WEP086

EPICS IOC of WindowsXP-based Oscilloscope for Fast BPM Data Acquisition System

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Overview

- KEK Injector Linac provides four different kinds of beam
- 8 GeV e- (1 nC)/ 3.5 GeV e+ (1 nC, primary e- 7 nC) for KEKB (Continuously)
- 2.5 GeV e- (0.1 nC) for PF (Scheduled Injection 2/day)
  => ***Top-up*** *(since April 2009)*
- 3 GeV e- (0.1 nC) for PF-AR (Scheduled Injection 2/day)

- Non-destructive Beam Position Monitor (BPM)
  - used for Beam orbit feedback/ Beam energy feedback
  - Number of BPM: 94 (four strip-line type electrode)

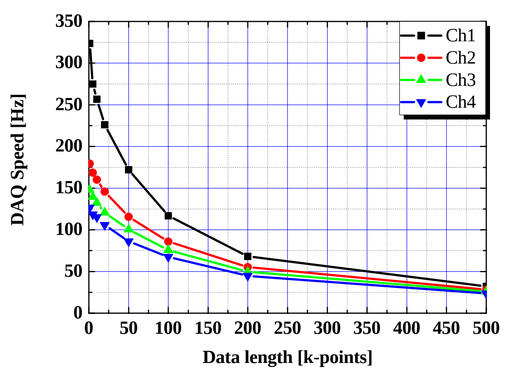
- *Towards KEKB continuous injection/ PF Top-up*
  ⇒ *We need BPM data acquisition of 50 Hz*

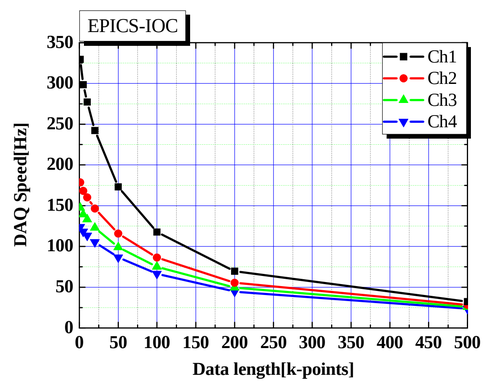
- Former BPM DAQ system: Old digital oscilloscope/GPIB and VME. The maintenance work is very difficult since the oscilloscope is discontinued product.

⇒ New system: Fast digital oscilloscope (Windows XP-based) w/ EPICS (Experimental Physics and Industrial Control System)

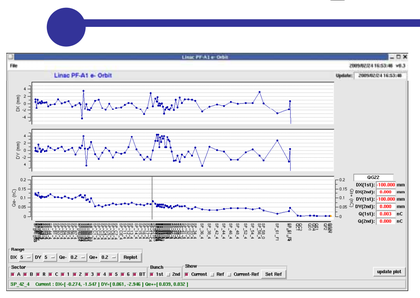
Performance test of the fast digital oscilloscope

- We tested the speed of waveform acquisition (Tektronix DPO7104, 4CH, WindowsXP, Pentium4-3.4 GHz, 2 GB memory) for the local and remote access. In the local access test, the test software is running on the oscilloscope.
- The test result shows that the acquisition speed is enough for 50-Hz measurement.
- In the practical operation, we need 2-k data length w/ 2CH.

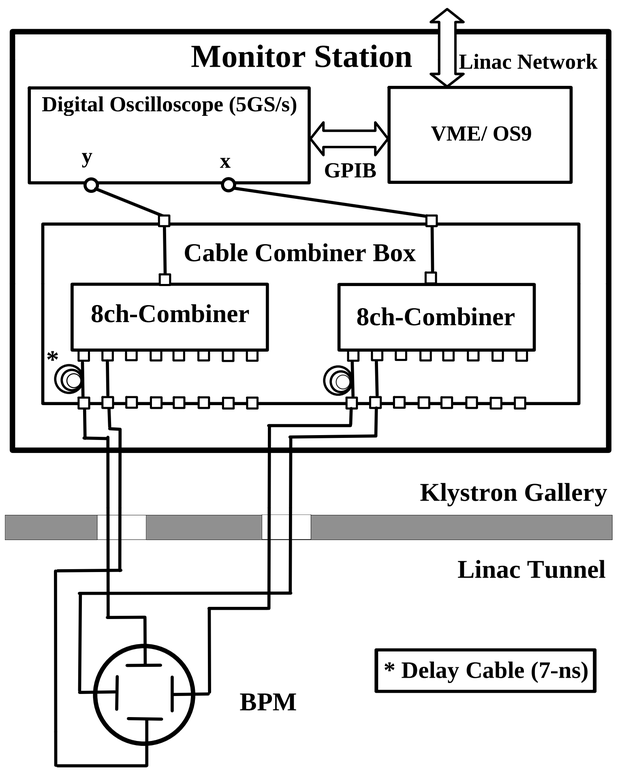


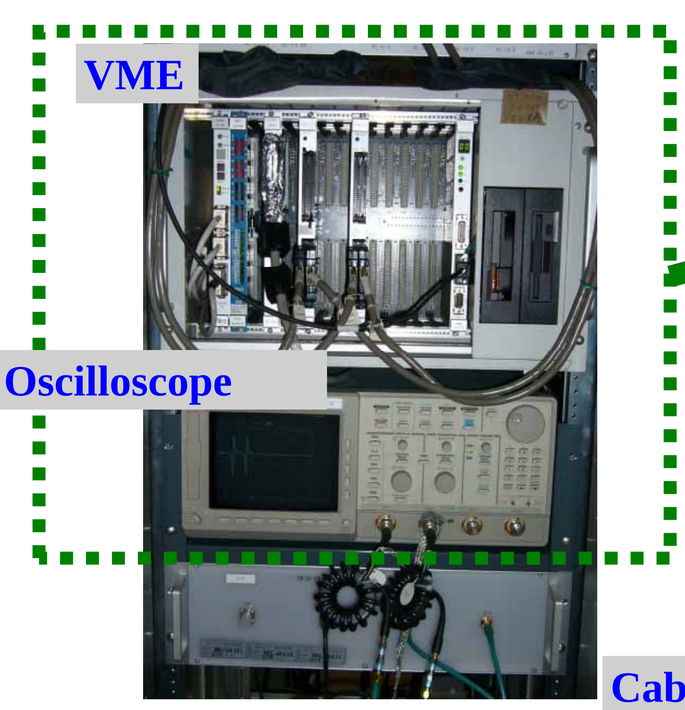


Beam Orbit panel examples



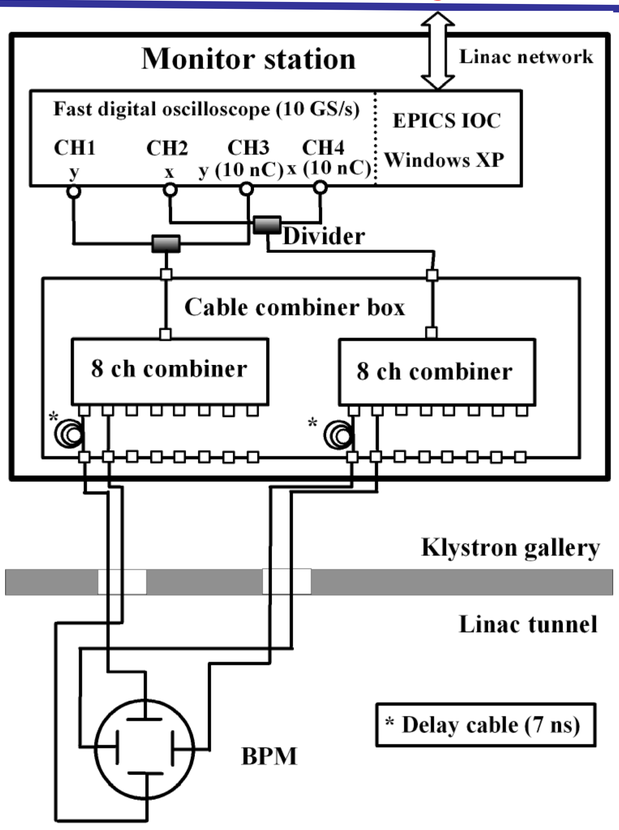
Former BPM DAQ System

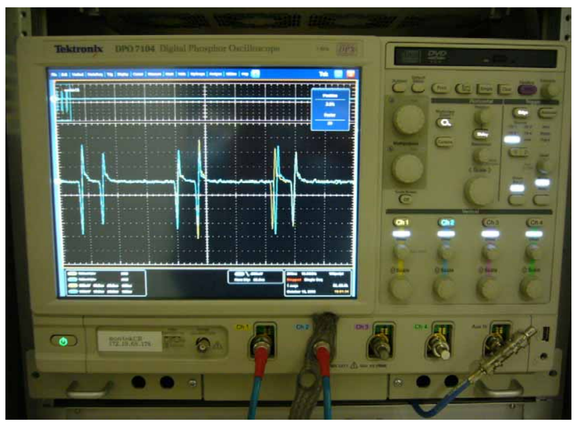




Photograph of Former System

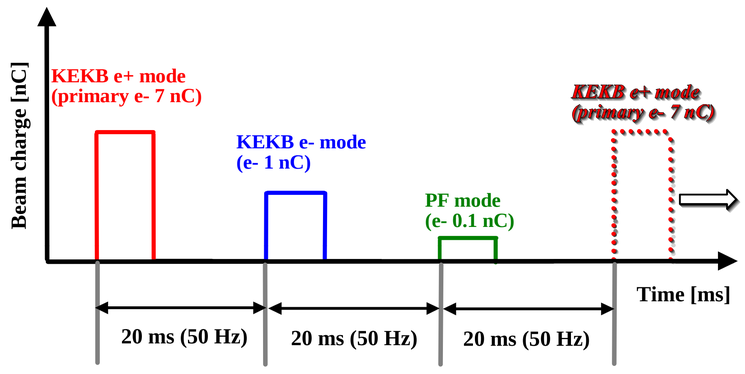
New BPM DAQ System

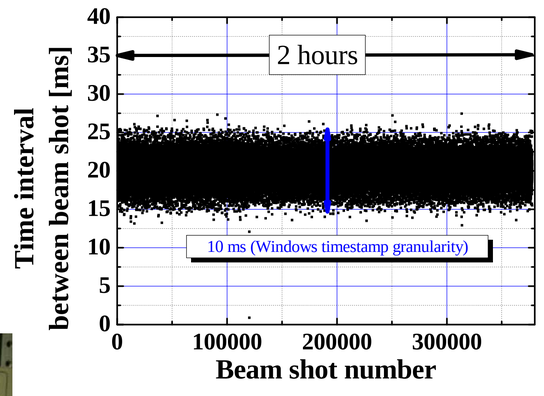


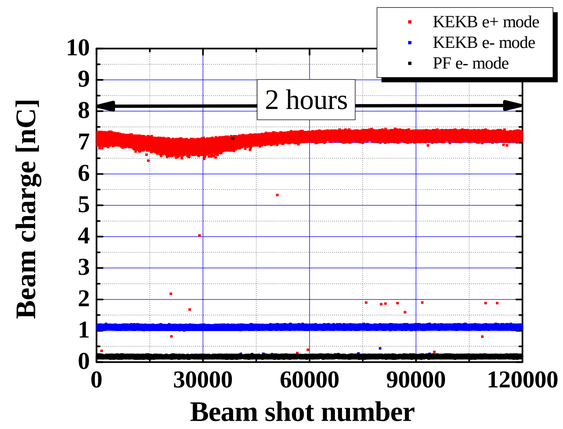


Photograph of Fast Digital Oscilloscope (Tektronix DPO7104)

Beam Test with 50 Hz repetition







Summary and future plan

- The new BPM DAQ system was developed for the KEK Injector Linac.
- A new system is the WindowsXP-based fast digital oscilloscope. Each of them can work as a EPICS.
- All of 23 BPM-DAQ systems have been already replaced by new one, and used for daily operation.
- They all work very stable.
- A similar system has been available for the KEKB-BT.

- EPICS record for the averaging data is under development.