Integrated Board Stack:
front-end electronics module for bPID @ Belle II

on behalf of:

Gary Varner
Kurtis Nishimura
Robin Caplett
Grace Jung
Christina Yee
Casey Honniball
Daniel Booth
Louis Ridley
Xin Gao
Chester Lim

University of Hawaii
Integrated Board Stack
Integrated Board Stack: SCROD

SCROD revA2:

1*FPGA (spartan6 150t)
2*SFP cages
2*RJ45 (remote timing/trigger, remote JTAG)
2*100 pin board-to-board connectors
2*120 pin board-to-board connectors
1*64Mbit flash memory
1*USB microcontroller
1*local JTAG
1*temperature sensor
16*LEDs for debugging

next revision:

• more board-to-board interconnects
• physically bigger board
• possibly a virtex6 depending on how this year's iTOP/fDIRC cosmic ray tests go
Integrated Board Stack: carrier0,1,2,3

carrier0 revB:

• mainly just a wiring board to hold ASIC daughtercards
• includes temperature sensor
• integrated thermal structure to help bring heat away from ASICs and amplifiers (copper heatsink)

next revisions:

• needs to have amplifiers and calibration circuit
• separate power distributed for ASICs vs amplifiers
Integrated Board Stack: ASIC daughtercard

IRS2_DC revB2:

- holds ASIC, DACs to set biases and thresholds
- point of load regulation
- no amplifiers on board (for fDIRC project)

next revision:

- will support IRS3B ASIC
Integrated Board Stack: front boards

front-front revC:

- holds PMTs
- distributes high voltage to PMTs
- brings signals from PMTs to rest of boardstack
- 8 layers to separate the 40 different voltages

next revision:

- might remove HV distribution (would be delivered from elsewhere)
Integrated Board Stack: current problems / concerns

- problems we think we can solve in the time remaining with current manpower:
  - next iteration of carrier boards, daughtercard, SCROD

- problems we don't know how to solve or don't have the resources to solve in the time allotted:
  - amplifier circuit
    - lowest power possible to mitigate thermal problems
    - appropriate bandwidth to capture SL10 pulses (unknown)
  - thermal problems
    - get heat away from ASICs/amplifiers and then get it out of boardstack
backup
Integrated Board Stack: further info

• most schematics for these boards are posted here:
  • http://code.google.com/p/idlab-scrod/downloads/list

• bPID/iTOP electronics documentation:
  • http://code.google.com/p/idlab-scrod/wiki/BelleIIbPIDElectronicsDocumentation

• other info (some outdated):
  • http://code.google.com/p/idlab-scrod/w/list
  • http://code.google.com/p/idlab-daq/wiki/HowToUseDAQSystem
  • http://code.google.com/p/idlab-general/wiki/USBReadoutSetupInstructions