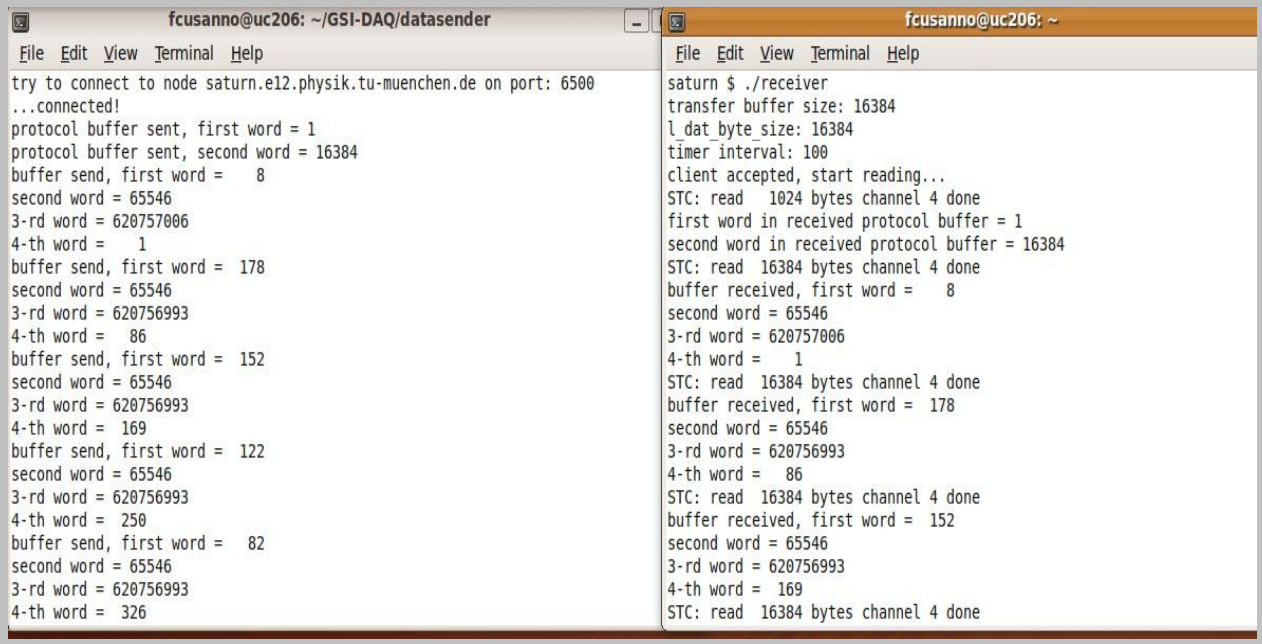
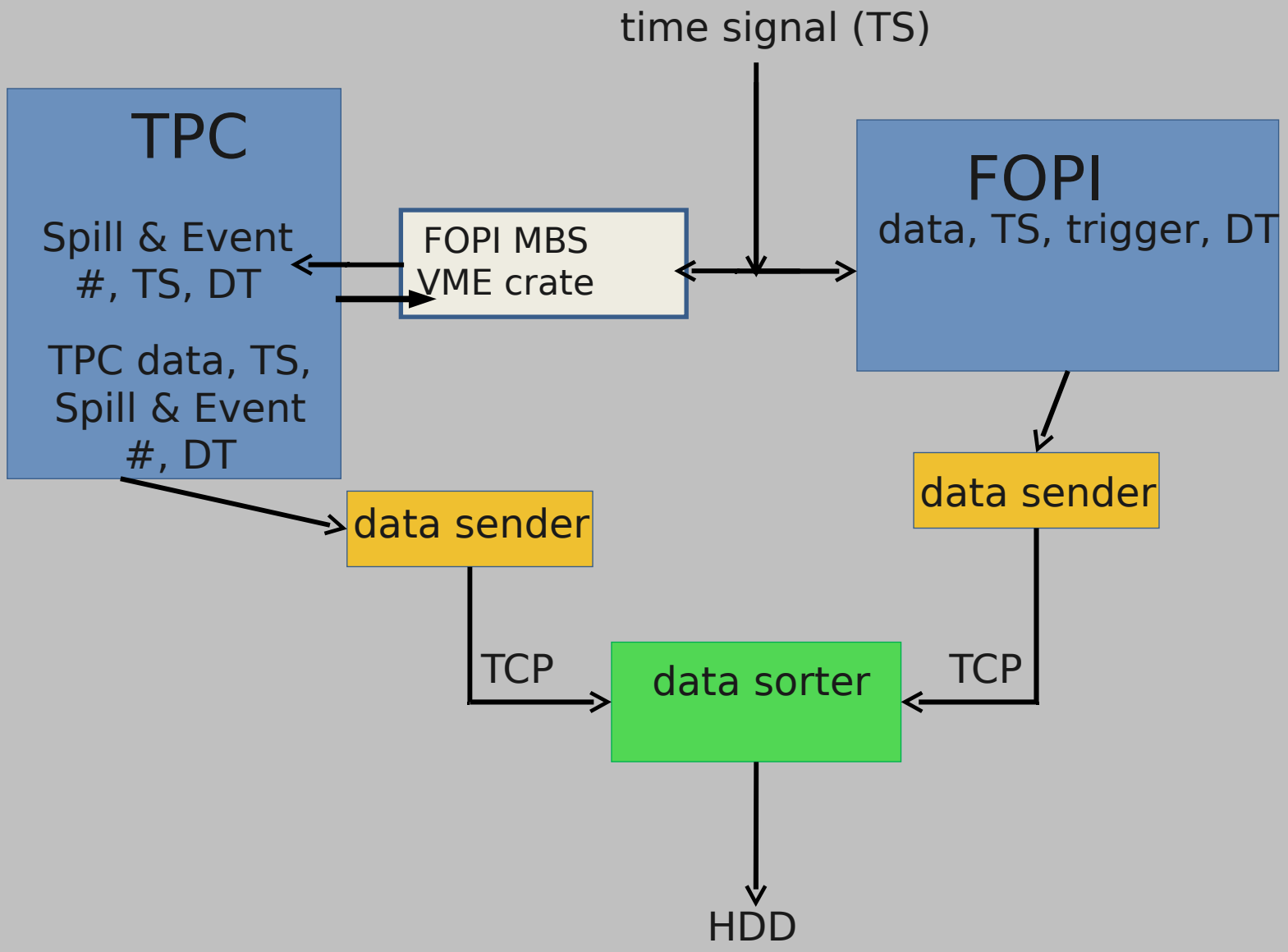
DAQ Integration in FOPI of the GEM-TPC

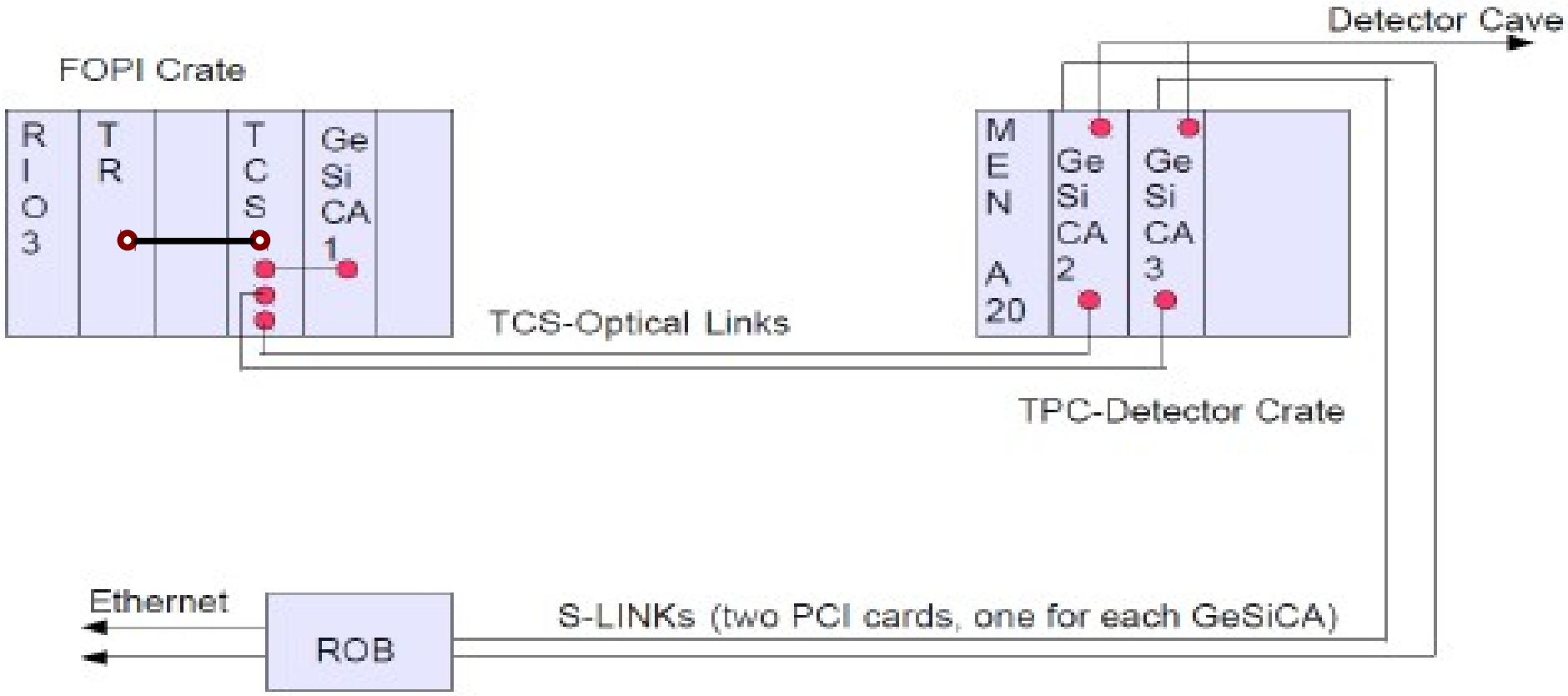
- The concept of the integration of the GEM-TPC DAQ in FOPI
- Hardware diagram
- Status of the different parts
- Plan and time-schedule



The Concept of the Integration



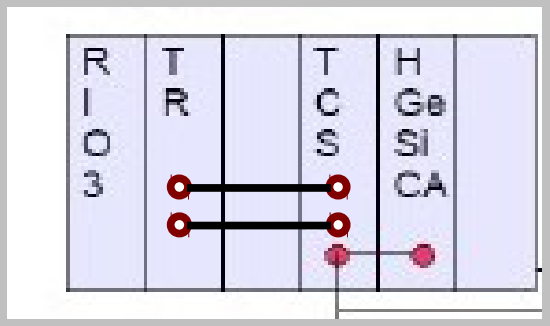
Hardware Diagram

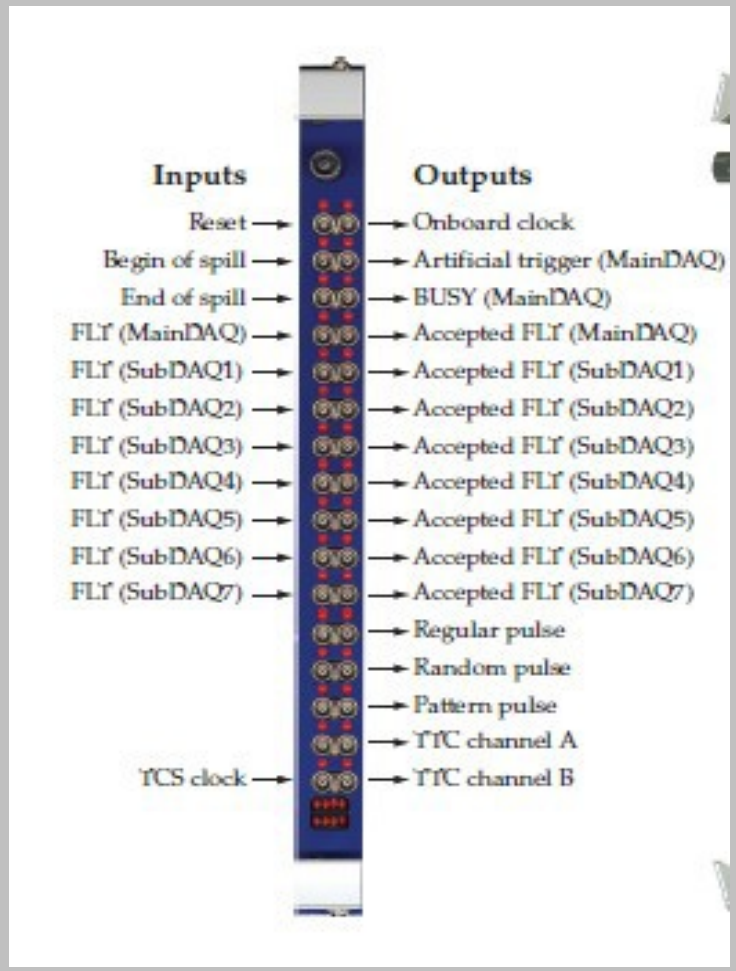


Spill signal → 1s before start beam
Sorting → by spill & evt #
SOR, EOR → write to TCS via VME

MBS VME Crate

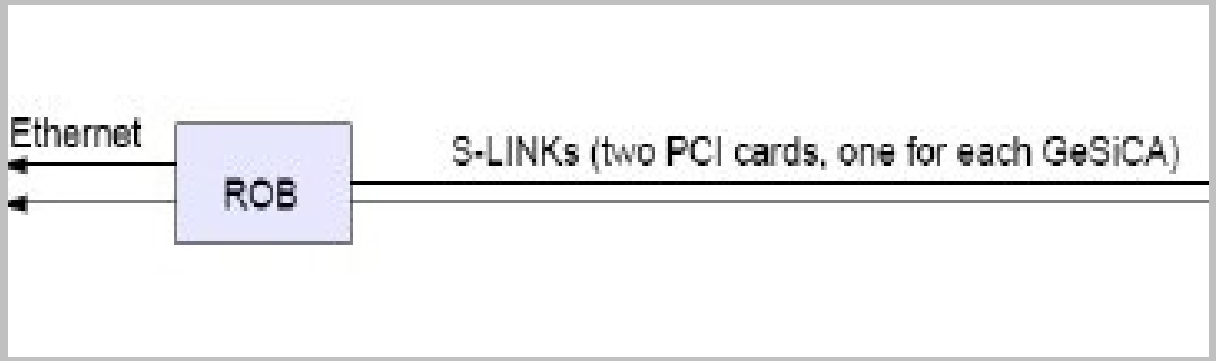
- VME access using CES-RIO function find_controller()
- Program to load firmware on TCS and GeSiCA
- Configuring and initialing scripts
- “Polling” GeSiCA Status Register
- Control signals are assigned to TCS, accepted trigger (in), dead-time (out)
- GEM-TPC event header read on RIO





Spill buffer and Data Sender

- S-Link spill buffer on PC, directly connected to the GeSiCA´s
- TCP-based data sender, block transfer of 1 MB, timeout assigned as parameter. Events sorted by spill No. and event No.




```
fcusanno@uc206: ~/GSI-DAQ/datasender
File  Edit  View  Terminal  Help
try to connect to node saturn.e12.physik.tu-muenchen.de on port: 6500
...connected!
protocol buffer sent, first word = 1
protocol buffer sent, second word = 16384
buffer send, first word =    8
second word = 65546
3-rd word = 620757006
4-th word =    1
buffer send, first word =  178
second word = 65546
3-rd word = 620756993
4-th word =   86
buffer send, first word =  152
second word = 65546
3-rd word = 620756993
4-th word =  169
buffer send, first word =  122
second word = 65546
3-rd word = 620756993
4-th word =  250
buffer send, first word =   82
second word = 65546
3-rd word = 620756993
4-th word =  326
```

```
fcusanno@uc206: ~
File  Edit  View  Terminal  Help
saturn $ ./receiver
transfer buffer size: 16384
l_dat_byte_size: 16384
timer interval: 100
client accepted, start reading...
STC: read   1024 bytes channel 4 done
first word in received protocol buffer = 1
second word in received protocol buffer = 16384
STC: read  16384 bytes channel 4 done
buffer received, first word =    8
second word = 65546
3-rd word = 620757006
4-th word =    1
STC: read  16384 bytes channel 4 done
buffer received, first word =  178
second word = 65546
3-rd word = 620756993
4-th word =   86
STC: read  16384 bytes channel 4 done
buffer received, first word =  152
second word = 65546
3-rd word = 620756993
4-th word =  169
STC: read  16384 bytes channel 4 done
```

MEN A20 Crate

- "Standard" COMPASS-based DAQ, TCS sits in the MBS crate
- GeSiCA (and TCS) configuration based on config_server
- config_server based on MySQL database
- New controller VME cpu, MEN A20
- config_server tested and operated at TUM
  presently operated with scripts in the integrated system

Status of the Art and Time-Schedule

- Spill-buffer datasender is operating with buffer size of 1 MB, timeout 2 s
- **Main tests of the integration successfully performed in N. Kurz lab!**
  No calibration event from GEM-TPC to avoid mis-synchronization
- Full test (two GeSiCA´s, one S-Link) of the integrated system at GSI
- Present rate limit ~ 50 – 60 MHz → two FOPI-event builders
- Implementation of a third GeSiCA and a second S-Link
  (same operation, same functionality, no changes required)
- Installation of the MySQL database, test of data sorting/decoding from the FOPI event sorter