IIOJIIVIRGD



Super Attenuator Control System

Alberto Gennai (INFN)

Riunione dei Rappresentanti dei Gruppi Sperimentali per l'utilizzo del Servizio Elettronica Pisa, 1 febbraio 2013

Goals

Replace

- Obsolete and old components
 - Boards have been running for years therefore MTTF is now too short to start a new decade (unless we start replacing all capacitors and chips)

Reduce

- Number and type of boards.
- Analog signal path length.
- Connections along the signals path.
- Power.

Improve

Reliability, operability and maintenability.

Requirements

- Not so many changes:
 - Tiltmeters (t.b.c.)
 - Piezos
 - Filter #7 Control (6 d.o.f.)
 - Marionette Control (4 d.o.f)
 - Higher closed loop bandwidth for signal recycling operation → much shorter delays → much higher sampling rate (100 kHz – t.b.c. very preliminar)
 - Something still pending since a few years related to software (bugs, supervisor, separate dsp code and parameters, better GUI, data processing, ...)

New Control System

Design based on DSP farms (8 to 12 boards each)

TMS320C6678

- Eight TMS320C66x DSP Core Subsystems
- 320 GMAC/160 GFLOP @ 1.25GHz
- Four Lanes of SRIO 2.1 5 Gbaud Per Lane Full Duplex
- Two Lanes PCIe Gen2 5 Gbaud Per Lane Full Duplex
- Ethernet MAC Subsystem Two SGMII Ports w/ 10/100/1000 Mbps operation
- 64-Bit DDR3 Interface (DDR3-1600)

HW Deliverables

- 20 crates microTCA.4 12 slots double size
 - Each crate is equipped with a custom backplane for analog signals
- About 200 modules
 - DSP only
 - DSP + Analog Interface
 - DSP + Analog Interface + additional current dirving capabilities
 - Communication
 - \bigcirc DSP Analog interface \rightarrow PCIe (2 lanes @ 5 Mbps)
 - SP-DSP \rightarrow serial RapidIO (4 lanes @ 5 Mbps)

SAT Control System

- We are developing a control system: the team goal is not boards production!
 - Installation
 - Cabling
 - Software development
 - System software
 - Control algorithm development
 - Supervisory software and user interfaces
 - Sensors and actuators improvement

Manpower

- D. Passuello (INFN staff)
- A. Gennai (INFN staff)
- C. Magazzu (INFN staff)
- M. Bitossi (INFN Fellowship, end Oct 2013)
- A. Kutynia (Poland, end 2013 possible 6 months extension)
- V. Boschi (volunteer, possible EGO 2 yrs fellowship starting from March 2013)
- EGO contribution is negligible (0.1 FTE ?). Support expected during installation phase (tbc)

Support Needs

- Manpower
- Laboratories ?
 - Still not known if there will be enough space available at EGO