

Simulation, test Vectors & organisation

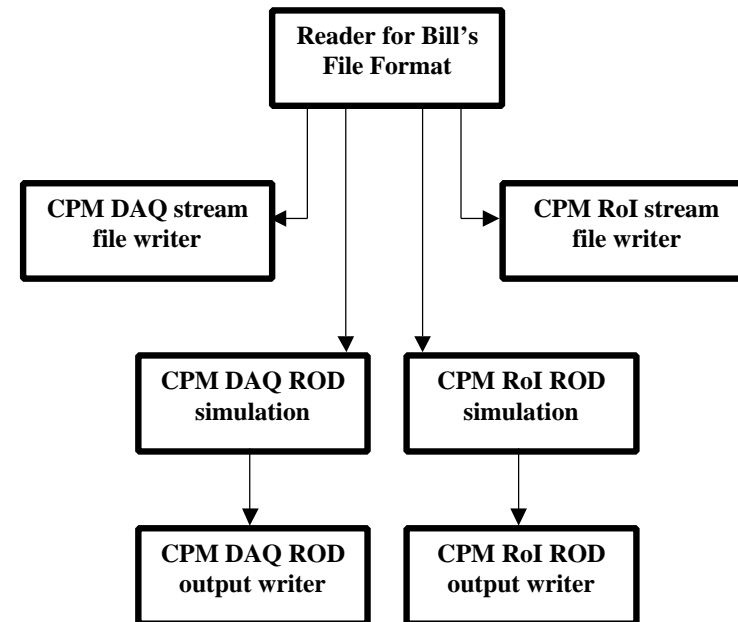
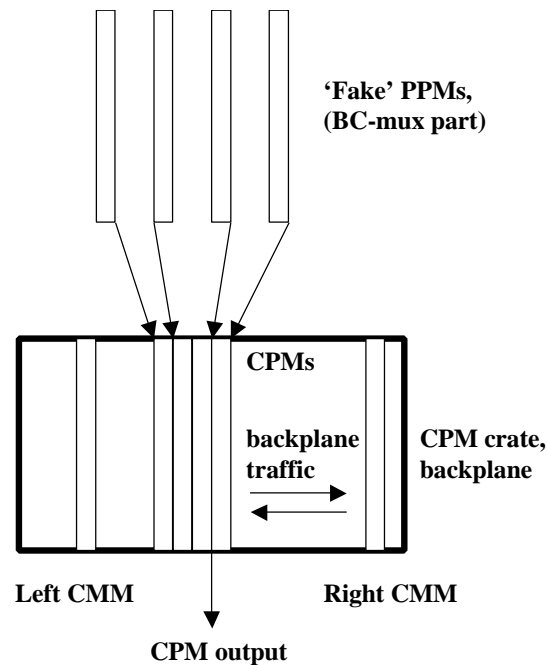
- Update on simulation situation
 - Documents
 - Module simulation status
 - Plans
- Current test-vectors
 - Generation techniques
 - Uses
- Report from test-vector brainstorming
 - Main issues to be addressed
 - Proposed solution
 - First attempts

Software simulation & documentation

- Framework is now stable
 - pending bug reports from users (if there are any)
 - plus any additional requested functionality
 - NB code tested with insure and purify
- Framework is well (?) documented
 - Programmers guide – Software note 11
 - Reference manual – Doxygen generated
 - Web page
 - general information
 - pointers to web-based documentation
 - URL:
<http://www.ep.ph.bham.ac.uk/user/hillier/level1/simulation/index.html>

Main existing module simulations

- Basic functionality CPM and CPM backplane
 - only 'standard mode'
 - includes threshold variation
- CPM DAQ and RoI RODs
 - Essentially same functionality as RODtest



Other modules and plans

- Will need other modules:
 - JEM: students at Stockholm – progress report from Sam?
 - CMM: Norman, when he has some time
 - PPM: Paul has expressed interest in using simulation
 - Other ROD types: ???
- Future developments
 - migration to CMT
 - more complete CPM simulation
 - bring together CPM and CPM-Rod work
 - integration with database
 - some initial work done here

Current test vectors and generation

- **Apologies for UK bias**
- Bill's test vectors for CPM RODs
 - generated from a description file
 - using Bill's RODtest C program
 - now also a generator in my 'simulation style'
 - produces file of values to be loaded into a DSS
- My CP-chip test vectors
 - generated in several ways:
 - from a file of physics like tower energies
 - random energies (moderated)
 - to test threshold and other algorithm behaviour
 - produces file of values to be used in simulation
 - CPM simulation provides 'fan-out' of single Cpchip test-block
- Library of calorimeter pulses
 - files to be loaded into VIDEO card

Notes on test-vectors and usage

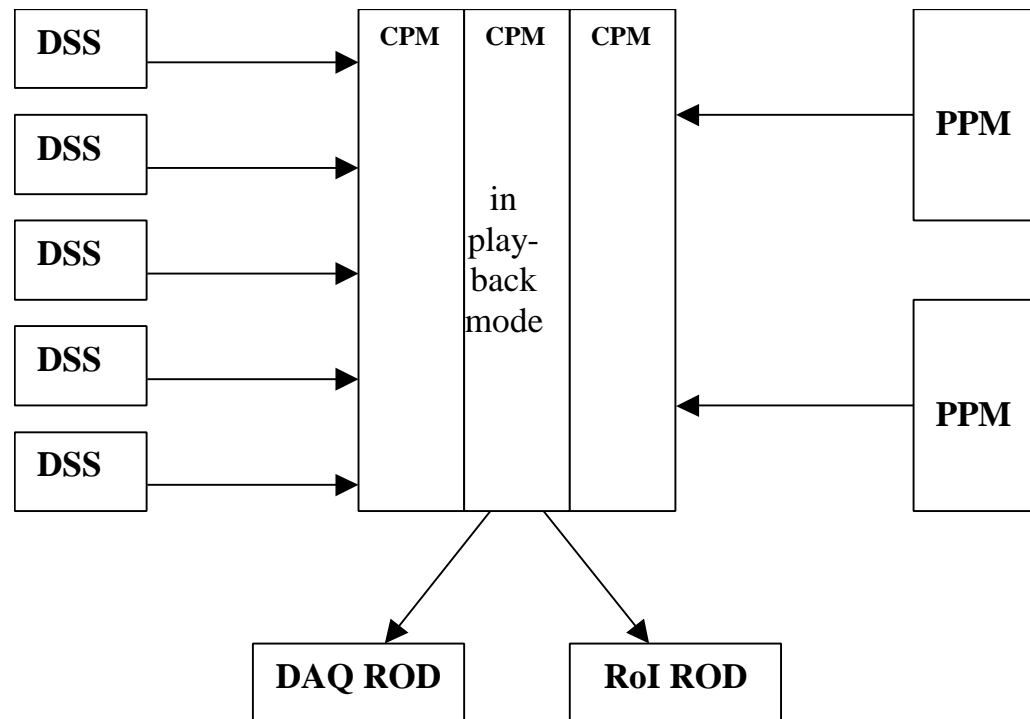
- We don't have very many test-vectors yet!
- Usage of test-vectors is currently very simple
 - ROD test-vectors
 - DSS-ROD-DSS
 - Cpchip test-vectors
 - file - VHDL Cpchip - file
 - file - CPM software simulation - file
- Conclusions:
 - We need to start generating more
 - Must be able to cope with more complex setups
 - Need way of dealing with system settings/trigger menu
 - Should consider test-vectors in calibration context too

Test-vector brainstorming session

- Held at Birmingham, 4th February 2002
- Summary of discussion at:
<http://hepwww.ph.gmul.ac.uk/l1calo/sweb/meetings/2002/testvectors.html>
- Main issues addressed:
 - How to organise test-vectors required for a particular test set-up
 - How does test-vector generator and simulation get information about set-up and module settings etc
 - When is simulation run
 - How to control L1A generation (L1A problem)
 - How to run iterative calibrations

Illustration of potential problem

- Consider this (possibly exaggerated) case:
 - Generate test vectors and expected output to test the CP-algorithm in the middle CPM:



Proposed Solutions

- The database is supreme!
 - Each test type fully specified by a database file
 - tagged by name/description, easily selectable from GUI
 - Database must contain system configuration
 - hardware present, connections
 - module settings, trigger menu etc
 - names of files of input test-vectors and expected results
 - Files generated automatically if necessary
 - simulation setup created from database
 - quick test start if files already exist
 - files should follow database structure
- L1A generation (and ORBIT) from DSS
 - Allows synchronisation of L1As to data flow
 - Some additional complexity when BUSY logic included
 - May require new firmware to limit L1A rate

First steps

- New version of CPM simulation
 - Reads hardware configuration from database
 - Creates simulation modules found in database
 - Uses new database cable objects to connect modules
 - Still very new, more work needed
 - eg module settings, trigger menu
 - include RODs

- Conclusions
 - As always, there is still much work to do
 - However, the way forward is now clearer