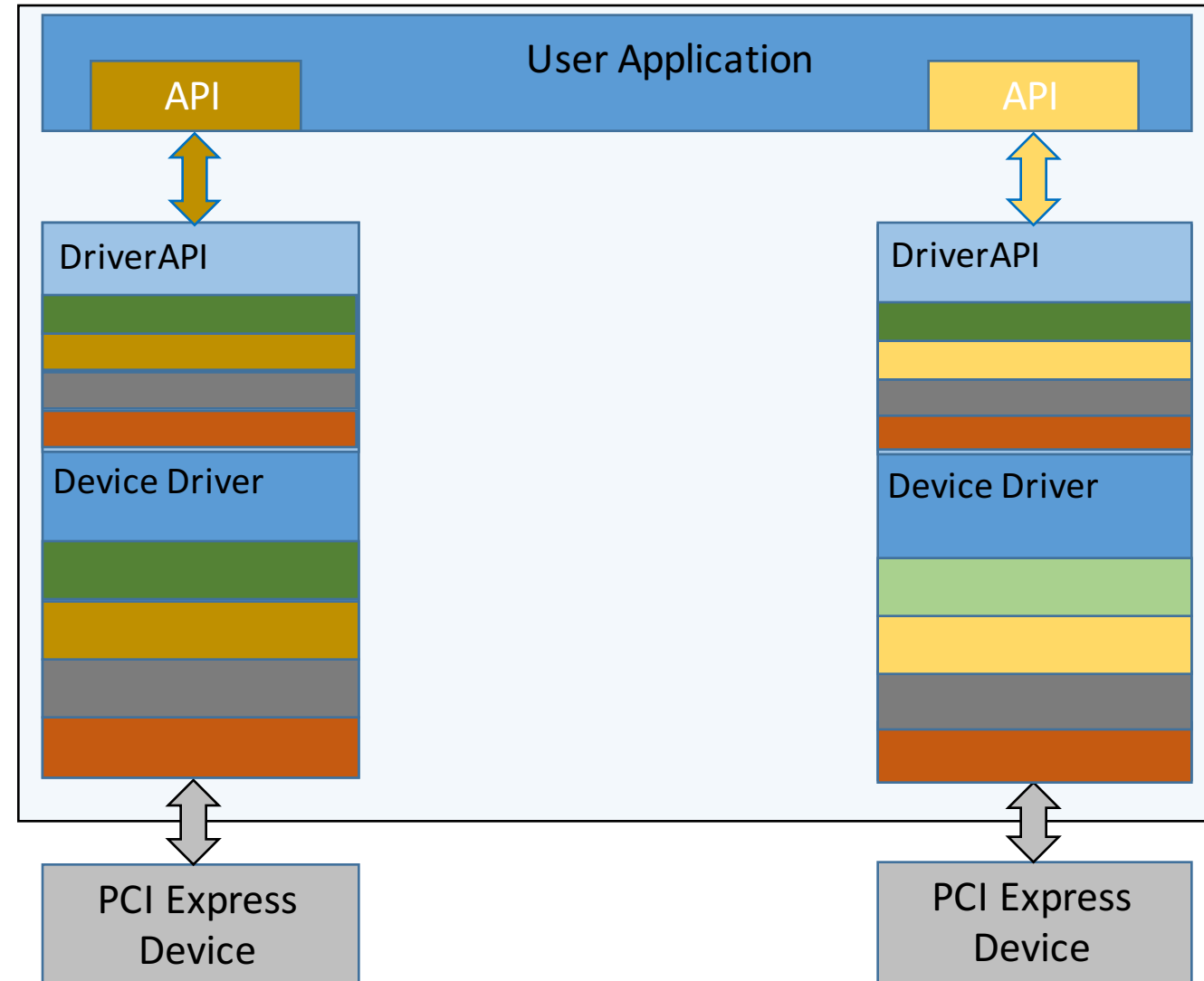


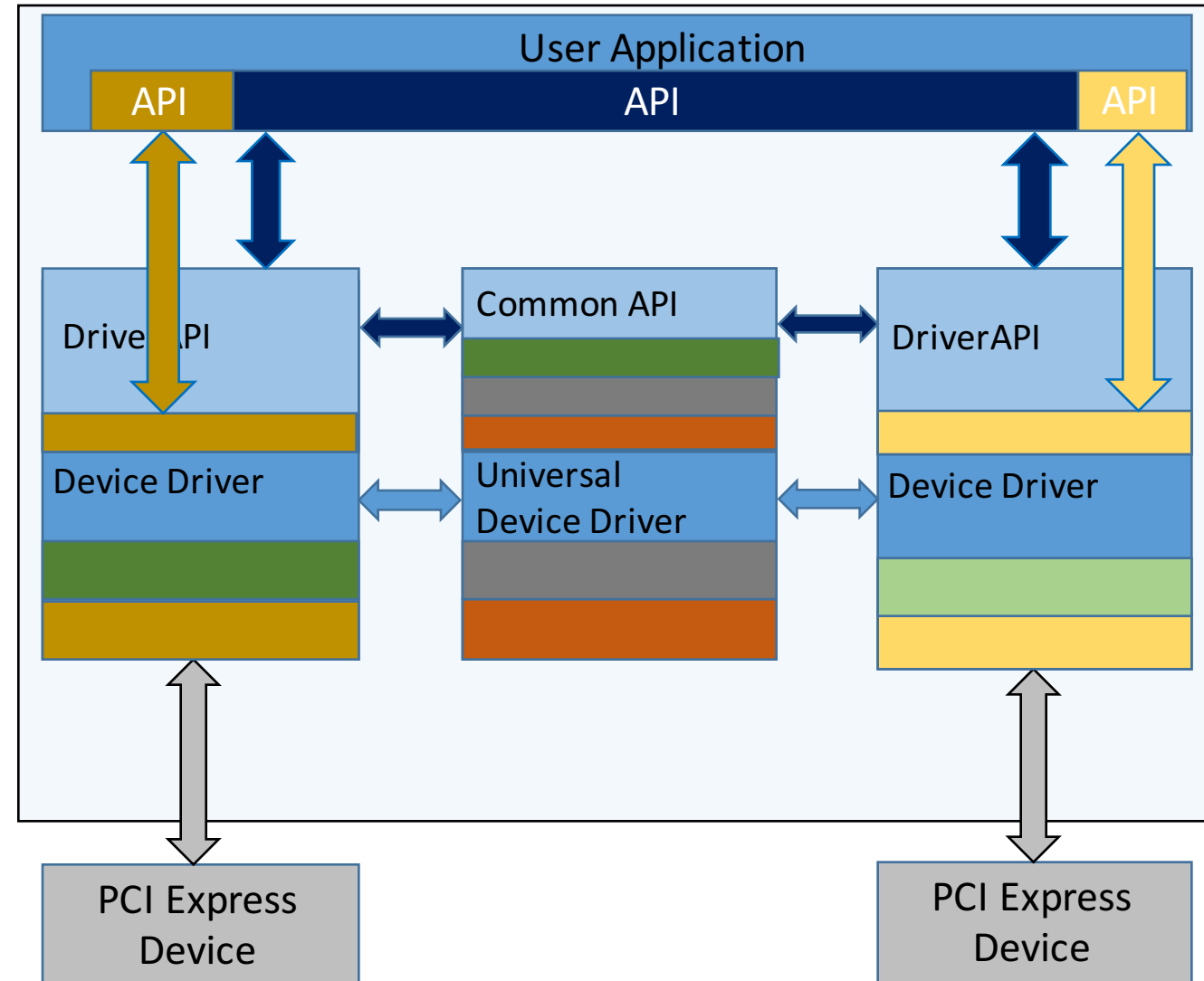
The universal PCI Express Device Driver for MTCA.4

L.Petrosyan

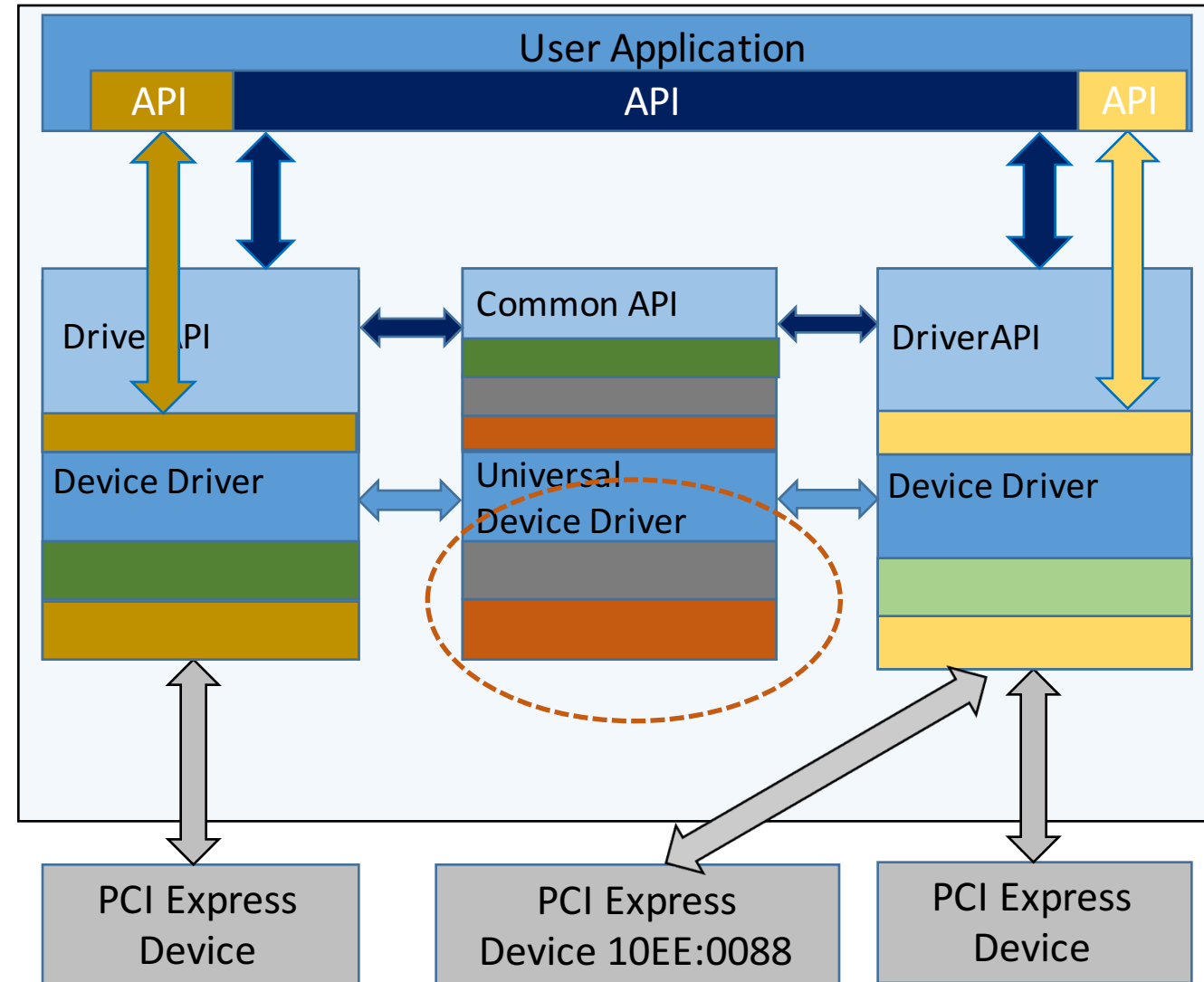
- Basic PCI Express functionality
 - Mapping memories
 - **Read, write** and some common **ioctl**
 - Error handling
 - Hot Plug
- Standards or Guidelines functionality
 - Standard Registers Set
 - SHAPI Registers Set (PICMG)
 - PICMG Standard Device Model
 - PCIe HotPlug functionality
- Device specific but has common API
 - DMA
- Device specific functionality



- Split Device Driver into two parts follow the Linux Device Driver stacking Model
- Add all common functionality and API into universal part
 - Basic PCI Express functionality
 - Standards or Guidelines functionality
- Add Common API for Device specific functionality into universal part but keep functionality in Device Driver side
 - Device specific but has common API



- this approach facilitates creation of new drivers and user applications
 - The Device Driver created on the top of **universal** driver has all necessary PCI Express functionality
 - It could be binded to any PCI Express Device
- echo „10EE:0088“ > /sys/bus/devices/xxx/driver/new_id*
- facilitates integration of new devices into the existing software

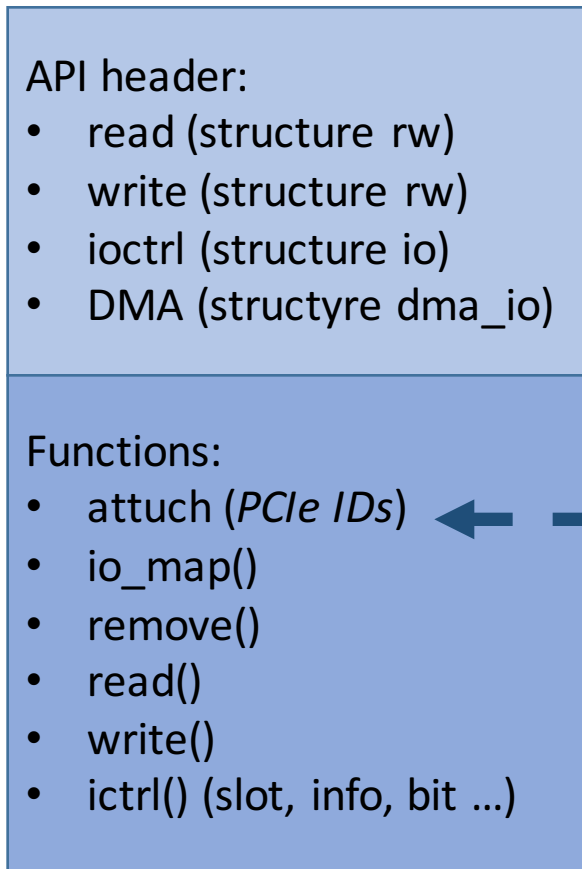


Drivers and tools set

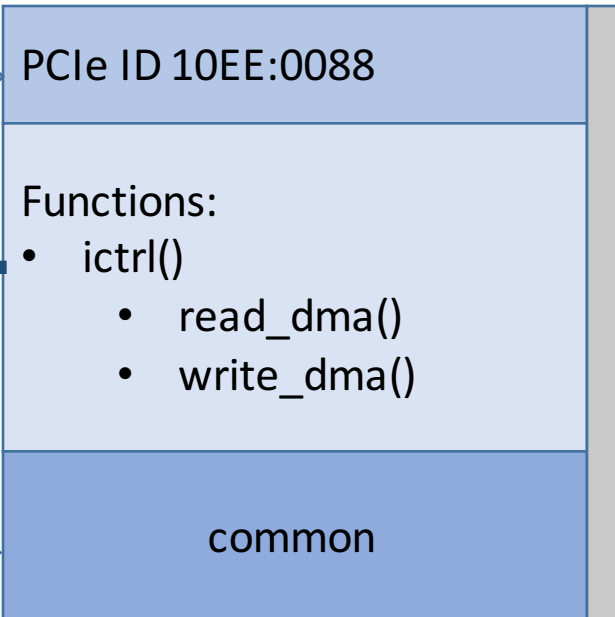
OS (device drivers)

User applications

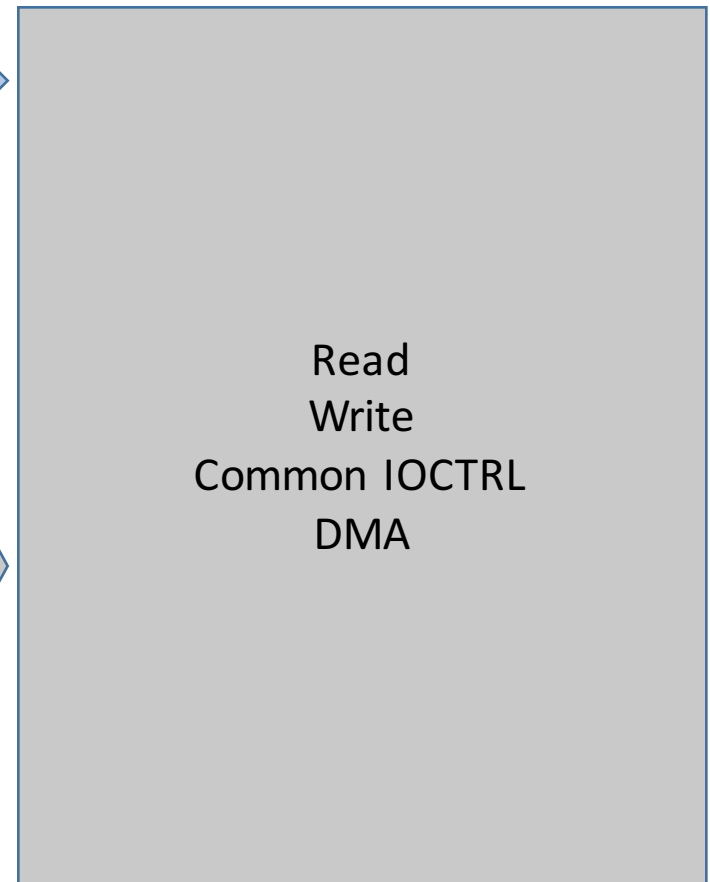
UPCIEDEV base level driver



PCIEDEV top level driver



MTCAMONITOR



MTCAMONITOR

MTCAMONITOR shows all Attached AMC(PCIe) boards
And provides read/write access

The screenshot displays two software windows. The main window, titled 'mTCA-MONITOR', features a grid of 11 columns representing different PCIe devices. Each column contains fields for device ID, vendor ID, driver name, BARs, and a status indicator. The second window, titled 'PCIe Monitor v2.0', provides a detailed view of a selected device, showing its address map, device path, and various configuration parameters like Bar, Data Mode, Offset, Mask, Address, Data, Radix, I/O, and DMA. A blue arrow points from the 'PCIe-monitor' entry in the main window to the 'PCIe Monitor v2.0' window.

10	11	12	2	3	4	5	6	7	8	9
Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:
0000:04:10.0	0000:04:0a.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:04:11.0
10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748
SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH OFF	SWITCH ON	SWITCH ON
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:
	0000:0a:00.0	0000:0c:04.0			0000:05:00.0	0000:08:00.0		0000:10:00.0		
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:
	10ee:0020	10b5:9056			1796:0018	10ee:0088		10ee:0088		
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:
	3300:0020	12fe:0600			1796:0018	3300:0088		3300:0088		
BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:
	16777215	511			16383	67108863		67108863		
	0	255			0	67108863		67108863		
	0	65535			0	16777215		16777215		
	0	0			0	0		0		
	0	0			0	0		0		
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO

X2TIMER MODULE

FPGA FW based on DESY START_UP PROJECT
Has separate device driver, but based on the universal driver API
PCIe ID 10EE:0020

SIS8300 BOARD LCBPM

FPGA FW based on DESY START_UP PROJECT
PCIe ID 10EE:0088

SIS8300 DIGITIZER

STRUCK FW with DMA R/W
PCIe ID 1796:0018, 1796:0019



Switch ON the crate

SIS8300 board with the LCBPM project was binded to pciedev driver.

No drivers for X2TIMER and SIS8300 with the STRUCK FM boards

The “Bind pciedev” button activated for the boards which has no driver binded

We can bind pciedev driver to X2TIMER and SIS8300 boards

Scan PCIe Bus				Run PCIe-Monitor			Rescan Bus			Quit		
1	10	11	12	2	3	4	5	6	7	8	9	9-1
Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:
0000:02:01.0	0000:04:10.0	0000:04:0a.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:02:09.0	0000:04:11.0
10b5:8717	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8717	10b5:8748
SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:
0000:03:00.0				0000:07:00.0			0000:08:00.0	0000:09:00.0				
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:
00:00				10ee:0020			1796:0018	10ee:0088				
00:00				3300:0020			1796:0018	3300:0088				
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:
NO DRIVER				NO DRIVER			NO DRIVER	pciedev				
DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	4.0.0	DevFile:	DevFile:	DevFile:	DevFile:
								pciedevs6				
BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:
				1048575			16383	67108863				
				0			0	67108863				
				0			0	16777215				
				0			0	0				
				0			0	0				
				0			0	0				
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI

We can get board information pushing "INFO"

mTCA-MONITOR-pciehp

Scan PCIe Bus				Run PCIe-Monitor		Rescan Bus				Quit			
1 Dev: 0000:02:01.0 10b5:8717 SWITCH ON LSPCI	10 Dev: 0000:04:10.0 10b5:8748 SWITCH ON LSPCI	11 Dev: 0000:04:0a.0 10b5:8748 SWITCH ON LSPCI	12 Dev: 0000:04:0b.0 10b5:8748 SWITCH ON LSPCI	2 Dev: 0000:04:02.0 10b5:8748 SWITCH OFF LSPCI	3 Dev: 0000:04:01.0 10b5:8748 SWITCH ON LSPCI	4 Dev: 0000:04:00.0 10b5:8748 SWITCH ON LSPCI	5 Dev: 0000:04:08.0 10b5:8748 SWITCH OFF LSPCI	6 Dev: 0000:04:09.0 10b5:8748 SWITCH OFF LSPCI	7 Dev: 0000:04:13.0 10b5:8748 SWITCH ON LSPCI	8 Dev: 0000:04:12.0 10b5:8748 SWITCH ON LSPCI	9 Dev: 0000:02:09.0 10b5:8717 SWITCH ON LSPCI	9-1 Dev: 0000:04:1 10b5:874 SWITCH ON LSPCI	

LSPCI

Command

Run it

Quit

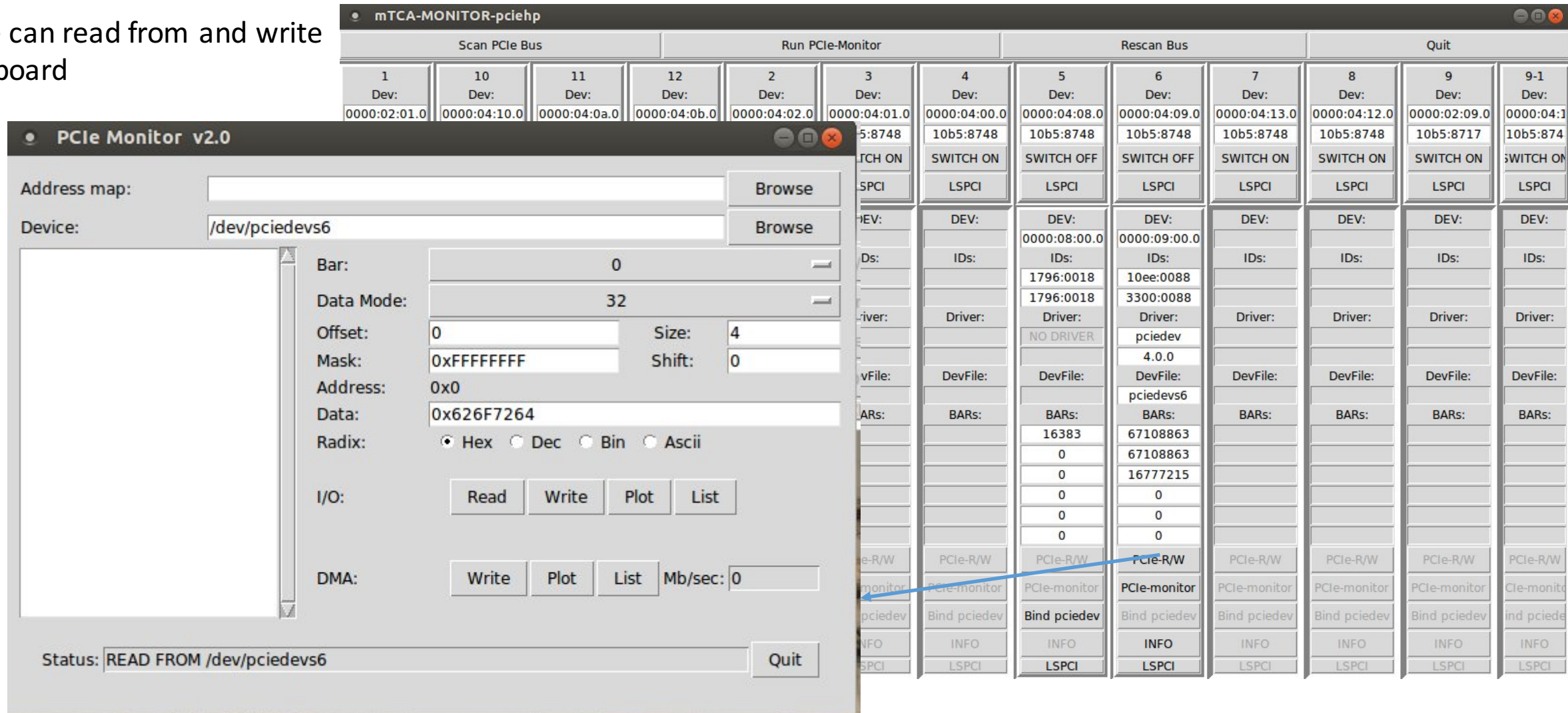
```

cat /proc/pciedevs6
UPCIEDEV Driver Version: 5.1
Driver Version: 4.0
Board NUM: 0
Slot NUM: 6
Board ID: 2
Board Version: 1000000
Board Date: 20120224
Board HW Ver: 1
Board Next Prj: 0
Board Reserved: 0
Number of Proj: 1
Project ID: 1
Project ID: 1
Project Version: 1000000
Project Date: 20120224
Project Reserver: 0
Project Next: 0

```

DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:
0000:08:00.0	0000:09:00.0					
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:
1796:0018	10ee:0088					
1796:0018	3300:0088					
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:
NO DRIVER	pciedev					
	4.0.0					
DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:
	pciedevs6					
BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:
16383	67108863					
0	67108863					
0	16777215					
0	0					
0	0					
0	0					
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev
INFO	INFO	INFO	INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI

We can read from and write to board



PCIe Monitor v2.0

Address map: **Browse**

Device: **Browse**

Bar:

Data Mode:

Offset: Size:

Mask: Shift:

Address:

Data:

Radix: ☒ Hex ☐ Dec ☐ Bin ☐ Ascii

I/O:

DMA: Mb/sec:

Status: **Quit**

Scan PCIe Bus				Run PCIe-Monitor		Rescan Bus				Quit			
1	10	11	12	2	3	4	5	6	7	8	9	9-1	
Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	
0000:02:01.0	0000:04:10.0	0000:04:0a.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:02:09.0	0000:04:11.0	
5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8717	10b5:8748	
SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	
							0000:08:00.0	0000:09:00.0					
							1796:0018	10ee:0088					
							1796:0018	3300:0088					
							NO DRIVER	pciedev					
							4.0.0						
							DevFile:	DevFile:					
							pciedevs6						
							BARs:	BARs:					
							16383	67108863					
							0	67108863					
							0	16777215					
							0	0					
							0	0					
							0	0					
							PCIe-R/W	PCIe-R/W					
							PCIe-monitor	PCIe-monitor					
							Bind pciedev	Bind pciedev					
							INFO	INFO					
							LSPCI	LSPCI					

pciedev driver attached to
X2TIMER and SIS8300 boards

Scan PCIe Bus				Run PCIe-Monitor			Rescan Bus			Quit		
1	10	11	12	2	3	4	5	6	7	8	9	9-1
Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:
0000:02:01.0	0000:04:10.0	0000:04:0a.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:02:09.0	0000:04:11.0
10b5:8717	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8717	10b5:8748
SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:
0000:03:00.0				0000:07:00.0			0000:08:00.0	0000:09:00.0				
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:
00:00				10ee:0020			1796:0018	10ee:0088				
00:00				3300:0020			1796:0018	3300:0088				
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:
NO DRIVER				pciedev			pciedev	pciedev				
				4.0.0			4.0.0	4.0.0				
DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:
				pciedevs2			pciedevs5	pciedevs6				
BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:	BARS:
				1048575			16383	67108863				
				0			0	67108863				
				0			0	16777215				
				0			0	0				
				0			0	0				
				0			0	0				
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI

2 Dev:	3 Dev:	4 Dev:	5 Dev:
0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0
10b5:8748	10b5:8748	10b5:8748	10b5:8748
SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF
LSPCI	LSPCI	LSPCI	LSPCI
DEV: 0000:07:00.0	DEV:	DEV:	DEV: 0000:08:00.0
IDs: 10ee:0020	IDs:	IDs:	IDs: 1796:0018
3300:0020			1796:0018
Driver: pcidev	Driver:	Driver:	Driver: pcidev
4.0.0			4.0.0
DevFile: pciedevs2	DevFile:	DevFile:	DevFile: pciedevs5
BARs: 1048575	BARs:	BARs:	BARs: 16383
0			0
0			0
0			0
0			0
0			0
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev
INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI

6 Dev:	7 Dev:	8 Dev:	9 Dev:
67108863	67108863	16777215	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
0	0	0	
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev
INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI

Blue arrows point from the 'PCIe-R/W' rows in the tables to the 'PCIe Monitor' windows above, indicating the source of the data.

We can read from and write to the boards

Custom drivers:

X1TIMER driver:

Separate driver created does not use the upciudev functionality but based on the upciudev API.

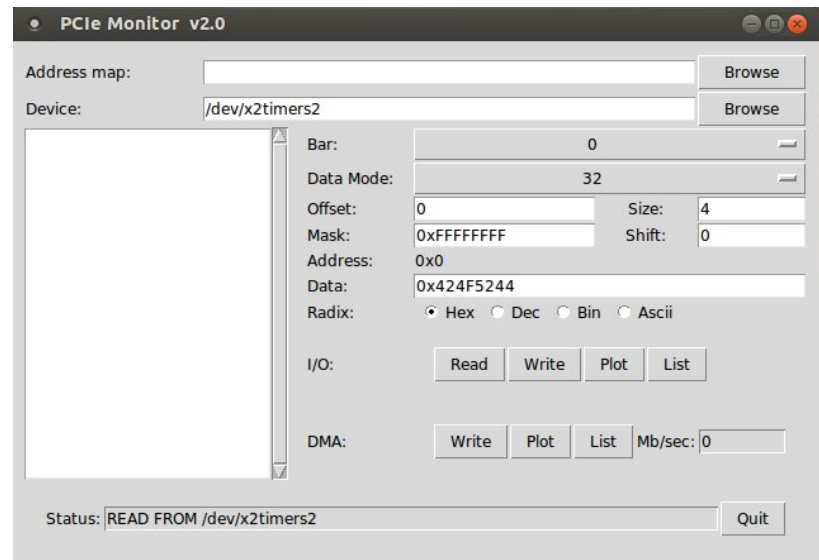
SIS8300 driver:

Based on the upciudev driver added only IOCTL for DMA.

SIS8300 LCBPM project:
pciudev driver.

Three different boards, three Drivers one user application.

Scan PCIe Bus				Run PCIe-Monitor			Rescan Bus			Quit		
1	10	11	12	2	3	4	5	6	7	8	9	9-1
Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:	Dev:
0000:02:01.0	0000:04:10.0	0000:04:0a.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:02:09.0	0000:04:11.0
10b5:8717	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8717	10b5:8748
SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:
0000:03:00.0				0000:07:00.0			0000:08:00.0	0000:09:00.0				
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:
00:00				10ee:0020			1796:0018	10ee:0088				
00:00				3300:0020			1796:0018	3300:0088				
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:
NO DRIVER				x1timer			sis8300	pciudev				
				3.5.0			4.0.0	4.0.0				
DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:
				x2timers2			sis8300s5	pciudev6				
BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:
				1048575			16383	0				
				0			0	0				
				0			0	0				
				0			0	0				
				0			0	0				
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev	Bind pciudev
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI



Address map: Browse

Device: Browse

Bar: 0

Data Mode: 32

Offset: 0 Size: 4

Mask: 0xFFFFFFFF Shift: 0

Address: 0x0

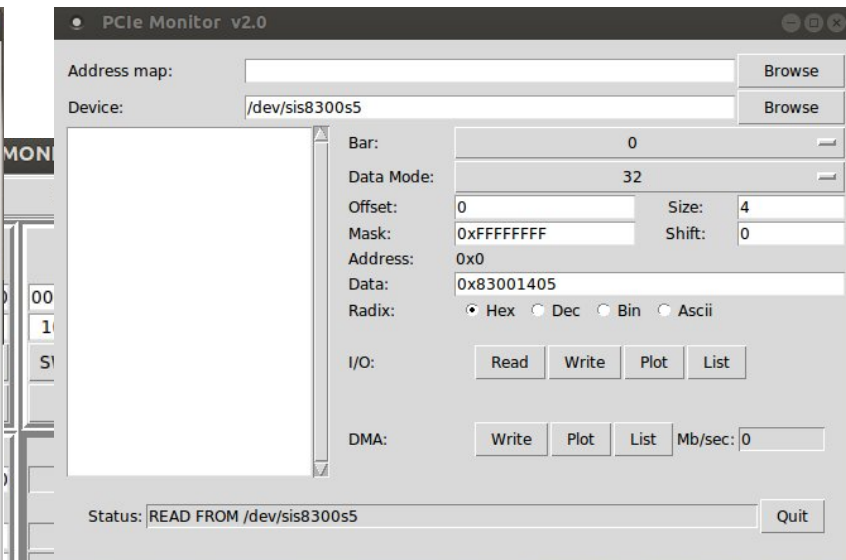
Data: 0x424F5244

Radix: ☒ Hex ☐ Dec ☐ Bin ☐ Ascii

I/O:

DMA: Mb/sec: 0

Status: READ FROM /dev/x2timers2



Address map: Browse

Device: Browse

Bar: 0

Data Mode: 32

Offset: 0 Size: 4

Mask: 0xFFFFFFFF Shift: 0

Address: 0x0

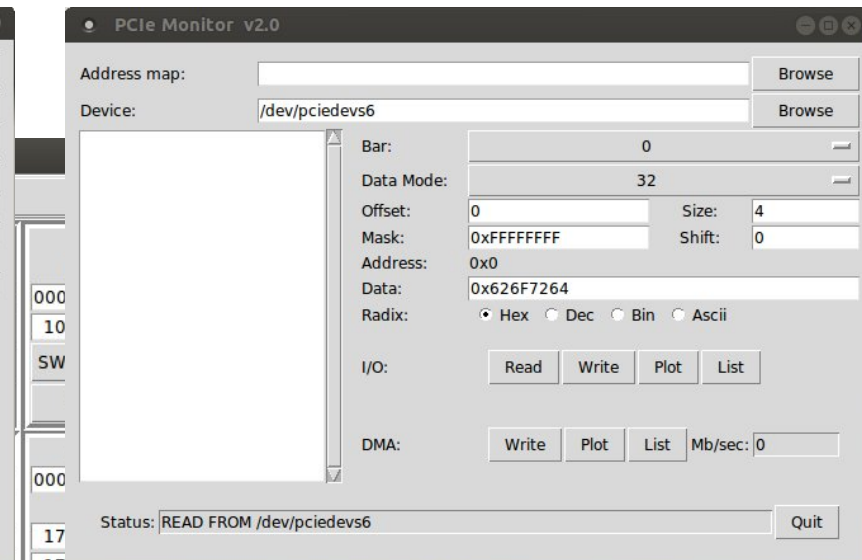
Data: 0x83001405

Radix: ☒ Hex ☐ Dec ☐ Bin ☐ Ascii

I/O:

DMA: Mb/sec: 0

Status: READ FROM /dev/sis8300s5



Address map: Browse

Device: Browse

Bar: 0

Data Mode: 32

Offset: 0 Size: 4

Mask: 0xFFFFFFFF Shift: 0

Address: 0x0

Data: 0x626F7264

Radix: ☒ Hex ☐ Dec ☐ Bin ☐ Ascii

I/O:

DMA: Mb/sec: 0

Status: READ FROM /dev/pciedevs6

We have read/write access to the boards

Driver: NO DRIVER	Driver:	Driver:	Driver:	Driver: x1timer	Driver:	Driver:	Driver: sis8300	Driver: pciedev	Driver:	Driver:	Driver:
DevFile:	DevFile:	DevFile:	DevFile:	DevFile: x2timers2	DevFile:	DevFile:	DevFile: sis8300s5	DevFile: pciedevs6	DevFile:	DevFile:	DevFile:
BARs:	BARs:	BARs:	BARs:	BARs: 1048575	BARs:	BARs:	BARs: 16383	BARs: 0	BARs:	BARs:	BARs:
				0			0	0			
				0			0	0			
				0			0	0			
				0			0	0			
				0			0	0			
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor
Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev	Bind pciedev
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI

[illegible]



Fast access to lspci for current board

[illegible]

Fast access to lspci for current MCH PCIe Switch port

```

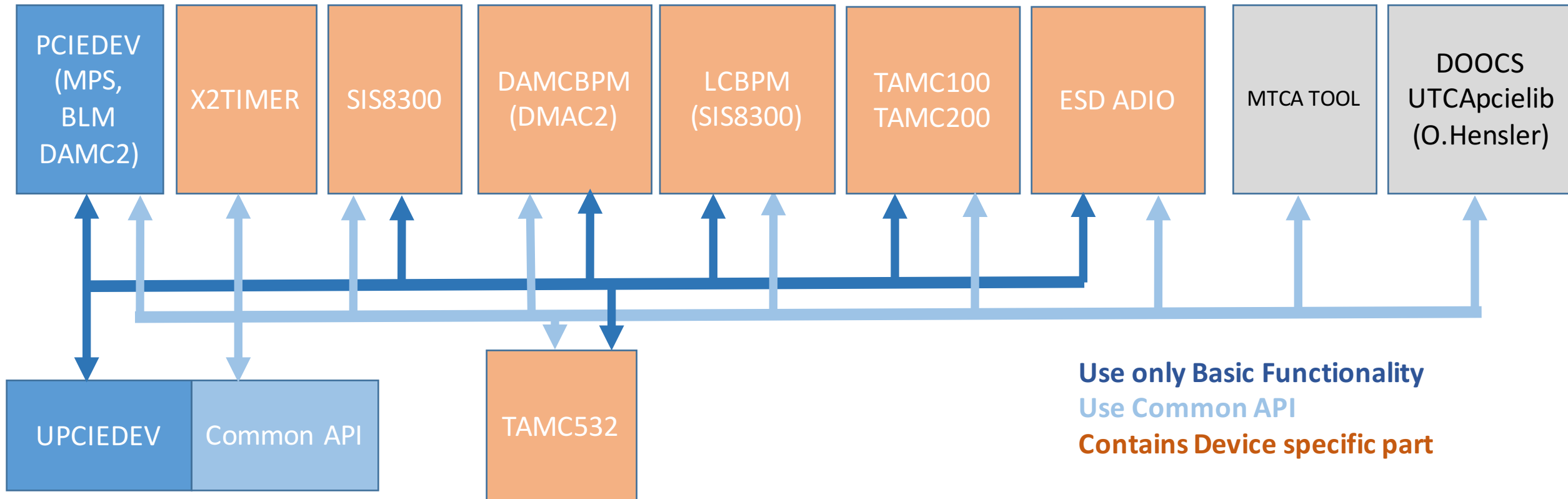
lspci -vvvv -s 0000:04:08.0
04:08.0 PCI bridge: PLX Technology, Inc. Device 8748 (rev ba) (prog-if 00 [Normal decode])
Control: I/O+ Mem+ BusMaster+ SpecCycle- MemWINV- VGASnoop- ParErr- Stepping- SERR- FastB2B- DisINTx+
Status: Cap+ 66MHz- UDF- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort- <SERR- <PERR- INTx-
Latency: 0, Cache Line Size: 64 bytes
Bus: primary=04, secondary=08, subordinate=08, sec-latency=0
I/O behind bridge: 0000f000-00000fff
Memory behind bridge: b9000000-b900ffff
Prefetchable memory behind bridge: 00000000b9000000-00000000ba0fffff
Secondary status: 66MHz- FastB2B- ParErr- DEVSEL=fast >TAbort- <TAbort- <MAbort- <SERR- <PERR-
BridgeCtl: Parity- SERR- NoISA- VGA- MAbort- >Reset- FastB2B-
PriDiscTmr- SecDiscTmr- DiscTmrStat- DiscTmrSRPrn-
Capabilities: [40] Power Management version 3
Flags: PMEClk- DSI- D1- D2- AuxCurrent=0mA PME(D0+,D1-,D2-,D3hot+,D3cold+)
Status: D0 NoSoftRst+ PME-Enable- DSel=0 DScale=0 PME-
Capabilities: [48] MSI: Enable+ Count=1/8 Maskable+ 64bit+
Address: 00000000fee00518 Data: 0000
Masking: 0000000f Pending: 00000000
Capabilities: [60] Express (v2) Downstream Port (Slot+), MSI 00
DevCap: MaxPayload 512 bytes, PhantFunc 0, Latency L0s <64ns, L1 <1us
ExtTag- RBE+ FLReset-
DevCtl: Report errors: Correctable- Non-Fatal- Fatal- Unsupported-
RlxdOrd+ ExtTag- PhantFunc- AuxPwr- NoSnoop+
MaxPayload 256 bytes, MaxReadReq 128 bytes
DevSta: CorrErr+ UncorrErr- FatalErr- UnsupReq+ AuxPwr- TransPend-
LnkCap: Port #8, Speed unknown, Width x4, ASPM L0s L1, Latency L0 <4us, L1 <4us
ClockPM- Surprise+ LLActRep+ BwNot-
LnkCtl: ASPM Disabled; Disabled- Retrain- CommClk-
ExtSynch- ClockPM- AutwidDis- BWInt- AutBWInt-
LnkSta: Speed 2.5GT/s, Width x4, TrErr- Train- SlotClk- DLActive+ BWMgmt+ ABWMgmt-
SltCap: AttnBtt+ PwrCtrl+ MRL+ AttnInd- PwrInd- HotPlug+ Surprise-
Slot #5, PowerLimit 25.000W; Interlock- NoCompl-
SltCtl: Enable: AttnBtt+ PwrFlt- MRL+ PresDet+ CmdCplt+ HPIrq+ LinkChg-
Control: AttnInd Unknown, PwrInd Unknown, Power- Interlock-
SltSta: Status: AttnBtt- PowerFlt- MRL- CmdCplt- PresDet+ Interlock-
Changed: MRL- PresDet- LinkState
DevCap2: Completion Timeout: Not Supported, TimeoutDis- ARIFwd+
DevCtl2: Completion Timeout: 50us to 50ms, TimeoutDis- ARIFwd-
LnkCtl2: Target Link Speed: Unknown, EnterCompliance- SpeedDis-, Selectable De-emphasis: -6dB
Transmit Margin: Normal Operating Range, EnterModifiedCompliance- ComplianceSOS-
Compliance De-emphasis: -6dB
LnkSta2: Current De-emphasis Level: -3.5dB
Capabilities: [a4] Subsystem: PLX Technology, Inc. Device 8748
Capabilities: [100 v1] Device Serial Number ba-87-00-10-b5-df-0e-00
Capabilities: [fb4 v1] Advanced Error Reporting
UESSta: DLP- SDES- TLP- FCP- CmpltTo- CmpltAbrt- UnxCmplt- RxOf- MalfTLP- ECRC- UnsupReq- ACSViol-
UESMsk: DLP- SDES- TLP- FCP- CmpltTo- CmpltAbrt- UnxCmplt- RxOf- MalfTLP- ECRC- UnsupReq- ACSViol-
UESvrt: DLP+ SDES+ TLP- FCP+ CmpltTo- CmpltAbrt- UnxCmplt- RxOf+ MalfTLP+ ECRC- UnsupReq- ACSViol-
CESta: RxErr- BadTLP- BadDLLP- Rollover- Timeout- NonFatalErr+
CEMsk: RxErr- BadTLP- BadDLLP- Rollover- Timeout- NonFatalErr+
AERCap: First Error Pointer: 1f, GenCap+ CGenEn- ChkCap+ ChkEn-
Capabilities: [138 v1] Power Budgeting <?>
Capabilities: [10c v1] #19

```

Scan PCIe Bus				Run PCIe-Monitor				Rescan Bus				Quit			
1 Dev:	10 Dev:	11 Dev:	12 Dev:	2 Dev:	3 Dev:	4 Dev:	5 Dev:	6 Dev:	7 Dev:	8 Dev:	9 Dev:	9-1 Dev:			
0000:03:01.0	0000:04:10.0	0000:04:08.0	0000:04:0b.0	0000:04:02.0	0000:04:01.0	0000:04:00.0	0000:04:08.0	0000:04:09.0	0000:04:13.0	0000:04:12.0	0000:02:09.0	0000:04:11.0			
10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8748	10b5:8717	10b5:8748			
SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH OFF	SWITCH OFF	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON	SWITCH ON			
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI			
DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:	DEV:			
0000:07:00.0				0000:07:00.0			0000:08:00.0	0000:09:00.0							
IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:	IDs:			
10ee:0020				1796:0018			10ee:0088								
3300:0020				1796:0018			3300:0088								
Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:	Driver:			
xrtimer				sis8300			pcidev								
3.5.0				4.0.0			4.0.0								
DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:	DevFile:			
x2timers2				sis8300s5			pcidevs6								
BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:	BARs:			
1048575				16383			0								
0				0			0								
0				0			0								
0				0			0								
0				0			0								
0				0			0								
PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W	PCIe-R/W			
PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor	PCIe-monitor			
Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev	Bind pcidev			
INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO	INFO			
LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI	LSPCI			

Status

- this architecture was developed in DESY group MCS4 and till today with success is used
- the following drivers, tools and libraries are developed used



THANK YOU