

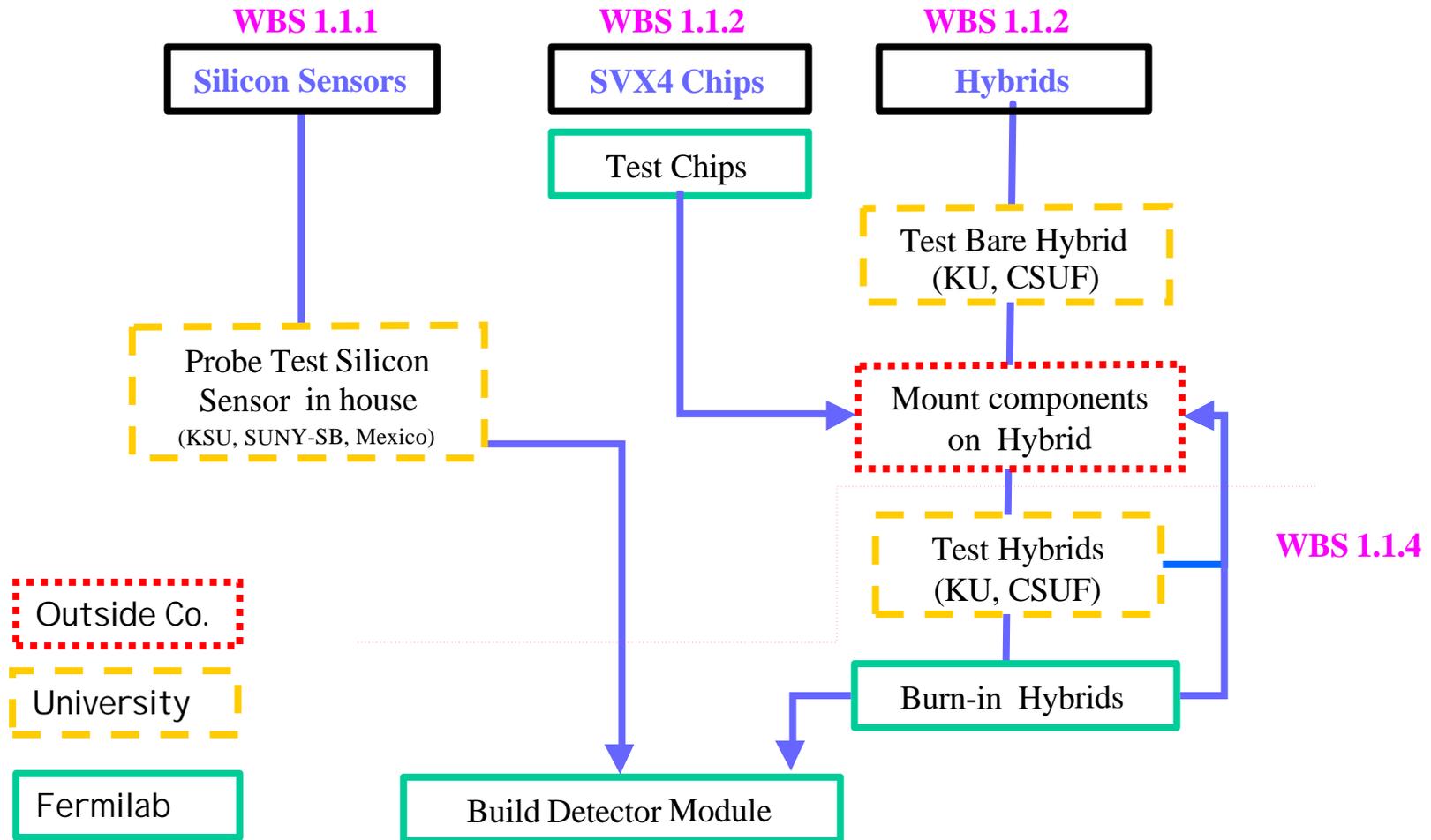


Quality Assurance, Testing and Burn-in WBS 1.1.4

Cecilia Gerber
University of Illinois at Chicago

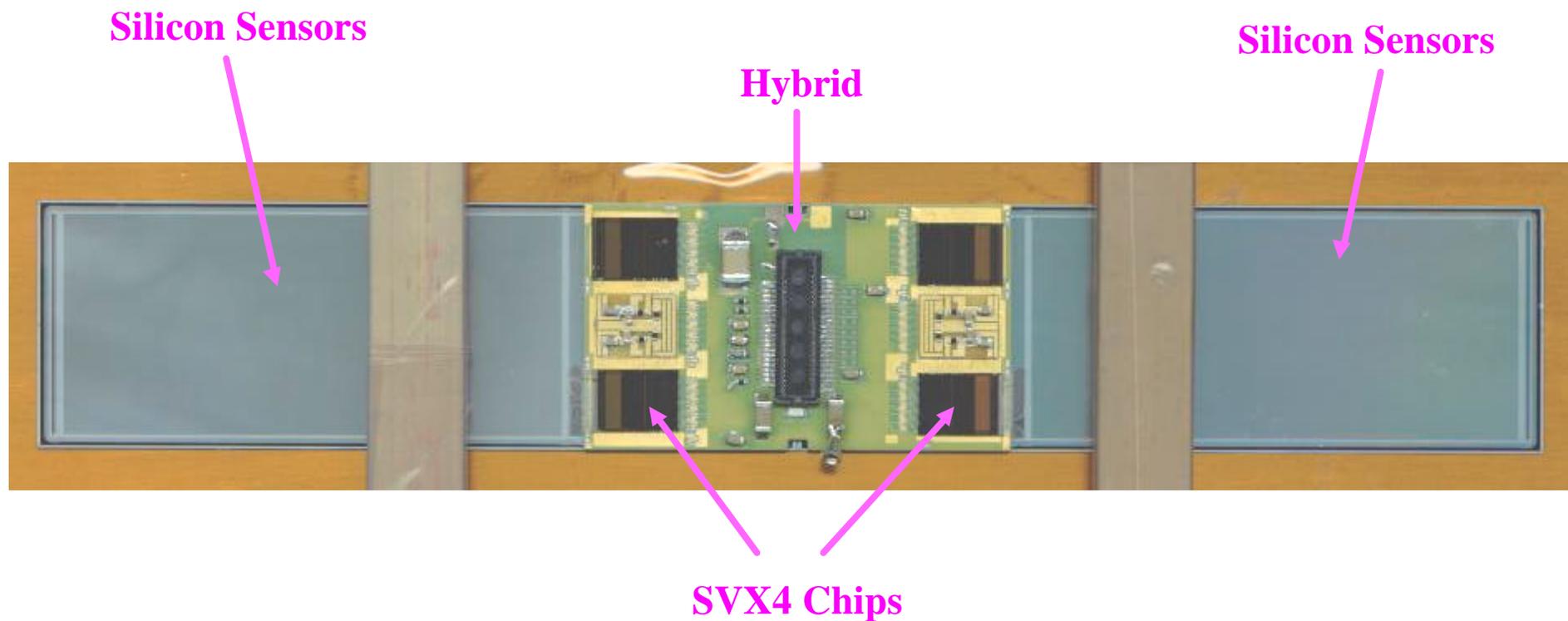


Production and Testing Sequence





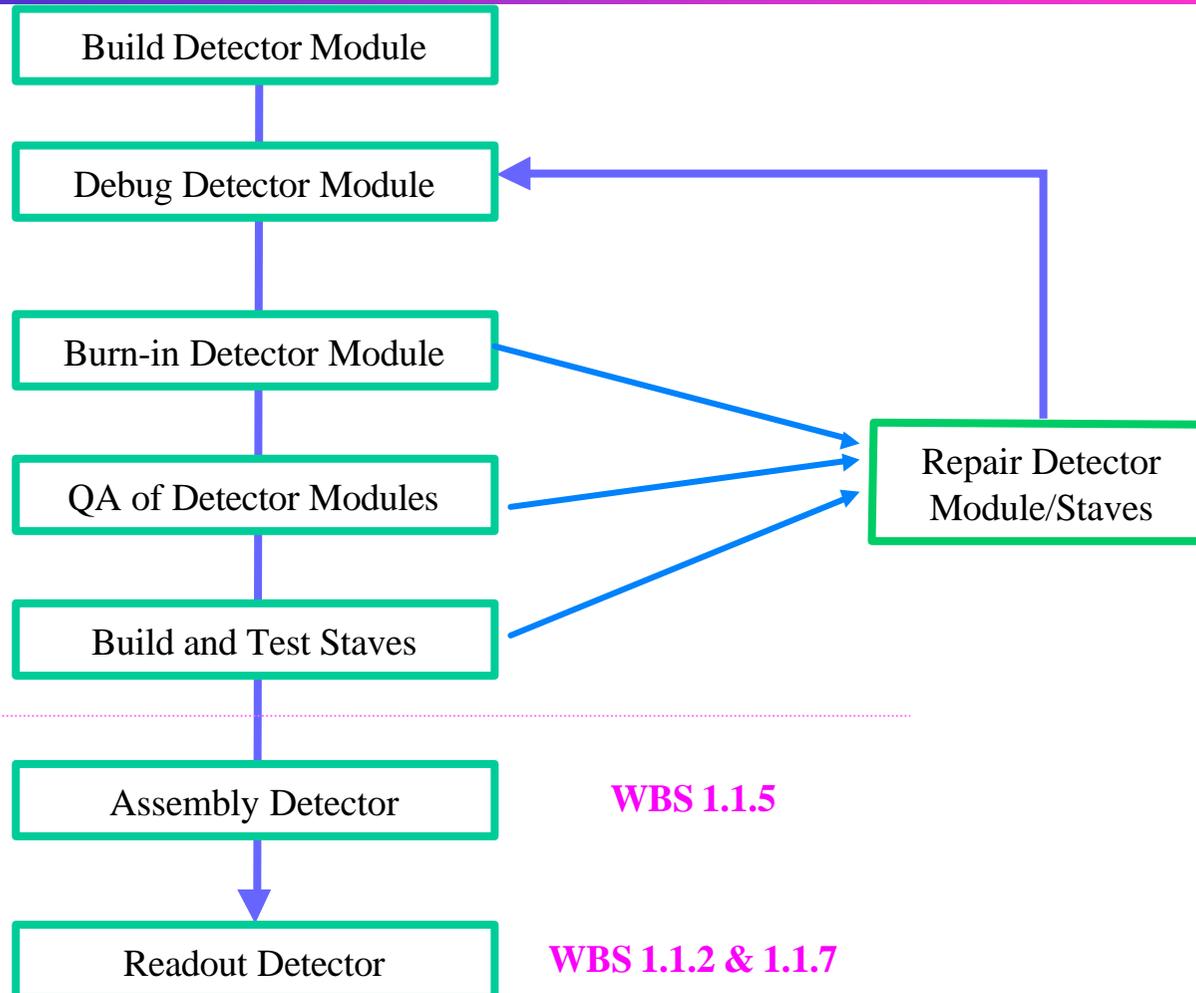
First L1 module





Production and Testing Sequence II

WBS 1.1.4



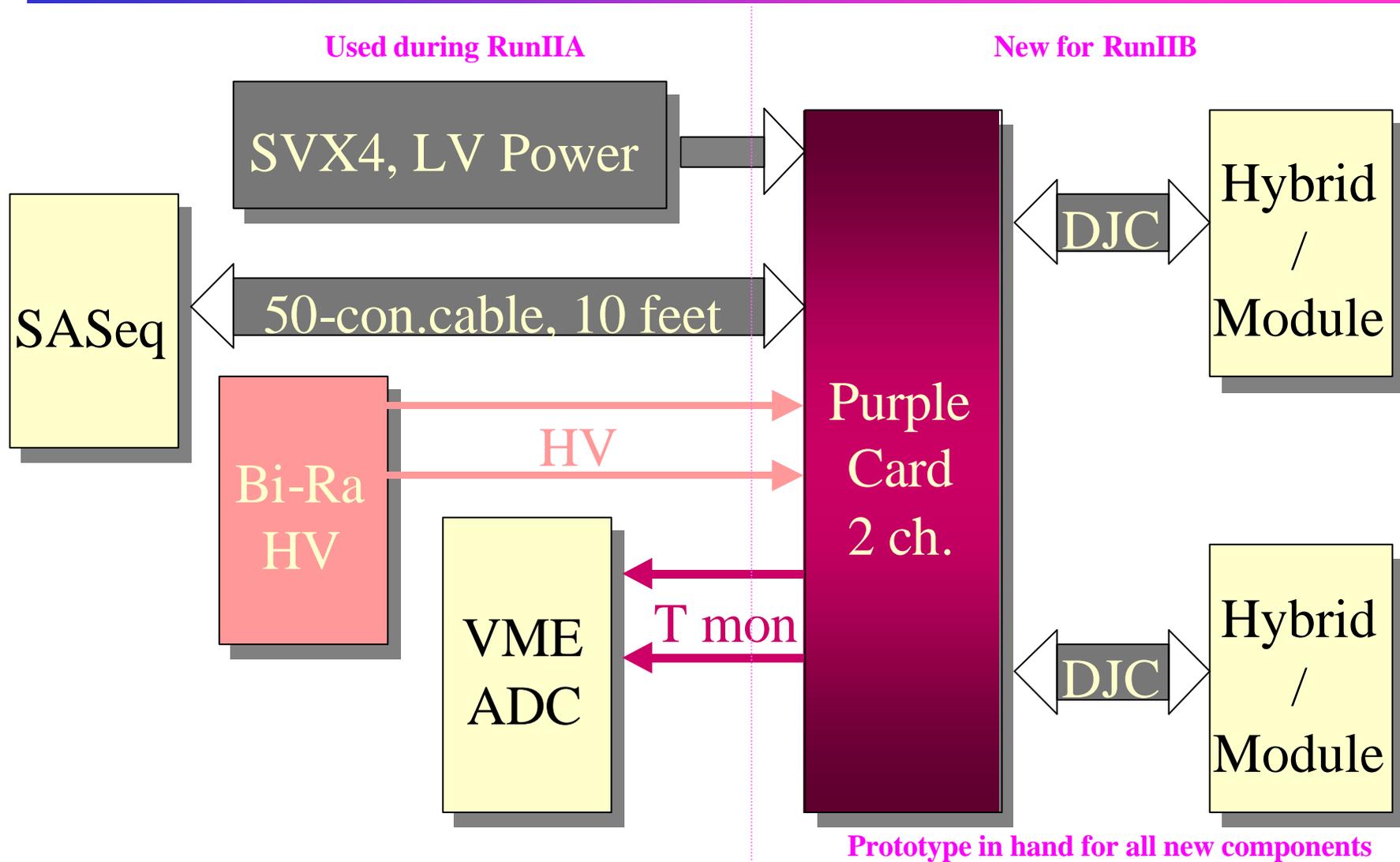


Description of Tasks

- **Debug detector module**
 - ◆ Visual inspection
 - ◆ Functionality test w/o HV
 - ◆ Detector biasing (5V steps)
 - ◆ Identify broken capacitors and pull bonds
 - ◆ Maintain depletion voltage + 10V for 30 min
 - ◆ Produce V-I & V-noise plots
 - Done by physicist (tech to pull wire bonds)
 - Assume 4 hours/module
- **Burn-in**
 - ◆ Temperature sensor test at room temperature
 - ◆ Long term test (60 hs) with detector biased and cooled
 - Done by supervised non-expert physicists
 - ◆ Results are used for detector grading
- **Quality assurance**
 - ◆ Laser test, temperature cycles, pull test, etc
 - Done by physicist on 10% of modules. Assume 1 week per module.

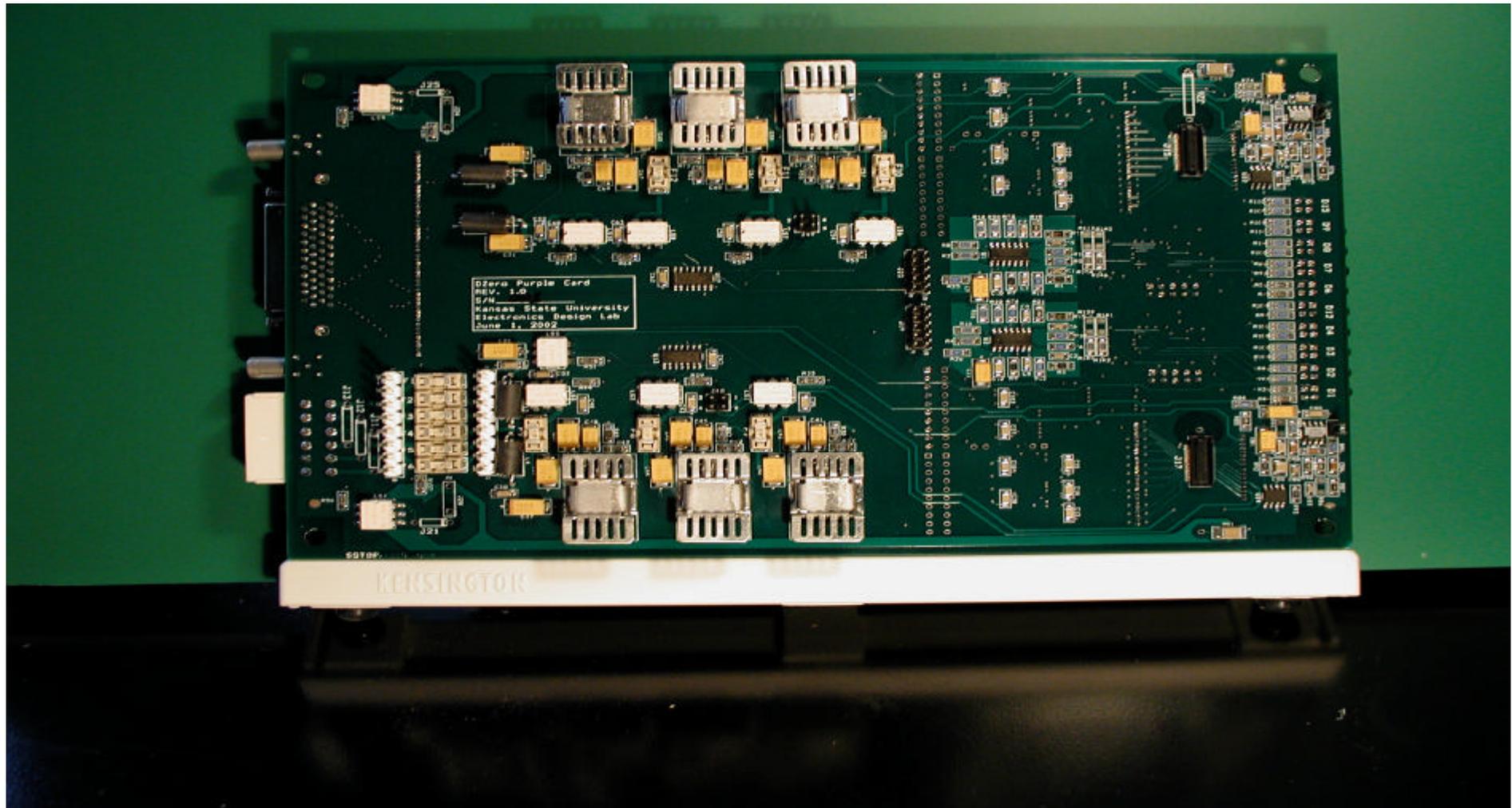


Base Unit of Test Stand HW





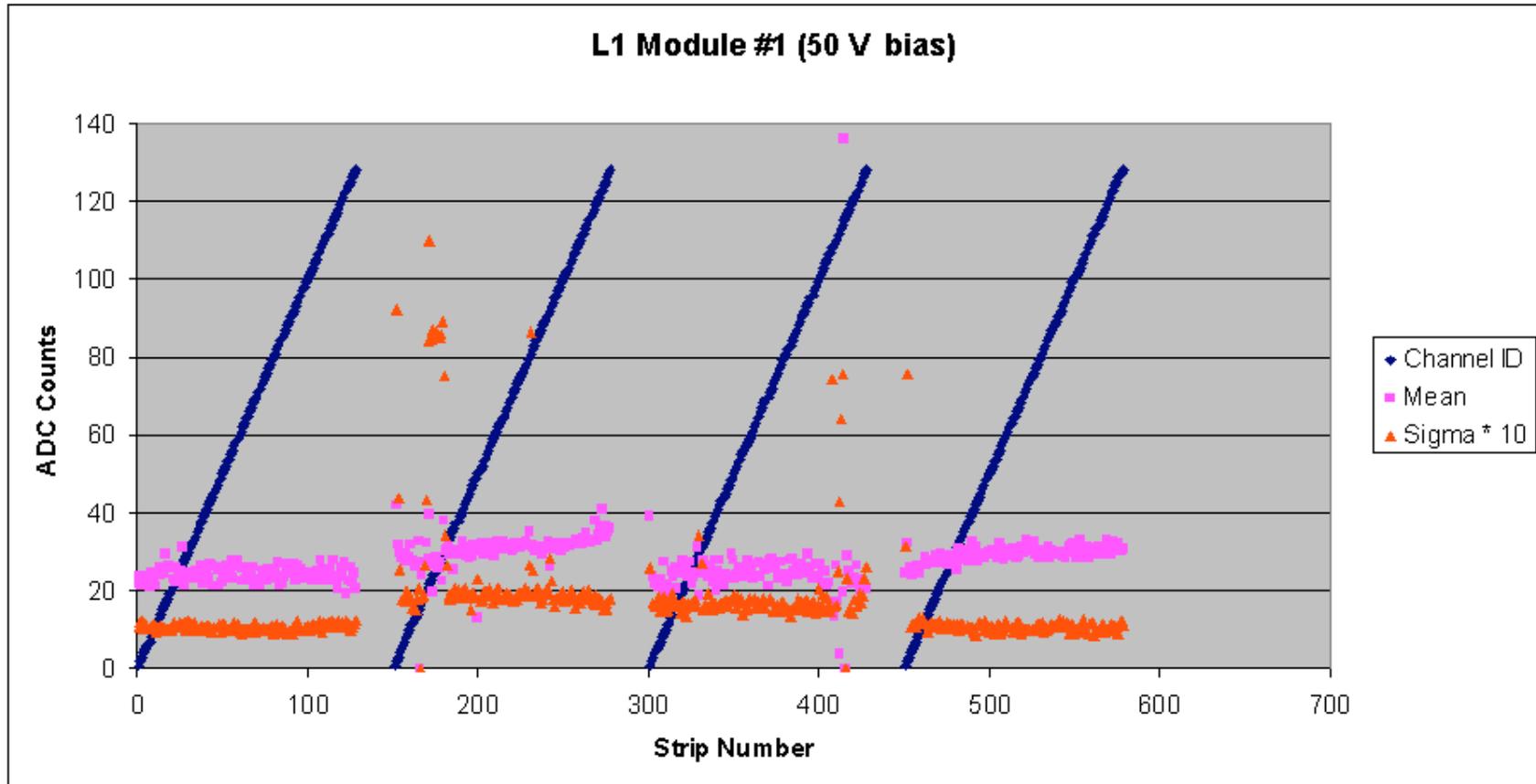
Purple Card Prototype





L1 module read out with new Run IIB "testing" HW

08/05/2002

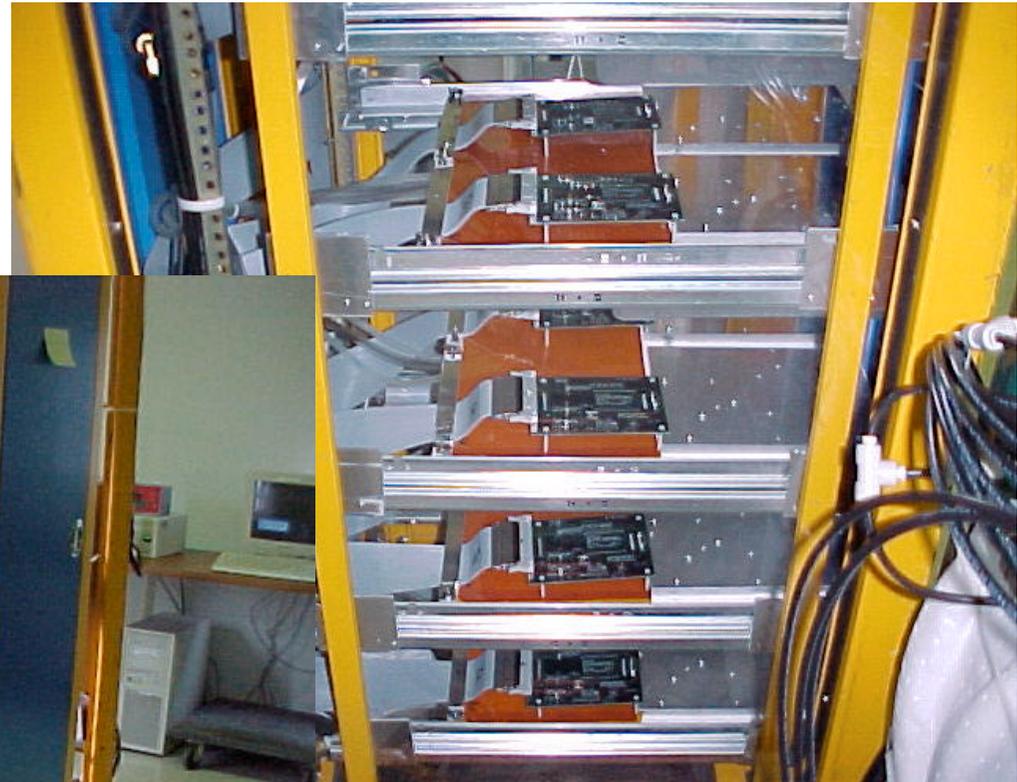


Chip 2&3 are bonded to ELMA Sensor
bias voltage 50 V, leakage current 1.5 mA



Run I I A Burn-in Setup: being adapted for Run I I B

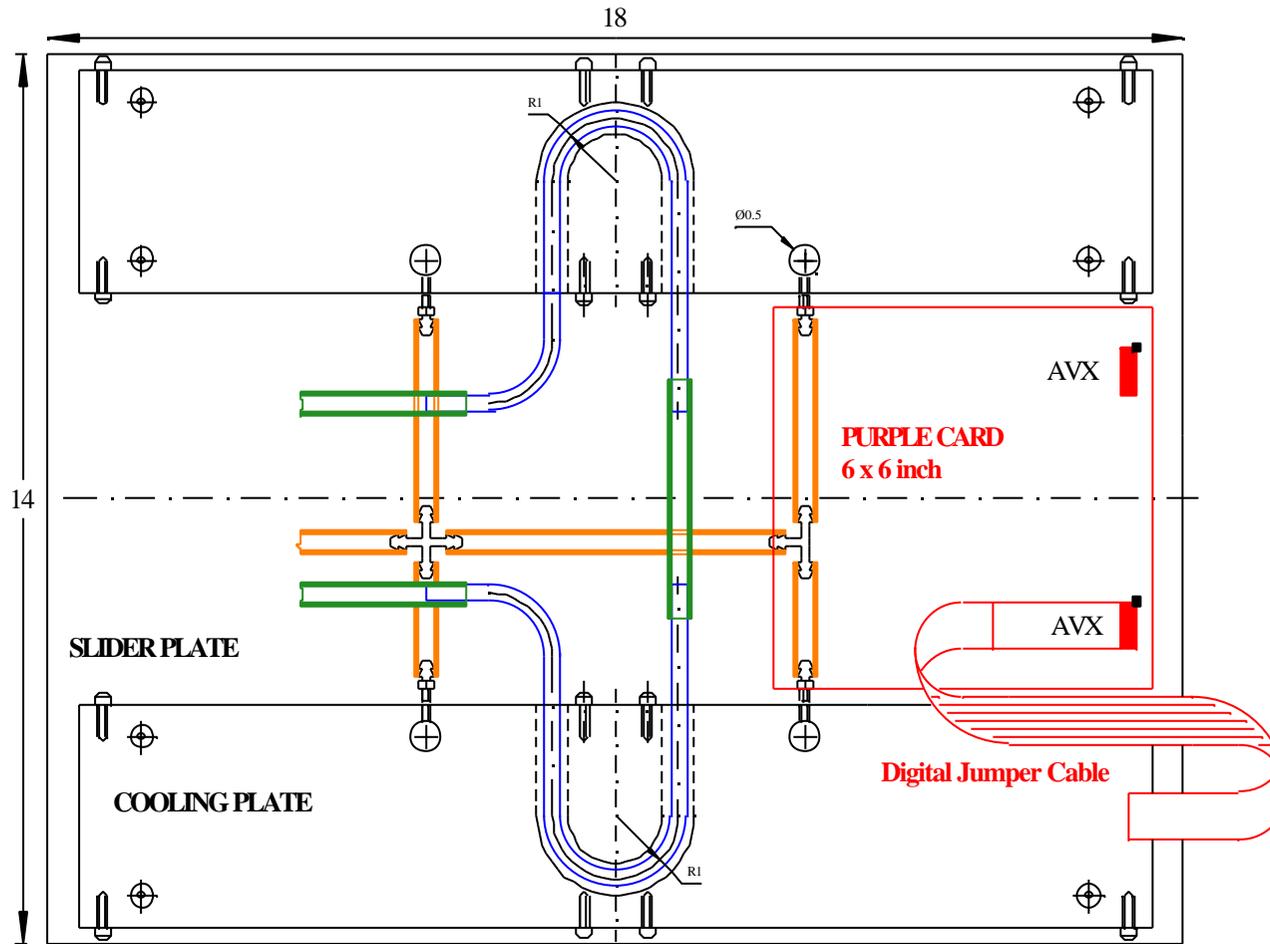
Modified Racks used as Dry&Cooled Testing Boxes



Slider Plates allow easy setup of modules and provide cooling during Burn-in



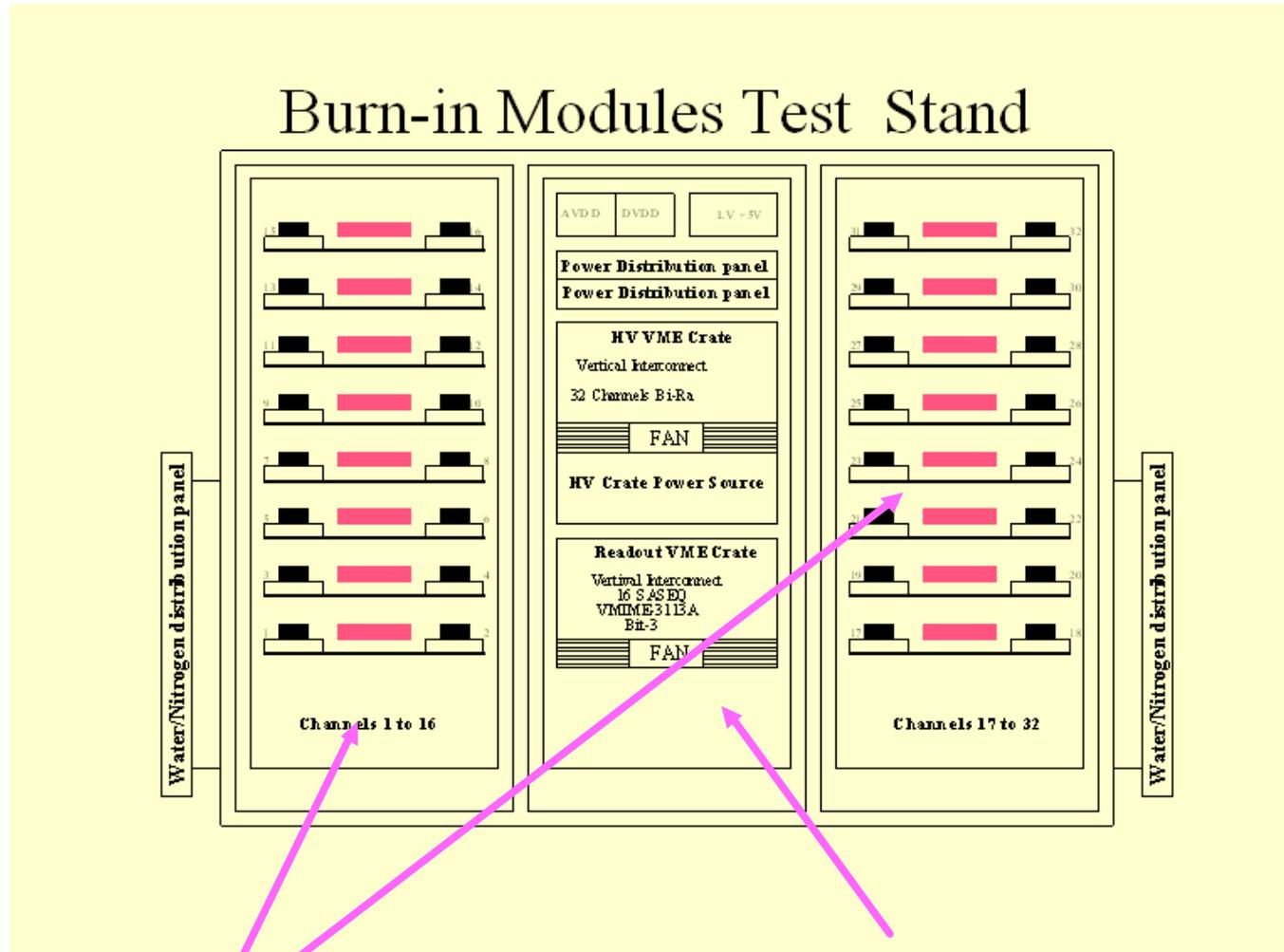
Slider Plate for Run I I B



- Slider Plate provides cooling for all type of modules during burn-in
- Two modules are connected to one Purple Card via a Digital Jumper Cable per slider plate



Layout for module Burn-in



Modified Racks used as Dry&Cooled Testing Boxes

One additional Rack houses all the readout electronics



Test Stations Count

- **Sidet lab AB bridge**
 - ◆ 2 hybrid (32 ch) and 2 module (64 ch) burn-in stations
 - ◆ 1 QA laser station
 - ◆ 1 station used for diagnosis & repair
- **Lab D: 2 debugging stations**
- **Lab C: 2 test stations for assembly**
- **At remote institutions**
 - ◆ KU, CSUF (hybrid testing and repair)
 - ◆ UIC, NW (code development)
 - ◆ KSU (electronic development)
- **Total of 4 burn-in and 11 testing stations**
- Run IIA: had 2 burn-in (16 channels each), 2 laser, 2 debug, 2 repair, 3 assembly, 1 development and 3 at remote institutions: 15 total.
- Expect Run IIB modules to require less debugging and repair. Will perform QA on only a fraction of all modules. Assumed yield and number of spares will avoid lengthy repairs on individual modules.



Rates for Burn-in Testing

- Two hybrid burn-in stations (16 channels each).
- Two module burn-in stations (32 channels each).
 - ◆ Proposed rate of production is 40-60 modules/week
 - ◆ Average Run IIA production rate: 20 modules/week, peak Run IIA production rate: 25 modules/week.
 - ◆ Total Run IIA burn-in capacity: 32
 - ◆ Corresponding capacity for Run IIB is 64 channels for module burn-in; 32 channels for hybrid burn-in.
 - ◆ Need to remember that hybrids and detectors may be burned-in more than once, and that module burn-in station can be used for hybrid burn-in (vice-versa not true).



Electrical Tests During Assembly

Layer 0 & Layer 1

- Modules get mounted directly on support structure – 6 per phi sector
 - ◆ Test modules before/after installation on support structure
 - ◆ Read out six modules together (check for cross talk/grounding problems)

Layers 2 to 5

- 4 modules/stave
 - ◆ Test individual modules before/after installation on stave
- Stave installed on bulkhead
 - ◆ Read out four modules together (check for cross talk/grounding problems)

Need 2 setups in LabC:

- ◆ Stave assembly (4 channels)
- ◆ Detector assembly (6 channels)



Summary

- Testing and QA follows successful scheme used during Run2A
- Testing capacity increased to keep up with expected production rate
 - ◆ Burn-in capacity of 32 hybrids + 64 modules
 - ◆ QA done on a fraction of all modules
 - ◆ Debugging rate of 4 hours per detector appropriate for Single Sided devices
 - ◆ Availability of spares will avoid extended repairs
- Confident that testing plans are appropriate