

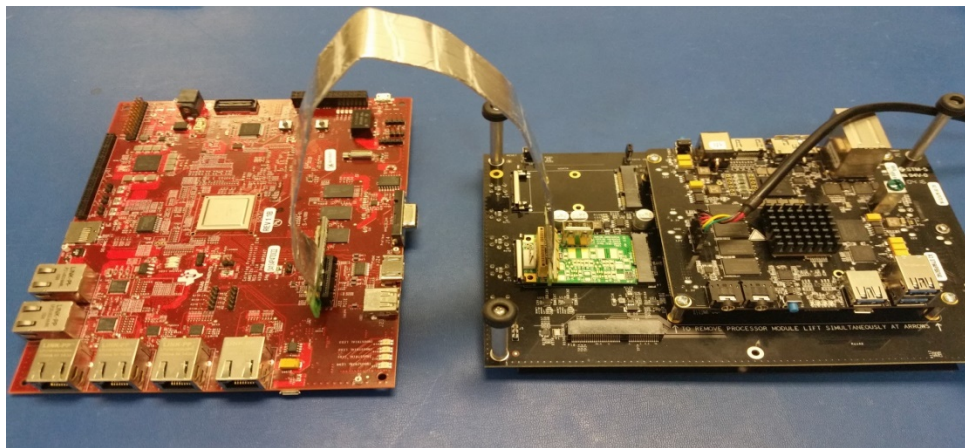
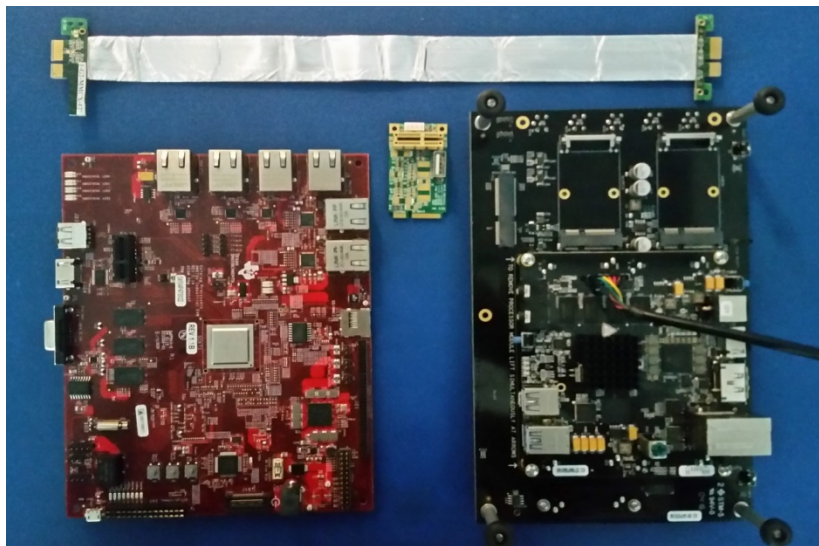
Enabling PCIe End Point (EP) Mode on AM57x using Processor SDK

Agenda

- Hardware and Connections
- Software Prerequisites
- Kernel Configuration and Build
- PCIe End Point (EP) Test

Hardware and Connection

1. PCIe Bus Extender (PE-FLEX1-MM-CX-3")
2. AM572x IDK
3. mPCIe-to-PCIe Adapter
4. AM572x GP EVM



Software Prerequisites

Processor SDK Download Page:

http://www.ti.com/lscs/ti/tools-software/processor_sw.page

Linux Kernel User's Guide:

http://processors.wiki.ti.com/index.php/Linux_Kernel_Users_Guide

```
PATH=<ProcSDK_Install_Dir>/linux-devkit/sysroots/x86_64-arago-linux/usr/bin:$PATH
```

Kernel Configuration and Build

KConfig changes to enable End Point Mode

```
make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- tisdk_am57xx-  
evm_defconfig
```

```
make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- menuconfig
```

```
Bus Support-> PCI Endpoint->PCI Endpoint Support <select>  
->PCI Endpoint Test Drive <select>
```

```
PCI Controller Drivers->PCIe Mode-> endpoint only mode <select>
```

Kernel Configuration and Build

Am57xx-evm-common.dtsi file change for End Point

Disable RC

```
&pciel_rc {  
-     status = "okay";  
     gpios = <&gpio2 8 GPIO_ACTIVE_LOW>;  
};
```

Enable EP

```
&pciel_ep {  
+     status = "okay";  
     gpios = <&gpio2 8 GPIO_ACTIVE_LOW>;  
};
```

Kernel Configuration and Build

Build the End Point Kernel image and device tree binary

```
make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- zImage
```

```
make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- am57xx-evm-reva3.dtb or
```

```
make -j8 ARCH=arm CROSS_COMPILE=arm-linux-gnueabihf- am57xx-evm-idk.dtb
```

Build the test utility for Root Complex

```
cd tools/pci
```

```
arm-linux-gnueabihf-gcc -I../../include/uapi -o pcitest pcitest.c
```

PCI End Point Test

Base Address Register (BAR) test:

```
#!/bin/sh
echo "BAR tests"
echo
bar=0
while [ $bar -lt 6 ]
do
    pcitest -b $bar
    bar=`expr $bar + 1`
done
```


PCI Test Utility: Interrupt

Interrupt test:

```
echo
echo "Interrupt tests"
echo
pcitest -l
msi=1
while [ $msi -lt 33 ]
do
    pcitest -m $msi
    msi=`expr $msi + 1`
done
```

PCI Test Utility: Read

Read test:

```
echo
```

```
echo "Read Tests"
```

```
echo
```

```
pcitest -r -s 1
```

```
pcitest -r -s 1024
```

```
pcitest -r -s 1025
```

```
pcitest -r -s 1024000
```

```
pcitest -r -s 1024001
```

PCI Test Utility: Write

Write test:

```
echo "Write Tests"
```

```
echo
```

```
pcitest -w -s 1
```

```
pcitest -w -s 1024
```

```
pcitest -w -s 1025
```

```
pcitest -w -s 1024000
```

```
pcitest -w -s 1024001
```

PCI Test Utility: Copy

Copy test:

```
echo "Copy Tests"
```

```
echo
```

```
pcitest -c -s 1
```

```
pcitest -c -s 1024
```

```
pcitest -c -s 1025
```

```
pcitest -c -s 1024000
```

```
pcitest -c -s 1024001
```

For More Information

- Sitara Processors Product Overview: <http://www.ti.com/sitara>
- Processor SDK Download page <http://www.ti.com/processorsdk>
- Linux Kernel User's Guide:
http://processors.wiki.ti.com/index.php/Linux_Kernel_Users_Guide
- Linux Core PCIe EP User's Guide:
http://processors.wiki.ti.com/index.php/Linux_Core_PCIe_EP_User%27s_Guide
- For questions regarding topics covered in this training, visit the Sitara Processors support forum at the TI E2E Community website:
https://e2e.ti.com/support/arm/sitara_arm/f/791