BPS: Bug Positioning System
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Post-silicon debugging
- The most challenging post-silicon bugs are intermittent:
  - A same test does not expose the bug in every run
  - Each run exhibits different behaviors

Signature collection during testing
- Summarize signal value over time
- Statistical separation between noise and bug
- Simple hardware
- Compact storage

SW post-analysis: bug band model
- Characterize signal activity statistically
- Multiple executions of a same tests are divided into two groups: passing and failing runs

Experimental Setup
- Test Platform
  - OpenSPARC T2 processor
  - Monitored 41,744 control signals
- Non-determinism
  - Variable memory delay, crossbar random traffic
- 10 bugs
  - e.g., functional bug in PCX, electrical error in Xbar
- 10 testcases
  - e.g., constrained random, floating point

Time to detect bug
- BPS automatically localizes bugs in time and space
- Effective for functional, electrical and manufacturing bugs
- Compact signatures minimize off-chip data transfer
- Submitted to ICCAD’11