Beams-doc-1315-v1
August 24, 2004

Performance of New Echotek for the Last Two Shots Before the Shutdown

Rob Kutschke, CD/EXP

Abstract

This note presents data taken using new BPM electronics at HA34 and VA35 for the shots done on August 21, 2004 and August 22, 2004. These are the last two shots before the fall 2004 shutdown. A bug was found in the online cancellation of the proton signal on the anti-proton cables. Otherwise the instrument worked well, as it has throughout the past week.

The four figures show screen captures of displays from D44. They show data from the Lumberjack data logger TevSA, which logged at 15 Hz. In all 4 figures there are 4 traces, HA34 proton(green), HA34 anti-proton(cyan), VA35 proton(blue) and VA35 anti-proton (red). Figure 1 shows the sum signals (A+B) for the shot on Saturday Aug. 21 and figure 2 shows the position signals for that shot. Figure 3 shows the sum signals (A+B) for the shot on Sunday Aug. 22 and figure 4 shows the position signals for that shot.

There is a bug in the cancellation of the proton signal on the anti-proton cables. The problem is a typo made when copying the cancellation coefficients to the code. The lesson learned here is that we need a) an automated procedure to reduce/remove the chances for typos and b) test inputs to verify that the code is working correctly before it is deployed to the front ends. This will be addressed during the shutdown.

Comments on the figures:

1. In all traces on all plots there are still a few tens of data points which are far from the main body of the data. As before, these outliers are not present in the intensities and positions which I computed offline from the datalogged IQ data. The reasons for these outliers in the online compuation need to be tracked down.

2. There appear to be 10 steps, not 9, in the anti-proton A+B signals. This is an artifact of the bug in the cancellation coefficients. The first step is the helix opening.

3. In figures 2 and 4 the red trace (VA35 anti-proton position) is present during the proton injection, even though there are no anti-protons in the machine at this time. This is another artifact of the bug in the cancellation coefficients: because of the incomplete cancellation, the antiproton signsls are above threshold. Actually the cyan trace (HA34 anti-protons) is also present at this time but it is off-scale.

One final comment. The phases of the signals look as they always have with this board - they vary over the full range of $[-\pi, \pi]$ instead of having five stable values.

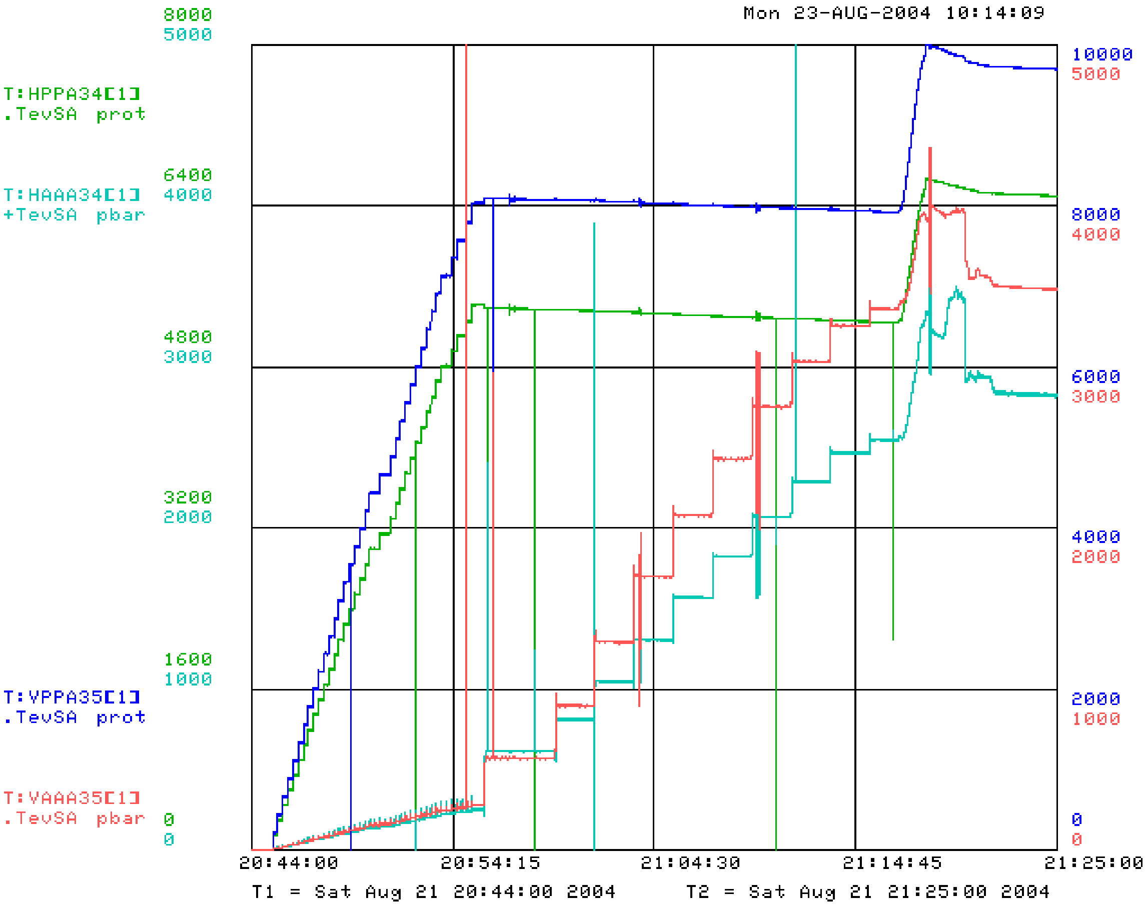

Figure 1: Intensity (A+B) for the proton and anti-proton signals from BPMs HA34 and VA35 for the shot taken on August 21, 2004, at about 9 PM. The vertical scale is in Echotek units.

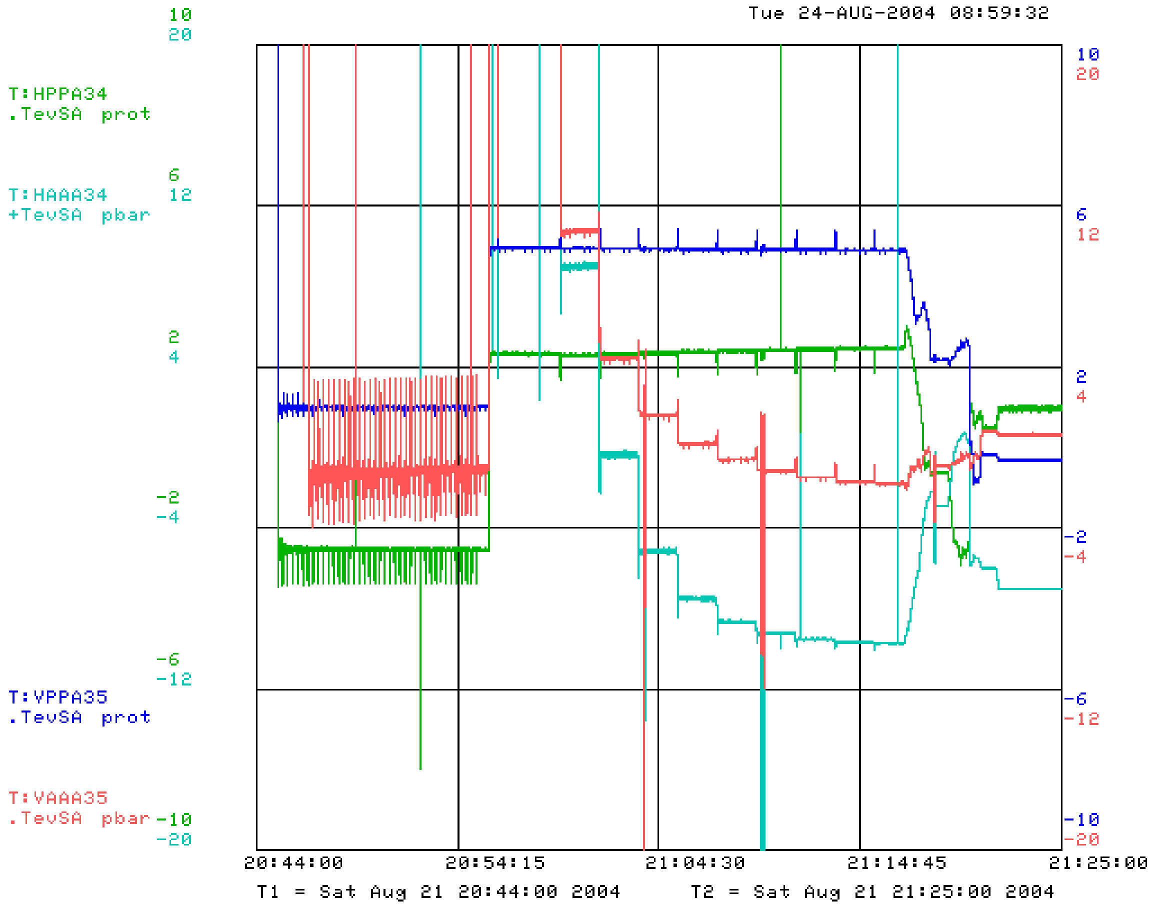

Figure 2: Beam positions for the protons and anti-protons at BPMs HA34 and VA35 for the shot taken on August 21, 2004, at about 9 PM. The vertical scale is in mm.

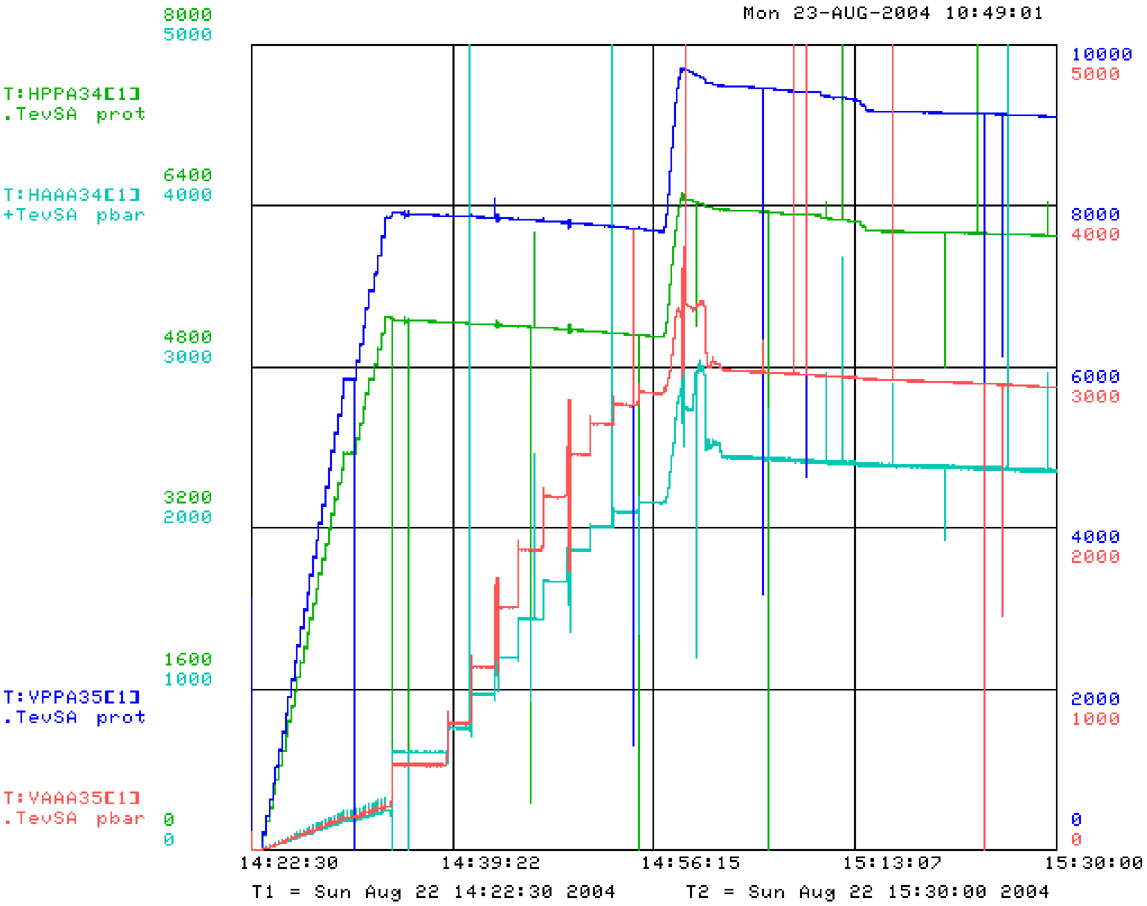

Figure 3: Intensity (A+B) for the proton and anti-proton signals from BPMs HA34 and VA35 for the shot taken on August 22, 2004, at about 2:30 PM. The vertical scale is in Echotek units.

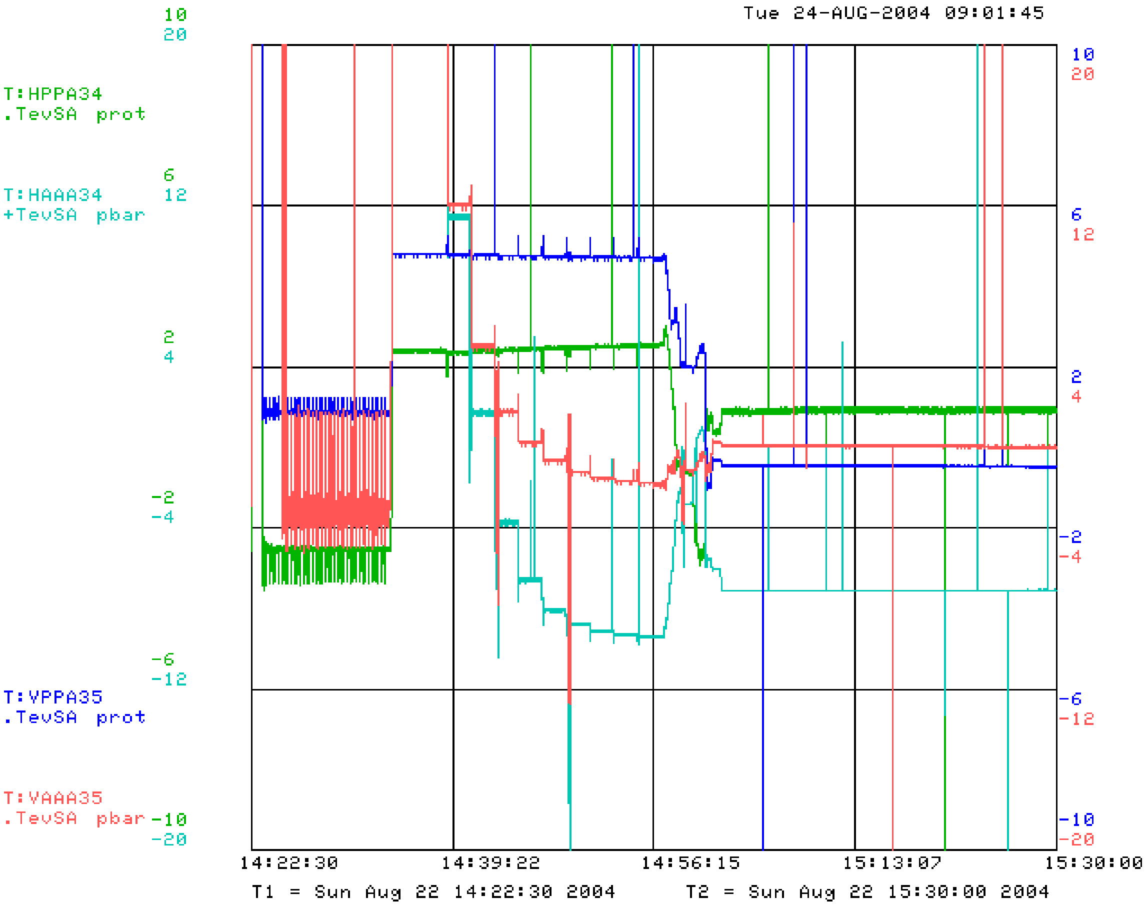

Figure 4: Beam positions for the protons and anti-protons at BPMs HA34 and VA35 for the shot taken on August 21, 2004, at about 2:30 PM. The vertical scale is in mm.