



HiKey970

PCIe Development Guide

Issue	01
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HiSilicon Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: <http://www.hisilicon.com>

Email: support@hisilicon.com



Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 01 (2018-03-11)

The first version.



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1 Description

1.1 PCIe description

1.1.1 General Description

PCI Express (Peripheral Component Interconnect Express), officially abbreviated as PCIe, is a high-speed serial computer expansion bus standard.

1.1.2 Features

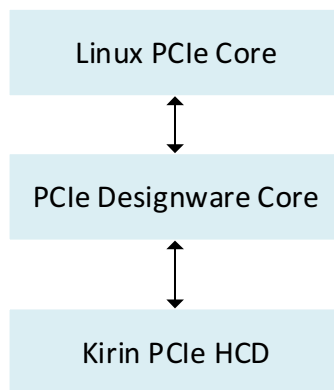
The PCIe has the following features:

- Compliance to the PCIe Specification (Rev 3.0).
- PCIe works in RootComplex mode.
- Support GEN1/GEN2 speed.
- Support MSI/INTx.
- Don't support MSI-X
- Don't support hotplug.
- Supports M.2 PCIe interface devices
- Supports MINI PCIe interface devices



2 Development

2.1 Driver Architecture



2.2 Driver Configuration

2.2.1 Source Location

- Kirin PCIe host controller and phy initialization can be found @
 - drivers/pci/host/pcie-kirin960 (HiKey960)
 - drivers/pci/host/pcie-kirin970 (HiKey970)
- Kirin PCIe host controller driver can be found @
 - drivers/pci/host/pcie-kirin.c
- PCIe designware core driver can be found @
 - drivers/pci/host/pcie-designware.c
- All other Linux PCIe Core can be found in
 - driver/pci

2.2.2 Kernel Configuration Options

- CONFIG_PCIE_KIRIN=y



2.2.3 DT Configuration

- The DT configuration documentation can be found in the linux kernel @
 - Documentation/devicetree/bindings/pci/ kirin-pcie.txt
- The DT configuration can be found @
 - arch/arm64/boot/dts/hisilicon/hi3660.dtsi (HiKey960)
 - arch/arm64/boot/dts/hisilicon/kirin970.dtsi (HiKey970)

2.3 Debug Tool

You can get a list of all PCI devices present on the system using the command “cat /proc/bus/pci/devices”.

Otherwise, You can use lspci tool which can be got from website to display information about PCI buses and devices that are attached to them. To list all PCI devices that are in the system, type the following at a shell prompt:

```
lspci
00:00.0 Class 0604: Device 19e5:3670 (rev 01)
01:00.0 Class 0604: Device 10b5:8606 (rev ba)
02:01.0 Class 0604: Device 10b5:8606 (rev ba)
02:04.0 Class 0604: Device 10b5:8606 (rev ba)
02:05.0 Class 0604: Device 10b5:8606 (rev ba)
02:07.0 Class 0604: Device 10b5:8606 (rev ba)
02:09.0 Class 0604: Device 10b5:8606 (rev ba)
03:00.0 Class 0108: Device 126f:2263 (rev 03)
05:00.0 Class 0280: Device 168c:002e (rev 01)
06:00.0 Class 0200: Device 10ec:8168 (rev 07)
lspci -vv
00:00.0 Class 0604: Device 19e5:3670 (rev 01)
Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping-
SERR+ FastB2B- DisINTx+
Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort-
<MAbort- >SERR- <PERR- INTx-
Latency: 0
Region 0: [virtual] Memory at f6000000 (32-bit, non-prefetchable) [size=16M]
Bus: primary=00, secondary=01, subordinate=01, sec-latency=0
Memory behind bridge: 01000000-012fffff
Prefetchable memory behind bridge: 01300000-013fffff
Secondary status: 66MHz- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort-
<MAbort+ <SERR- <PERR-
BridgeCtl: Parity- SERR- NoISA- VGA- MAbort- >Reset- FastB2B-
PriDiscTmr- SecDiscTmr- DiscTmrStat- DiscTmrSERREn-
Capabilities: <access denied>
Kernel driver in use: pcieport
```



CAUTION

You can get more about lspci tool from website <https://github.com/pciutils/pciutils>.
