
***Presentation
of a diagnostic tool for
hybrid and module testing***

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Overview

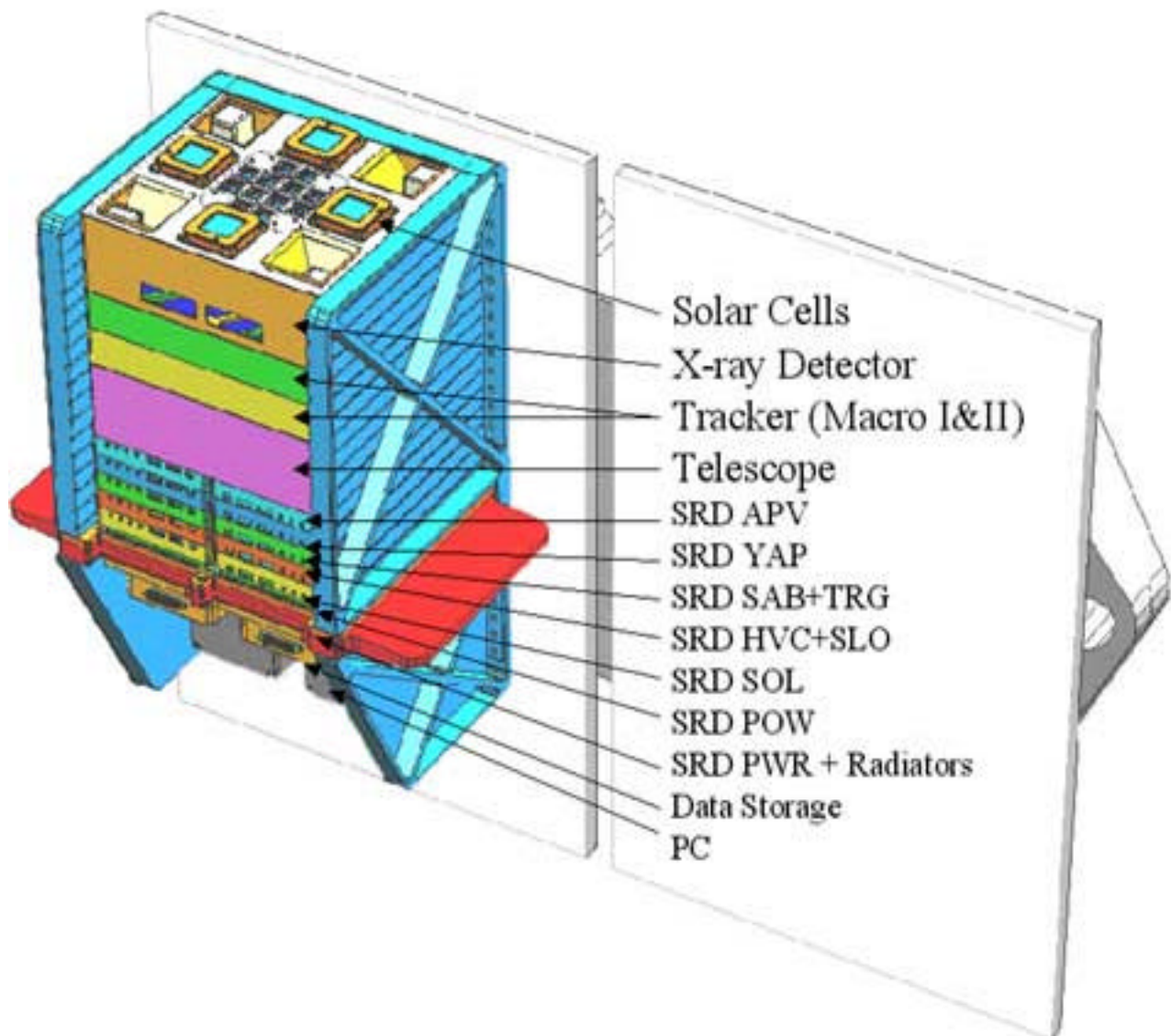
- Introduction
- Current Test Setup
- APV25 Hybrid Test
(live presentation)
- Cost Estimates
- Summary and Future Plans

Introduction

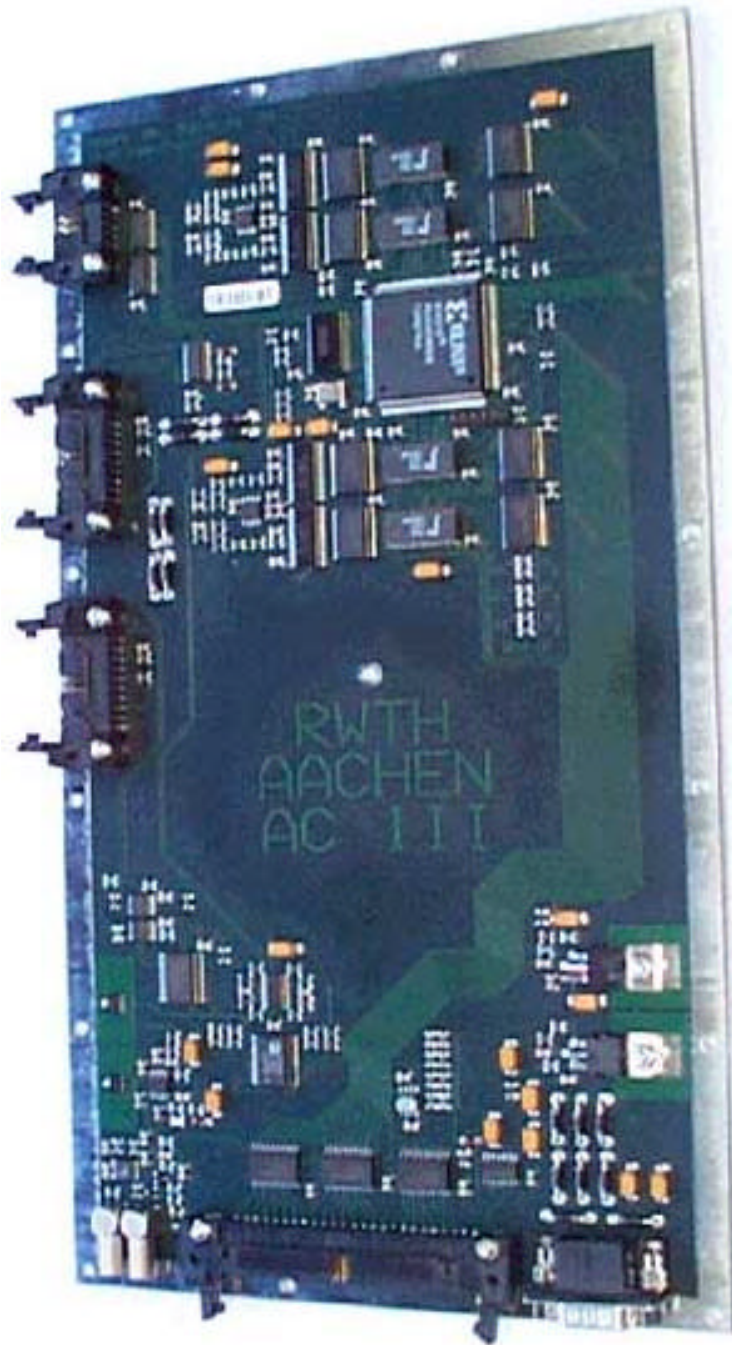
- task: hybrid and module testing
 - test objects in Aachen:
 - two **APV25 hybrids**
 - one CMS silicon detector (3 APV6)
- hardware and software tools
 - test setup formerly designed for the AMS (**A**lpha **M**agnetic **S**pectrometer) experiment
 - ⇒ **S**ynchrotron **R**adiation **D**etector
 - adopted for CMS hybrid and module test purposes (short- and long-term tests)
 - software is not intended for DAQ but for testing and diagnostic purposes

The AMS Experiment

- The **A**lpha **M**agnetic **S**pectrometer is designed to search for and measure various unusual types of matter



SRDAPV Board



SRDAPV Board

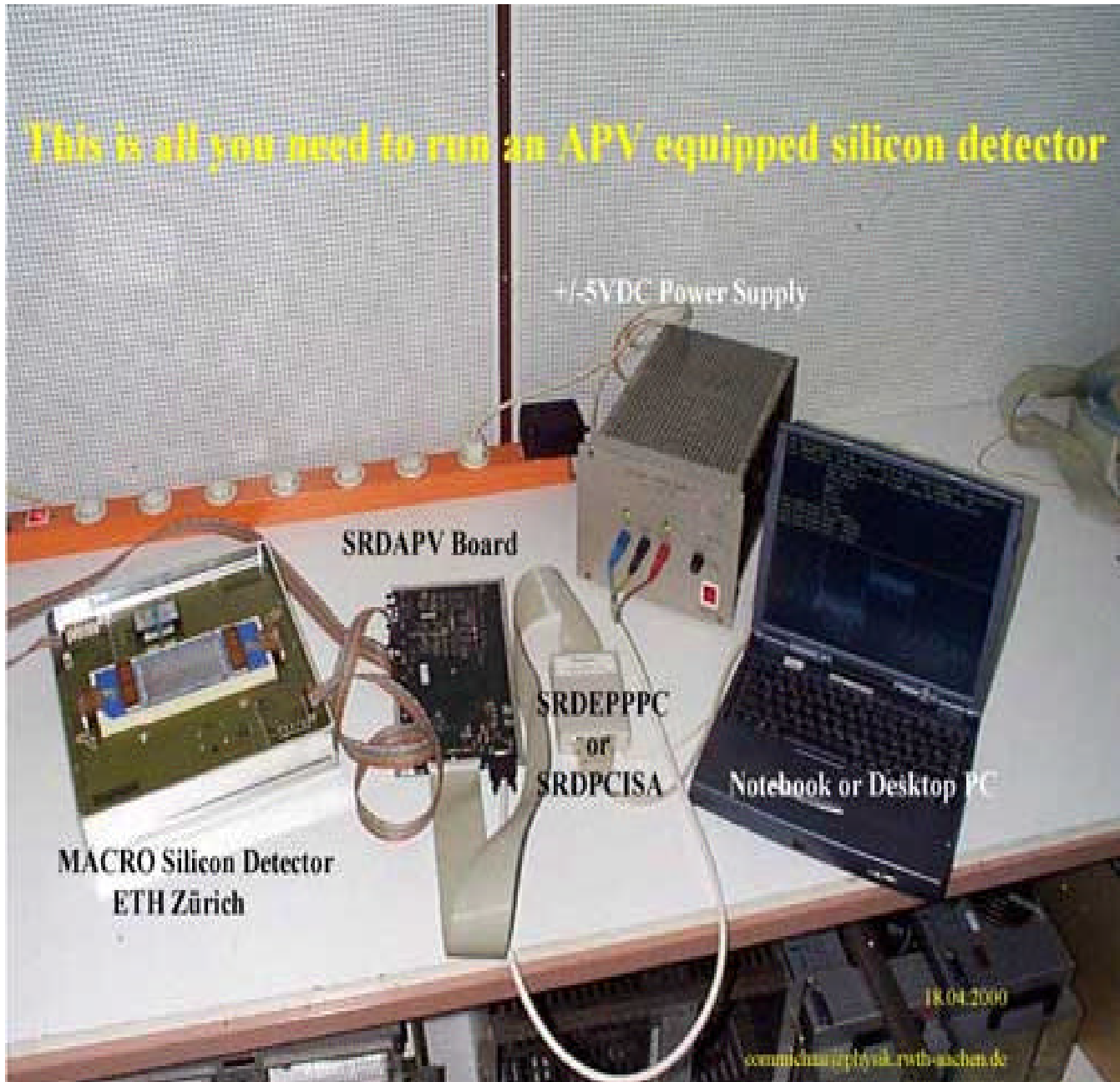
All functions that are needed to run an APV are integrated in the SRDAPV board !

- it combines the **slow control link** with I2C protocol between up to four APVs and the readout system
- it contains a **fast sequencer function** to generate the APV clock (40 MHz)
- it delivers the synchronized **event trigger** for the APV
- it contains **Fast ADCs** (20 MHz or optional 40 MHz sampling rate) with random access memory (8 kbytes) to digitize and store analogue data output

SRDAPV Board

- with an **implemented on board extension** one may **link up to 16 boards together** to construct a test system of up to **64 APVs linked to one PC** (one board has the function of a system master and delivers the synchronized trigger and ADC clock to all the other boards)
- the SRDAPV is build around a **XILINX PLDXC95216-10-PQ160C/I** which serves as
 - system controller for different data paths
 - controller for ADCs and memories
 - sequencer for the APVs

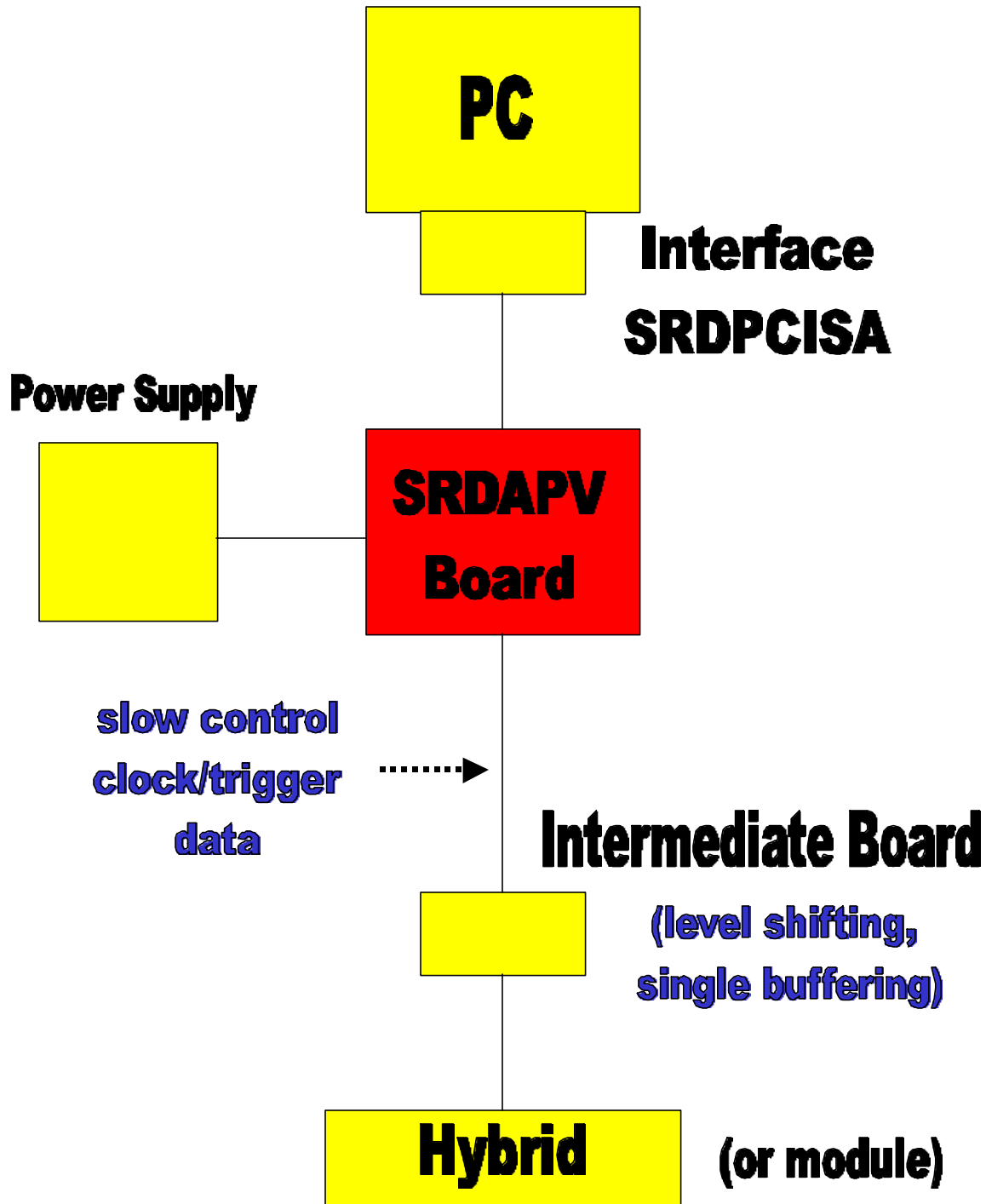
SRD Test Setup (AMS)



SRD Test Setup

- That is all you need to run and test an APV25 hybrid or an APV equipped silicon detector:
 - [SRDAPV board](#)
 - Intermediate board ([SRDCON](#)) for level shifting
 - PC interface ([SRDEPPC](#) or [SRDPCISA](#))
 - Notebook or [Desktop PC](#)
 - [Hybrid](#) or detector
 - [+-5V DC power supply](#)
 - [SRD Software](#)

SRD Test Setup



APV25 pedestal matrix

Titel:

pedestals_col4a.ps (Portrait A 4)

Erstellt von:

HIGZ Version 1.26/04

Vorschau:

Diese EPS-Grafik wurde nicht gespeichert
mit einer enthaltenen Vorschau.

Kommentar:

Diese EPS-Grafik wird an einen
PostScript-Drucker gedruckt, aber nicht
an andere Druckertypen.

LED signal on a silicon detector (APV6)

Titel:

led_eng.eps

Erstellt von:

Micrografx Graphics Engine

Vorschau:

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Kommentar:

Diese EPS-Grafik wird an einen PostScript-Drucker gedruckt, aber nicht an andere Druckertypen.

Cost Estimates

- Low cost PC (no special requirements except one ISA slot)
- SRDAPV Board (for one hybrid)
~ 1200 SFr (~ 770 €)
- Intermediate Board
~ 80 SFr (~ 50 €)
- Interface
~ 100 SFr (~ 60 €)

Summary

- The presented test setup is
 - compact (few elements, no crates ...)
 - flexible with regard to APV handling (e.g. different controller, register changing ...)
 - suited for stable running and for precise testing of
 - » APV25 hybrids
 - » silicon modules
 - suited for detection and diagnostics of errors
 - cheap

Future Plans

- hardware upgrade due to milestone prototype properties and requirements
 - e.g. sampling with 40 MHz (tests already running)
- build up a **burn-in test facility** based upon:
 - the presented diagnostic tool
 - a cooling box (under construction)
 - temperature regulation (from AMS)
 - an upgraded software version (in collaboration with LLN) with the inclusion of a data base
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<http://www.physik.rwth-aachen.de/group/IIIphys/Electronics/PSRD/index.html>