

Subject: 1\_17\_03 RR BPM Meeting minutes (Calibration System)

Minutes of Friday 1/17/03 RR BPM Meeting to discuss calibration system

Attending: P. Prieto, A. Cadorna, M. Bowden, S. Zimmermann, B. Choudhary, B. Webber

The design of the calibration circuitry of the present RR BPM system falls considerably short of the requirements identified for the new BPM system. In addition, certain component failures have prevented the present system from functioning even as designed. The purpose of this meeting was to discuss conceptual design of the new calibration system. Understanding this piece of the BPM system at some level is schedule critical because it will almost certainly have an impact on the preamp design.

Peter led off meeting with overview of the design of the present calibration system.

Requirements of the new system were reviewed. Calibration to a position accuracy of  $\pm 0.25$ mm position and 2% intensity is specified. The BPM sensitivities are about 0.63db/mm vertical and 0.29db/mm horizontal; therefore 0.25mm corresponds to 0.8% test signal accuracy (horizontal).

Considerable discussion about possible designs transpired.

The result was identification of a set of design parameters from which more detailed engineering could proceed. Those parameters are:

- 1) Use single daisy-chained test signal cable, i.e. not separate cables for A and B test signals. Parallel cable system did not seem suitable to control relative levels to the 1% accuracy level.
- 2) Test signals shall produce preamp outputs with same time shape as 2.5MHz beam structure and 7.5MHz beam structure. No attempt to simulate signal of unbunched beam.
- 3) Test signals shall be continuous train of pulses, e.g. not separate bursts of 4 2.5MHz bunch signals. This is to eliminate timing considerations from the design at the present time. This may be re-visited once the timing issues of measuring actual beam signals are well in hand.
- 4) There shall be an automatic level control (ALC) circuit at each preamp to facilitate equal amplitude test signals to each preamp despite attenuation down the daisy chain. (Expected compliance range of ALC is order 20 db, that is approximately the attenuation down the daisy chain at 7.5MHz.) The ALC circuit shall have two reference levels in a ratio of 2:30, the ratio of low to high 2.5MHz beam intensities, to calibrate at two different "intensities". There shall not be a continuous range of test signal amplitudes.
- 5) Common test signal shall be "split" into A and B signals local to each preamp downstream of ALC circuit. Test ratios of A=B, A=B-6db, and B=A-6db will be provided. (Note this corresponds to approximately  $\pm 20.7$ mm for a horizontal BPM and  $\pm 9.5$ mm for vertical BPM.)

Sergio Zimmermann agreed to pursue engineering details for this scope of calibration system.

Next meeting on this topic was not set, although they should continue at rate of once per week in order to assure that progress is being made, that this direction continues to be sensible, that any show-stoppers are caught early, and that implications for other parts of the system are identified as soon as possible.

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