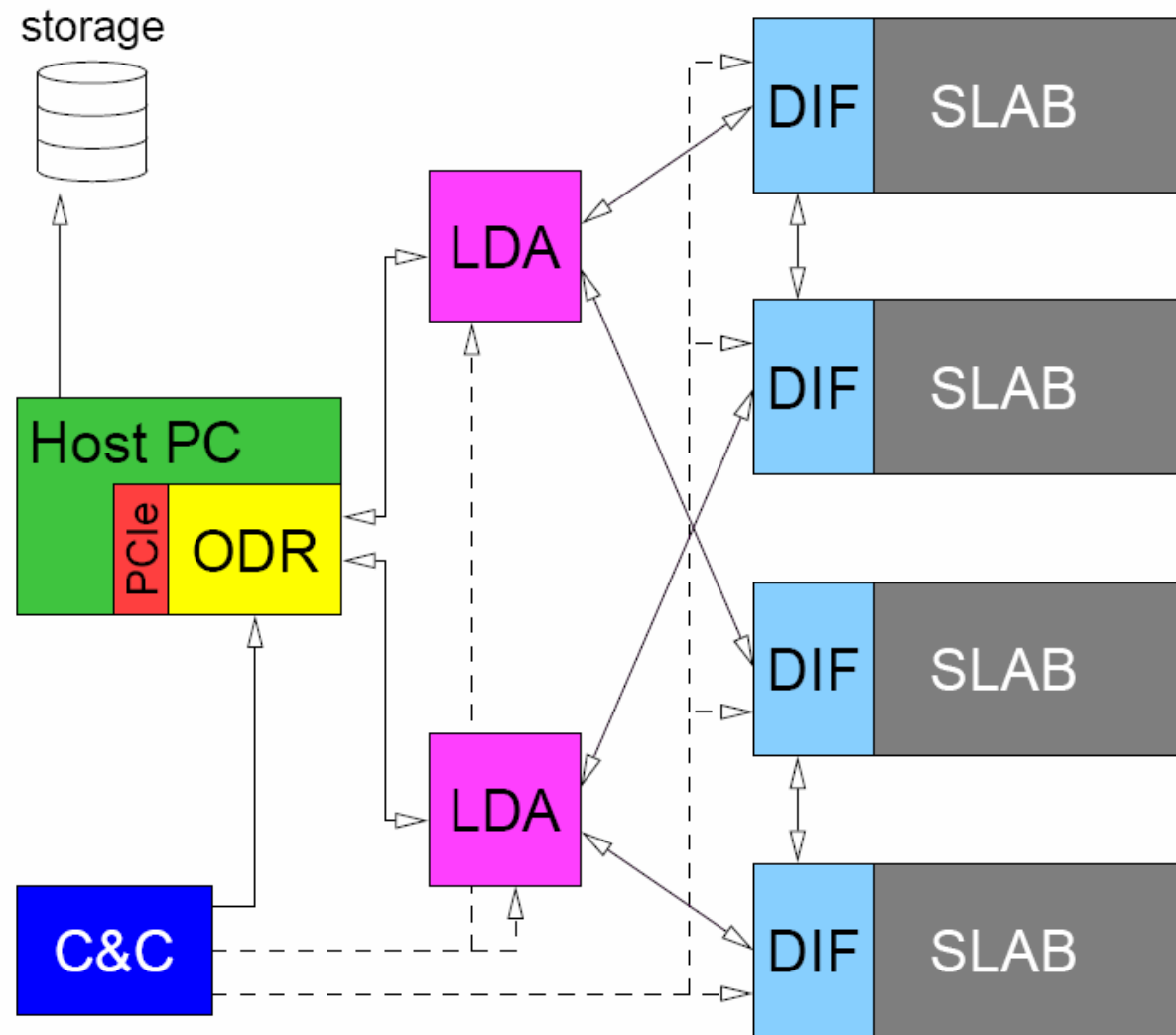
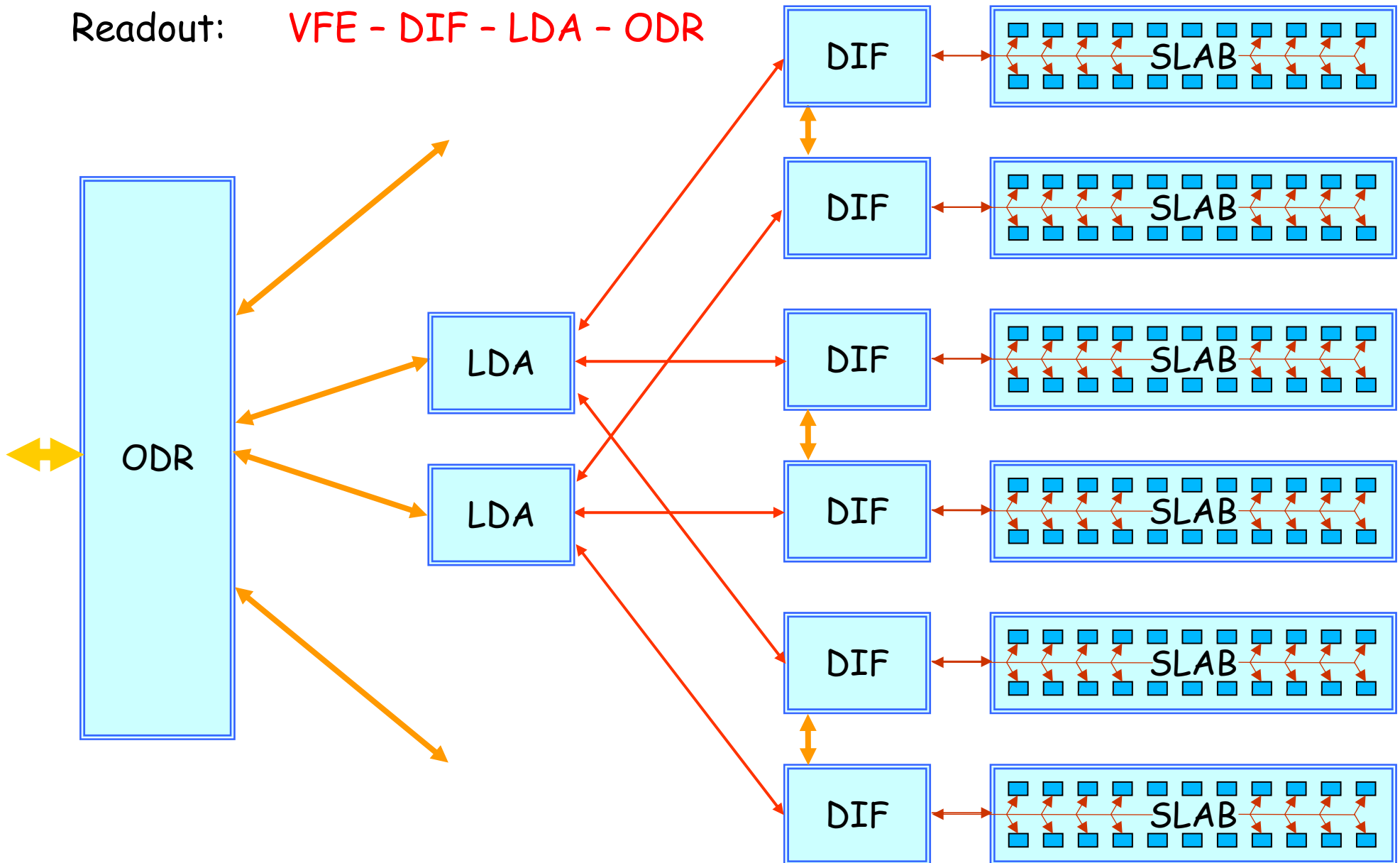


Readout Architecture



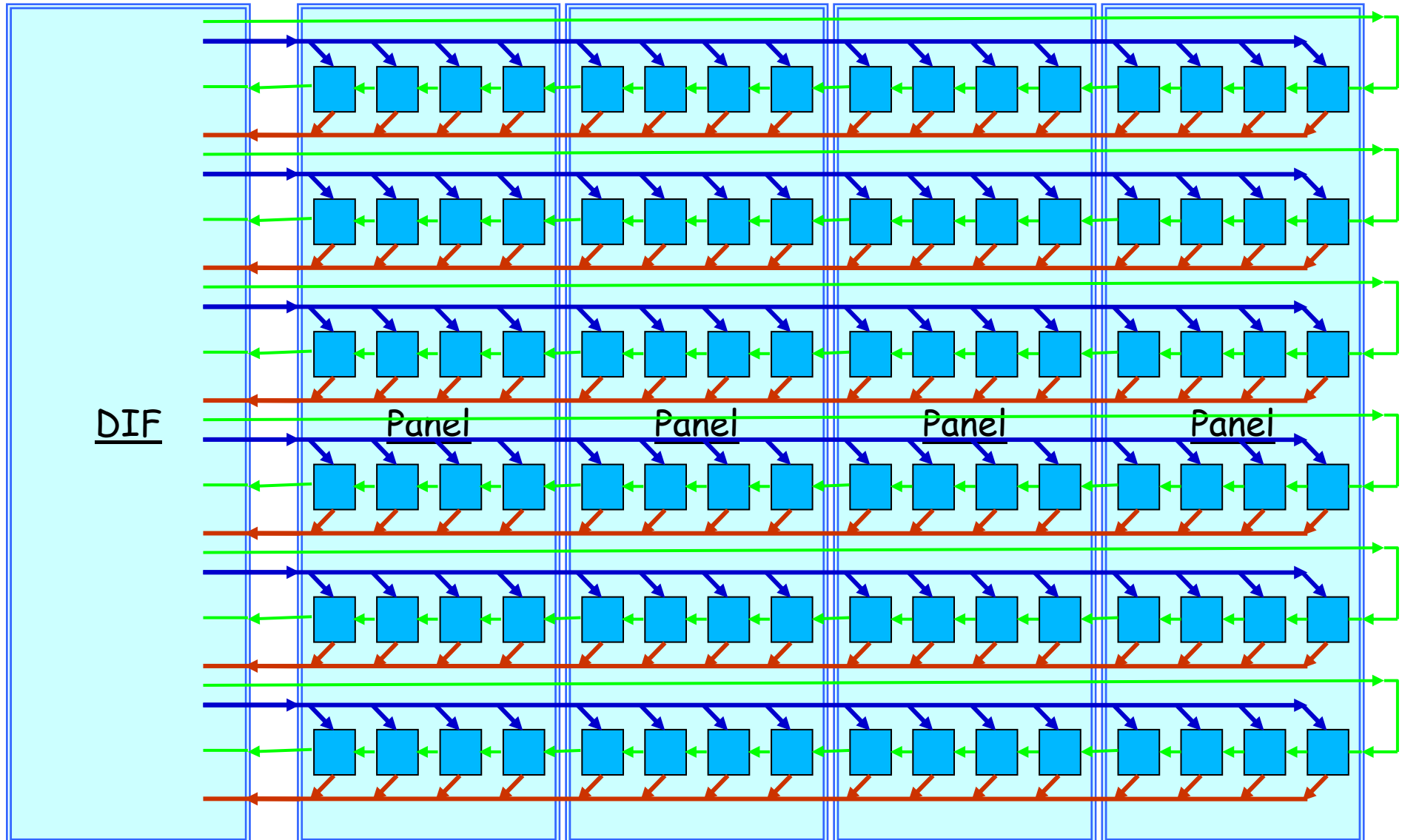
DIF-Slab, Slab-DIF

Control: ODR - LDA - DIF - VFE
Readout: VFE - DIF - LDA - ODR



Reality

- . 6 Rows of VFEs
- . Some Daisy-Chained
- . Many Multi-drops
- . Some Differential & Zo
- . Some Star
- . VFE & Slab Dependant



DIF

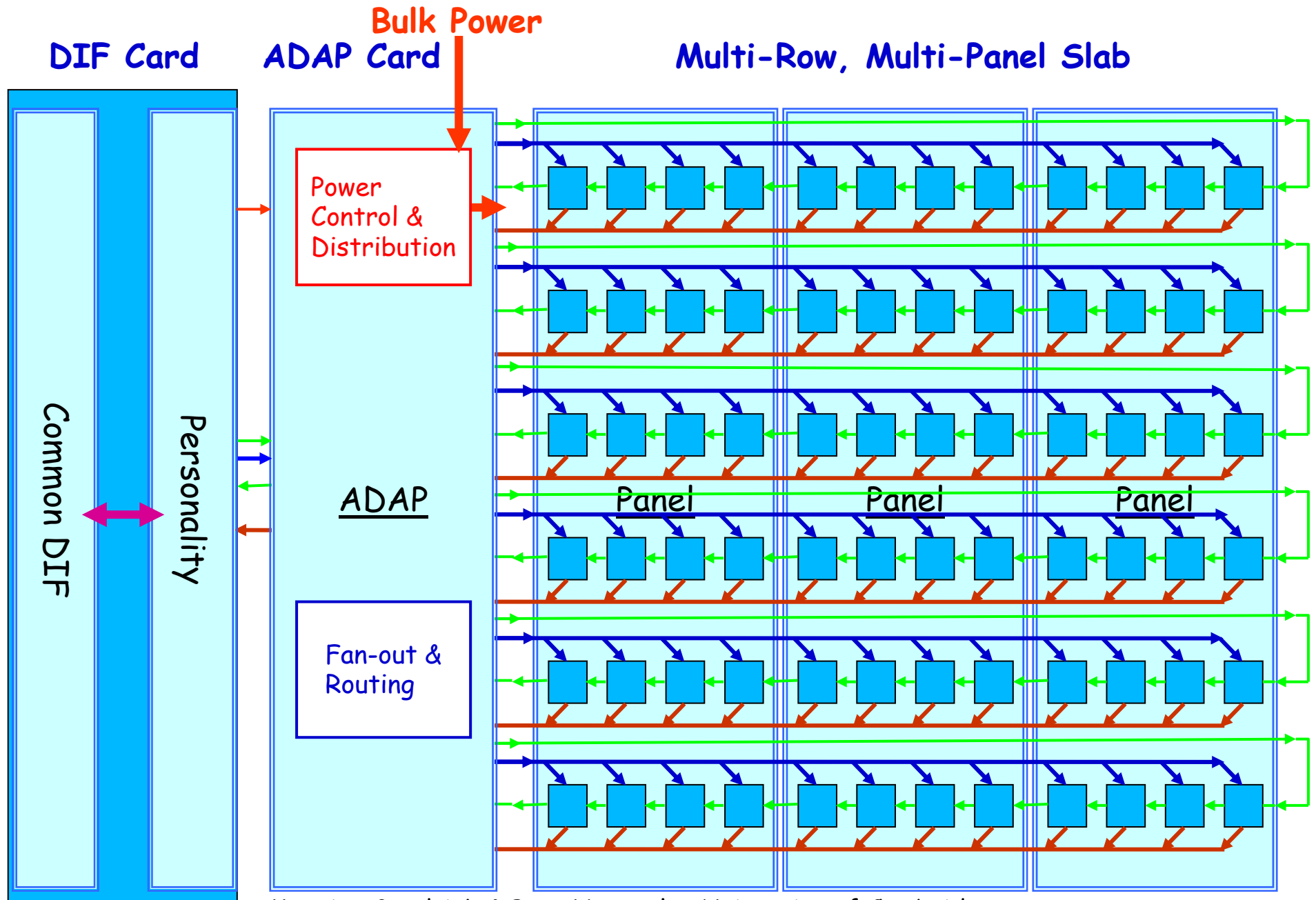
Panel

Panel

Panel

Panel

Personality and Adapter Card !!



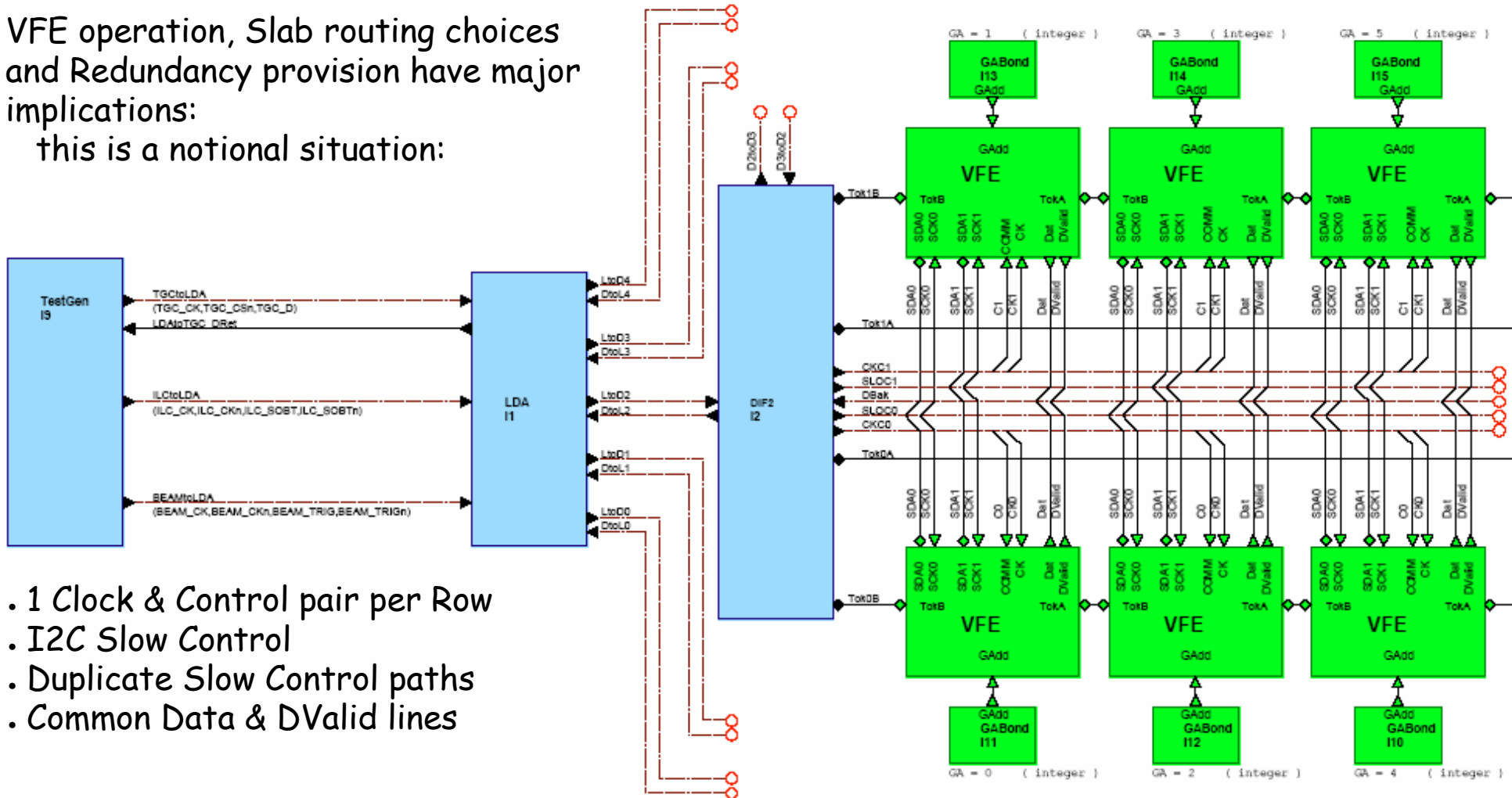
= A Multi Purpose DIF for ECAL

Should Support:

- .Test Slab in the Lab - WP2.2 core work
- .EUDET prototype in the lab
- .EUDET prototype in Test Beam
- .Next ASICs
- .Test bed for ILC environment

Many Possible DIF-SLAB Arrangements

VFE operation, Slab routing choices and Redundancy provision have major implications:
this is a notional situation:



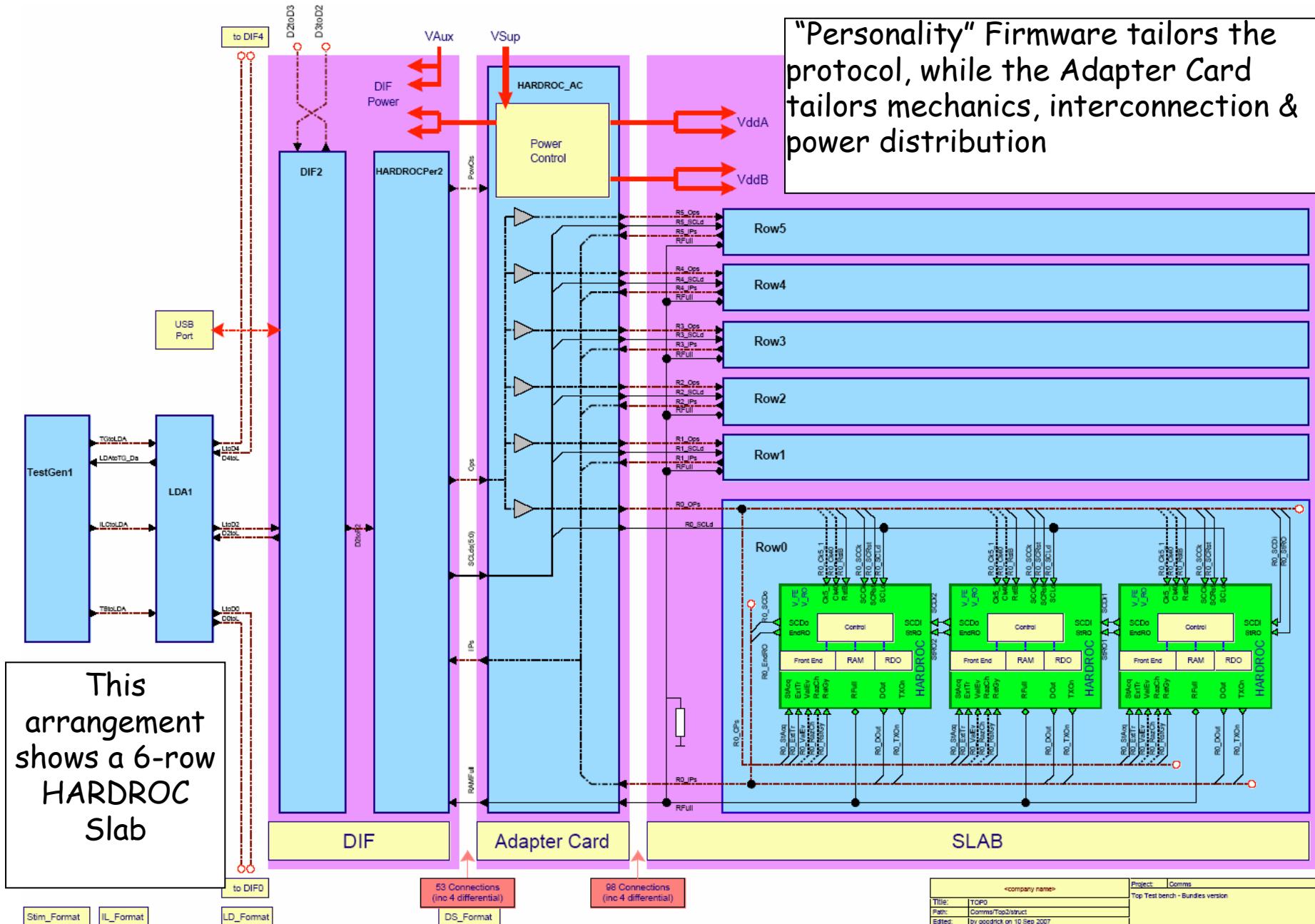
- . 1 Clock & Control pair per Row
- . I2C Slow Control
- . Duplicate Slow Control paths
- . Common Data & DValid lines

We will encounter a large number of different arrangements thanks to permutations of:

- . VFE variants: HARDROC, SKIROC,, with their iterations
- . Evolving Slab designs

A Top-Level Description

"Personality" Firmware tailors the protocol, while the Adapter Card tailors mechanics, interconnection & power distribution



It is very worthwhile adopting a VHDL description at this stage:

- behavioural description provides key framework:
 - will prove the viability of the scheme
 - will allow fine tuning
 - allows rapid description and testing of different flavours for different tasks (Test Panel, EUDET Prototype, ...)
- specific VFE VHDL code can be included (as has been done for HARDROC)

ODR

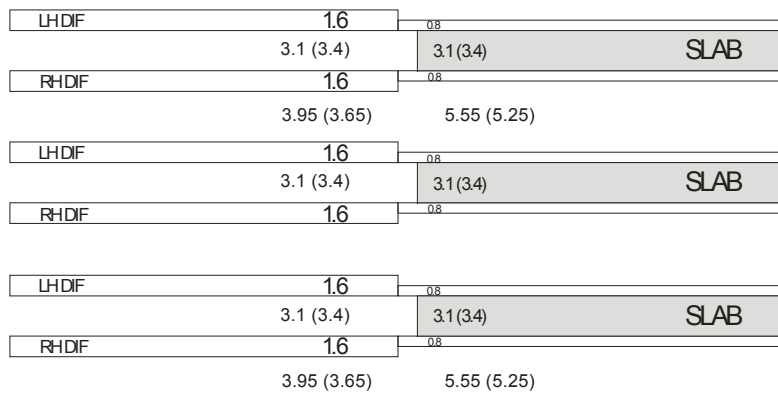
LDA

DIF

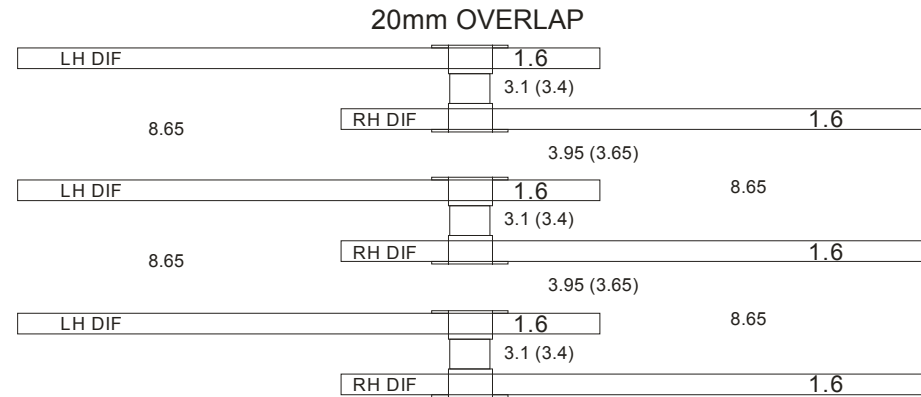
SLAB

Card Spacing: based on Marc Anduze's ECAL Module design

NOMINAL SPACINGS (ADAPTER CARDS IGNORED)

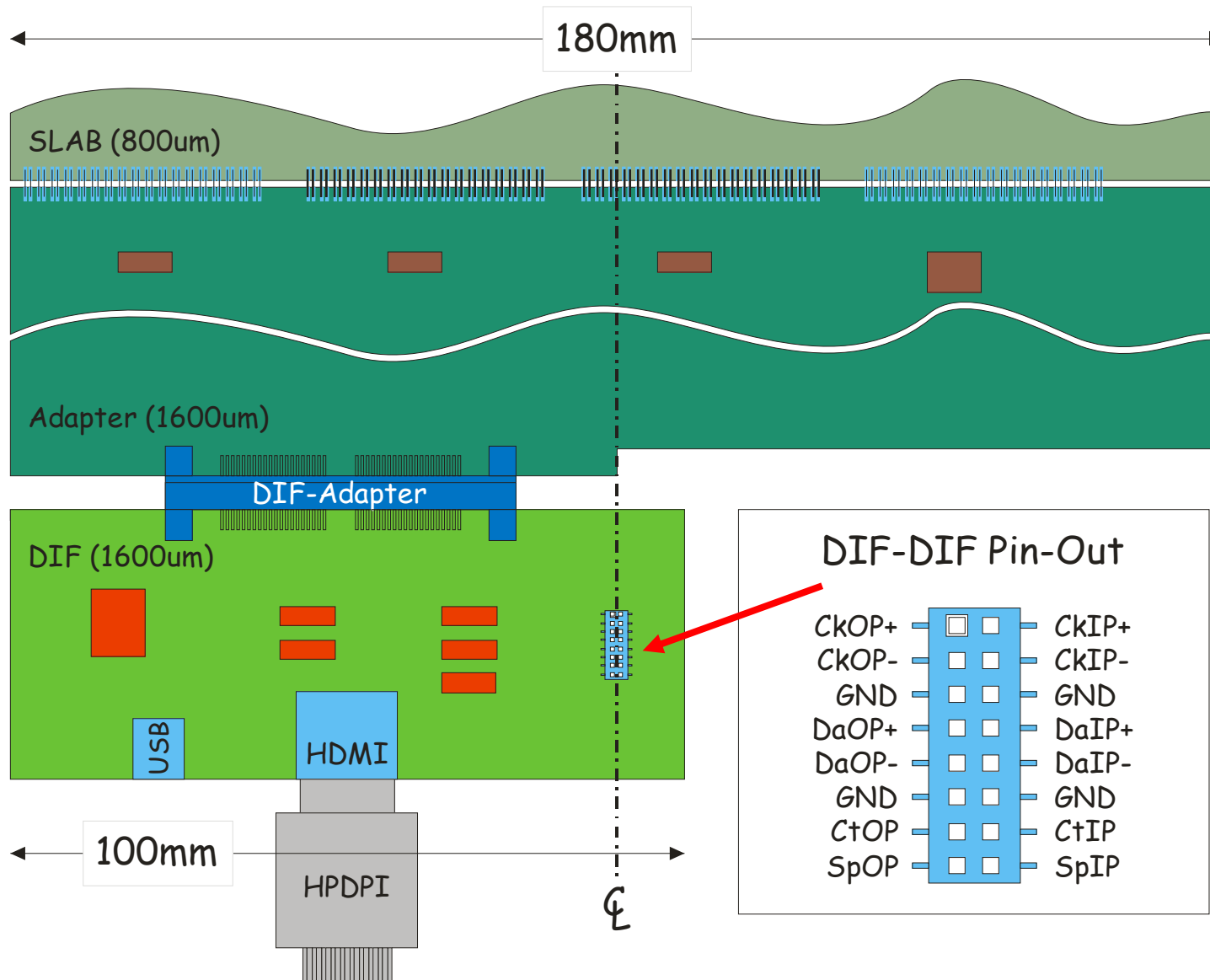


Side View

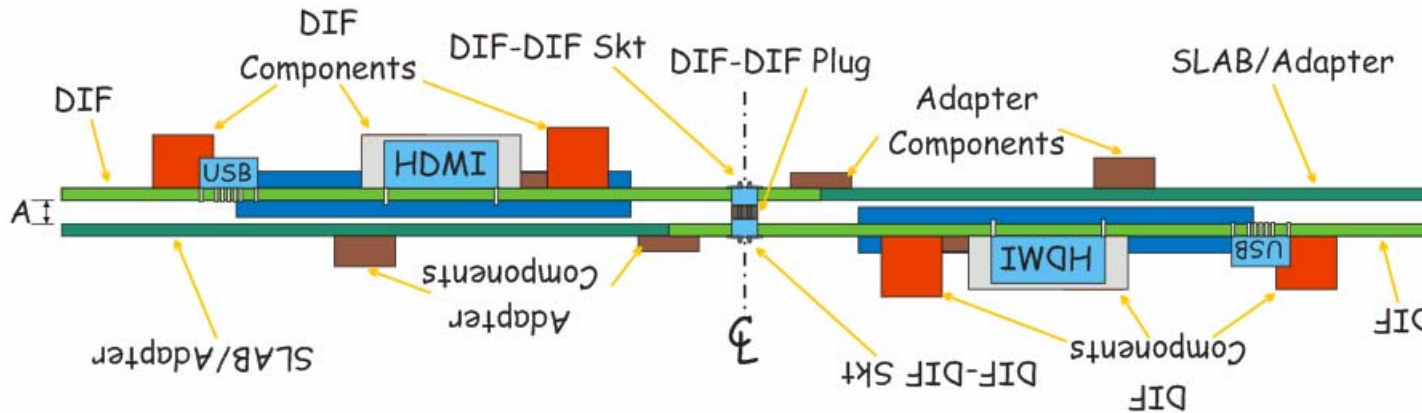


Rear View

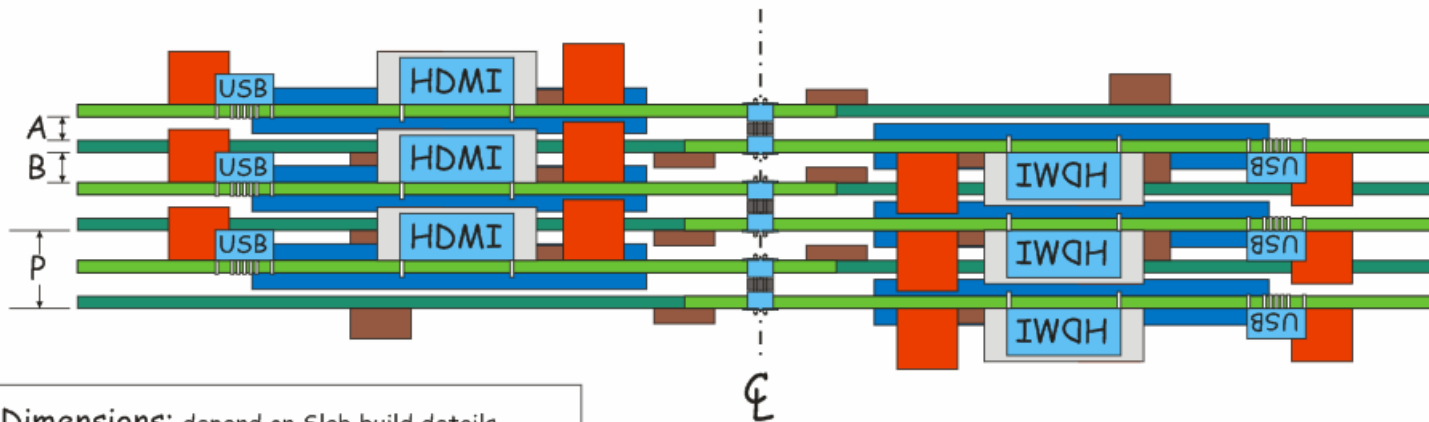
A Layout



How it Fits Together



The rotation routes DIF-DIF Outputs to Inputs and, combined with the lateral asymmetry, gives head room for components

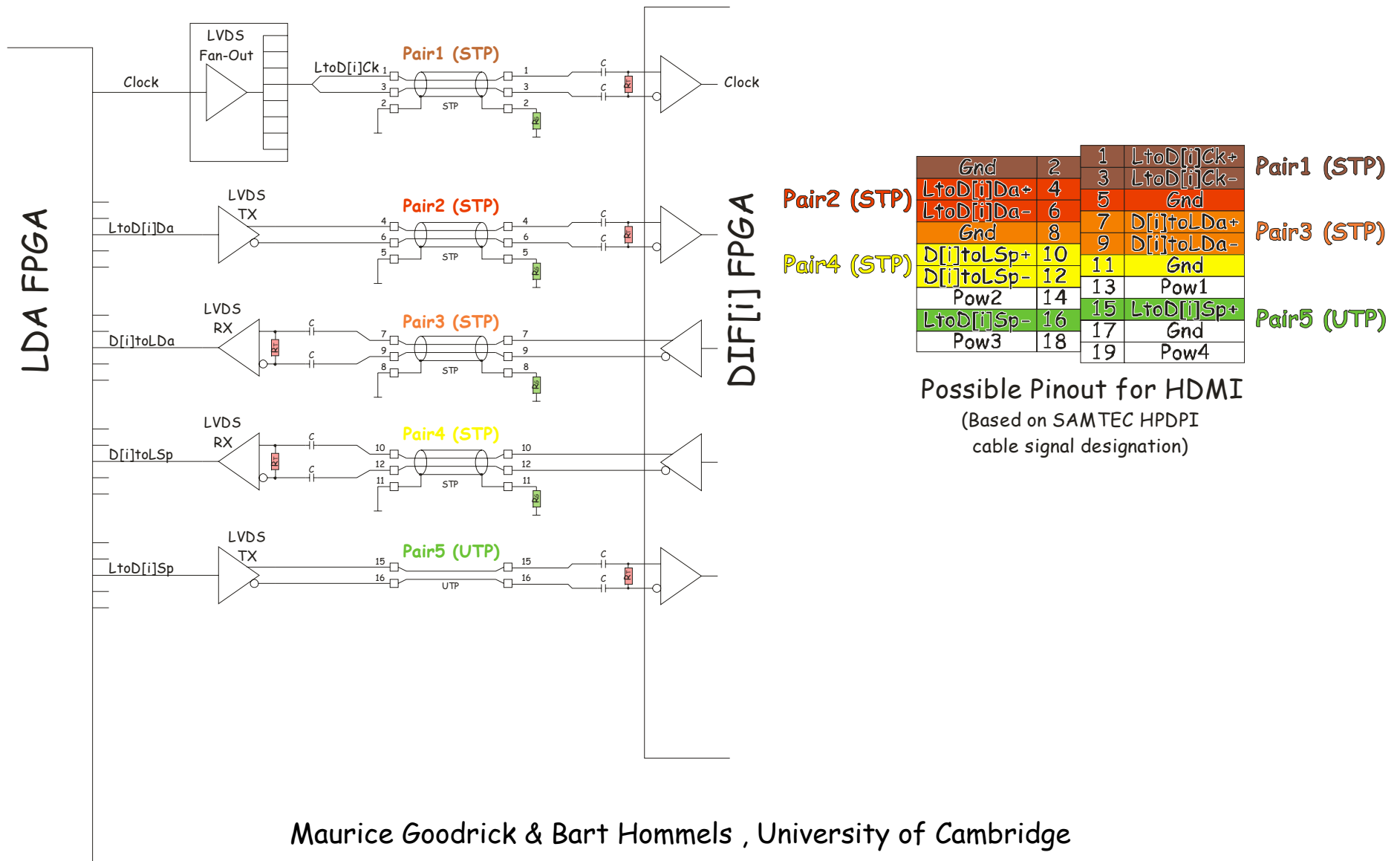


Dimensions: depend on Slab build details
 A : (PCB-PCB of 2-sided module) 3.1 to 3.4mm
 B : (PCB-PCB of adjacent modules) 3.95 to 3.65mm
 P : (pitch of adjacent modules) 10.25mm

3 Double-Sided Slabs
 (for 2.1 mm W thickness)

The LDA Interface

LDA-DIF Cable and Connector



In Conclusion

- We are producing a Multi-purpose DIF for ECAL
- We are working on the Adapter Card and Personality to allow it to be used for further Slab signal path studies using the existing Test Panel
- It will support laboratory work with prototype Slabs with different VFE chips and their different iterations
- It will be usable with single and multiple EUDET ECAL modules
- The VHDL model should be an invaluable testbed for modelling different VFEs and Slabs
- It should also allow command and data structures to be tested
- We welcome discussion with other interested groups

A Multi Purpose DIF for ECAL

Different Formats at Different Levels

