


A flexible stand-alone testbench for facilitating system tests of the CMS Preshower

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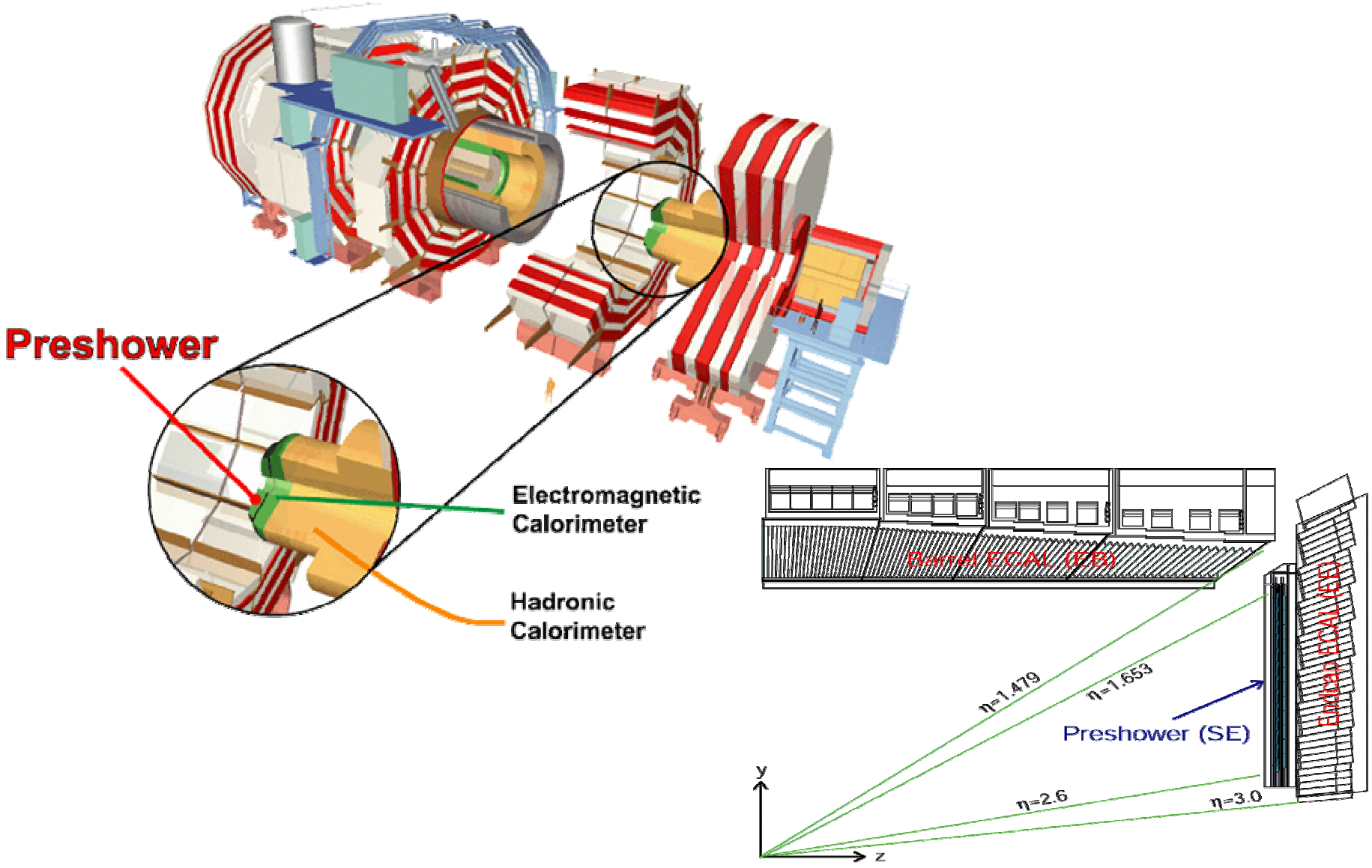
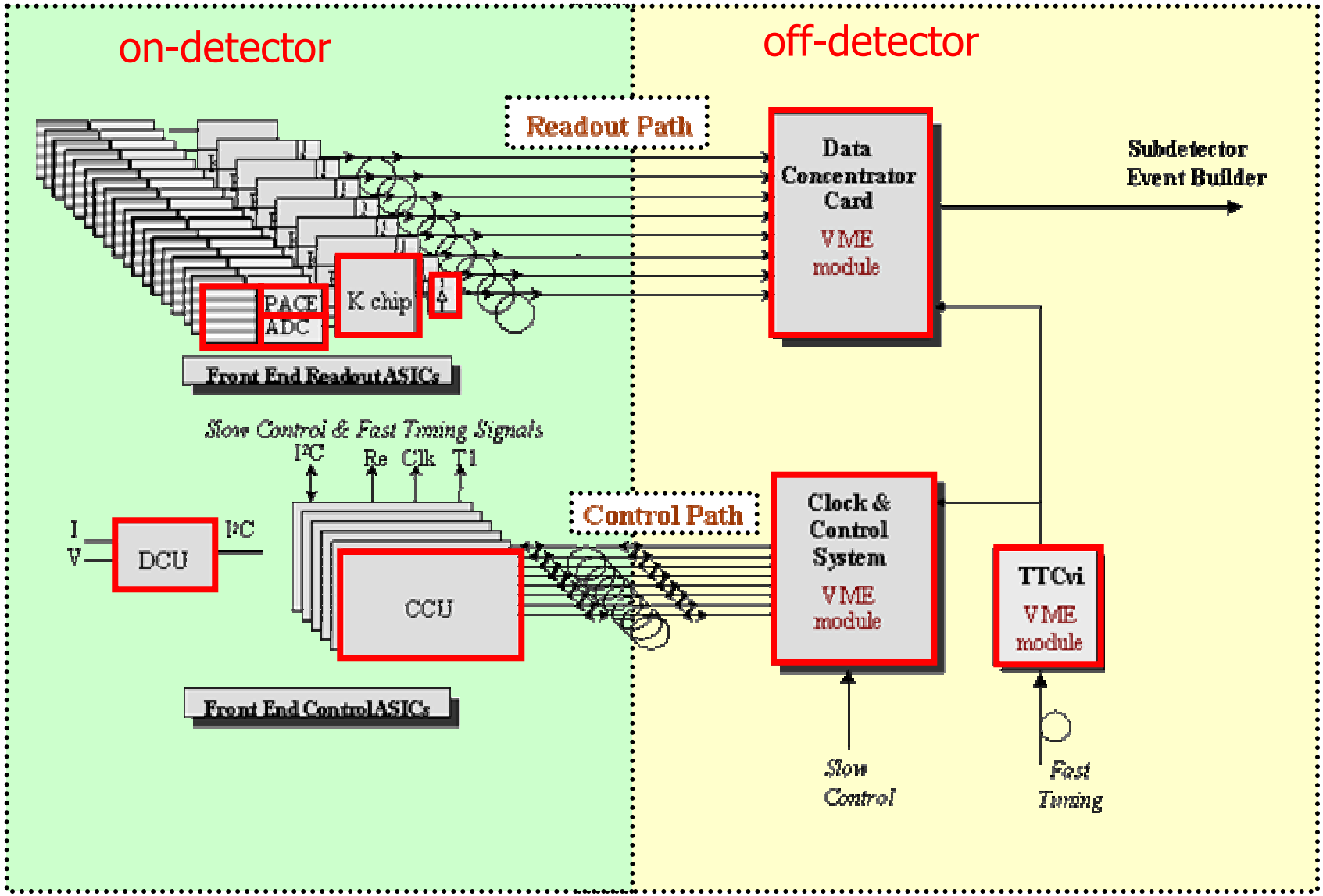
Presentation Overview

- Introduction
- Testbench
  - Motivation
  - Implementation
  - Features
  - Software
  - System Tests
  - Other Uses
- Summary/Conclusions

INTRODUCTION – CMS Preshower

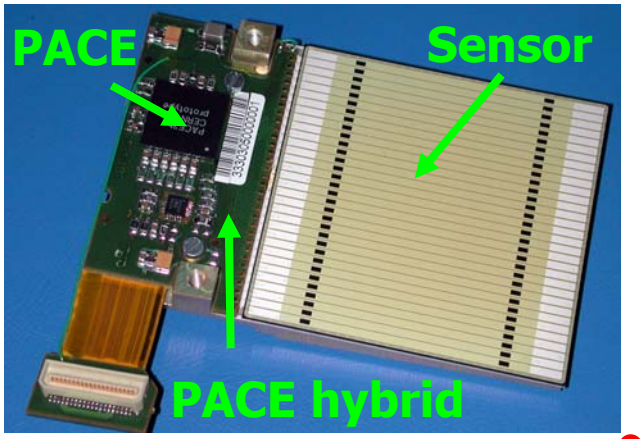


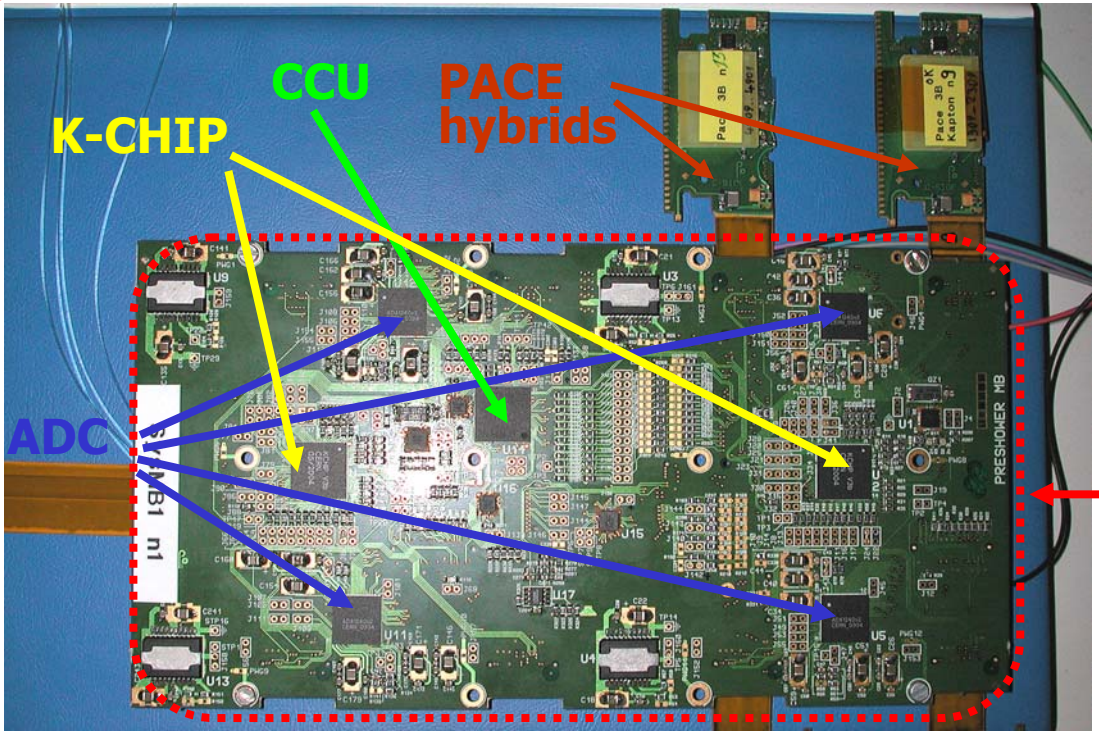
INTRODUCTION – Preshower Architecture



INTRODUCTION - On-detector electronics

μmodule





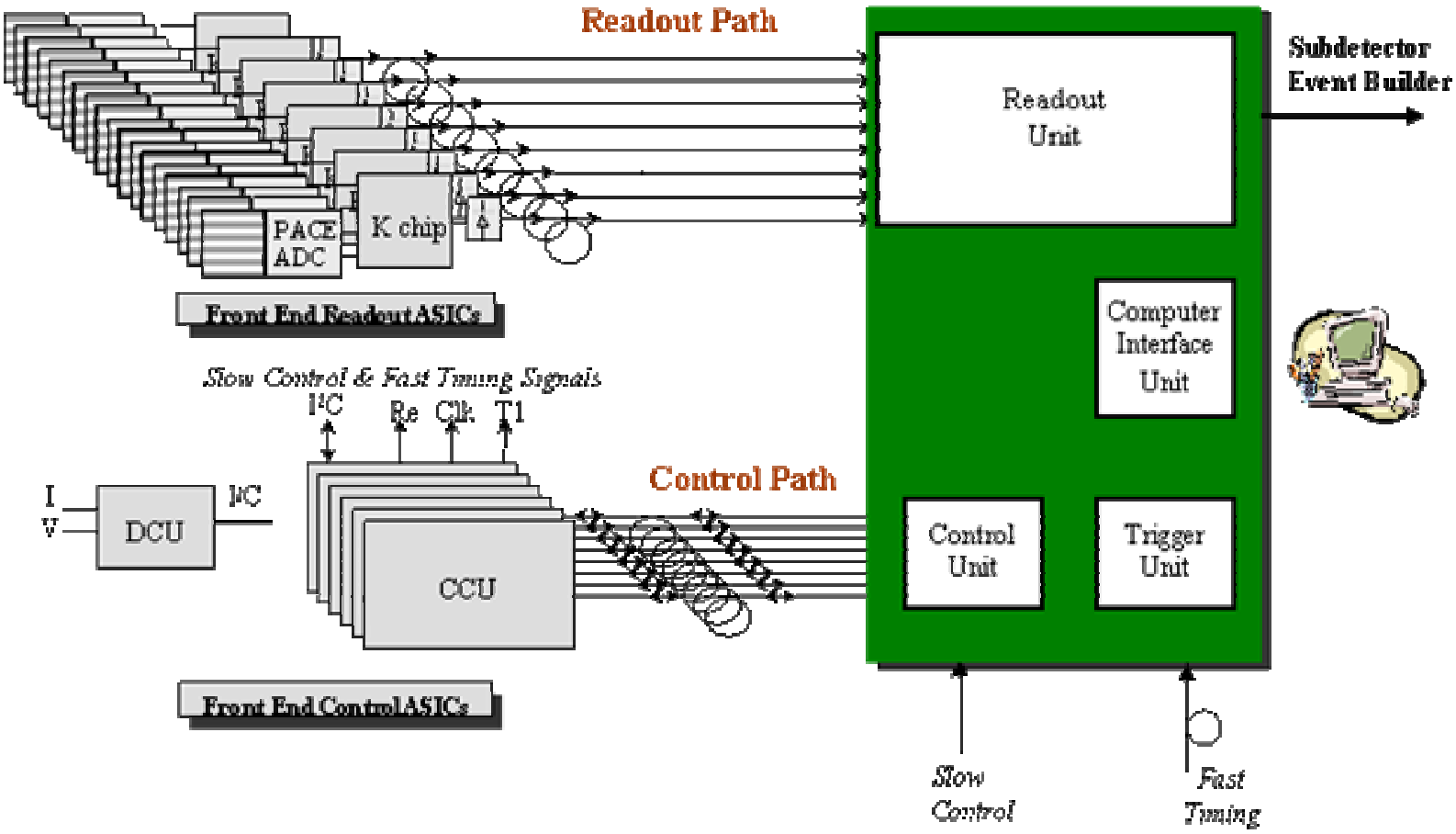
System board

TESTBENCH - Motivation (1/2)

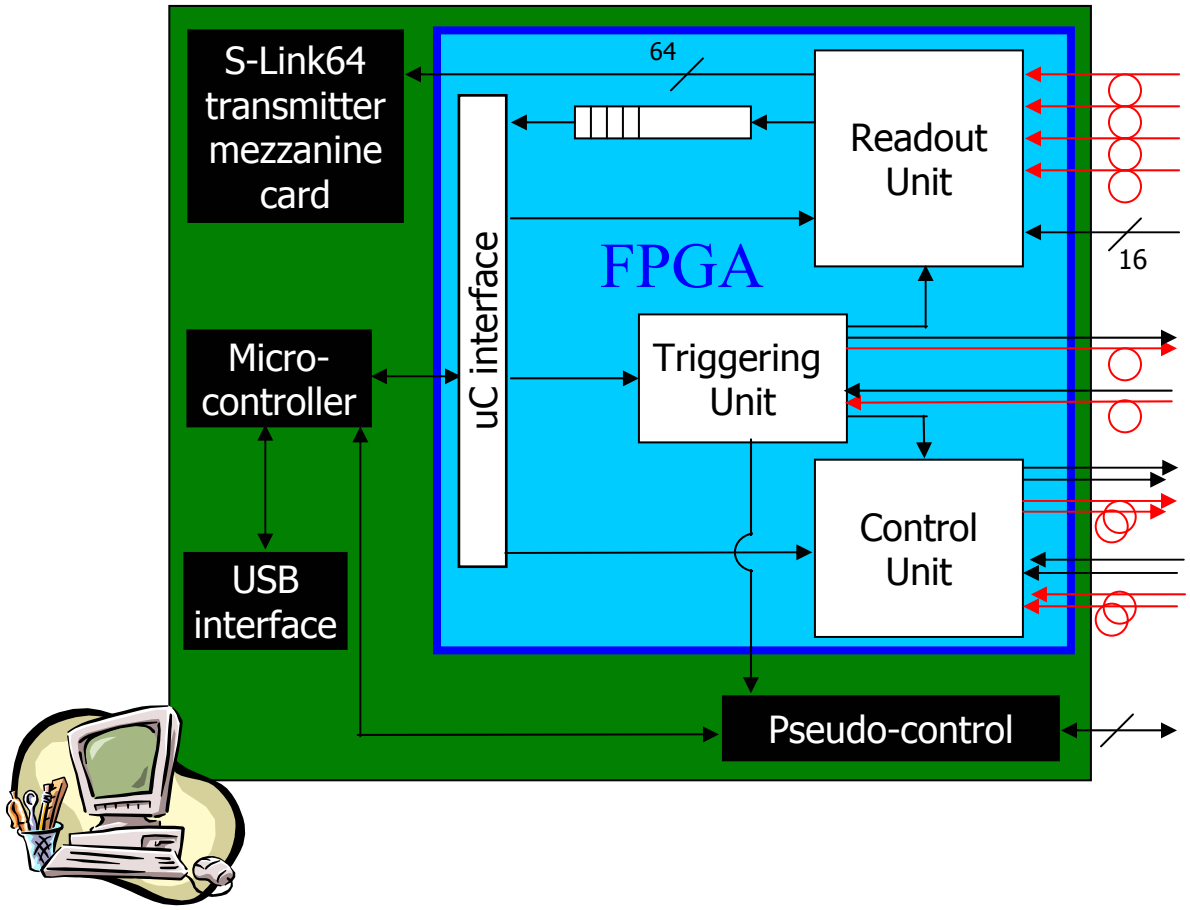
Main Purpose: Evaluation of system board

Requirements	Availability (Q3 2003)
☞ Clock & control system	☑ FEC
☞ Flexible Trigger Generation system	☒
☞ Readout system	☒
	☒

TESTBENCH - Motivation (2/2)



TESTBENCH - Features (1/2)

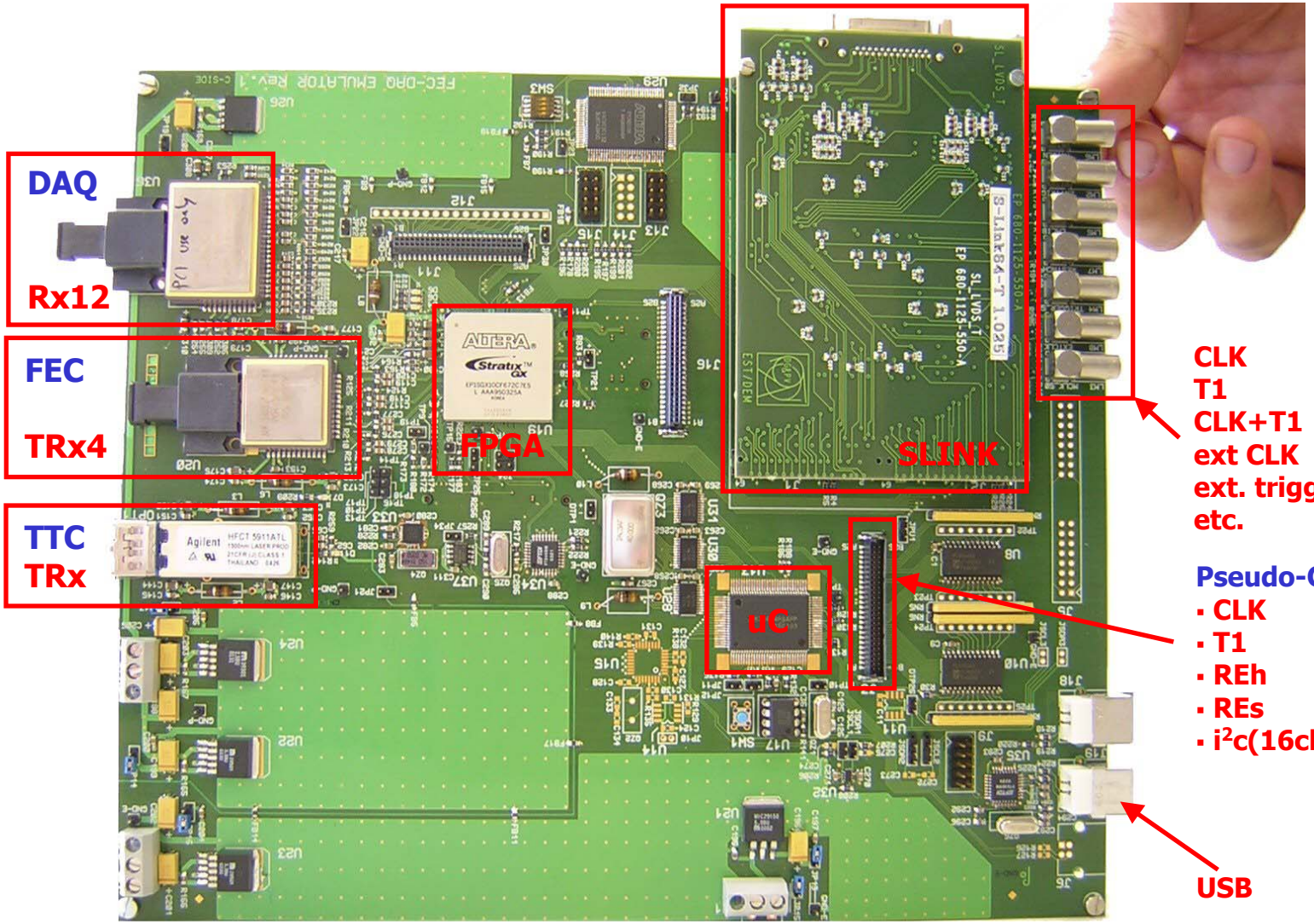


TESTBENCH - Features (2/2)

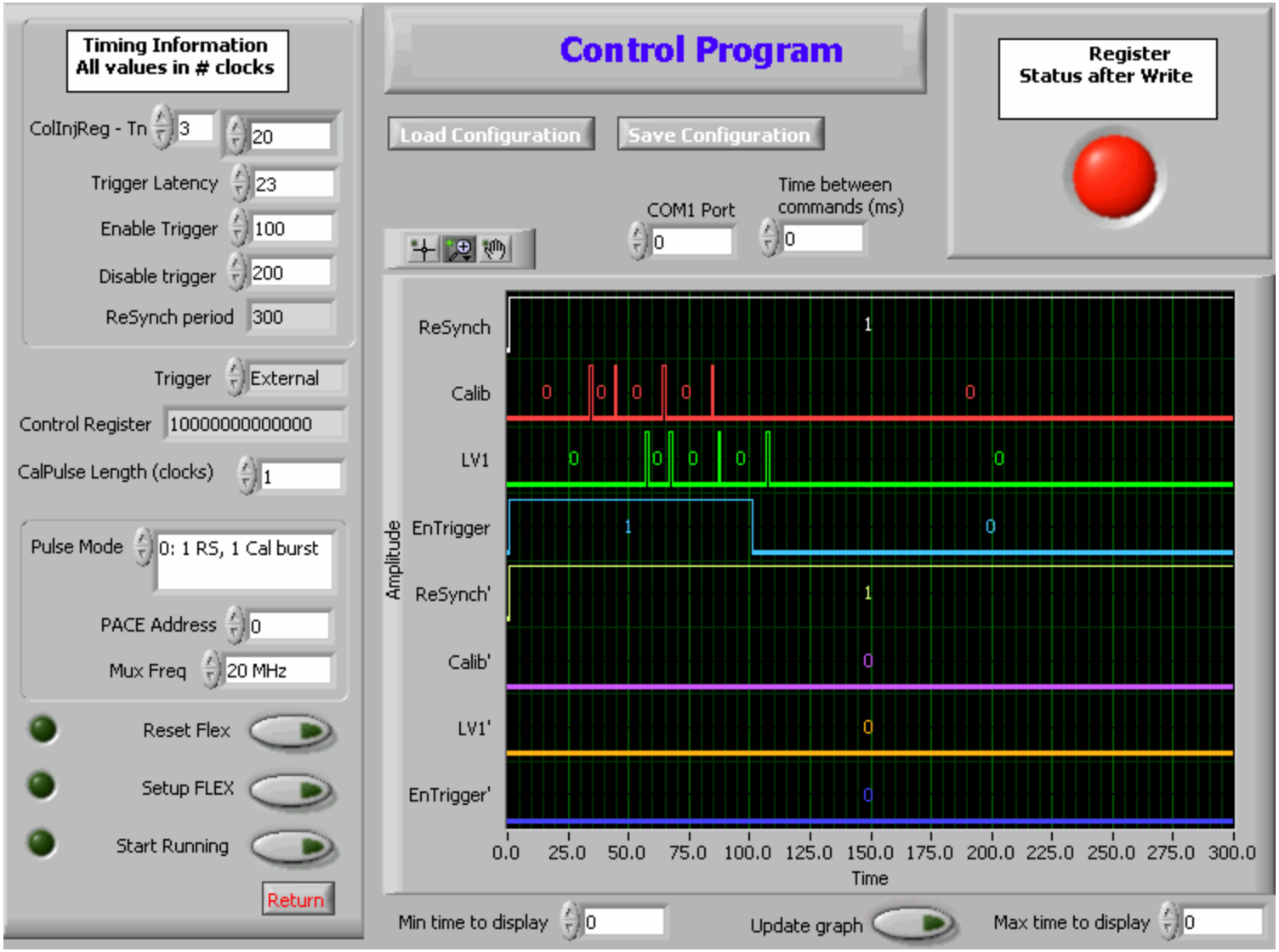
Programmable Trigger Generation

- Generate bursts of up to 1000 triggers - specifying the time (clock cycles) between each trigger
- Each "trigger" is actually two pulses
  - Calib – telling the PACE to generate an internal electronic injection signal
  - LV1 – sent <latency> clocks after the Calibration pulse

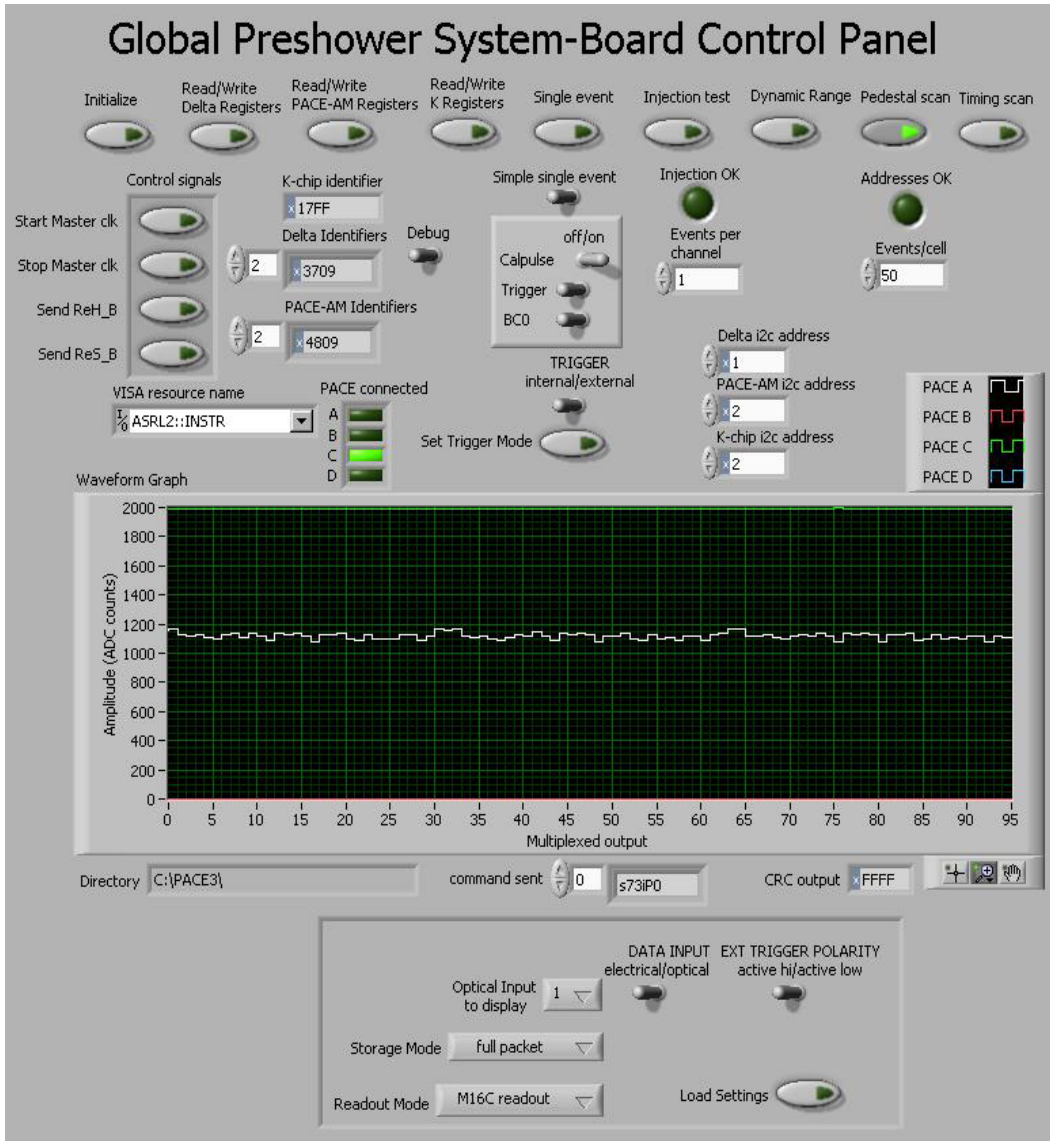
TESTBENCH - Implementation

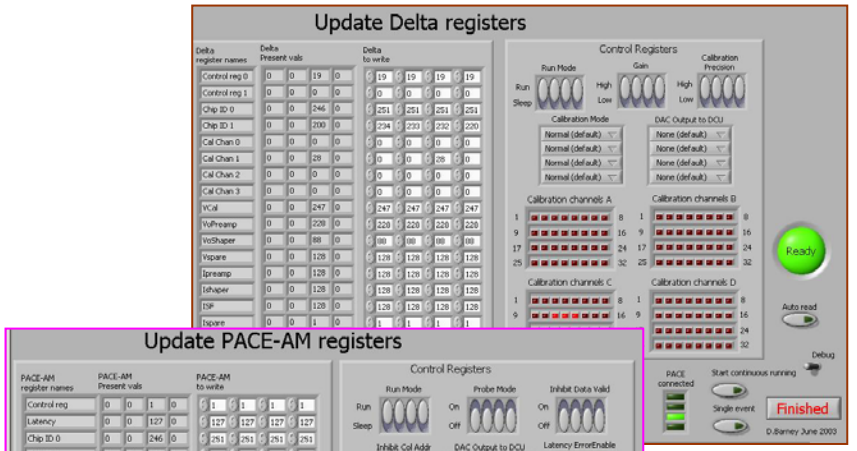


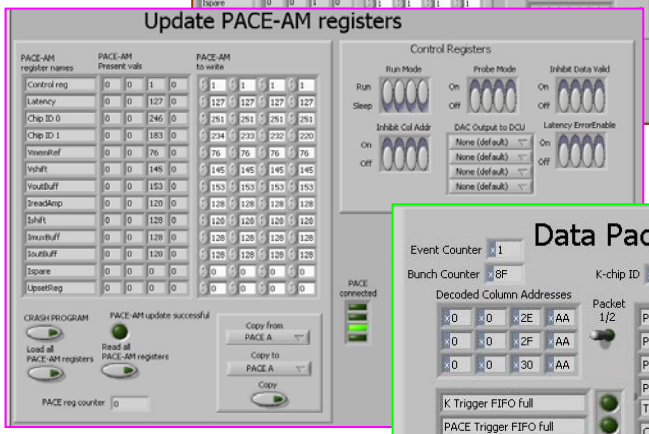
TESTBENCH - Software (1/2)

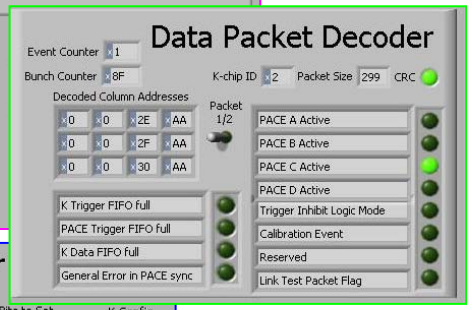


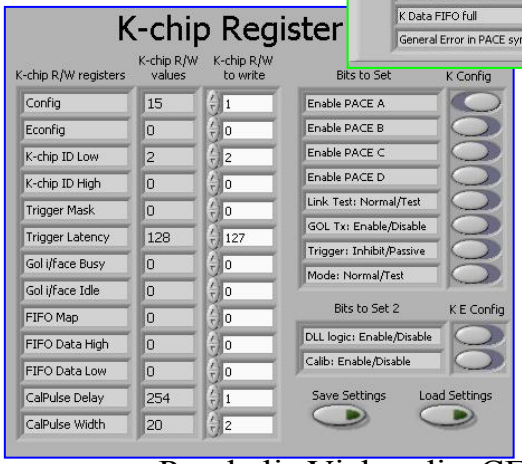
TESTBENCH - Software (2/2)





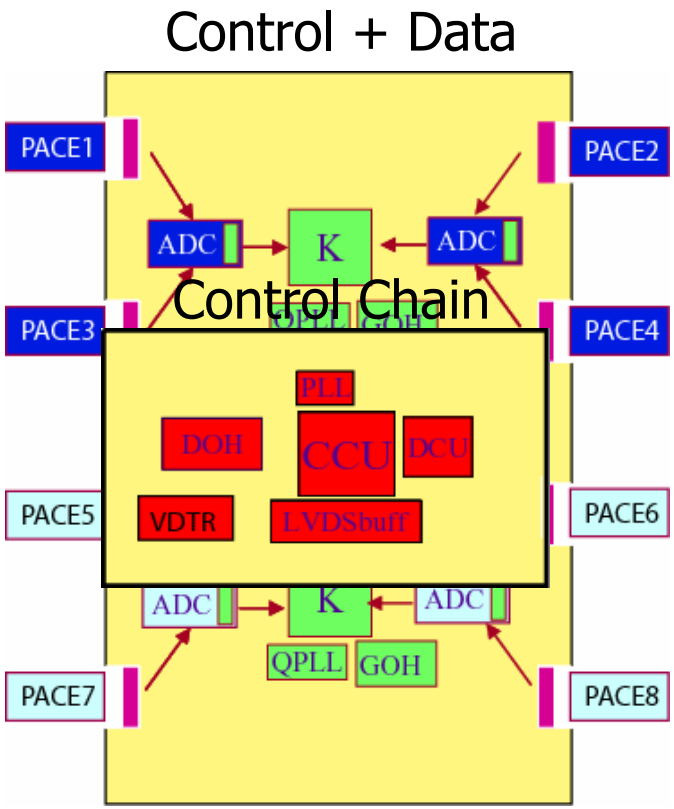




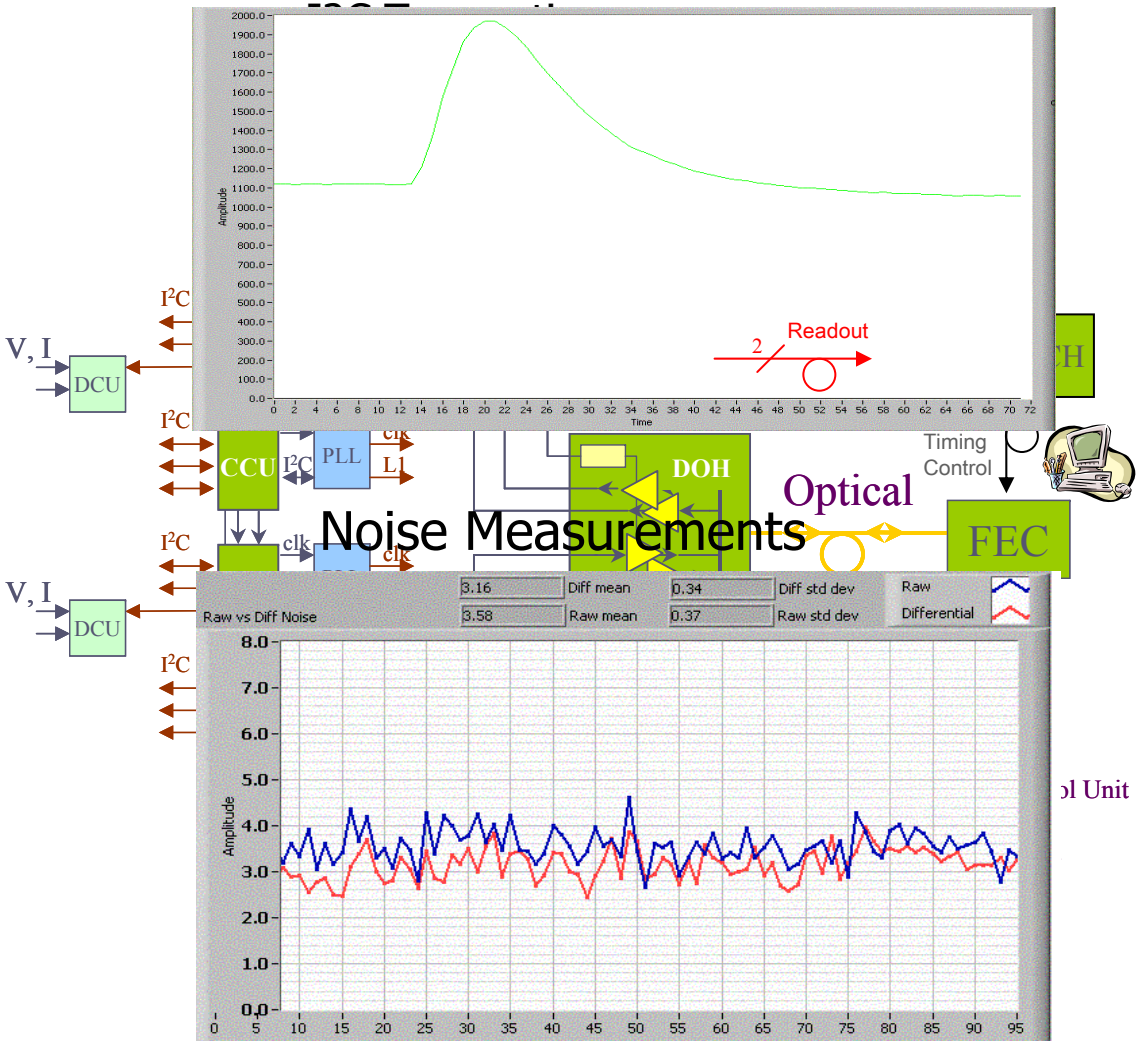


TESTBENCH – System Tests

Design Verification



☞ Pulse Response Distribution



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TESTBENCH – Other Uses

- Production testing of system boards/micromodules Taiwan,Greece,CERN
- Test beam (end of September 2004)
- Prototype of CMS Preshower Data Concentrator Card, if necessary

SUMMARY

- Stand-alone PC-controlled evaluation system for Preshower on-detector electronics
- Timing, trigger and control signals & readout
- Optical interface available
- Flexible/Portable/Low Cost
- Principle production testing system for ~500 CMS Preshower system boards & ~4300 PACE hybrids in Taiwan, Greece and CERN
- Useful (?) for evaluating or production testing of other detector electronics systems, for LHC and beyond