Instrumentation Technologies
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Bunch-by-Bunch Feedback System

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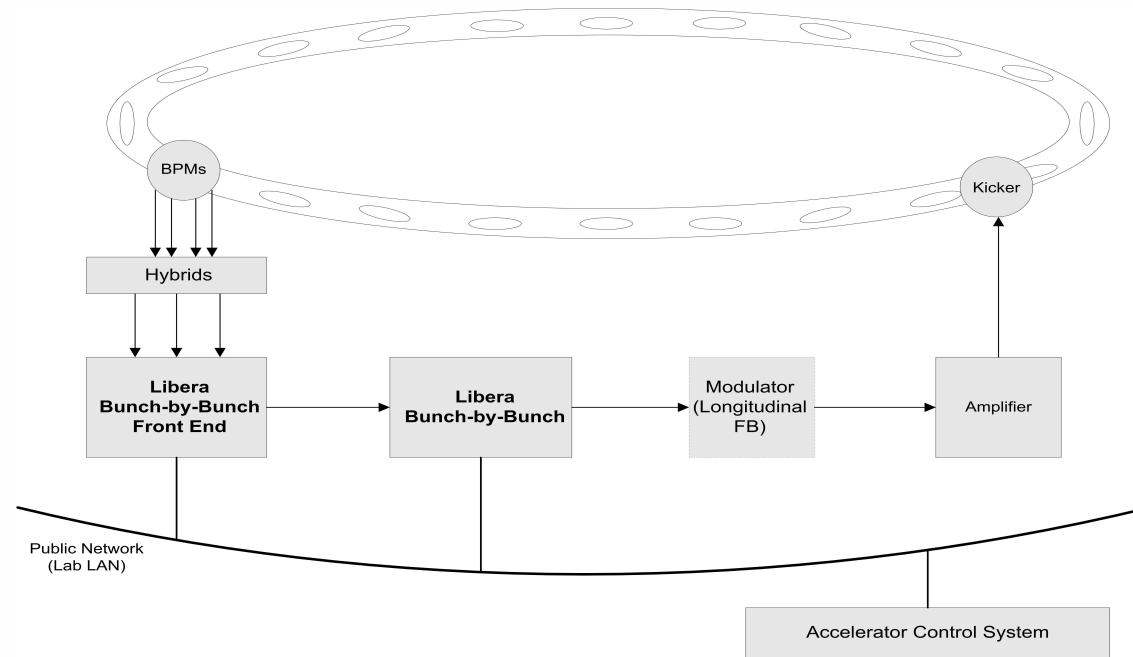Libera WORKSHOP 2008

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Purpose of the Bunch-by-Bunch Feedback System

The purpose of the bunch-by-bunch feedback system is to damp the beam instabilities.

The oscillations are transverse (betatron) or longitudinal (synchrotron) and originate from:
- Cavity High Order Modes
- Resistive wall impedance
- Interactions of the beam with other objects (discontinuities)
- Ion instabilities

Bunch-by-Bunch Loop Operation

- **Hybrides combine BPM pick-ups. The outputs are X, Y, I (sum).**
- **Libera Bunch-by-Bunch Front End converts X, Y, I signals to baseband.**
- **Libera Bunch-by-Bunch (processing unit) digitizes the signal, does the processing and converts the signal back to analog.**
- **The modulator is used only in longitudinal feedback and translates the correction signal to the frequency of the kicker.**
- **The power amplifier supplies the power to the kicker.**

Our New Products

Libera Bunch-by-Bunch /S

- one ADC @500 Msps instead of four (in the /Q version) @125 Msps
- no crosstalk, no amplification differences between the channels
- suitable for synchrotrons with any harmonic number
- bigger FPGA (XC2VP50)
- additional features for bunch cleaning

Libera Bunch-by-Bunch Front End

- converts signals from the hybrids to baseband
- 4-channel unit
- Local and remote RF gain and LO phase setting

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