

## (1/3) 模拟x86设备运行pcie设备驱动，读取英特尔的82540EM和82574L千兆以太网卡信息

模拟x86设备，添加82540EM和82574L千兆以太网卡，以测试pcie总线驱动。

- (01)对82540EM千兆以太网卡：读取类/供应商/设备ID，从EEPROM读取默认MAC地址。
- (02)对82574L千兆以太网卡：读取类/供应商/设备ID，读取MAC，并通过写寄存器方式更改MAC地址；

```
root@archiso ~ # dmesg | grep eason
[ 40.939188] [eason:init] pci : init
[ 40.939189] [eason:init] =====
[ 40.939212] [eason:probe] pci : probe
[ 40.958887] [eason] start/len/flags: 0xFEAA0000/20000/40200
[ 40.958929] [eason] enum_max: 255,enum_cur: 255
[ 40.958930] [eason] class revision : 0x2000000 ; [vendor:device] : [8086:10d3] ; revision : 0
[ 40.958963] [eason:mac1] original      mac_addr : 52:54:00:12:34:58
[ 40.959037] [eason:mac2] manually set mac_addr : 52:54:00:12:34:69
[ 40.959037] [eason] irq allocated : 10 ;eason
[ 40.959038] [eason] driver name: pci_busDru_e1000 ; device name : (null) ;
[ 40.959040] [eason] #####
[ 40.962396] [eason:probe] pci : probe
[ 40.985291] [eason] start/len/flags: 0xFE840000/20000/40200
[ 40.985327] [eason] enum_max: 23,enum_cur: 20
[ 40.985329] [eason] class revision : 0x2000000 ; [vendor:device] : [8086:10d3] ; revision : 0
[ 40.985351] [eason:mac1] original      mac_addr : 52:54:00:12:34:57
[ 40.985387] [eason:mac2] manually set mac_addr : 52:54:00:12:34:68
[ 40.985388] [eason] irq allocated : 10 ;eason
[ 40.985388] [eason] driver name: pci_busDru_e1000 ; device name : (null) ;
[ 40.985390] [eason] #####
[ 72.996238] [eason:exit] pci : exit
[ 72.996242] [eason:exit] =====
[ 72.996260] [eason:remove] pci : remove
[ 72.996296] [eason:irq] irq : 10
[ 73.018882] [eason] pci: Device is removed successfully
[ 73.018886] [eason] *****
[ 73.018921] [eason:remove] pci : remove
[ 73.018947] [eason:irq] irq : 10
[ 73.038504] [eason] pci: Device is removed successfully
[ 73.038515] [eason] *****
root@archiso ~ # lspci -tv
-[0000:00]-+-00.0  Intel Corporation 440FX - 82441FX PMC [Natoma]
              +-01.0  Intel Corporation 82371SB PIIX3 ISA [Natoma/Triton II]
              +-01.1  Intel Corporation 82371SB PIIX3 IDE [Natoma/Triton II]
              +-01.3  Intel Corporation 82371AB/EB/MB PIIX4 ACPI
              +-02.0  Device 1234:1111
              +-03.0  Intel Corporation 82540EM Gigabit Ethernet Controller
              +-04.0  Red Hat, Inc. QEMU XHCI Host Controller
              +-05.0  Ensoniq ES1370 [AudioPCI]
              +-06.0  NEC Corporation uPD720200 USB 3.0 Host Controller
              +-07.0  Red Hat, Inc. PCI SD Card Host Controller Interface
              +-08.0  Intel Corporation 82801DB/DBM (ICH4/ICH4-M) USB2 EHCI Controller
              +-09.0-[01]----00.0  Intel Corporation 82574L Gigabit Network Connection
              \-0a.0  Intel Corporation 82574L Gigabit Network Connection
```

## (2/3) 模拟 ARM Cortex-M3 芯片

(01) 查询支持的设备列表（仅保留eason\_m3设备/开发板）：

```
[eason@Arch]$ ./qemu-system-arm -M help Supported machines are:
eason_m3 eason's machine ( cortex-m3 , tested)
none empty machine
```

## (02) 启动qemu-system-arm仿真eason\_m3设备，运行demo程序 (startup.bin)

- 备注：目前仅参考PCIE设备linux驱动的数据结构，从程序架构上优化了芯片SOC数据结构。

```
[eason@Arch]$ ./qemu-system-arm -M eason_m3 -kernel startup.bin -nographic
```

```
[01] Entry from main!
```

```
[ISR] Execute in ISR to respond to interrupt from [source: demo] !
```

```
QEMU: Terminated (按下快捷键退出QEMU)
```

```
[eason@Arch datas]$ ./qemu-system-arm -M help
```

```
Supported machines are:
```

```
eason_m3          eason's machine ( cortex-m3 , tested)
```

```
none             empty machine
```

```
[eason@Arch datas]$ ./qemu-system-arm -M eason_m3 -kernel startup.bin -nographic
```

```
[01] Entry from main!
```

```
[ISR] Execute in ISR to respond to interrupt from [source: demo] !
```

```
QEMU: Terminated
```

```
[eason@Arch datas]$
```

## (3/3) 模拟 RISC-V MCU:: rv32imac 芯片

### (01) 查询支持的设备列表（仅保留easonLiang\_rv32imac和eason\_demo\_riscv的设备/开发板）：

```
[eason@Arch soc_pcie]$ ./qemu-system-riscv32 -M help
```

```
Supported machines are:
```

```
easonLiang_rv32imac EasonLiang's RISC-V dev board (mcu::rv32imac)
```

```
eason_demo_riscv eason's demo Board for RISC-V
```

```
none empty machine
```

### (02) 启动qemu-system-riscv32仿真easonLiang\_rv32imac设备，运行hello\_world程序 (hello\_rv32imac.elf)

```
[eason@Arch soc_pcie]$ ./qemu-system-riscv32 -M easonLiang_rv32imac -nographic -  
kernel hello_rv32imac.elf
```

```
Hello, World!
```

```
Language : C
```

```
Author : EasonLiang
```

```
Env Type : Regressive Integration
```

```
Build Platform : ArchLinux @ 20230814
```

Running Platform : Emulated RISC-V

```
[eason@Arch soc_pcie]$ ./qemu-system-riscv32 -M help
Supported machines are:
easonLiang_rv32imac  EasonLiang's RISC-V dev board (mcu::rv32imac)
eason_demo_riscv     eason's demo Board for RISC-V
none                 empty machine
[eason@Arch soc_pcie]$ ./qemu-system-riscv32 -M easonLiang_rv32imac
-nographic -kernel hello_rv32imac.elf
Hello, World!
Language : C
Author : EasonLiang
Env Type : Regressive Integration
Build Platform : ArchLinux @ 20230814
Running Platform : Emulated RISC-V
QEMU: Terminated
[eason@Arch soc_pcie]$
```

(03) 为easonLiang\_rv32imac开发板编译应用程序：

```
riscv64-unknown-elf-gcc -march=rv32imac -mabi=ilp32 -mmodel=medlow -ffunction-sections
-fdata-sections \ --specs=nano.specs -O0 -g -nostartfiles -nostdlib \ -T
sdk_easonLiang/rv32imac/hello.lds -L sdk_easonLiang/rv32imac/libs/ -Wl,--gc-sections \
hello_rv32imac.c -Wl,--start-group -lc -lgcc -lm -lmetal -lmetal-gloss -Wl,--end-group -
o hello_rv32imac.elf
```