# Monitoring and Control of Wiener equipment

Katharina Schmidt

COMPASS Friday meeting, 07.09.07

# Outline

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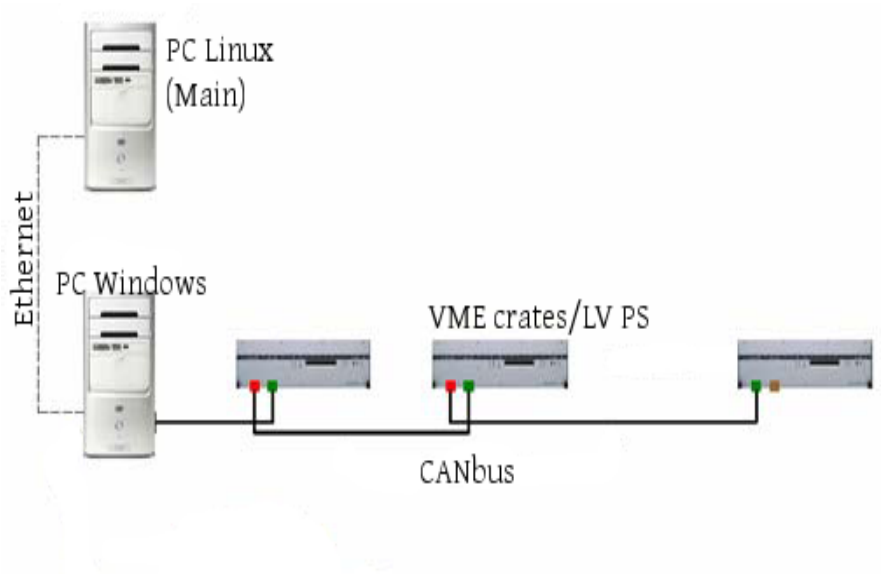
# General layout for the Wiener equipments




## The Wiener equipment

- is distributed over 3 (4) CANbus lines
- contains several different models and varying firmware.

## Control

- The OPC Server for Wiener, running on a Windows PC, communicates with each crate via the CANbus line.
- The PVSS OPC Client sends the values of the subscribed items to the main PVSS project running on a Linux PC.

# Performance of the OPC servers

| OPC Server | Purpose | run time | efficiency [%] |
|---|---|---|---|
| 6 | CAEN HV | | 98.6 |
| 7 | Gas Systems (PLCs) | | 98.7 |
| 8 | ISEG HV | 20.05.07 | 97.9 |
| 9 | ELMBs | - | 98.7 |
| 11 | Wiener VME crates | 23.08.07 | 98.3 |
| 19 | Wiener LV | | 98.7 |
| 20 | Wiener LV | | 98.8 |

The non-active periods occur when:

- stop of the full project for maintenance
- crash of OPC or PVSS, or power-cut
- network problem

$$efficiency = \frac{OPC\ \ Server\ \ running\ \ for\ \ control}{Total\ \ Run\ \ time}$$

$\Rightarrow$ Satisfying performance of the DCS per OPC

# The problem

## But

- These efficiencies do not mean we are controlling the equipment the whole time.
- The server might be running but not able to communicate with the hardware.
- This behaviour we saw very frequently for the Wiener equipment.

# General remarks on the invalid values

- For each subscribed item, the OPC Server provides: value, quality and timestamp.
- Invalid values are defined as a current or voltage value with a flag of bad quality.
- Visible in PVSS due to purple background color of monitored values or in trends.

## The observed invalid values can be

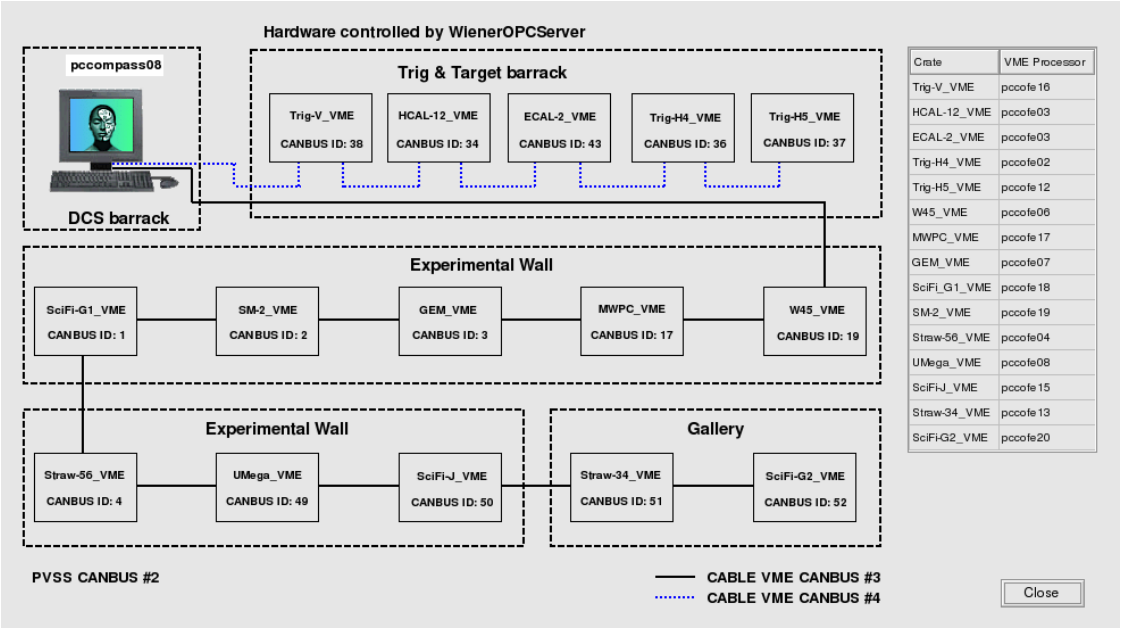
1. "flipping" invalids: Readings are marked as invalid for one reading cycle. The associated value change regularly.
2. "permanent" invalids: Readings are marked as invalid for a long period. They show a constant value for the period.

CANbus line CAN2 shows the most invalid readings during the 2007 Run.

We try to analyse this behaviour by investigating:

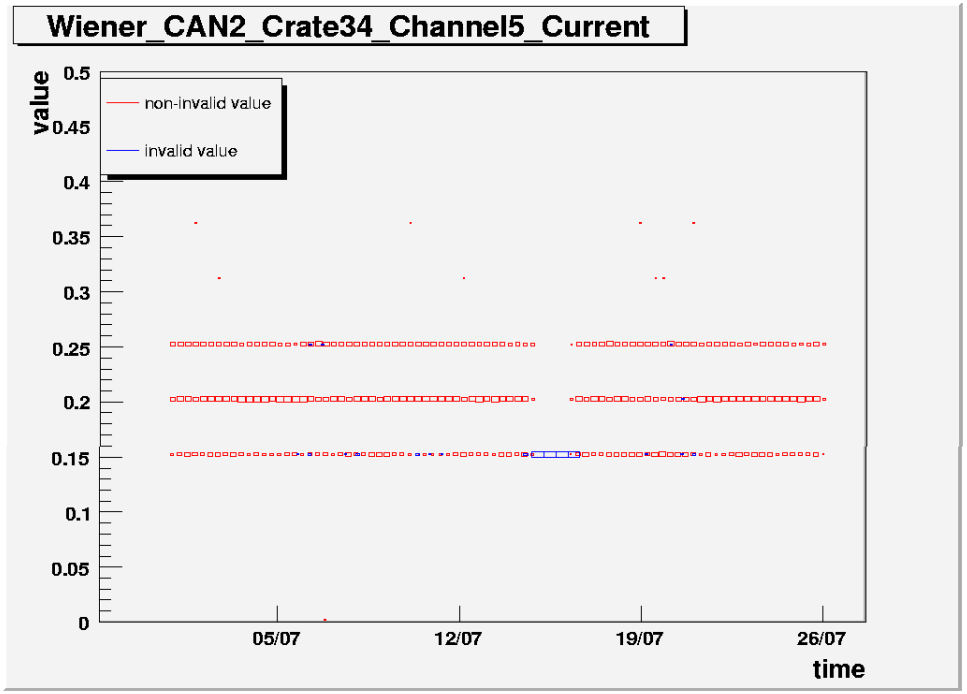
- What is the pattern of valid/invalid values over time?
- Does the number of invalids increase gradually?
- Is it more likely to occur for some crates than for others?

# CANbus line CAN2




- Consists of VME crates for DAQ.
- Includes 15 crates.
- Was split into 10+5 on 01.08.07.
- The devices integrated in CAN2 have the oldest Firmware.

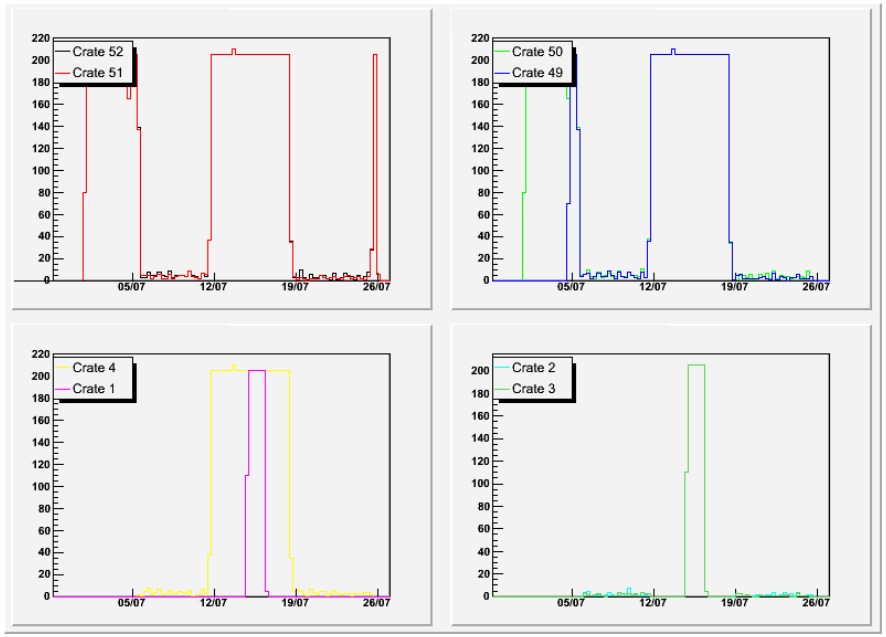
# "invalid" readings for CAN2




- The occurence of flipping invalid readings is evenly distributed.
- The permanent invalid readings occur more often for the last crates in the bus.
- When permanent invalid readings occur for one crate it will show for all channels in this crate.

Current value over time, 01.07-20.07.
The blue color indicates an invalid value.

# Permanent invalid periods for CAN2




Number of invalid current readings over time, per crate, 01.07-20.07.

- For some crates the start of a permanent invalid period correlates with known DCS intervention (e.g. restart of the OPC server).
- These periods can only be interrupted by power cycling the crates.

# Past actions and future plans

## What was tried so far

- Replace connectors (no change)
- Adding terminators at the beginning and at the end of each bus (no change)
- Split CAN2 (no change)
- Remove not used/never read items for temperatures and fan-trays (improvement)
- Read the items with another OPC Client (confirms invalids).

## Firmware upgrade is under discussion

- CAN3
  - Firmware upgraded before the 2007 Run in all 3 crates.
  - Did not show any permanent invalid periods, over the 3 months of running.

# Conclusion

- Several situations were observed where the OPC server is running but is not able to communicate with the hardware ("invalid readings").
- This occurs more frequently for the Wiener equipment and in particular for CAN2.
- The study of the invalid readings of CAN2 and report of actions taken were presented.

- There are still open questions concerning the permanent invalid readings.
- Our knowledge of the system improved and some workaround procedures could be found.

$\Rightarrow$ Wiener equipment control is now in a better condition.

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