

BLT Roadmap

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Version 1.0

1 Tevatron BLTs

1.1 TEVBLT

1.1.1 Function

For operations: Used to close orbits by measuring transverse positions for first 64 turns for pbar transfers from MI to Tev for each bunch of every transfer.

Optional functions: Used to close orbits for proton transfers or measure time-of-arrival (energy-phase) of proton and pbar bunches.

1.1.2 System Description

System utilizes four channels of 2.5 GHz Tektronix TDS7104 oscilloscope to digitize A-B and A+B signals from horizontal and vertical striplines. The pbar signals for each bunch are digitized at injection for the first 64 turns. The analysis algorithm extracts a horizontal and vertical position for each turn for each pbar bunch and sends them via ACNET for turn-by-turn analysis at the end of each transfer.

A Racal Dana multiplexer is used to select upstream (proton) or downstream (pbar) signals as well as proton or pbar RF signals. This allows the system to close orbits for proton transfers or measure time-of-arrival (energy-phase) of proton and pbar bunches. At present, this system is not used in operations for proton closing or time-of-arrival measurements.

1.2 TEVBLT2

1.2.1 Function

For operations: Used to measure proton and pbar time-of-arrival from MI to Tev. This can indicate energy-phase mismatches between Tev and MI.

Optional functions: Used to measure transverse positions to close orbits for pbar or proton transfers from MI to Tev for first 1000 turns for each bunch for every transfer.

1.2.2 System Description

System utilizes eight channels of 106 MHz, 12 bit Struck ADC card to digitize A and B signals from horizontal and vertical Tev striplines for both upstream (protons) and downstream (pbars). A and B signals are passed through a 30 MHz analog low-pass filters to stretch the 53 MHz doublet from the stripline. Signals are then digitized at $2*RF$, down converted and correlated with a response function to give a magnitude and phase for A and B. Both position and phase (time-of-arrival) are calculated for each bunch and sent to ACNET after every transfer.

2 Main Injector BLTs

2.1 MIBLT

2.1.1 Function

For operations: Used to close orbits by measuring transverse positions for first 1000 turns for 53 MHz pbar transfers from Accumulator to MI for each batch (7-9 bunches) of every transfer.

2.1.2 System Description

System sends A and B downstream (pbar) MI stripline signals to AM/PM BPM modules that generate transverse position. Position is digitized by Kinetic Systems ADC card in VXI crate. Digital position data is acquired by Labview program in PC and set via ACNET for turn-by-turn analysis after every pbar transfer.

2.2 MIBLT2

2.2.1 Function

For operations: Used to close orbits by measuring transverse positions for first 1000 turns for 2.5 MHz pbar or proton transfers from Recycler to MI for each bunch of every transfer.

Optional functions: To close orbits by measuring transverse positions for first 1000 turns for 2.5 MHz and 53 MHz pbar or proton transfers from Accumulator to MI for each batch (7-9 bunches) of every transfer.

2.2.2 System Description

System utilizes eight channels of 106 MHz, 12 bit Struck ADC card to digitize A and B signals from horizontal and vertical MI striplines for both upstream (protons) and downstream (pbars). A and B signals are passed through a 5 MHz analog low-pass filter, amplified and then digitized. Digital signals are down converted and correlated by a Labview program on a PC to give a magnitude and phase for A and B. Positions are sent via ACNET for turn-by-turn analysis after every transfer.

3 Recycler BLT

3.1.1 Function

For operations: Used to close orbits by measuring transverse positions for first 1000 turns for 2.5 MHz pbar and proton transfers from MI to Recycler for each bunch of every transfer.

3.1.2 System Description

System utilizes eight channels of a 65 MHz, 14 bit Echotek card (older model from SLAC) to digitize A and B signals from horizontal and vertical Recycler striplines for both upstream (protons) and downstream (pbars). A and B signals are passed through a 5

MHz analog low-pass filters, amplified and then set to the Echotek card. The Echotek card then digitizes, down converts and filters these signals to give a magnitude and phase for A and B. Transverse positions are calculated and sent via ACNET for turn-by-turn analysis after every transfer.