

# Status of CCC

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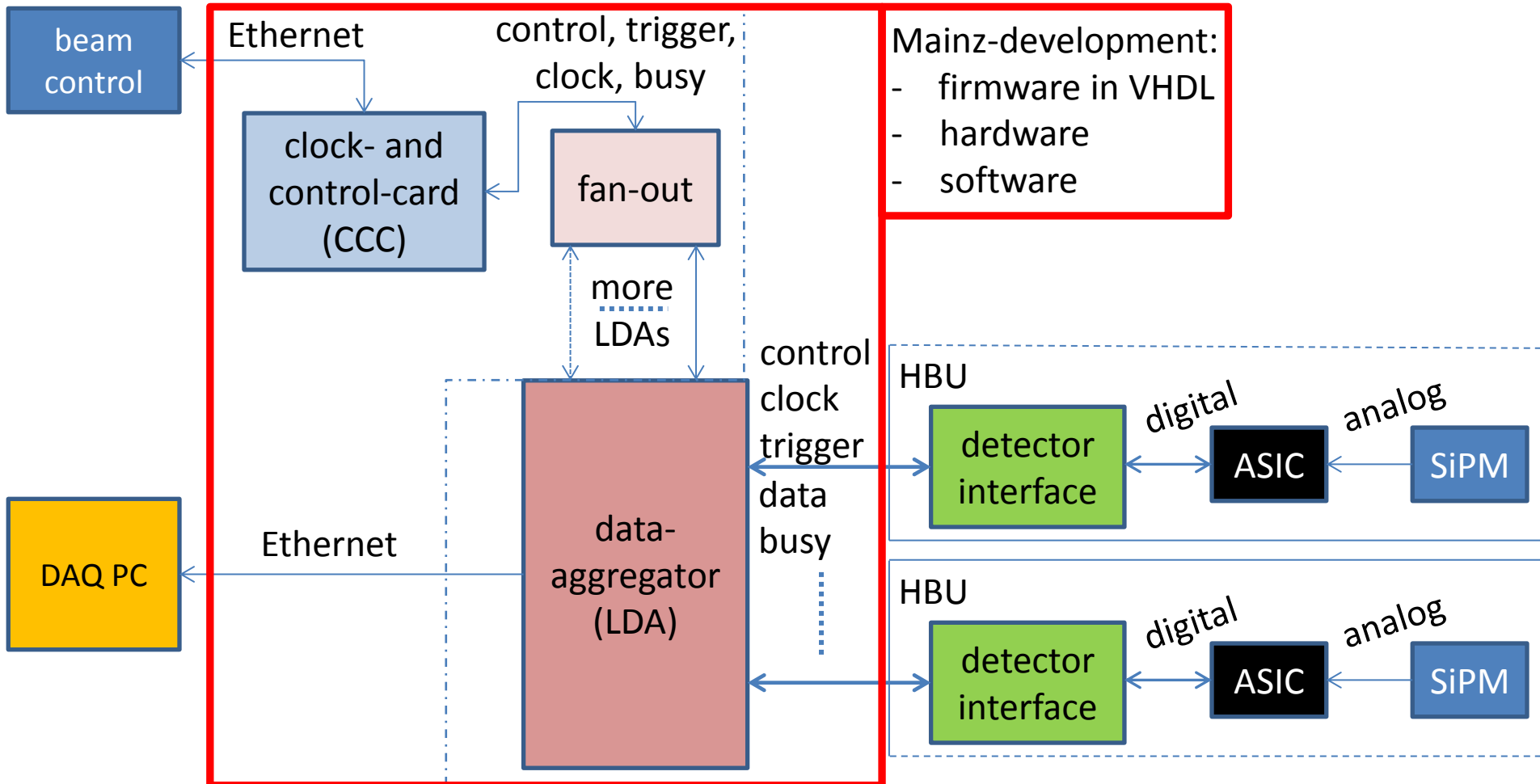
JOHANNES GUTENBERG  
UNIVERSITÄT MAINZ



# Read-out-chain

off-detector-electronic

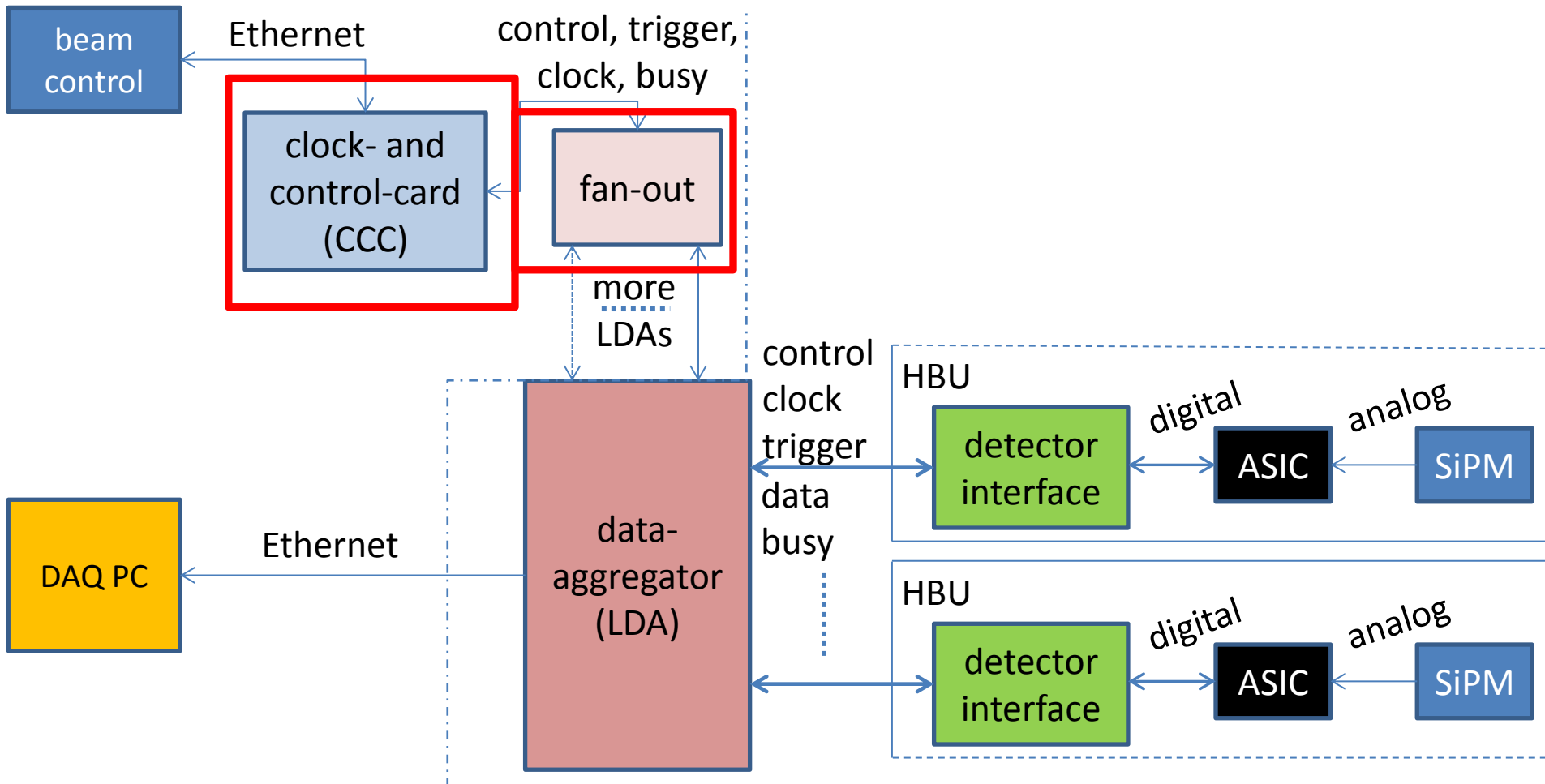
on-detector-electronic



# Read-out-chain

off-detector-electronic

on-detector-electronic



# Clock and Control Card(CCC)

## Requirements:

1. **High clock stability in the whole detector**
2. **Configuration interface over Ethernet**
  - manage different running modes
  - for feedback functions
  - for beam control

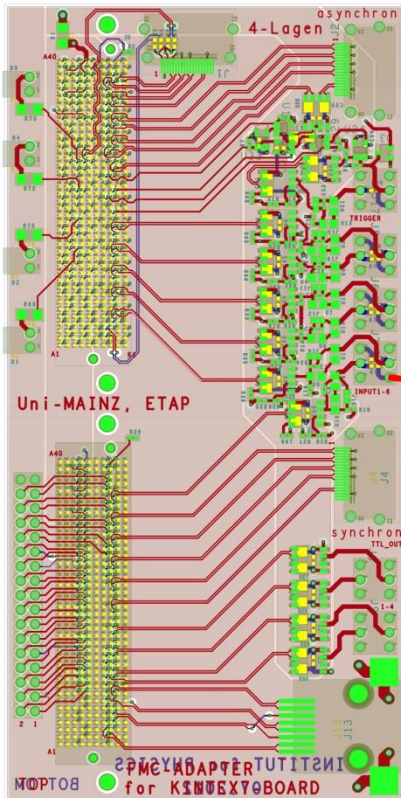
## Status:

1. **Built and tested for a lab setup and used in test beams 2012**
2. **Next step: Upgrade for bigger test beams (almost finished)**

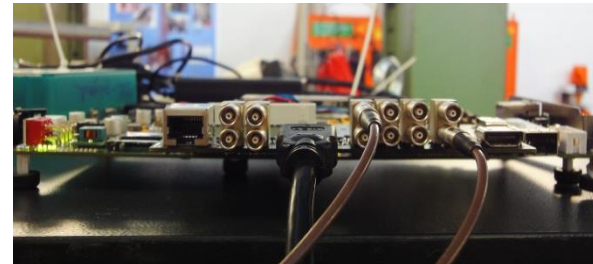
# 2012 Clock and Control Card

## Mezzanine on an Kintex 7 Evaluation-Board:

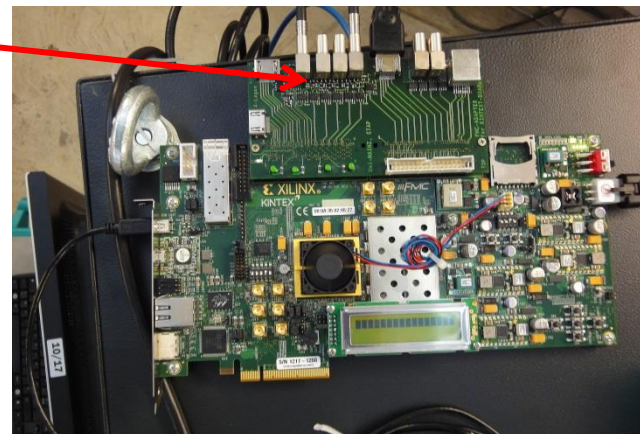
### FPGA-controlled CCC board:



### CCC at the testbeam (front):

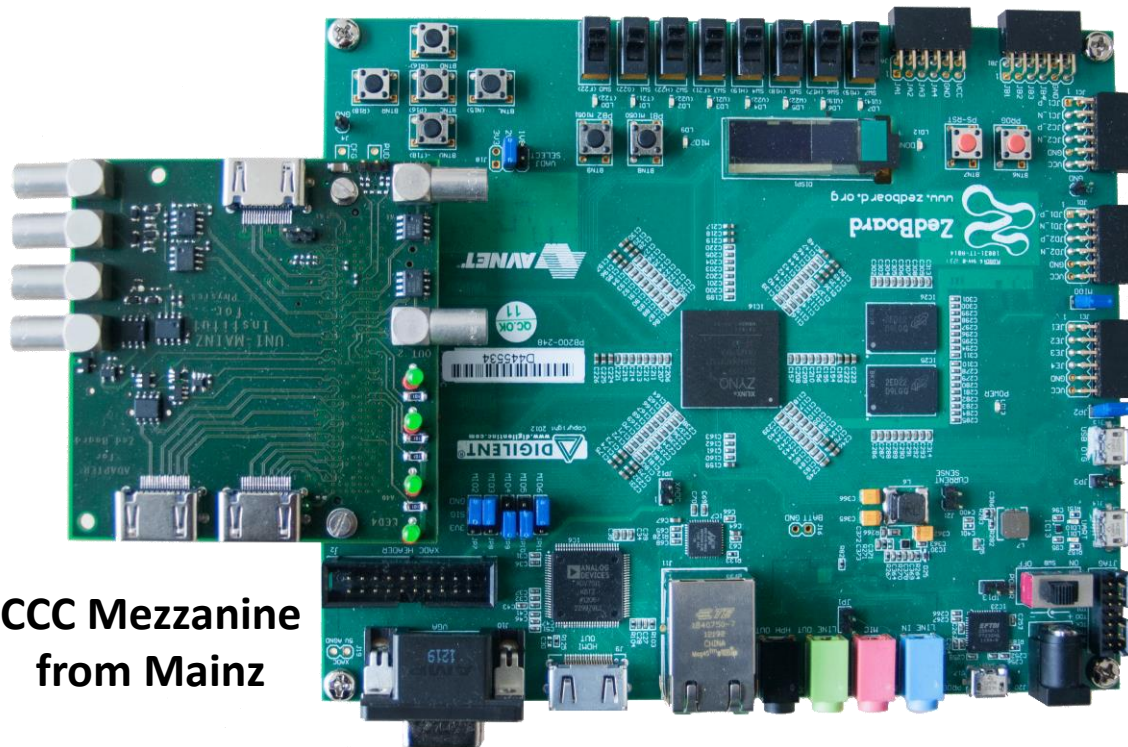


### CCC at the testbeam (top):



# New 2013 Clock and Control Card

First iteration with a Zynq-processor on a Zedboard for development:



CCC Mezzanine  
from Mainz

## Zedboard:

- Evaluation Board from Digilent

## Zynq:

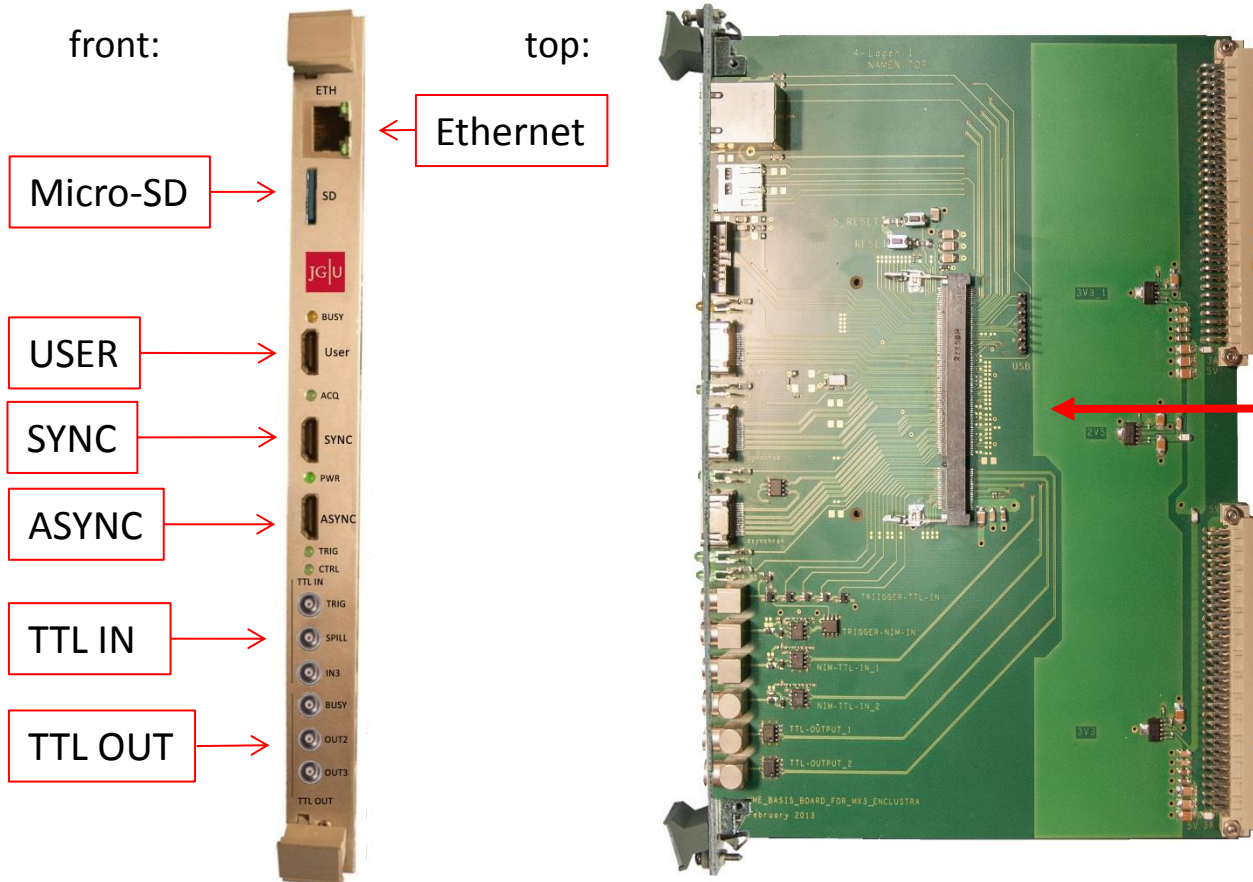
- ARM9 dual core processor (Linux)
- +  
- FPGA

# Clock and Control Card(CCC)

**Final design for test beams:**  
6U-VME formfactor

**Peculiarity of the Mars-Modul:**

1. Zynq
  - ARM9 dual core
  - Linux + FPGA
2. 512MB NAND/RAM

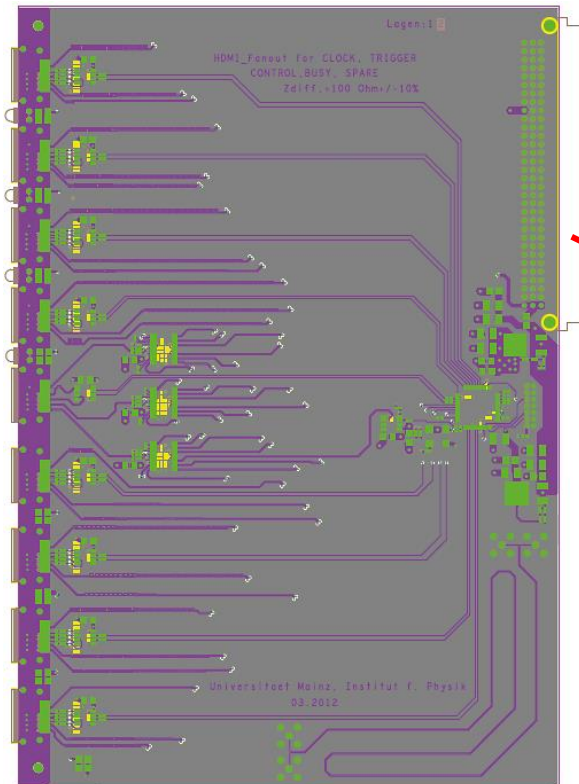


Mars-ZX3 firm:Enclustra

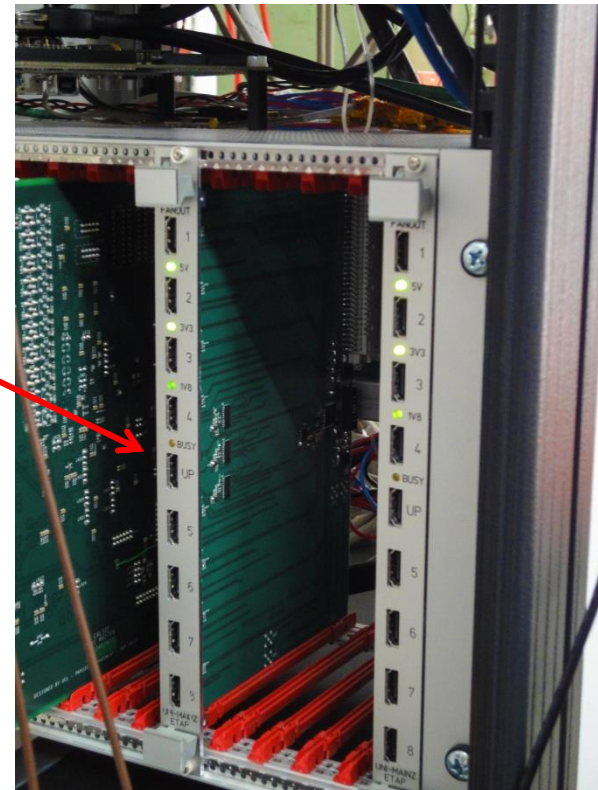
# CCC Fan-out same as in 2012

## 6U-VME Fan-out board:

### Fan-out board layout:



### Fan-out board at the testbeam:



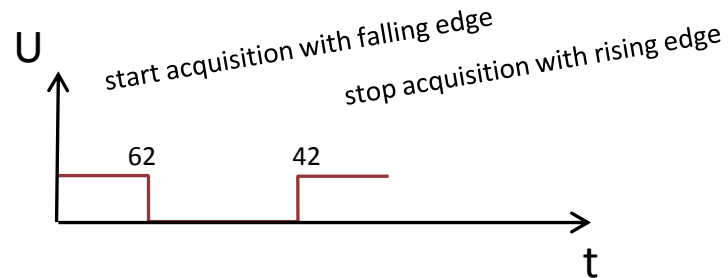


# Running Modes



Four main modes and 13 commands:

signal:  
e.g. busy:

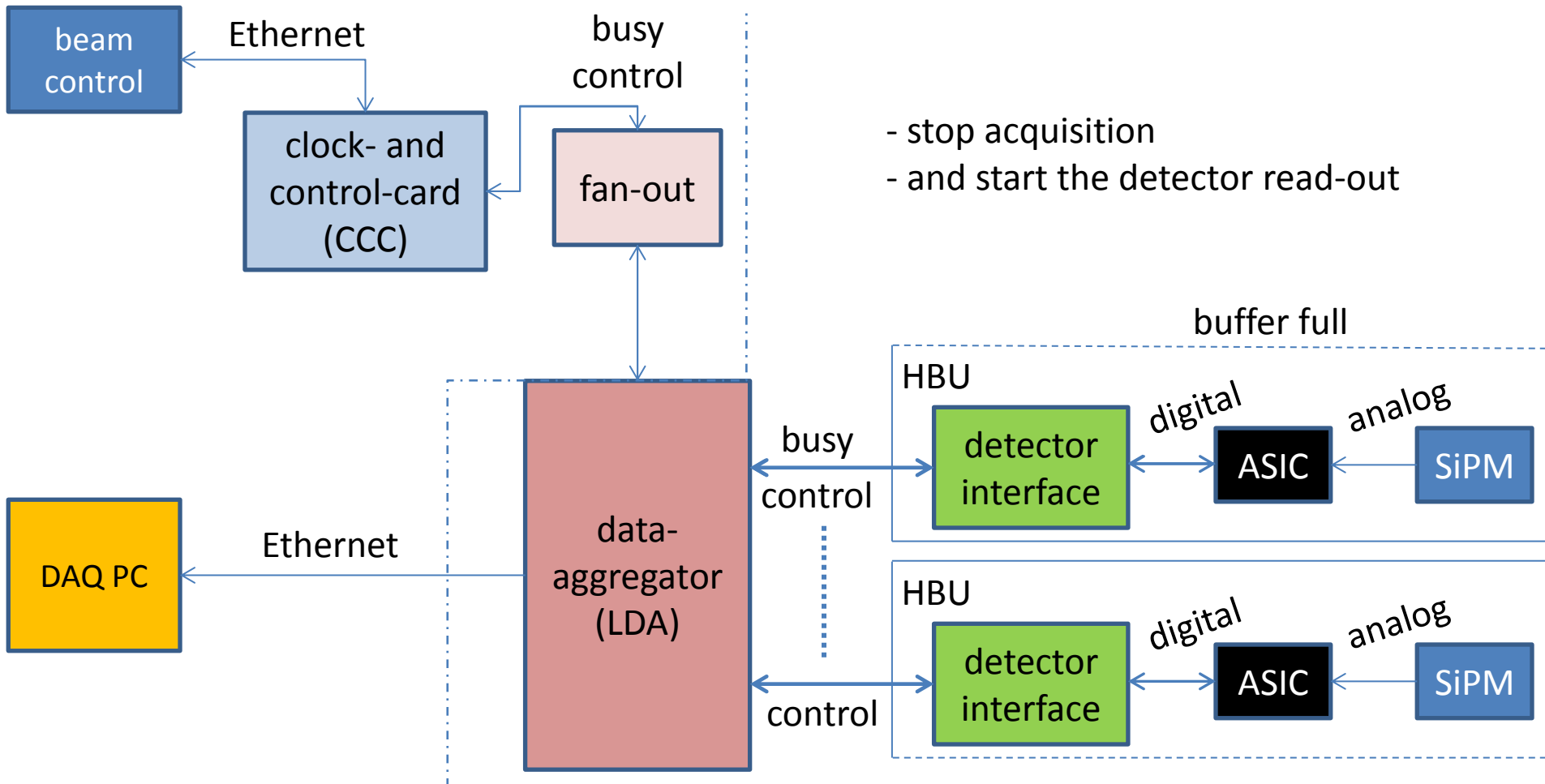


conditions:  
ASIC buffer full

# Read-out-chain

off-detector-electronic

on-detector-electronic



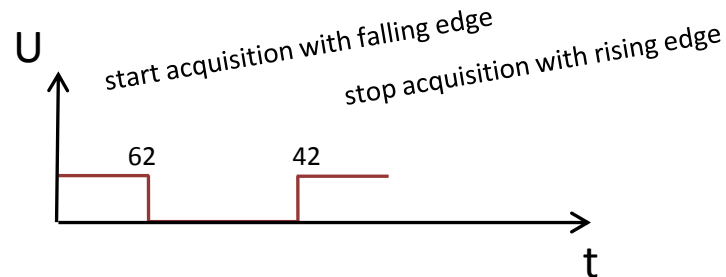
- stop acquisition
- and start the detector read-out

# Running Modes

Four main modes and 13 commands:

signal:

e.g. busy:



conditions:  
**ASIC buffer full**

extended commands: (backward compatible)

- manual trigger
- listen on falling or rising edge
- status
- hard- and softreset
- and many more

# CCC (and LDA) Configuration

## Processing Instruction Configurator (piconf) (by Rouven Spreckels)

- Configures all devices
- Configuration procedures are automated
- Everything stored in one or multiple XML files
- Self-explanatory, predefined XML tags
- Interface independent:
  - implemented: TCP/IP

# picconf example

```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <picconf version="1.0.0">
3     <!-- Only <pi> tags in this level are parsed and must only contain
4         predefined tags. -->
5     <pi>
6         <conf>
7             <!-- Include some values. -->
8             <fpath>lda/some_values.xml</fpath>
9             <!-- Define another value. -->
10            <another_value>1</another_value>
11            <!-- picconf informs us if an endpoint rejected unknown
12                or invalid values. -->
13            </conf>
14            <!-- This <xpath> tag will be replaced by the <tcp> tags below,
15                since it is pointing to them. -->
16            <xpath>../../some_devices/node()</xpath>
17        </pi>
18        <some_devices>
19            <!-- Above <conf> tag will be sent to following devices. -->
20            <tcp>
21                <host>lda1.physik.uni-mainz.de</host>
22                <service>3141</service>
23            </tcp>
24            <tcp>
25                <host>lda2.physik.uni-mainz.de</host>
26                <service>3141</service>
27            </tcp>
28        </some_devices>
29 </picconf>

```

# Status of CCC

1. One module physically exists
2. Hardware tested
3. Firmware almost done

**CCC should be ready to go for the test beam in May 2013**

**Thank you for your  
attention!**