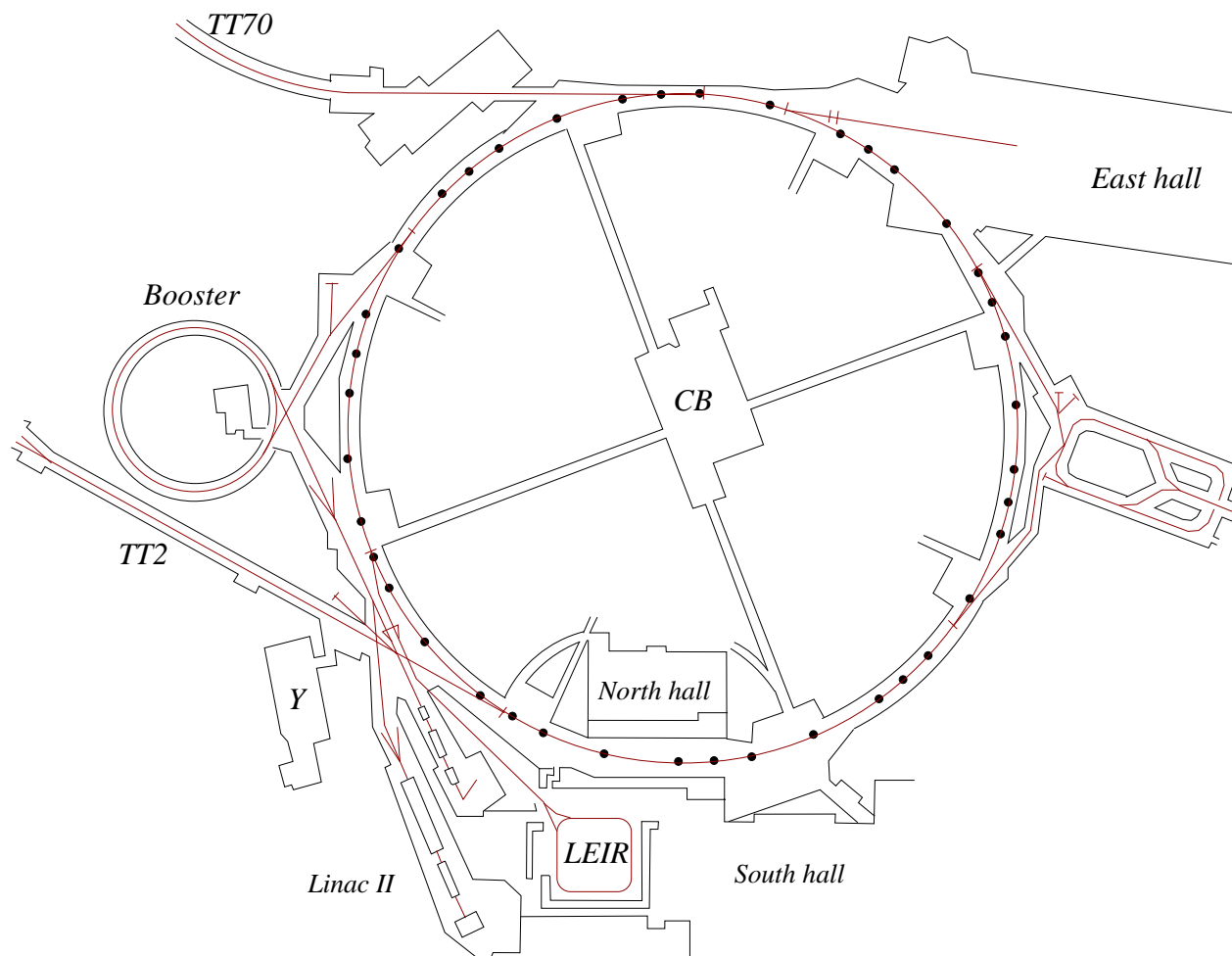
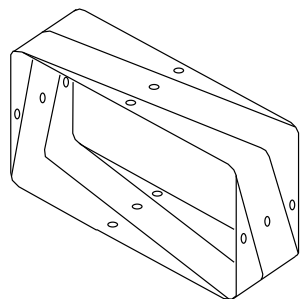


PS Trajectory Measurement System



Forty electrostatic PUs
distributed around the PS
ring

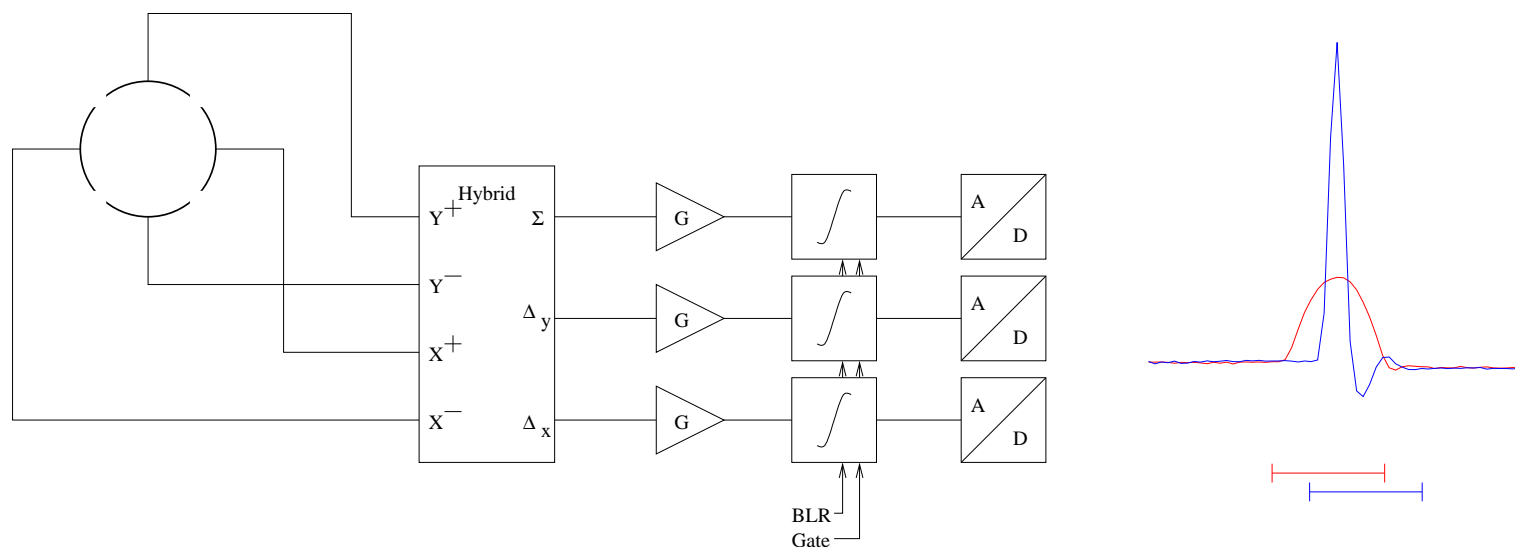
All analogue signals are
brought together in CB





Principle of measurement:

Centre of charge of a chosen bunch
by gated integration of sum and difference
signals



This requires accurate beam-synchronous timing

PS Trajectory Measurement System



The current system architecture:

Three DSCs: Acquisition, synchronization and PU control

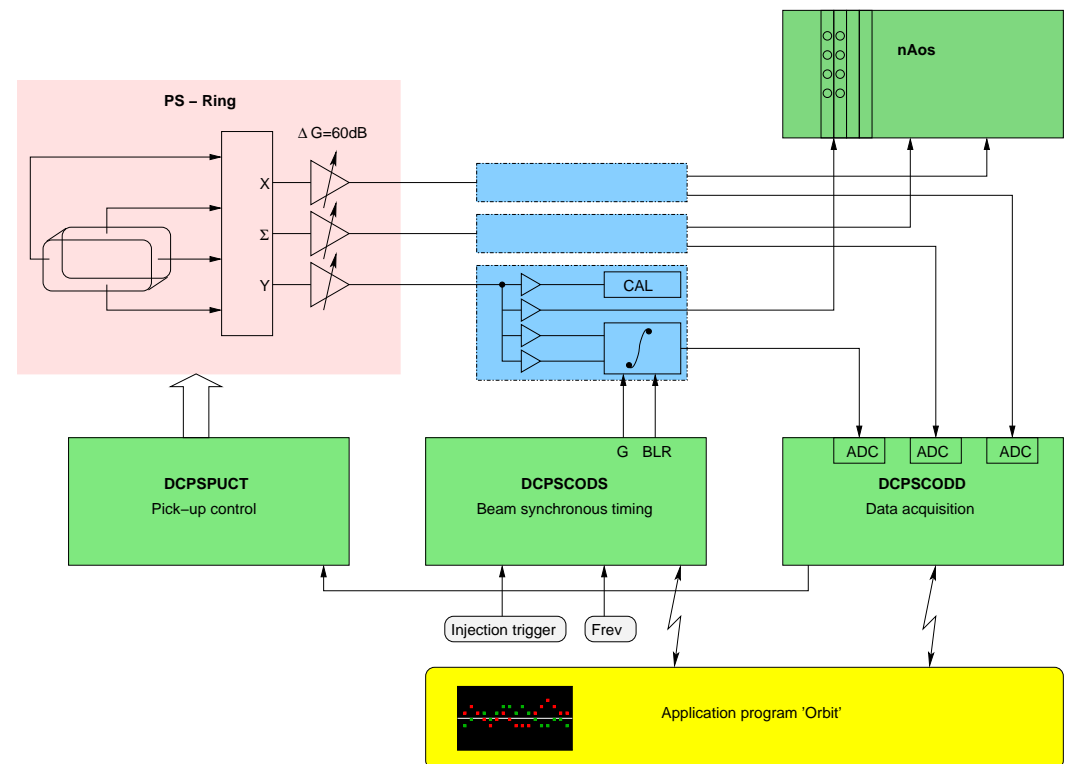
Much of the complexity of working the system resides in the control room display application:

- Setting up timings
- Reservation of resources
- Coherence of usage across 3 DSCs

Incoherent system states occur frequently

- Abnormal application termination
- Software bugs
- Misuse

It doesn't handle RF gymnastics very well





Limitations of current system:

The current system can only provide measurements on one single bunch over two consecutive turns spaced at least 5ms apart

It also delivers MRP and MVP values (mean of all PUs over one turn)

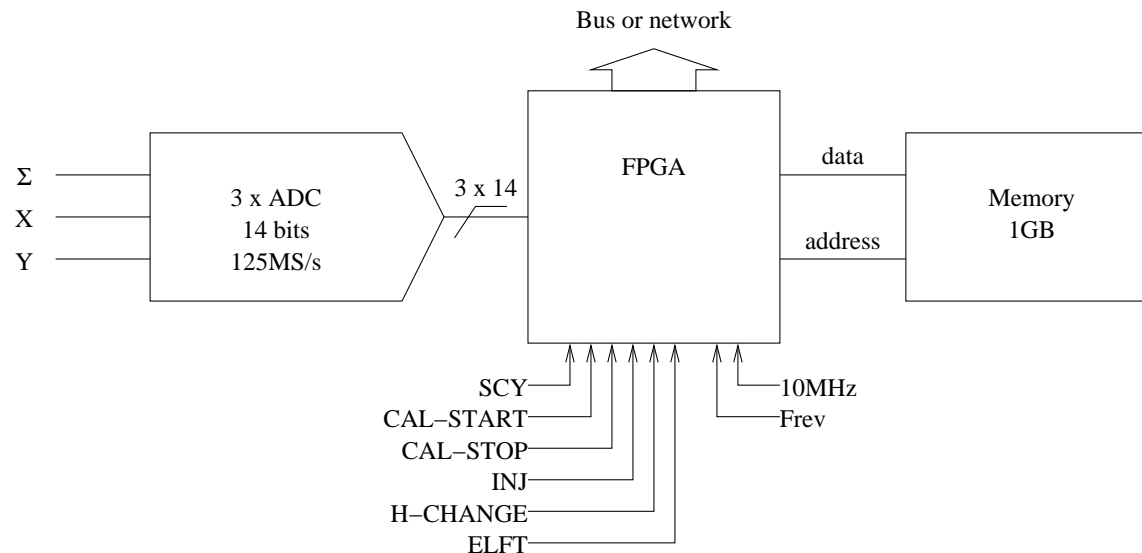
It can measure MRP and MVP at 5ms intervals over the full cycle, but doing so precludes normal operation



The new system:

- Based on commercial hardware
- Measures all bunch positions, always
- Stores measurements in a circular buffer with a few seconds of persistence

Uses only fixed hardware timing events, none of which are under control of the application, plus some PLS telegram and RF gymnastics information



Basic system architecture:
40 times this

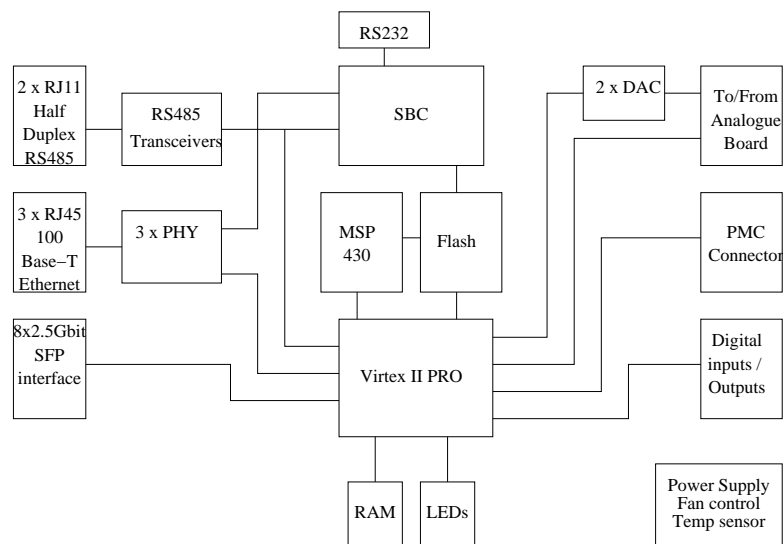
PS Trajectory Measurement System



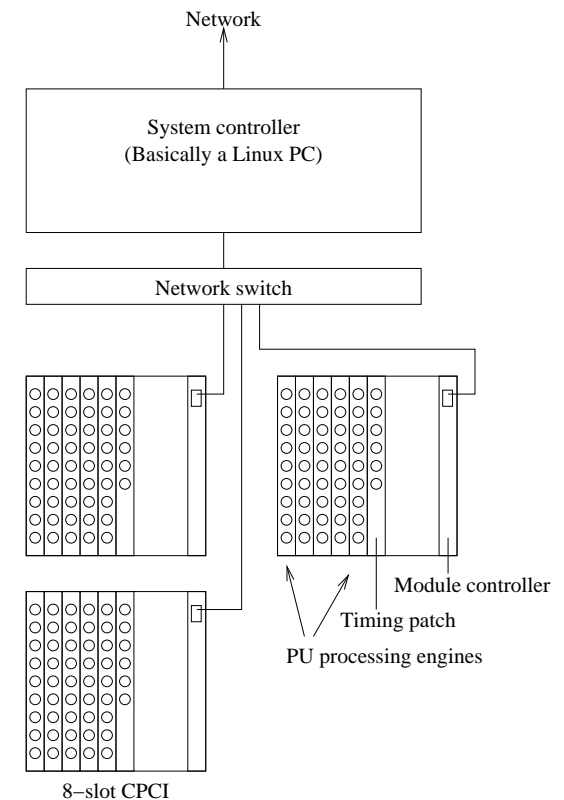
A market survey and subsequent tender identified two serious contenders:

- Instrumentation Technologies' Libera
- Alpha-Data's TMS

(The latter won the tender)



(Forty of these)



(or one of these)

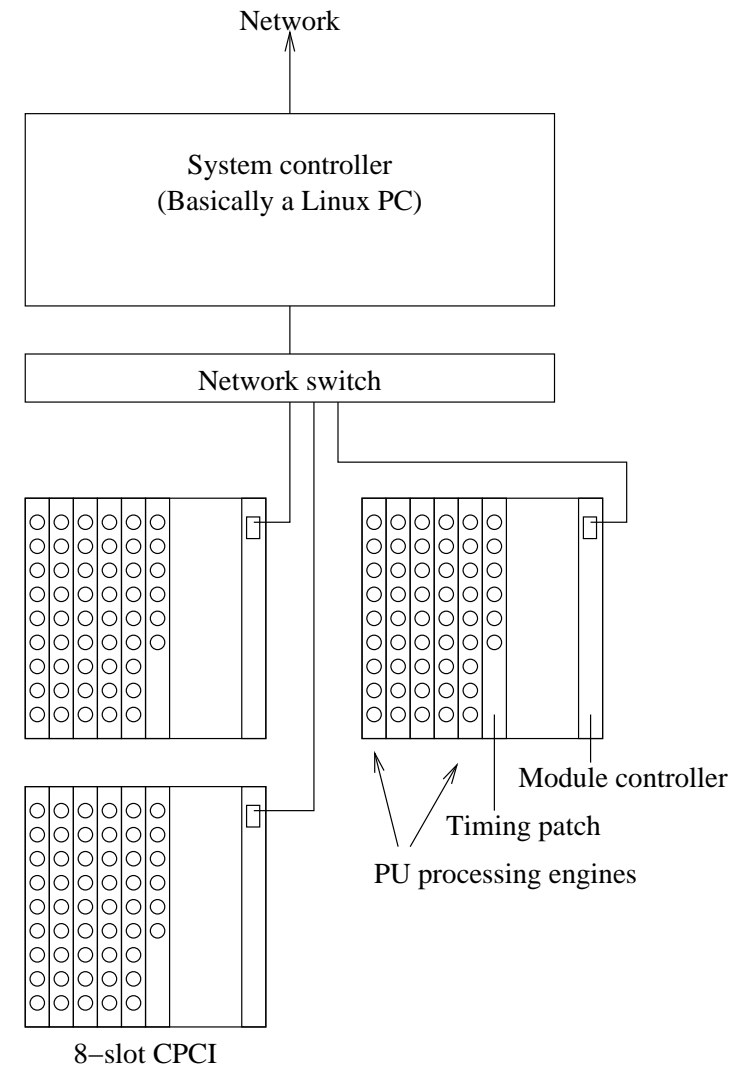


System controller functions:

- Data server to application client
- Boot server for MCs
- File system server for MCs
- Bridge to MCs
- Development platform

Module Controller functions:

- Data server to system controller
- FPGA initialization
- PUPE control





All data is stored all the time:

- No set-up action required from application
- Limited data persistence, but server cache can hide that
- No real-time burden on the application

Display:

- Trajectory of any single bunch over a selected number of turns
- MRP, MVP over a selected number of turns
- Orbit (Mean over ~100 turns of position)
- Position of two selected PUs over many (10k-100k) turns



Current planning:

Prototype system, with Linux server PC, network

switch and 3-PU acquisition hardware: Now

Complete hardware: October 2007

New system operational in parallel with old: April 2008

Removal of old system: End 2008