



Hybrid Production and Testing

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3-3-3

- ◆ Procedures outlined in testing document

<http://d0server1.fnal.gov/projects/run2b/silicon/www/smt2b/Testing/testing.html>

<http://kuhep4.phsx.ukans.edu/~hep/run2b>

<http://physics.csufresno.edu/hep/tests.html>

- ◆ Questions and Modifications



Production Steps

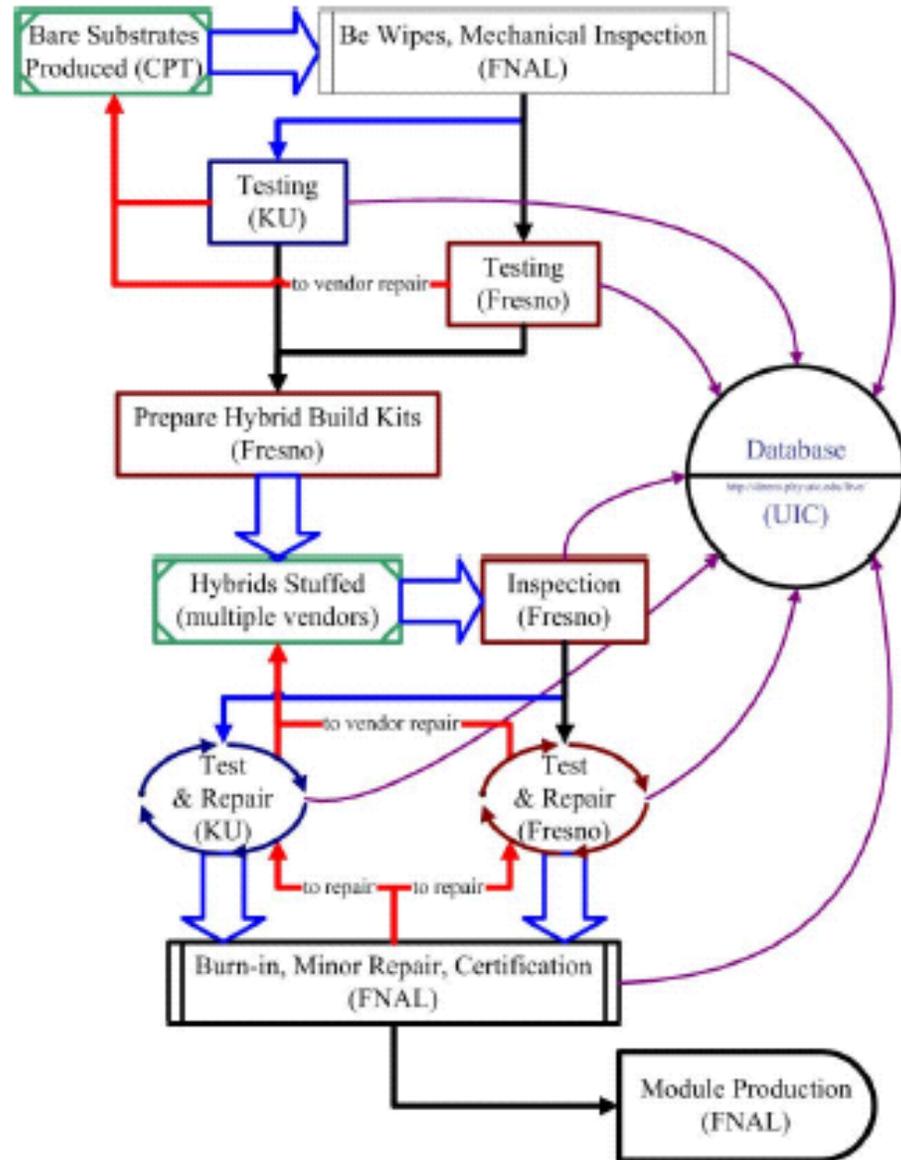


KU's probe station with extra flying head

- Bare Hybrid Production
 - Vendor
- Bare Hybrid Mechanical Inspection
 - Fermilab (possibility of moving some to KU)
- Bare Hybrid Electrical Testing
 - KU, Fresno State
- Hybrid stuffing and wirebonding
 - Vendor
- Functional Testing/Debugging
 - KU, Fresno State
- Burn-in
 - Fermilab



Production Diagram





Bare Hybrid Testing

● At Vendor

- Continuity tests of all pads done with flying probe
- Solderability

● At Fermilab

- Beryllium wipe
- Flatness and dimension tests

● At KU/Fresno State

- Visual inspection
- Continuity test with probe station

How many hybrids tested in production?

- Be testing a couple per batch

- go/no-go fixture for all hybrids, 5% flatness

- visual on all

- probing on 10%



Bare hybrid experience so far

- Needed more cleaning at vendor to pass Be tests
- Problems with solderability
- QC at CPT on continuity tests needs to be improved
- Time for Be wipe at FNAL

Decisions to be made:

1. Scheduling of Be wipes at FNAL
2. How many bare hybrids need to be probed at KU/Fresno State
3. Continued vendor QA checks and how to do them



Hybrid Stuffing

- All prep work and shipping goes through Fresno State
- SVX4 chips tested and certified at FNAL prior to shipment to Fresno State
- Ring out testing setup at Vendor for after surface mount step
- Extra bonds on chip for bond pull tests?



Probe Station at CSUF



Functional Testing

- Visual Inspection
- Quick short test on AVX connector
- SASEQ teststand tests
 - 100 successful downloads
 - error free readout of 10,000 events in pedestal mode
 - error free readout of 10,000 events in cal. mode with a specific channel mask

STATUS:

SASEQ teststations at both KU and CSUF

KU- teststands all functional and ready to go.

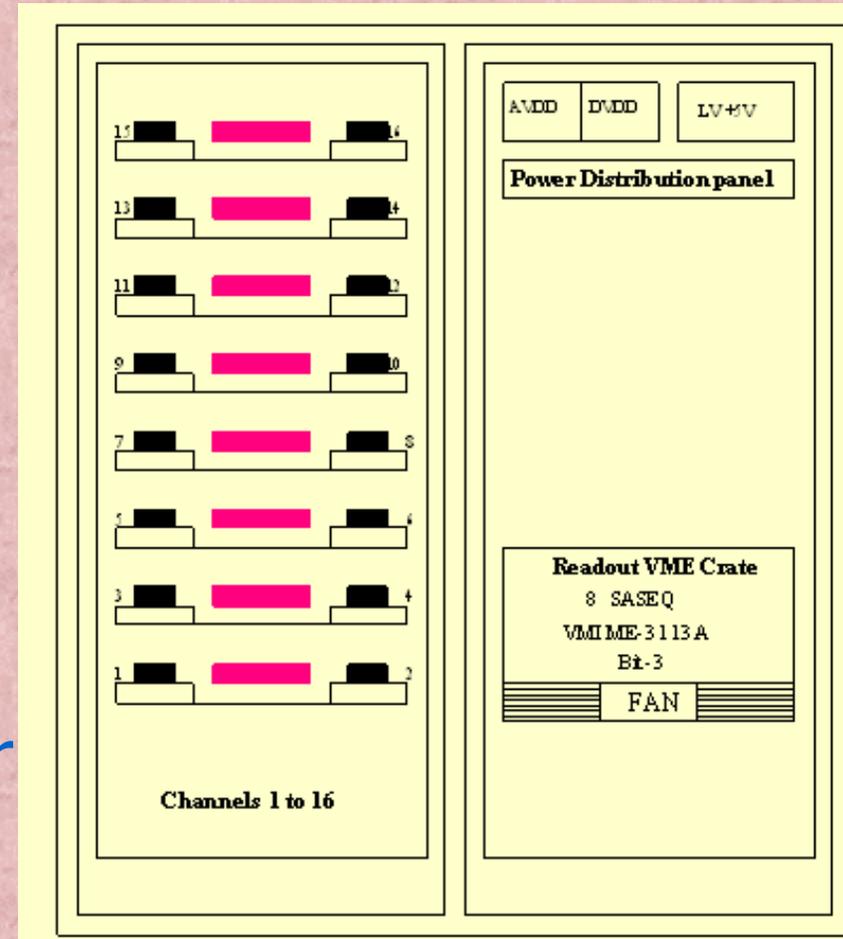
CSUF – needed purple card, but now proceeding



Burn-in Tests

UIC responsible with Sasha Leflat working now

- 2 16 channel burn-in stands
- Temperature sensor test
- Data integrity check
- 2-3 day readout test where hybrids are powered and readout in read-all and read-neighbor modes





Documentation

- Hard copy traveller started at FNAL
- Be database entries at FNAL
- D0 RunIIb Database entries
 - Initial entries started at FNAL
 - KU/Fresno State update entries at every step
 - After burn-in entries at FNAL, a final check of all testing is done by a testing coordinator to check that hybrid is ready for module production

Hybrid Traveler

Hybrid # _____ **Type (circle one)** L0 L1 L2A L2S

Manufacturer _____ **Stuffing Vendor** _____

Build Kit # _____

Procedure	Name	Date	Comments
Received at Fermilab			
Be wipe OK			
Mechanical meas.			
Bare hybrid probe			
Shipment to Stuffing Vendor			
Short test at stuffing vendor			
Wirebond pull test			
Shipment from Stuffing Vendor			
Received at CSUF			
Shipped for I.F.T			
Initial Functionality Test (IFT)			
Shipped from IFT			
Received at Fermilab			
Fermilab Initial Test			
Burn-in			
Certify & Rate			

SVX4 chips used: