

BananaPi R3

https://wiki.banana-pi.org/Banana_Pi_BPI-R3_Mini

Hardware

- MT7986(Filogic 830) quad core ARM A53 SoC
- 2G DDR RAM
- 8G eMMC flash, SPI-NAND (128 MiB)
- 2x 2.5GbE network port (airoha en8811h phy)
- dual-band wifi:
 - 2.4G
 - 5G



debug-uart

connections from the edge of board: GND,RX,TX (remember RX/TX swap on your adapter :))

Software

my R3mini came preinstalled with vendors openwrt (21.02-SNAPSHOT, Linux version 5.4.171) on emmc and nand. i suggest to leave the nand to have always a rescue-system and only flash emmc as productive system with a more recent version.

It will take some time till i can release a full emmc-image for R3 Mini, but my uboot-repo generates already a very basic bpi-r3 emmc image (Releases Page) without rootfs/kernel which can be used on r3mini as well. Userspace can generated with the buildchroot.sh of my BPI-Images Repo or extracted from a full r3 Image.

Step-by-step:

used usb-stick to get files accessible from r3mini

started with r3-img:

```
gunzip -c /mnt/sda2/bpi-r3_bookworm_nokernel.img.gz |dd bs=1024
conv=notrunc,fsync of=/dev/mmcblk0
```

then flash uboot (wonder why there is no mmcblk0boot0 block to flash the bl2 - seems to be a problem with vendor-image, in my linux i see the boot0):

```
#r3mini/bl2_r3mini_emmc_pcie.img to boot0 conv=notrunc,fsync  
dd if=/mnt/sda1/r3mini/fip_r3mini_emmc_pcie.bin bs=1024 conv=notrunc,fsync  
of=/dev/mmcblk0p4
```

Kernel (creates the bpi-r3.itb with conf-emmc-mini bootconfig):

<https://github.com/frank-w/BPI-Router-Linux/tree/6.6-r3mini>

need to drop the "run setbootconf;" from newboot first

```
BPI-R3M> run useusb  
BPI-R3M> setenv initrd rootfs.cpio.zst  
BPI-R3M> setenv fit r3mini/bpi-r3.itb  
BPI-R3M> setenv bootconf "#conf-emmc-mini"  
BPI-R3M> run newboot
```

how to get available bootconfigs from binary fit image:

```
dumpimage -l /media/frank/Android-x86/r3mini/bpi-r3.itb
```

vendor-kernel

DTS for reference:

<https://github.com/BPI-SINOVOIP/BPI-R3MINI-OPENWRT-V21.02.3/blob/main/target/linux/mediatek/files-5.4/arch/arm64/boot/dts/mediatek/mt7986a-bananapi-bpi-r3mini-emmc.dts>

chainload uboot

```
BPI-R3M> fatload usb 0:1 $loadaddr r3mini/u-boot-pcie.bin  
815592 bytes read in 73 ms (10.7 MiB/s)  
BPI-R3M> go $loadaddr  
## Starting application at 0x46000000 ...  
U-Boot 2024.01-bpi-r3mini-00011-g5aadabca11e5-dirty
```

pcie/nvme

not working yet

```
BPI-R3M> pci enum  
drivers/pci/pcie_mEDIATEK_gen3.c:mtk_pcie_startup_port[258] no card detected  
BPI-R3M> version  
U-Boot 2024.01-bpi-r3mini-00011-g5aadabca11e5-dirty (Jan 20 2024 - 20:57:24  
+01)  
  
aarch64-linux-gnu-gcc (Ubuntu 11.4.0-1ubuntu1~22.04) 11.4.0
```

GNU ld (GNU Binutils for Ubuntu) 2.38

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