# Fast and Continuous sampling TAMC532/SIS8300KU

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Project 1

#### Project 2

- TAMC532 ADC
- 16kHz Trigger
- 10MHz ADC Clock
- ~16 samples per trigger
- Save data from the ADC to DAQ without gups

- SIS8300KU ADC
- Continuously sampling with 100MHz
- Save data to DAQ



## Hardware

## GEMEINSCHAF

#### What we have:

- Shroff 12 Slot MTCA Crate
- AM G64/471 with Quad Core 3.0GHz Xeon E3-1505M, Gen3 8GT/s PCIe, 4 Lines
- NAT MCH, PEX8748 PCIe Switch Gen3 8GT/s 4 Lines, 256Bytes Payload
- TAMS532 ADC, Gen2 2.5GT/s 4 Lines PCIe
- SIS8300KU ADC, Gen2 2.5GT/s 4 Lines PCIe
- X2TIMER board

## Great support from TEWS and STRUCK team, THANKS !!!





## Hardware PCIe Links









#### TAMC532: Short functional description: per each Trigger







## Project 1: 16kHz with 10MHz Sampling



16kHz Trigger with 10MHz sampling 16samples->we have 62mks ~ for data processing:

- 1. Get status of the ADC (check for ERRORS)
- 2. Prepare new DMA descriptors
- 3. Send Descriptor Address to ADC
- 4. Send Data to DAQ
- 1. Prepare two DMA Buffers
- 2. Prepare first Buffer for DMA
- 3. Collect data from ADC for more than one trigger (500 triggers, now we have ~31ms)
- 4. Prepare second Buffer for DMA
- 5. Send First Buffer to DAQ





## Project 1: 16kHz with 10MHz Sampling



To save time switch more tasks to driver level (save time for system calls)









Runs on ALPS Project: 3 CPUs Per CPU:

- Two ADC Boards: per Board
  - Clock 10MHz
  - Trigger 16kHz
  - 32 Channels
  - 500 Triggers
  - 16 samples per Trigger
  - Rep-Rate 32ms



# Project 2: Continuously sampling 100MHz



### SIS8300KU: Short functional description of the Continuously sampling mode



ADC memory filled with sampled data in circular ring buffer mode

**Registers:** 

- 1. START\_ADDRESS
  - 1. Used as a start address for saved data
- 2. ACTUAL\_ADDRESS
  - 1. Used as actual write pointer
- 3. ACT\_DMA\_ADDR
  - 1. Used as last DMA reading address
- 4. DIFF\_IRQ\_THR
  - 1. ACTUAL\_ADDRESS and ACT\_DMAADDR differenc threshold
  - 2. If the value of the ACTUAL\_ADDRESS and ACT\_DMA\_ADR difference excssds this value sends interrupt





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#### **STATISTICS**

Rate Hz/MS	CH Num	Sampled Sample Num	Sampled Buf Size MB	SIG Time	DMA Tima	DMA Rate MB/Sec
10/100	1	9994240	19.98		45.5	439.307
12.5/80	1	8003584	16		35.03	456.955
25/40	1	4005888	8		13.398	597.982
10/100	2	20021248	40		76.59	522.816
12.5/80	2	16007168	32		62.78	509.944
25/40	2	8003584	16		35.89	446.006











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