

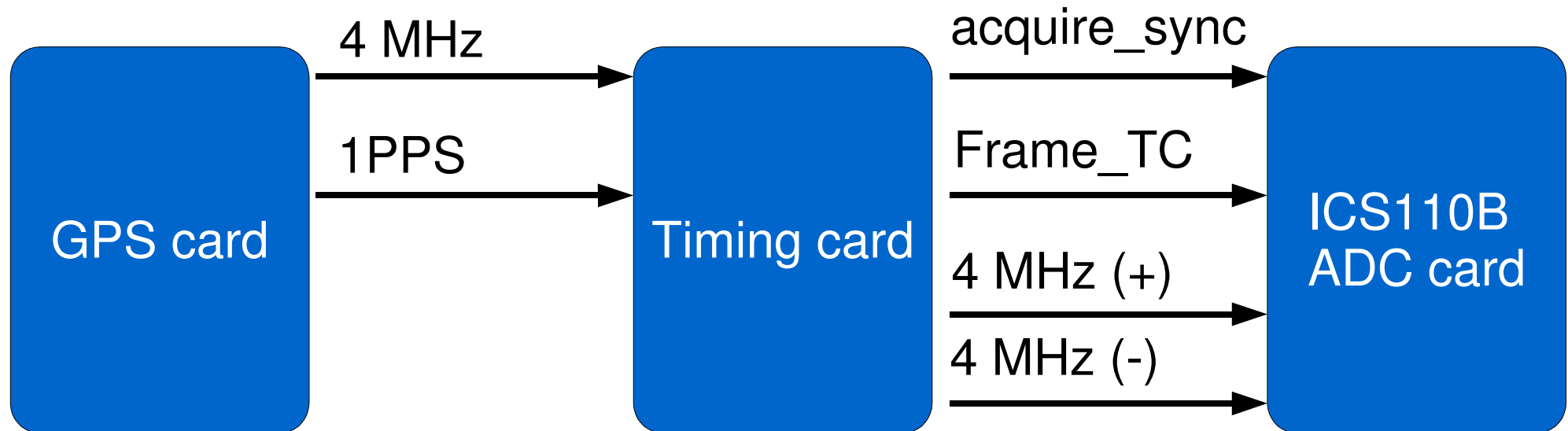
# Timing tests of the GEO600 DAQS

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# GEO600 DAQS



GEO built timing card, using purely digital electronics,  
not the same as LIGO timing board



# Timestamping GEO600 data

- timing card starts acquisition (lowering `acquire_sync` line) on a GPS second boundary (defined by 1PPS signal)
- on startup, 37 samples gate-delay are removed
- 62ms after GPS second boundary the current GPS second is read from GPS card for timestamping the one second data chunk

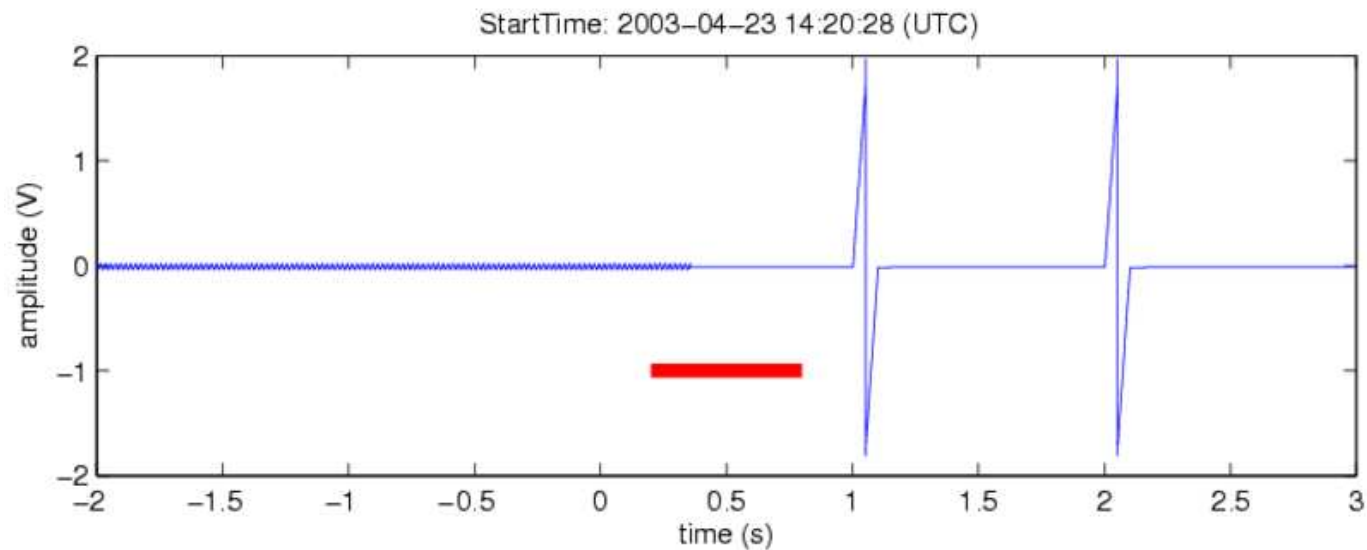
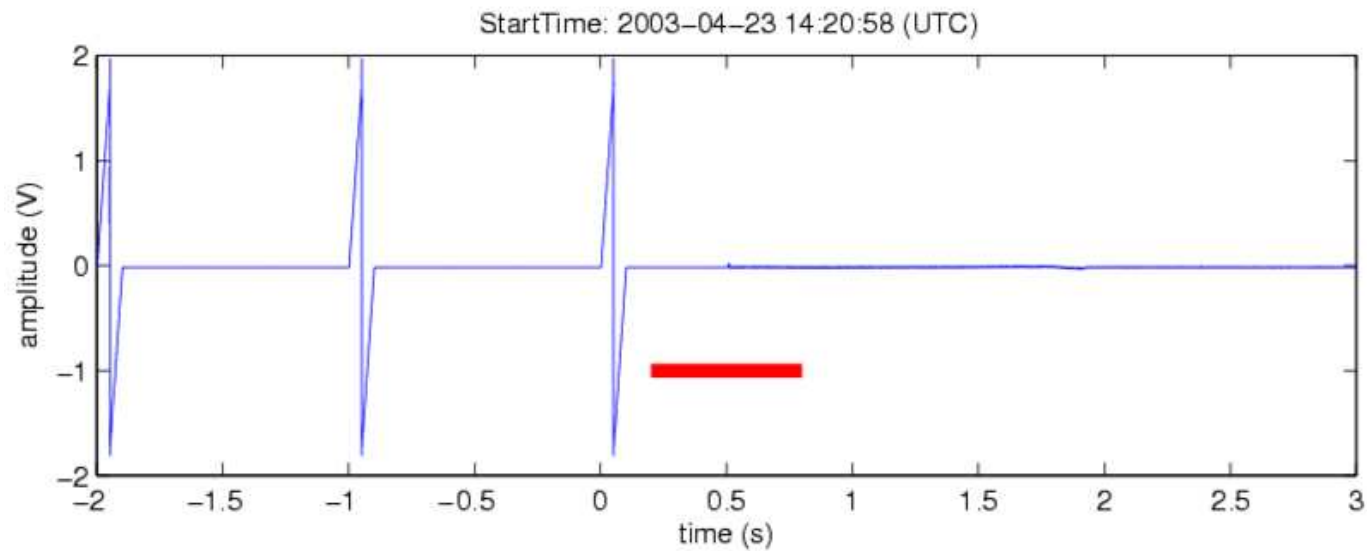


# GEO600 timing tests

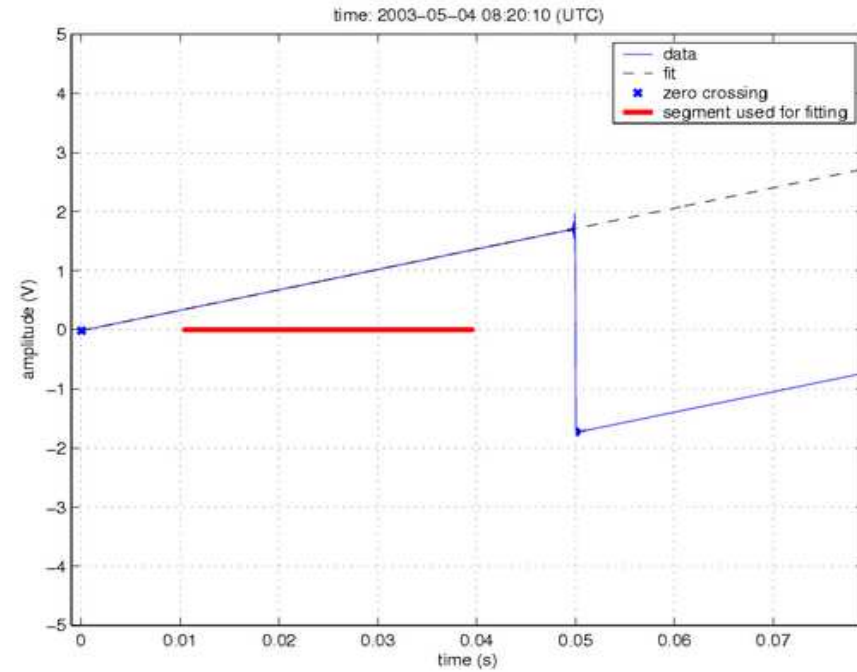
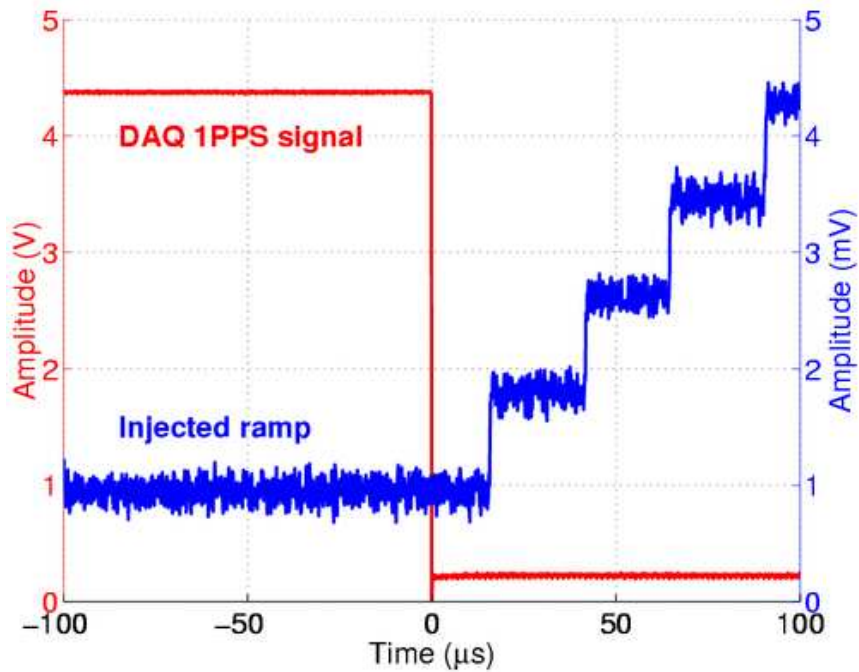
## gross timing accuracy

- a check of the gross timing accuracy (one second resolution) was done by disconnecting and reconnecting a signal to the DAQ system
- times were noted using a radio-controlled clock as a reference and then compared with the data

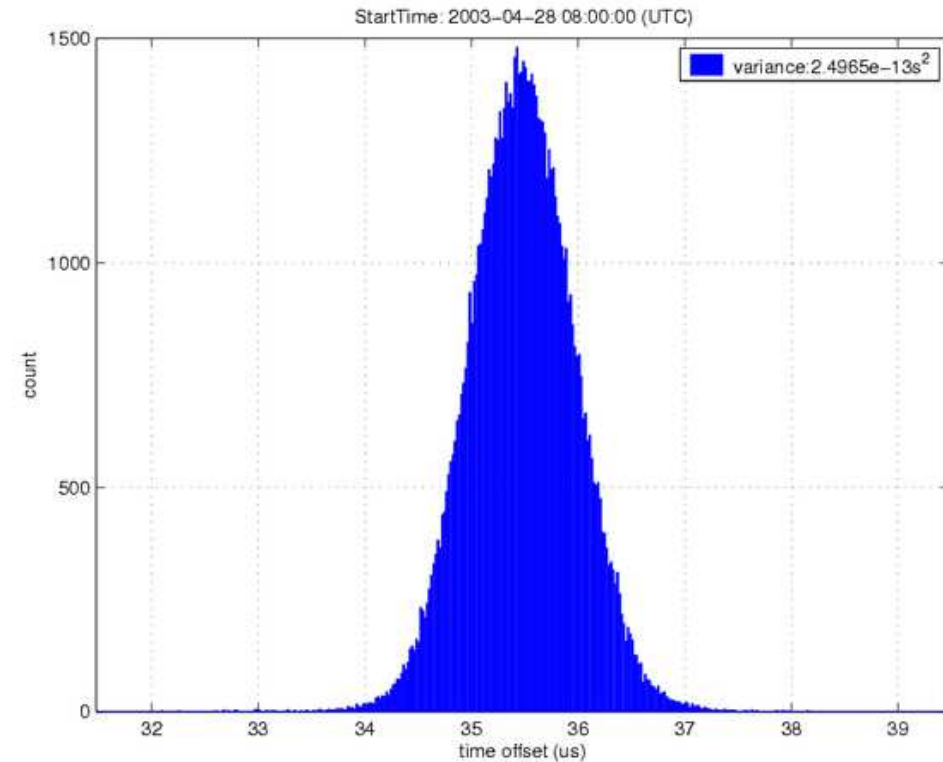
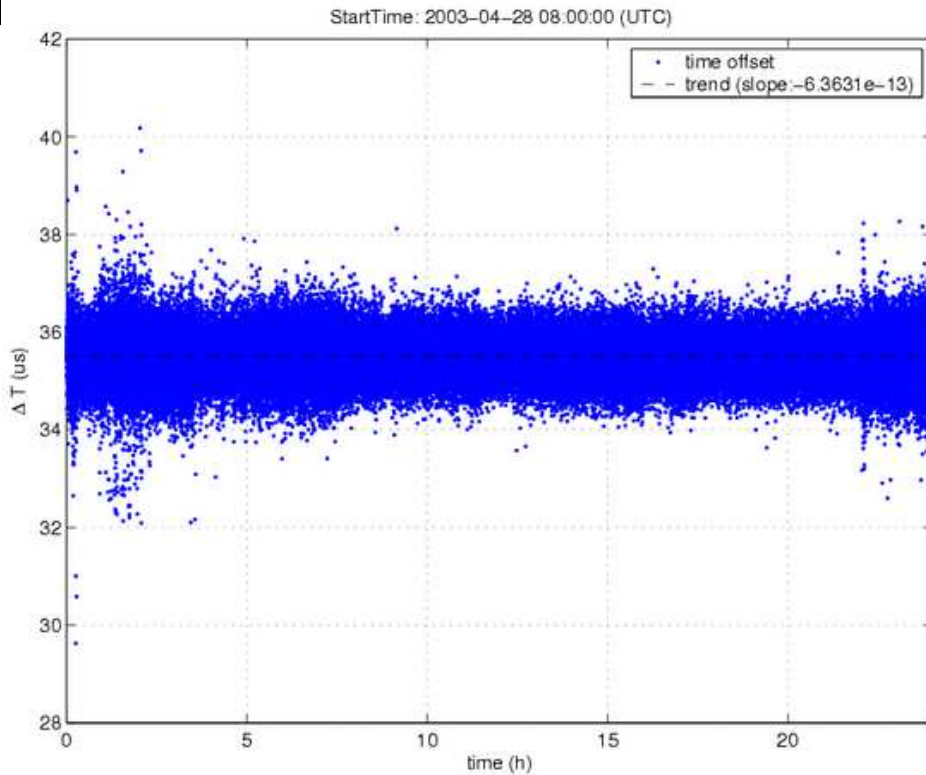
# gross timing accuracy – results



# Timing test setup

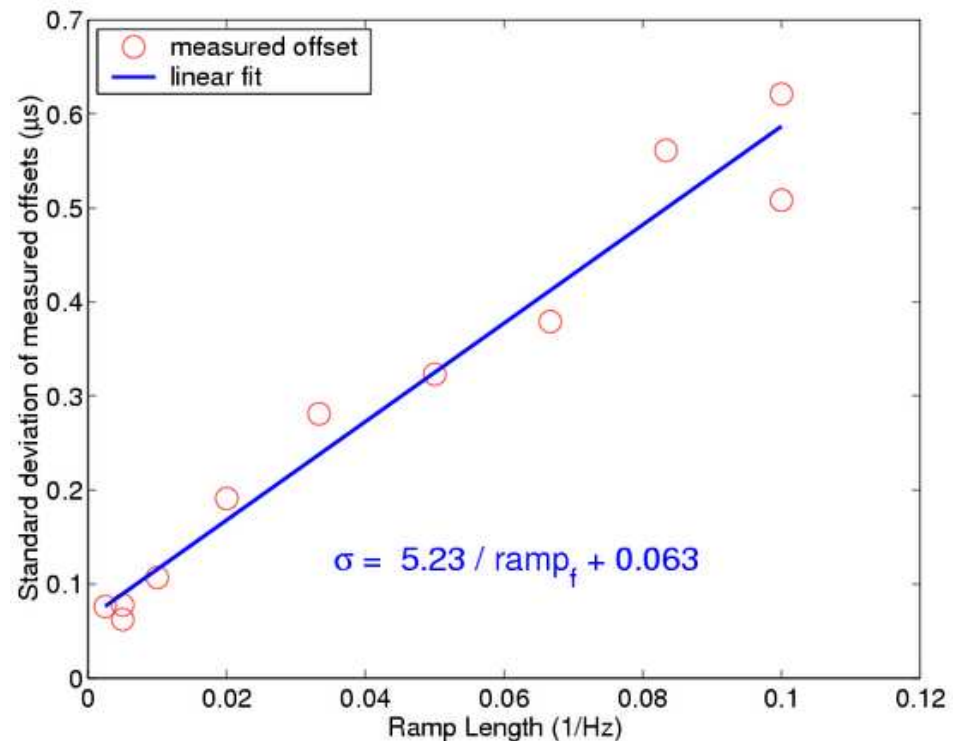
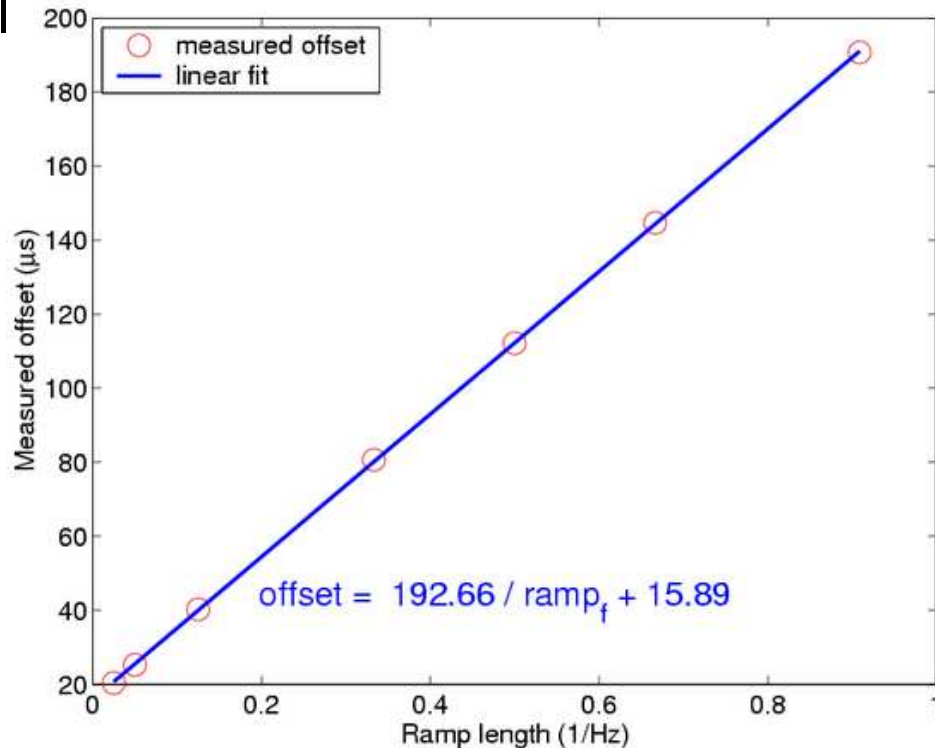


# measurement over 24h



- measurements done with 50ms ramp length
- scatter believed to come from ramp rather than DAQ

# results extrapolated to zero ramp length

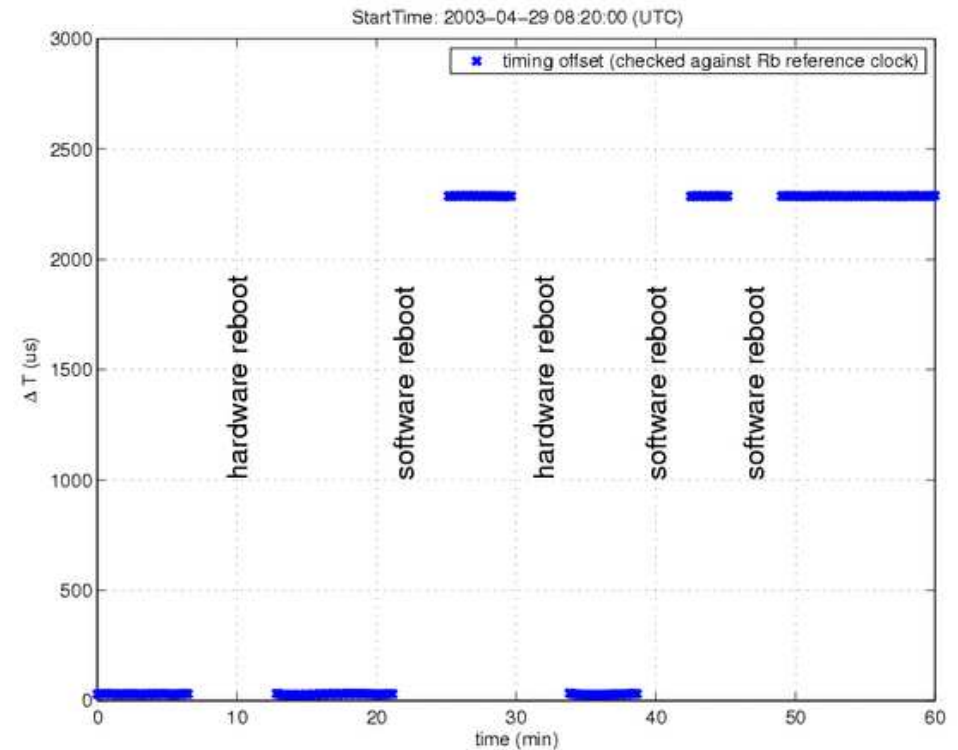


- measurements repeated with different ramp length
- part of offset and scatter are products of the measurement system
- offset for zero ramp length is 15.89 +/- 0.063 us



# reboot problem

- removing the gate delay worked only after hardware reboot (power cycle)
- problem in driver code
- fixed now

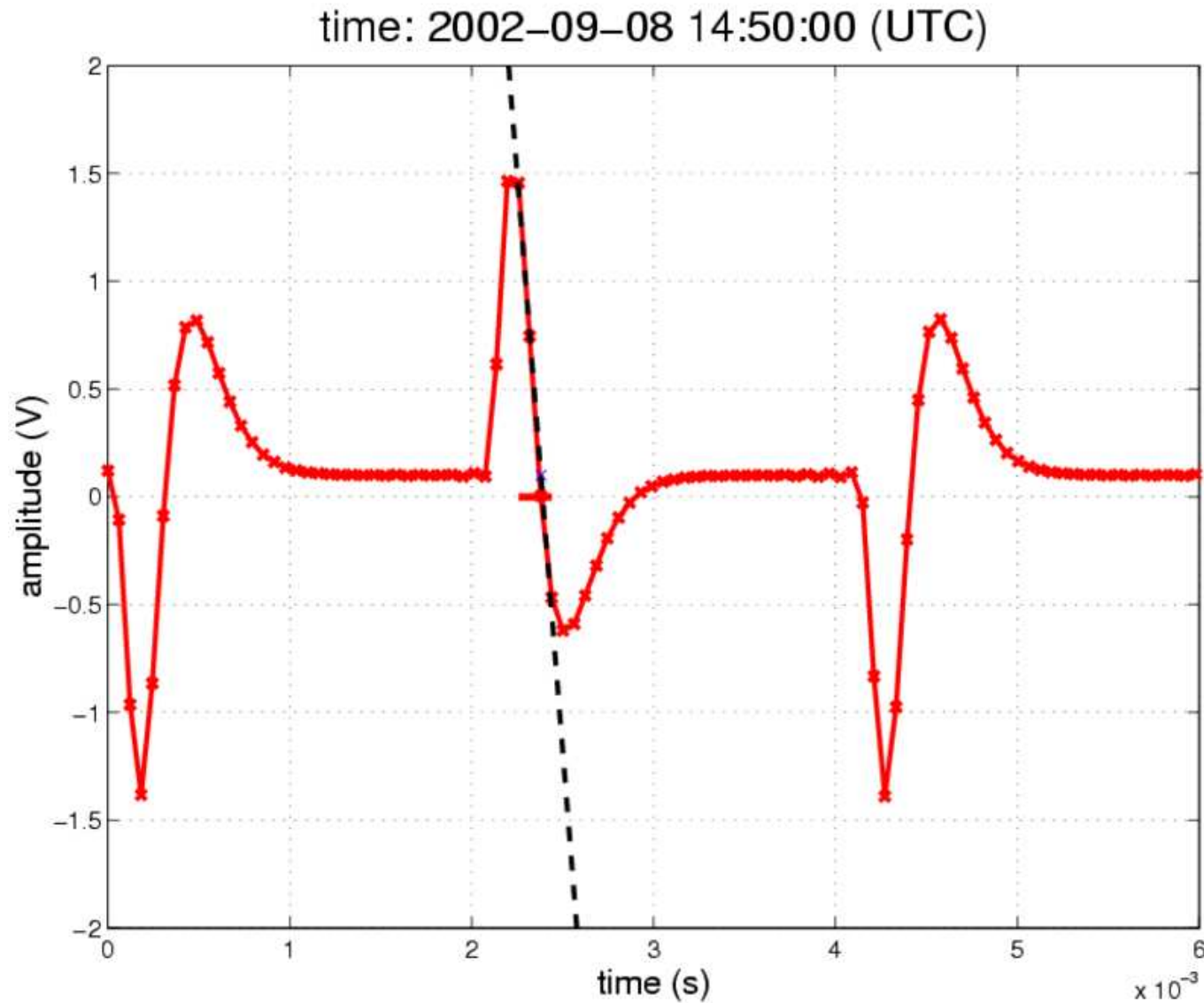




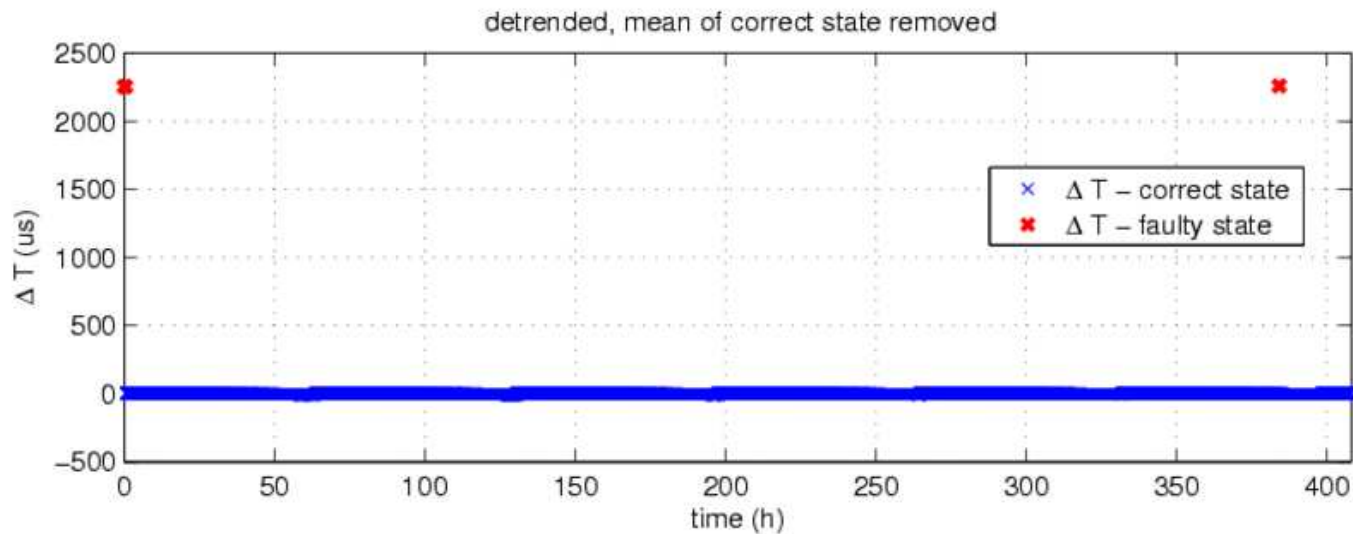
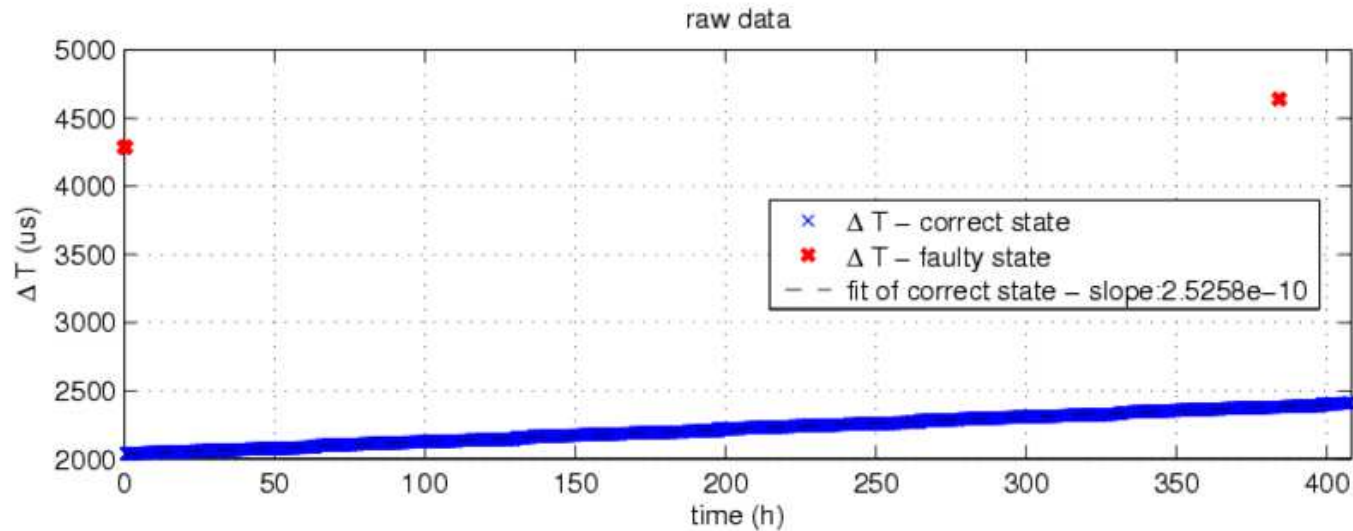
# timing accuracy during S1

- ramp test signal was not available during S1
- used calibration signal instead
  - (+) phase locked to Rb/GPS unit
  - (-) no absolute timing information
  - (-) not well suited for fitting
    - only short segments (~4 data points) can be used for fitting
    - segments are only approximately linear
  - (-) frequency not an exact multiple of 1 Hz
    - signal drifts with respect to GPS second boundaries

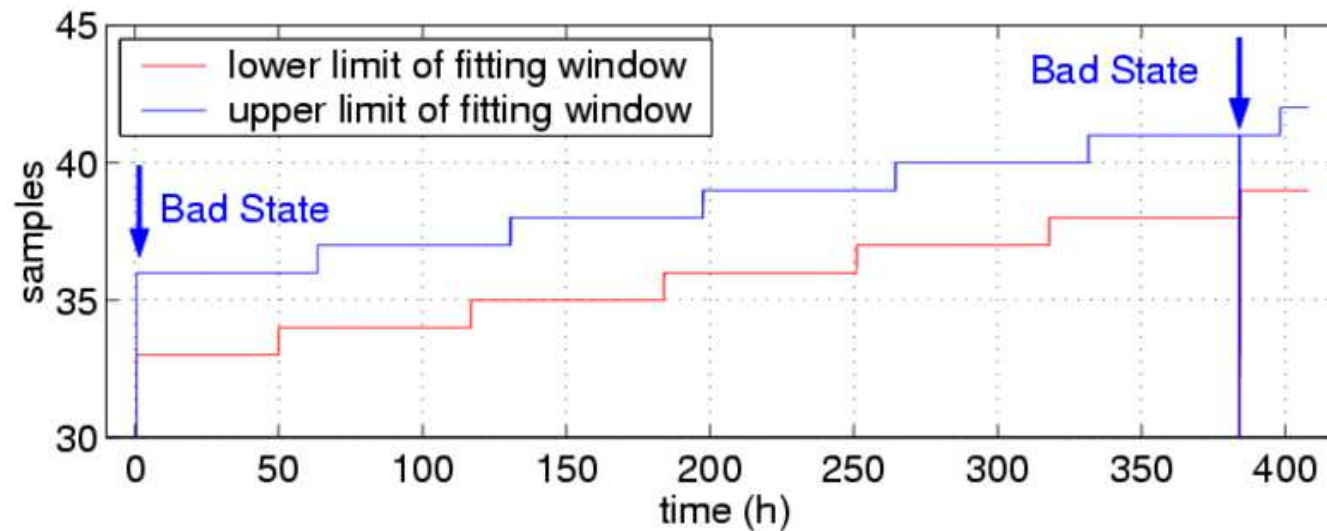
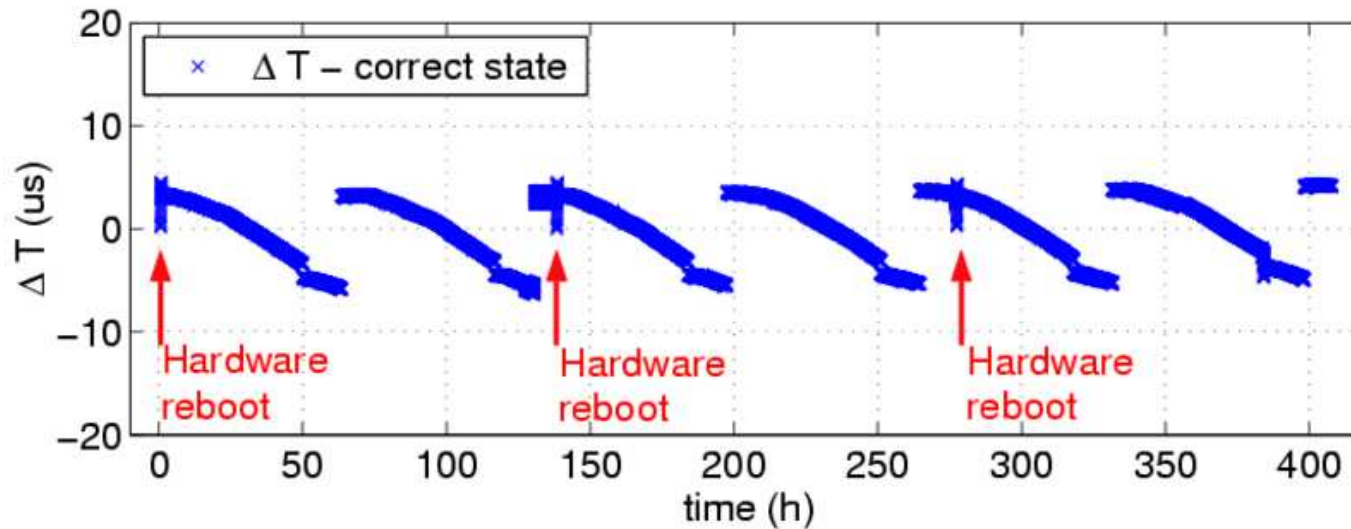
# calibration signal used during S1



# results from S1 data (1)



# results from S1 data (2)



# effect of GPS locking servo

