Hybrid issues

Andrei Nomerotski, 5/5/2003

L2A & L2S hybrids

- Amitron
  - August 2002 : received 23 L2A
    - Soldering problems – used silver epoxy
    - Flatness 180-210 um
    - Two hybrids had a broken trace
  - 12 hybrids stuffed, 8 ok
  - One hybrid used in L2A-20-20 module

L2A &L2S hybrids CPT

- November 2002 : first batches
  - Received 15 L2A and 23 L2S
  - Good hybrids (meet or almost meet all specs) with two caveats
    - Low yield (30-50%)
    - Two L2S had a via problem – fixed by CPT
  - Stuffed 19 hybrids : 8 L2A and 5+6=11 L2S
    - 6 L2A and 4 L2S ok – waiting for 6 more L2S
    - All 9 last hybrids built with tested chips were good
    - Built 3 modules (L2A1010, L2S1010, L2S2020)
    - 2 more modules (L2A2020, L2S2020) in the pipeline

L2A & L2S hybrids CPT

- February 2003 : second batches
  - Received 35 L2A and 27 L2S
    - Completes the 50 L2A/ 50 L2S order
  - To address yield issues with first batches CPT used new processing for L2S with lapping
    - Starts with thicker (30 mil vs regular 15 mil) BeO. After printing the excess of BeO is lapped away improving the flatness.
    - L2A were built with regular processing
  - Both L2A and L2S have worse flatness than first batches (next slide)
  - 10 L2A / 10 L2S being tested electrically at KU and Fresno

Flatness (1)

- Original specification for flatness was 50 um
  - Not perfect CTE matching of BeO and dielectric (including different temperature dependence) causes bending during firing cycles – known effect
  - To compensate some dielectric is printed on the other side of BeO substrate
    - Total thickness spec (0.95 mm) is a limitation
  - Another approach tried by CPT is lapping
- Three first batches from CPT were close to the spec while two last batches failed
  - Reason not understood, apparently 50 um spec is too tight
- After discussions with mechanical group decided to increase the flatness spec to 150 um
  - Gluing to silicon is less trivial but possible – tests successful
  - Hybrid temperature ok even with partial glue coverage (up by 2 degC)

Flatness (2)

- Summary table

	Flatness	Thickness	Recess depth
CPT L2A 1	60	970	110
CPT L2S 1	45	940	100
CPT L2A 2	120	1000	30
CPT L2S 2	80	930	60
CPT L1	40	920	100
Amitron L2A	190	840	40

- In touch with CPT and Amitron on flatness issue – they believe the new spec is doable with some safety margin
- In any case this is a concern and more vendors are being contacted

Other news/issues

- Revision 2 hybrids
  - L2A revision 2 layout is ready, went for quoting last week
  - L2S and L1 revision 2 layouts ready soon
- L0 hybrids
  - Ordered 50 hybrids from Amitron
  - Hybrids are ready but did not pass QA
    - Same crack in corner during dicing
  - Sent us two hybrids for evaluation
  - Will start a new lot
- Some backup solutions has been discussed
  - Remove one trace layer (helps thickness/flatness)
  - Kapton or G10 hybrids
- Some grounding discussions inspired by CFT/SMT problems
  - Do we need separate ground planes? – more next week on this