



Status of On-Detector Opto-Links

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Outline

- Results on prototype opto-board
- Result on accelerated lifetime test
- Plan/summary



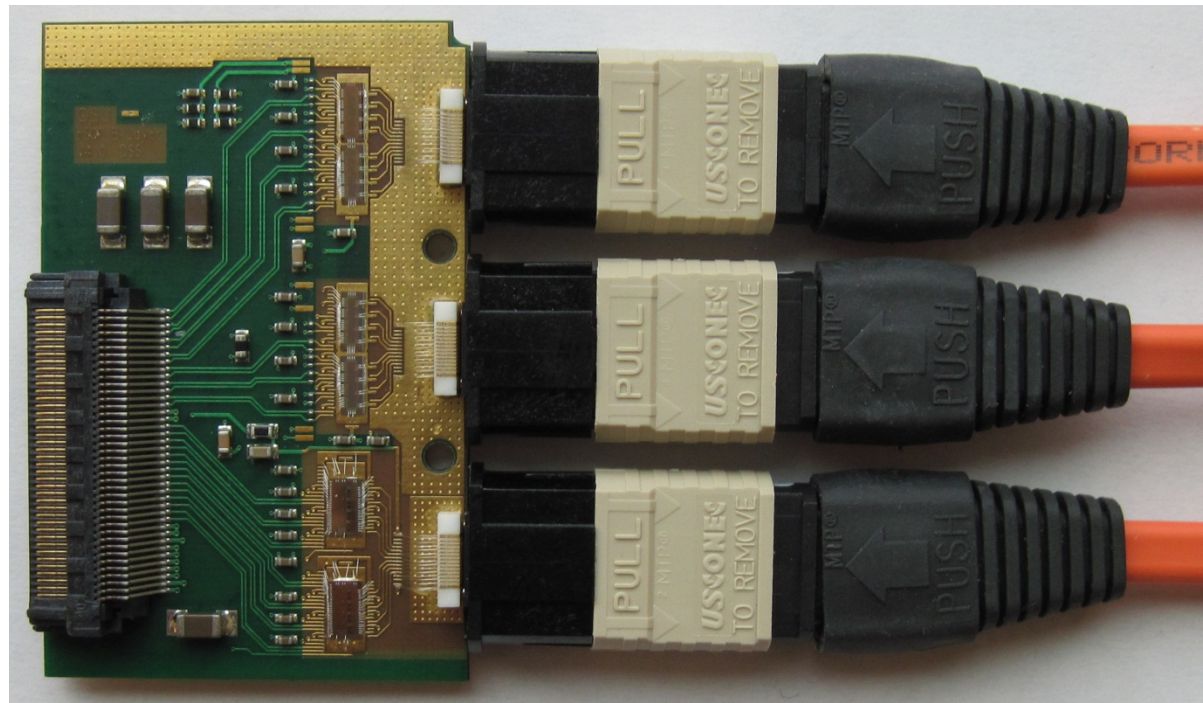
Status of Opto-Board Prototyping

- 3 opto-board flavors
 - ◆ D opto-board (disk): 7 TTC + 7 data links (2 flavors)
 - ◆ B opto-board (B-layer): 7 TTC + 14 data links
 - ◆ IBL opto-board: 8 TTC + 16 data links
- Last IBL GM:
 - ◆ PCBs for B opto-board (nSQP) were fabricated by CERN
 - 6 opto-boards populated and works
 - ⇒ no error in electrical/optical layout
 - several fabrication defects in PCB
 - ⇒ design changes to ease the PCB fabrication



Status of Opto-Board Prototyping

- New batch of B opto-board (nSQP) received
 - ◆ fabricated PCBs look good
 - ◆ one opto-board populated
 - ✓ all channels passes electrical/optical tests



VCSEL
→

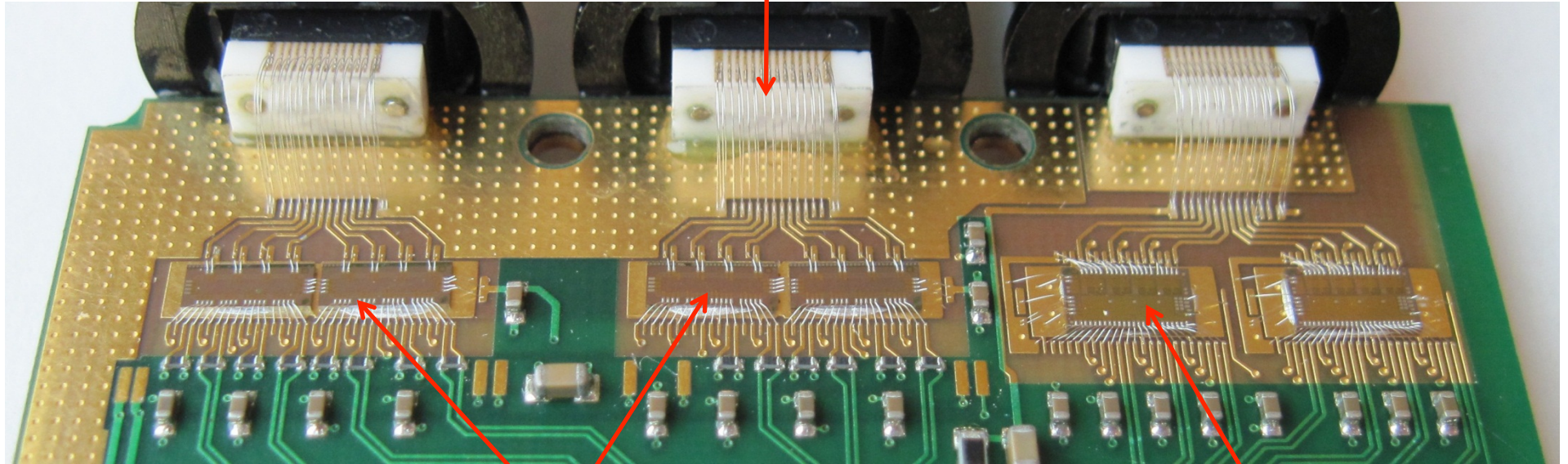
VCSEL
→

PIN
←



Close Up View

Opto-pack

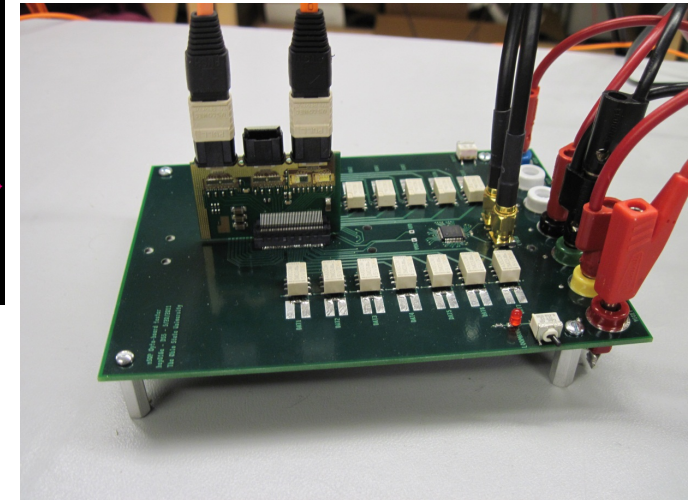
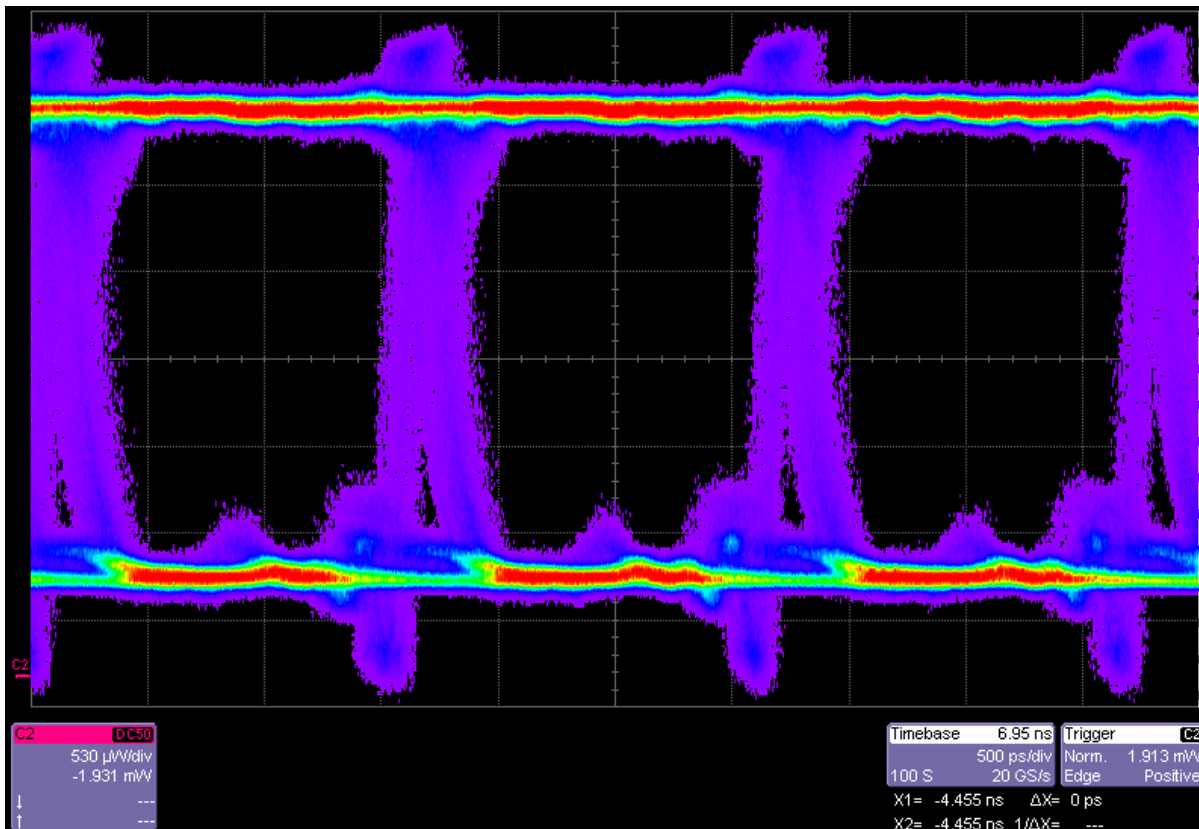


VDC

DORIC



640 Mb/s Optical Eye Diagram



- Plenty of margin for 160 Mb/s operation with good quality input LVDS



Plan for Opto-Board Prototyping

- Plan to fabricate 20 B opto-board by end of March
 - ◆ 16 reserved for accelerated lifetime test:
 - 2,000 hours at 85°C and 85% relative humidity
 - ◆ 4 reserved for urgent tests:
 - Bern, SLAC, CERN (2)
 - ◆ automated QA system currently being setup
 - your board should be qualified with this system if you can wait
- Plan to start the layout of IBL opto-board next week:
 - ◆ start populating IBL opto-boards at end of March
 - ◆ design changes are small
 - ⇒ accelerated lifetime test on ~4 IBL opto-boards?
 - ◆ some boards will be distributed:
 - Bern, SLAC, CERN, Wuppertal...



Accelerated Lifetime Test

- Stress test with 85% relative humidity @ 85°C
 - ◆ operate all 12 VCSEL channels with 10 mA DC
 - ◆ continuously monitor optical power and current consumption
 - ◆ good devices are expected to survive at least 1,000 hours



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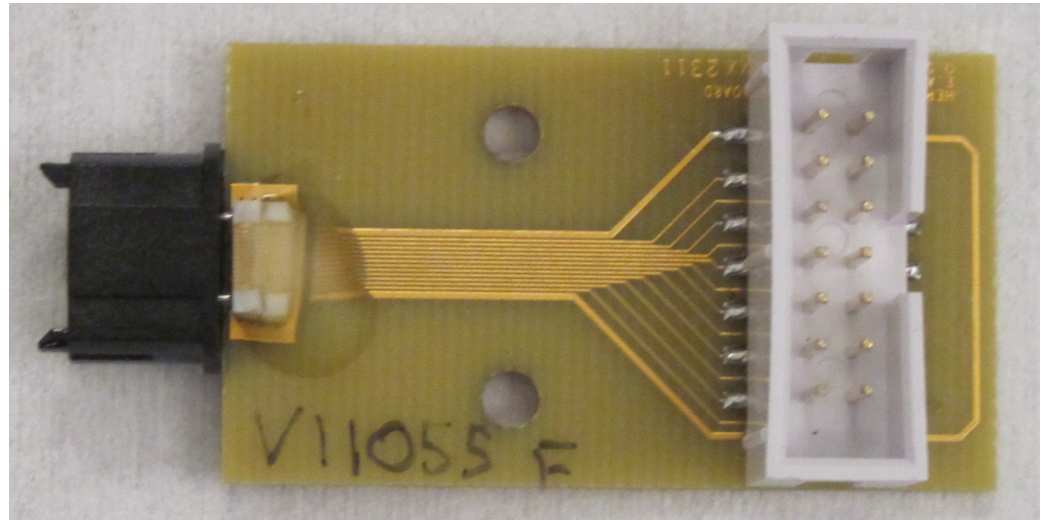


IBL General Meeting

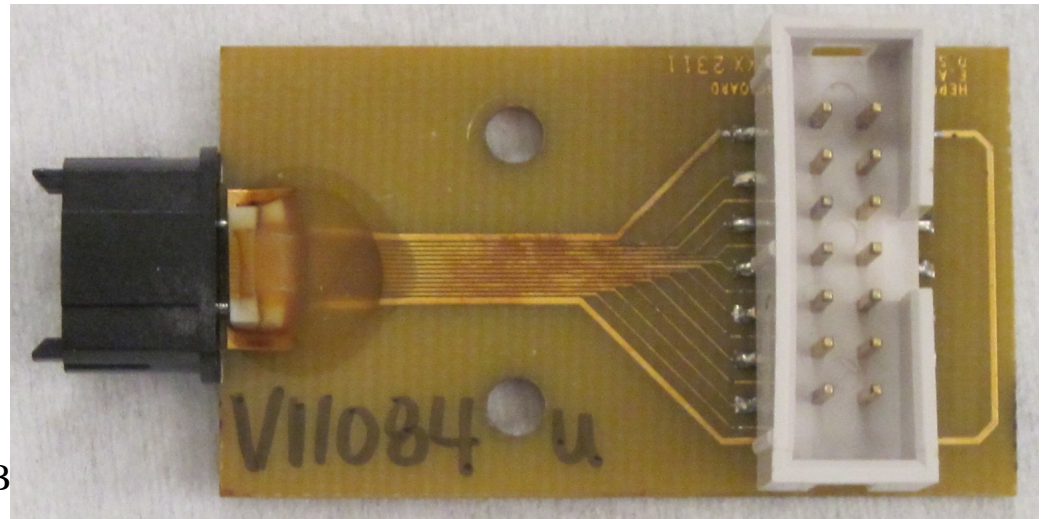


Accelerated Lifetime Test is Stressful...

Not in 85/85



After 2,200 hours
in 85/85



K.K. Gan

IB



Accelerated Lifetime Test Plan

- 20 ULM VCSEL arrays:
 - ◆ no failures up to 1,000 hours
 - ◆ 2 failed channels at 1,510 hours
 - ◆ 19 failed channels at 2,200 hours
 - ◆ more analysis in progress
- 20 Finisar VCSEL arrays:
 - ◆ expect to start the test next week
- 16 B opto-boards (nSQP):
 - ◆ expect to start by end of next month
- 4 IBL opto-boards:
 - ◆ expect to start in April



Summary

- quality of new B opto-board PCB (nSQP) is satisfactory
 - ◆ one new opto-board successfully fabricated
 - ◆ IBL opto-board will be designed and fabricated next
- 20 ULM VCSEL arrays survived accelerated lifetime test up to 1,000 hours
 - ◆ should complete accelerated lifetime test on Finisar VCSEL arrays and opto-boards by next IBL GM in June