

A Single-Pass Beam Position Monitor for the Injection Beam at the Photon Factory Storage Ring,

T. HONDA, KEK/PF - A single-pass beam position monitoring system for the injection beam is under development. A signal extracted through a button electrode was detected using a high-speed waveform digitizer. The button signals were recorded by real-time sampling with a maximum rate of 5×10^9 samples/s and an analogue bandwidth of 1 GHz. For the single-pass measurement, eight BPMs were selected around the ring. The duration of the injection-beam signal was much shorter than the intervals between the BPMs, so one button signals from the eight BPMs could be recorded in a single channel of the digitizer by means of an RF combiner. The all four-button signals were simultaneously detected by the four-channel digitizer. The maximum number of turns to be measured for a single injection pulse was ten. The charge per bunch of the injection beam (electron) was about 2×10^{-10} C, and the bunch length was 2 ns. At a preliminary measurement, the first-turn positions were determined with an resolution better than 1 mm.