

### A.5: Data acquisition system for the booster beam current pulse profile

The Booster Synchrotron works as an injector for Indus-1 and Indus-2 Synchrotron Radiation Sources. A data acquisition system is developed by Accelerator Control System Division (ACSD), which acquires the Booster beam current profile of every single pulse of current during injection in Indus-1 and Indus-2. Block diagram and photographs of the data-acquisition system are shown in Figure A.5.1 and Figure A.5.2, respectively.

This system is aimed to facilitate study of variation in the beam current pulse profile (shown in Figure A.5.3), over several cycles during injection in Indus-1 and Indus-2. This will provide more information for optimization of various parameters of Booster, Microtron and Transport Line-1. LabVIEW based GUI is developed to analyze the acquired data for variation in pulse width and amplitude, as shown in Figure A.5.4.

Salient features of the data-acquisition system are as follows:

- Input voltage range: 0 - 10 volts
- Adjustable gain: 1, 1/2, 1/4, 2, 4
- Galvanically isolated analog input
- Captures current pulse of typical duration of ~ 600 milliseconds
- 128 KB on-board memory, expandable up to 16 MB
- Synchronization: External trigger, programmable threshold
- High-speed, self-calibrating, 12-bit A to D conversion
- Interface: Isolated RS485
- Modbus standard communication protocol for data transfer

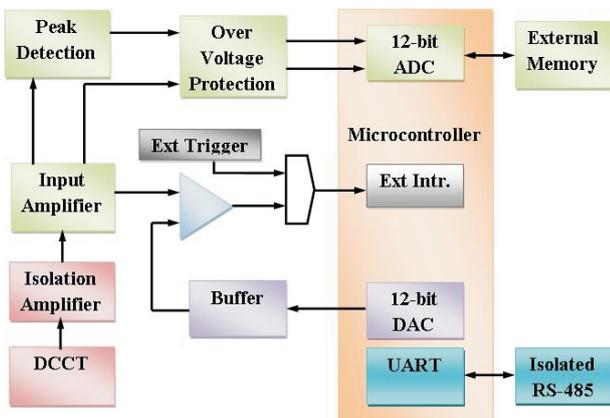


Fig. A.5.1: Block diagram of data acquisition system.

This system has been installed in Indus control room and acquisition of booster current is synchronized with Microtron. Various beam parameters like peak current, average current, pulse-width, rise-time of each current pulse gets stored in a spread sheet, apart from complete profile of every current pulse in separate date and time-stamped files.



Fig. A.5.2: Photograph of the data acquisition system.

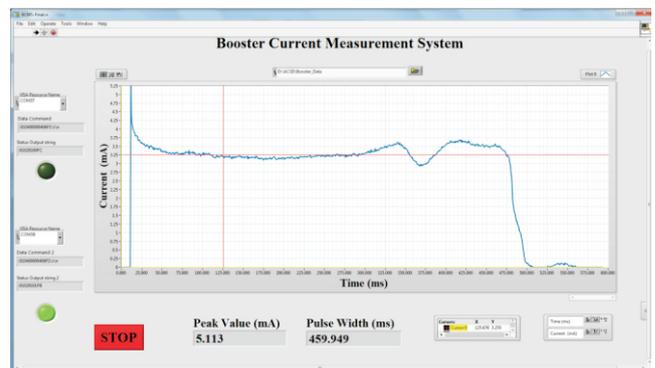


Fig. A.5.3: Plot of the booster current profile captured during injection in Indus-1.

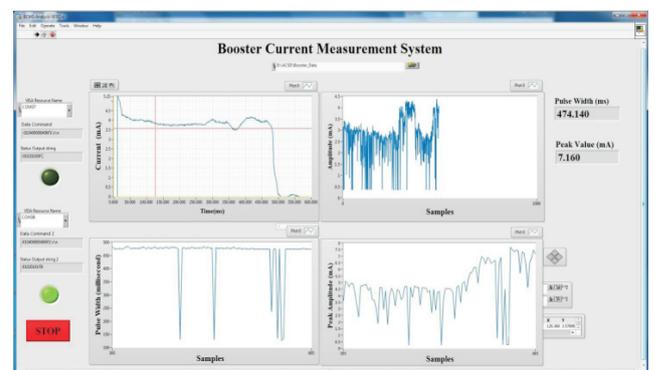


Fig. A.5.4: Plots of variation in amplitude and pulse width.

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