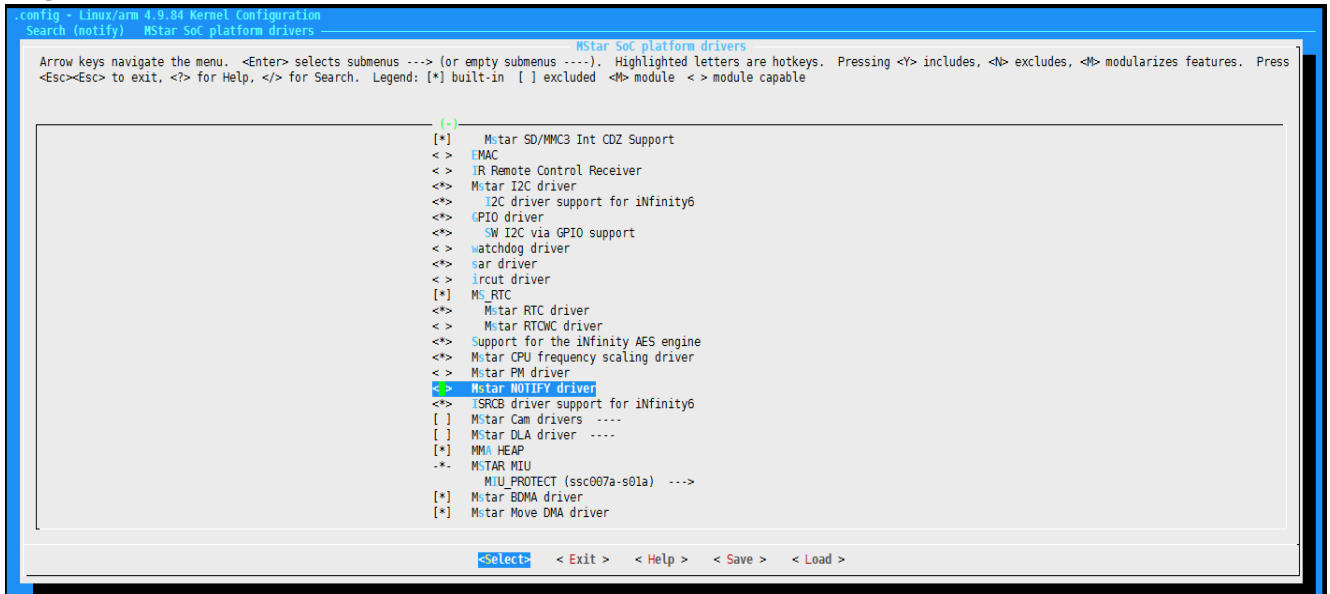
Linux/arm 4.9.84 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are
hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for
Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module < > module capable

--* Patch physical to virtual translations at runtime
General setup --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
System Type --->
Bus support --->
Kernel Features --->
Boot options --->
CPU Power Management --->
Floating point emulation --->
Userspace binary formats --->
Power management options --->
[ ] Networking support ----
Device Drivers --->
Firmware Drivers --->
File systems --->
Kernel hacking --->
Security options --->
{*} Cryptographic API --->
Library routines --->
[ ] Virtualization ----

[Select] < Exit > < Help > < Save > < Load >
```



Step3. 取消 Mstar NOTIFY driver 的选项

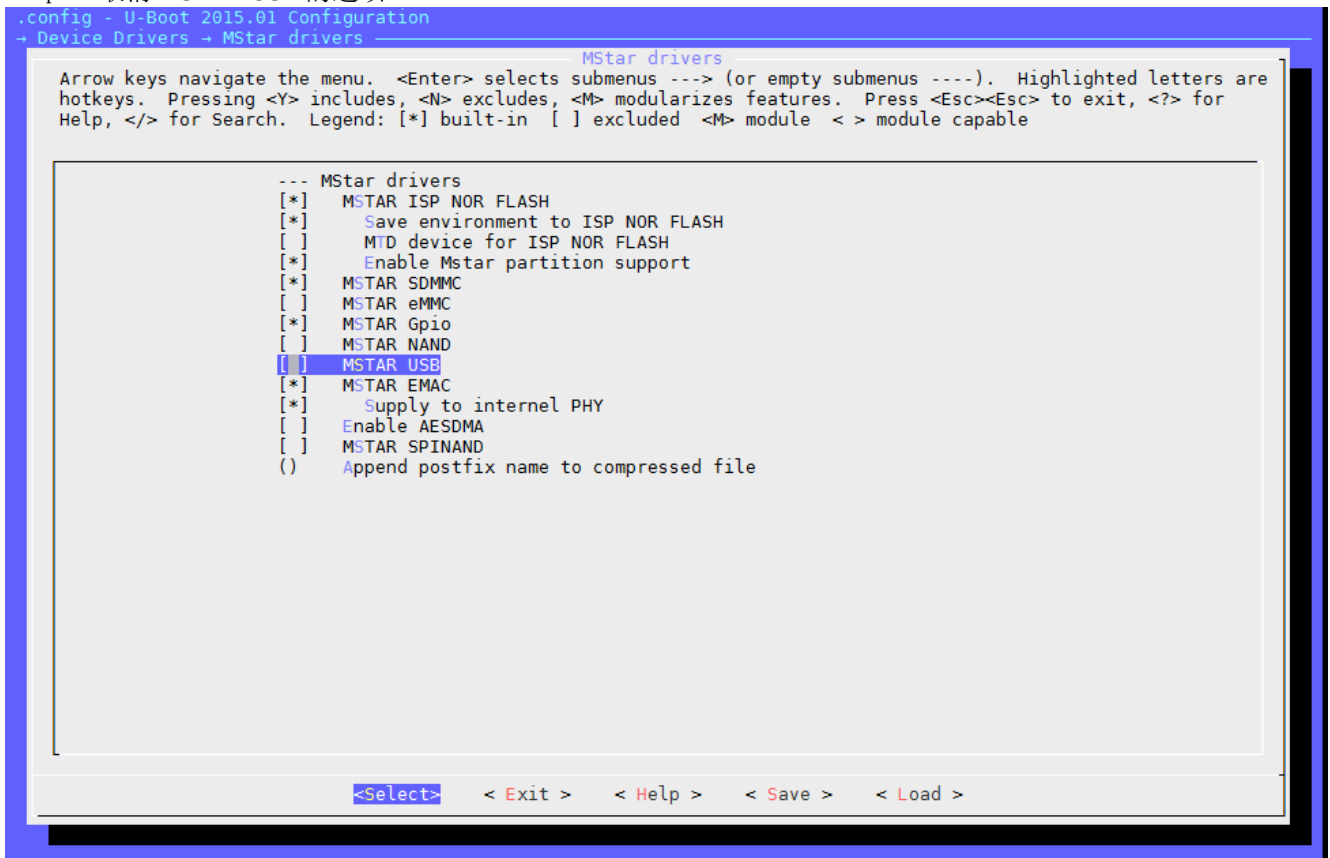


1.3. USB

需要在 U-Boot 及 Linux Kernel 进行调整才能完全关闭该组件

1.3.1 调整 U-Boot

Step1. 取消 MSTAR USB 的选项





1.3.2 调整 Linux Kernel

Step1. 修改文件 linux-4.9/arch/arm/boot/dts/infinity6.dtsi (调整 status = "disabled"来关闭 USB)

```
225  
226 .....Mstar-ehci-1 {  
227 .....compatible = "Mstar-ehci-1";  
228 .....clocks = <&CLK_utmi>;  
229 .....interrupts = <GIC_SPI INT_IRQ_UHC IRQ_TYPE_LEVEL_HIGH>;  
230 .....status = "disabled";  
231 .....};  
232
```



2. 组件时钟频率配置

2.1. CPU 时钟频率配置

2.1.1 Voltage scaling 配置

- 提供 **voltage scaling** 的切换，预设是关闭。可通过如下命令设置开启该配置。
`echo 1 > /sys/devices/system/cpu/cpufreq/scaling_voltage`
- 该配置开启后，系统会自动针对目前的温度(T)来进行 **voltage** 的切换。切换策略如下：
 $T > 60^{\circ}\text{C} : \text{VDD} = 0.9\text{V}$
 $T < 40^{\circ}\text{C} : \text{VDD} = 1.0\text{V}$

2.1.2 Clock scaling 配置

- 提供 **clock scaling** 範圍的設置，可通過入下命令設置 **clock scaling** 的範圍。
`echo s_min > /sys/devices/system/cpu/cpufreq/policy0/scaling_min_freq` (default 400MHz)
`echo s_max > /sys/devices/system/cpu/cpufreq/policy0/scaling_max_freq` (default 800MHz)
- 提供 **clock** 設置
`echo performance > /sys/devices/system/cpu/cpu0/cpufreq/scaling_governor`
clock 固定运行在 **s_max**
`echo ondemand > /sys/devices/system/cpu/cpu0/cpufreq/scaling_governor`
clock 可以在 **s_min** 和 **s_max** 之间切换。
- 设置约束：
 - s_min** 必须小于等于 **s_max**
 - s_min** 必须大于等于 `/sys/devices/system/cpu/cpufreq/policy0/cpuinfo_min_freq`
 - s_max** 必须小于等于 `/sys/devices/system/cpu/cpufreq/policy0/cpuinfo_max_freq`

2.2. ISP 时钟频率配置

2.2.1 ISP 配置示例

在 `isp.ko`, `ispmid.ko` 加载之后，开启视频处理任务之前，即可通过如下命令设置相关频率：

- 读取目前的 **isp clock rate**, 可通过以下命令取得
`cat /sys/devices/virtual/mstar/isp0/isp_clk`
- 设置 **isp clock rate**, 可通过以下命令设置
`echo 240000000 > /sys/devices/virtual/mstar/isp0/isp_clk`



2.2.2 ISP 时钟频率档位

- 72000000
- 86000000
- 123000000
- 144000000
- 172000000
- 192000000
- 216000000
- 240000000

2.2.3 约束

以上的设置应该在模块加载完成之后操作模块功能之前设置，才能正确的生效。

2.3. 编码时钟频率配置

2.3.1 编码器配置示例

在 mhal.ko 加载时，可通过下面方式设定 clock rate。

- 上电进入系统后，打开 demo.sh，修改 mhal.ko 的加载时参数

```
insmod /config/modules/4.9.84/mhal.ko drv_venc_module.clk_rate=504000000
```

```
#kernel_mod_list
insmod /config/modules/4.9.84/csi.ko
insmod /config/modules/4.9.84/libcamera_if.ko
insmod /config/modules/4.9.84/mhal.ko drv_venc_module.clk_rate=504000000
insmod /config/modules/4.9.84/isp.ko
insmod /config/modules/4.9.84/ispalgo.ko
```

- 重新上电

2.3.2 编码器时钟频率档位

- 123000000
- 240000000
- 288000000
- 320000000
- 384000000
- 432000000
- 480000000

2.3.3 约束

以上的设置应该在模块加载時设置，才能正确的生效。432MHZ 与 480MHZ 两档依赖 1V 的 cpu core 电压。

2.4. VPE scaler 时钟频率配置

2.4.1 scaler 时钟频率配置

在 mhal.ko 加载之后，开启视频处理任务之前，即可通过如下命令设置相关频率：

- echo 320000000 > /sys/module/mhal/parameters/drv_scl_module.scl_clock



2.4.2 scaler 时钟频率档位

- 172000000
- 240000000
- 288000000
- 320000000

2.4.3 约束

以上的设置应该在模块加载完成之后操作模块功能之前设置，并在执行模块时才能正确的生效。

2.5. 观察 cpu 的温度

```
cat /sys/devices/virtual/mstar/msys/TEMP_R
```

结果仅供参考，因为误差可以达到 5 摄氏度。