Tevatron Tune Tracker

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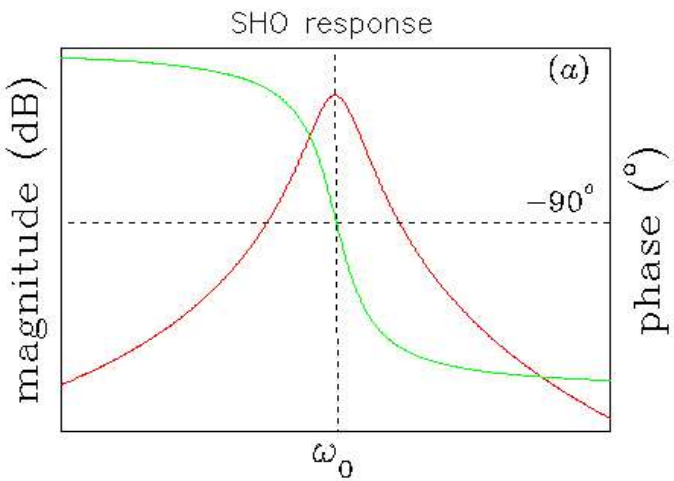
Overview

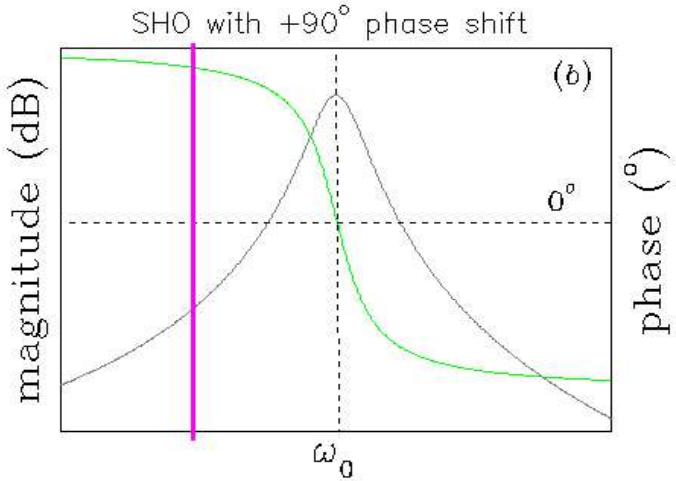
- Tune Tracker principle.
- Tune Tracker hardware.
- Tracking results
- Plans

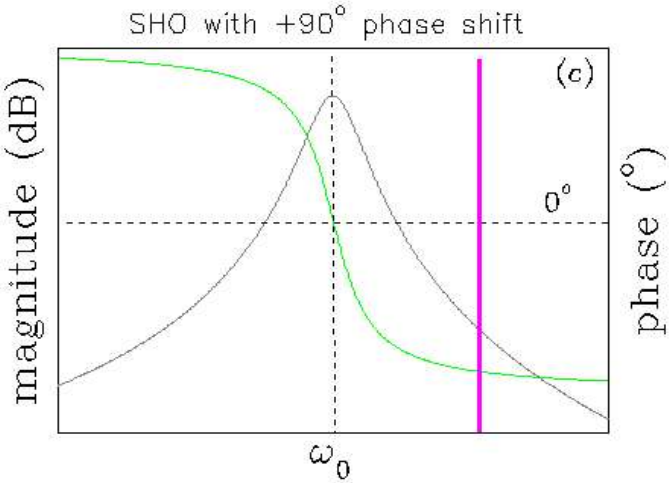
Tune Tracker Principle (Thought Experiment)

- Young Fermi wants to find the peak a pendulum resonance (SHO).
- He is armed with
  - Sine wave generator to excite the pendulum
  - Phase detector
    - Detect phase of pendulum w.r.t. Phase of sine wave

How to find the peak from phase



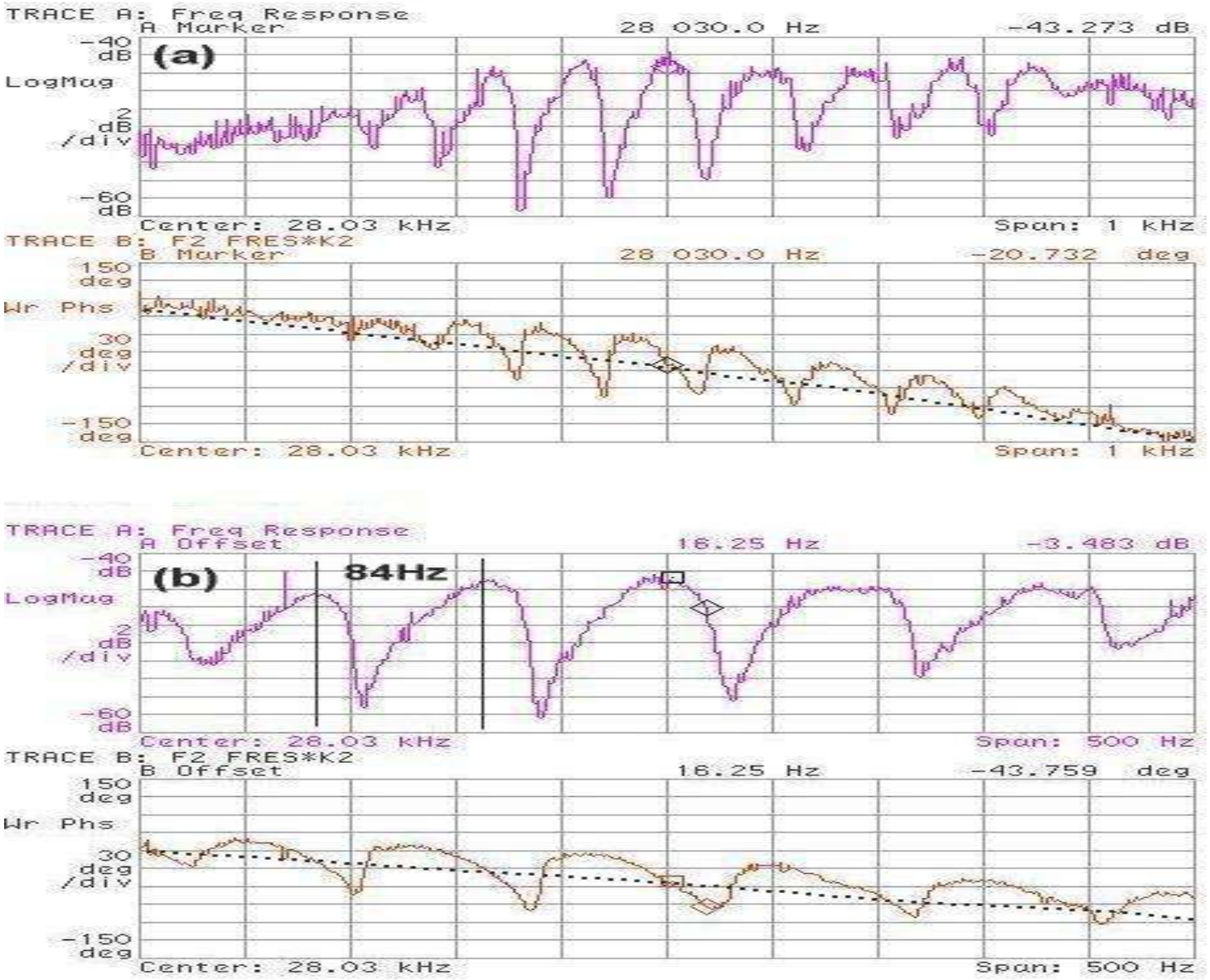




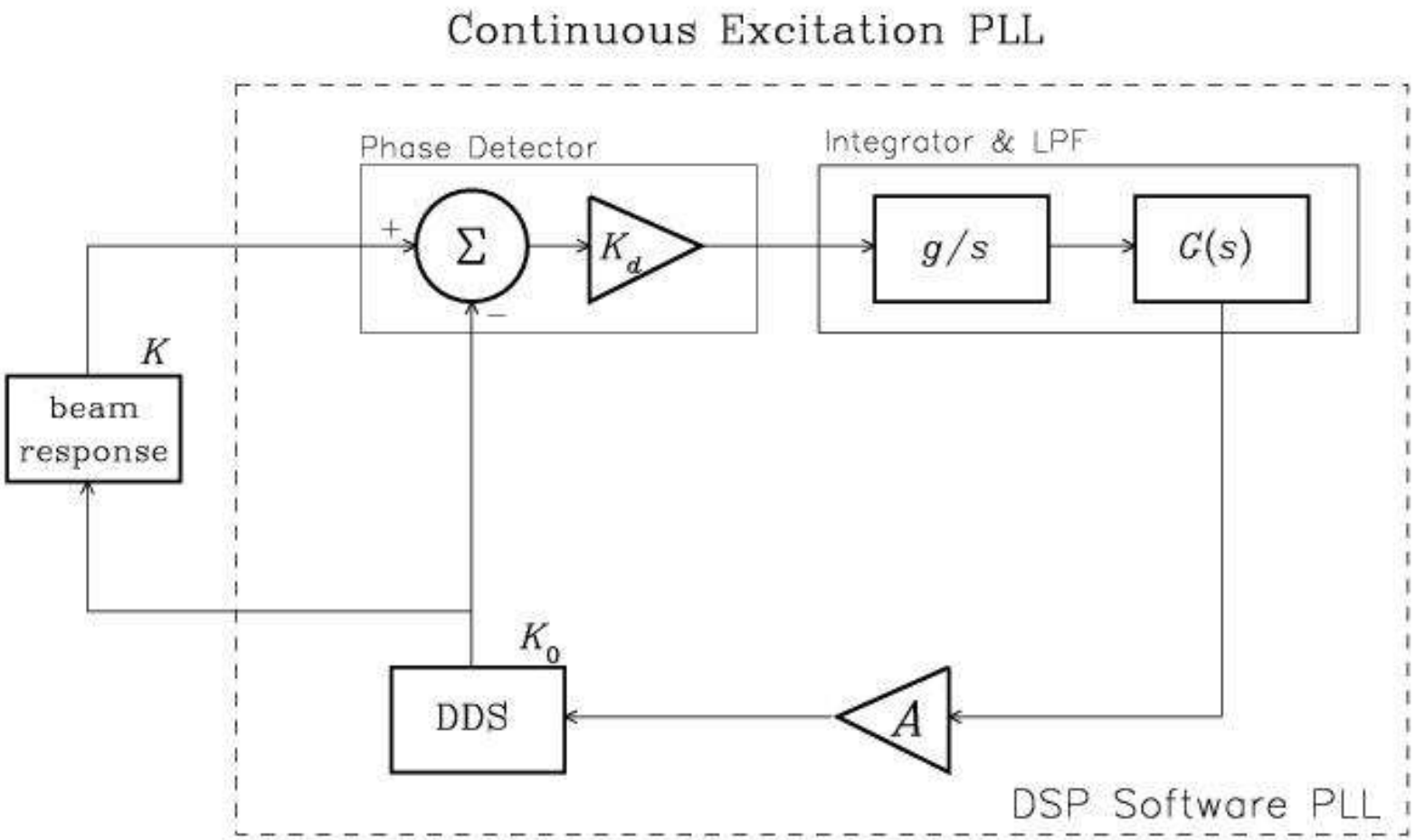
What I need

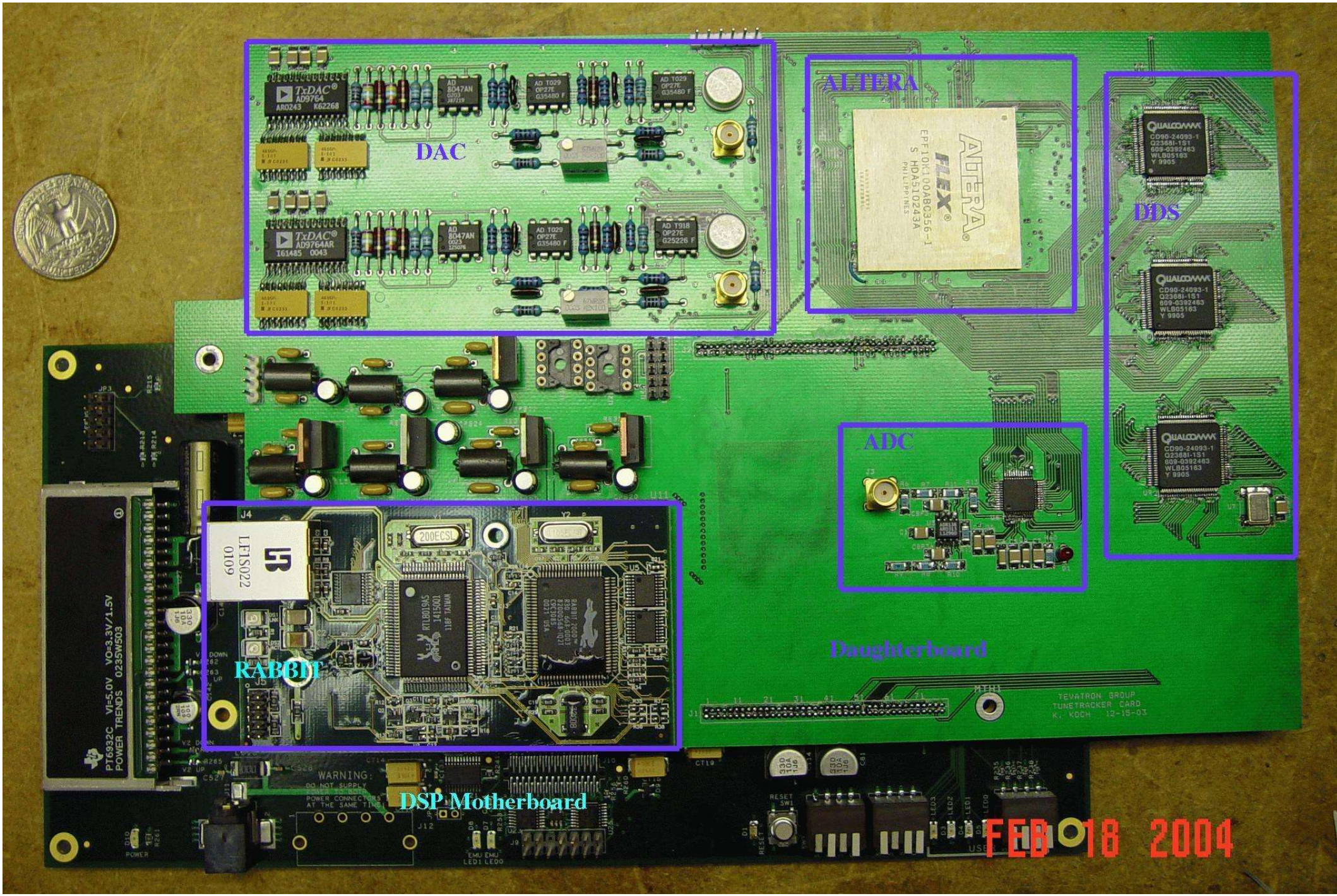
- A detector
  - 21. 4MHz Schottky at A1
- A kicker
  - 1 foot long stripline BPMs converted to kickers at A1
- Can I measure a frequency response?

Can we measure a frequency response?

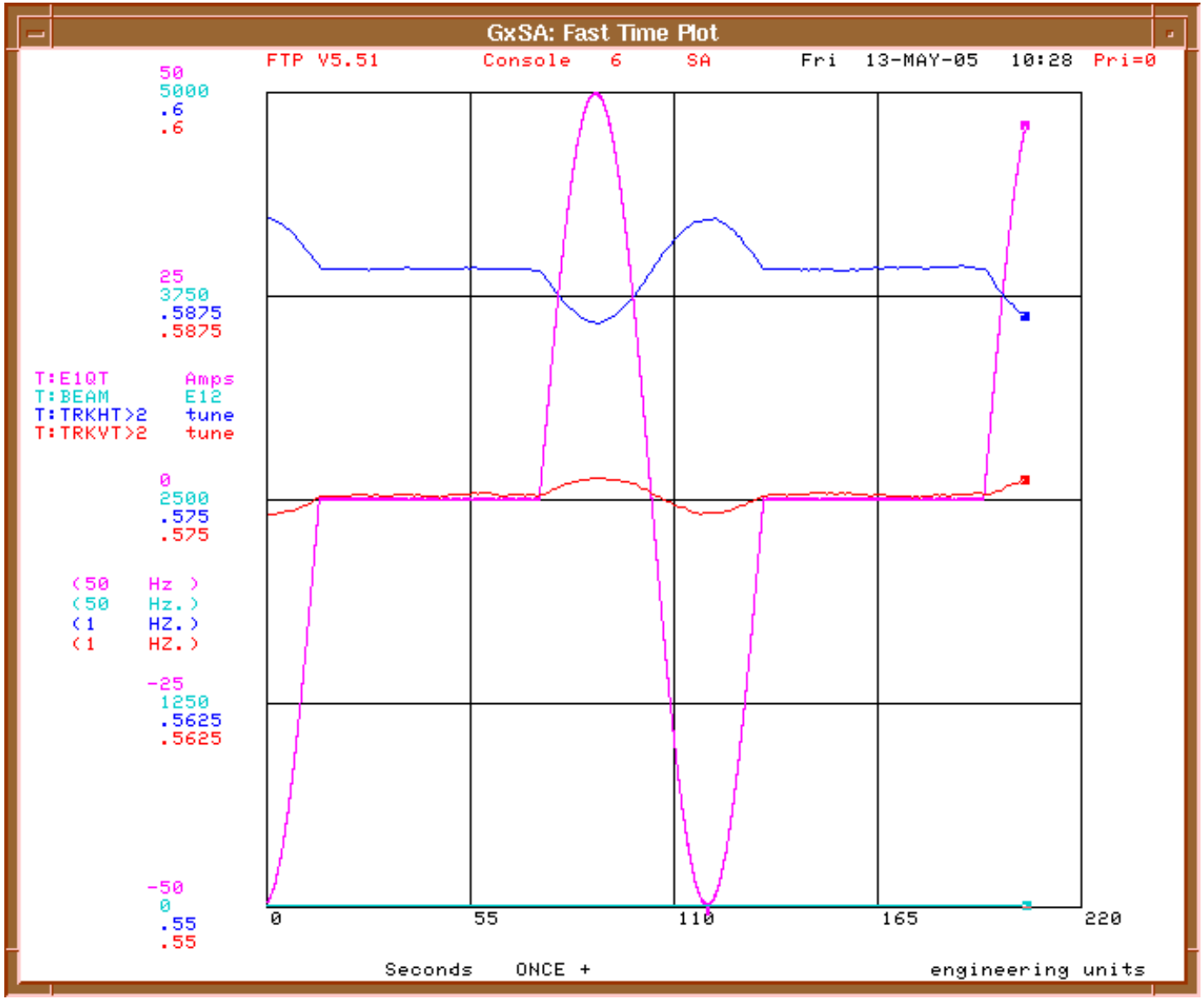


In Principle

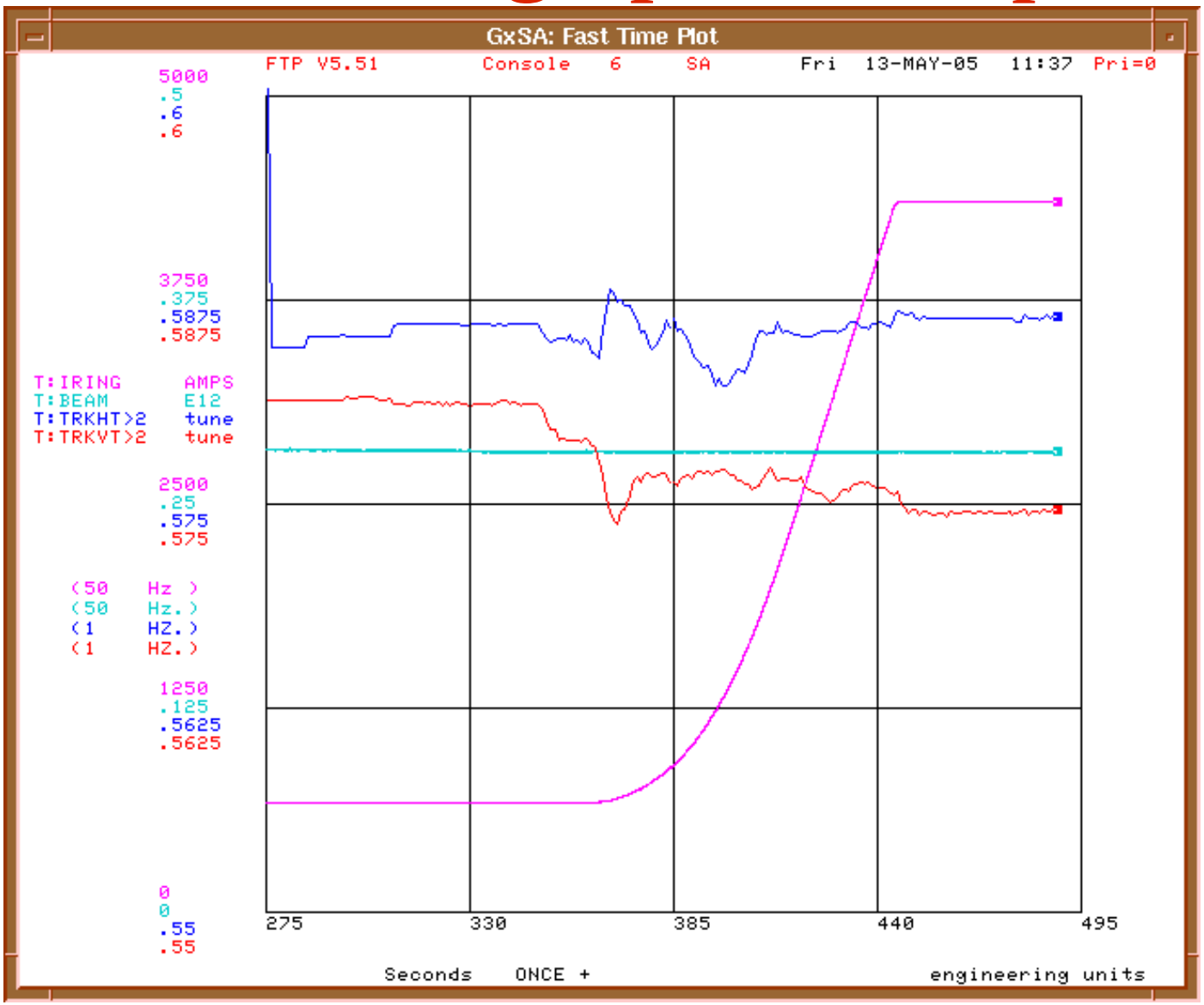



DAC
ALTERA
DDS
ADC
Daughterboard
RABBIT
DSP Motherboard
FEB 18 2004

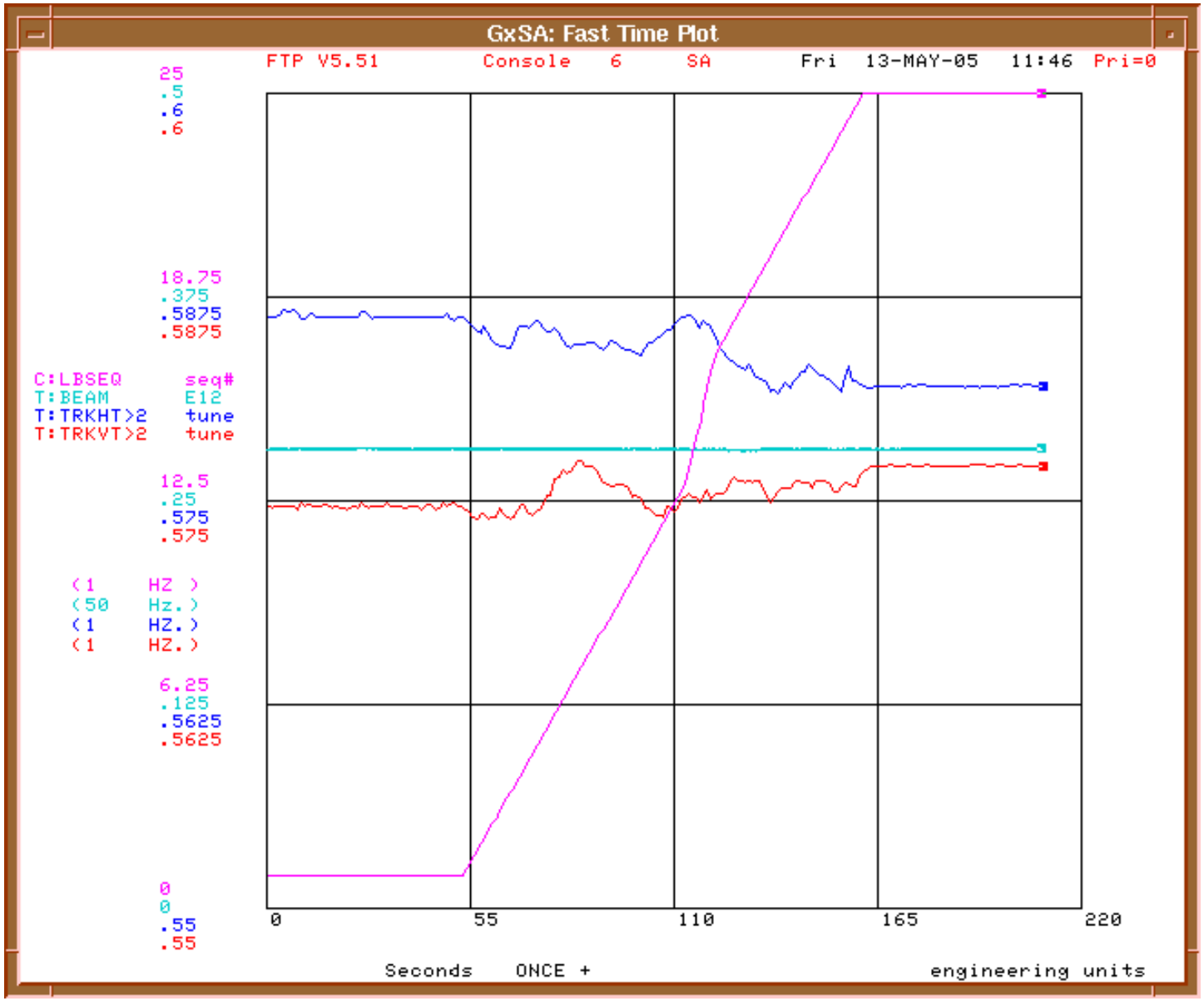
Example of Tune Tracking



Tracking up the ramp



Tracking Through Squeeze



Future Plans

- Running tune tracker for every store.
  - First attempt successful up to 400GeV before Tevatron quenched (not my fault).
- Chromaticity tracker
  - VFKNOB method
  - Phase modulation method
- Coupling tracker