QWAD Pulse Test Results, a Representative Sampling of Runs

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September 14, 2016

What each of the trial types mean:

Counter test: A test where a 100Hz NIM signal (unless if otherwise specified) is used on input G0 of our V1495 scaler for the trigger signal, and the value in control.in for LVDS_ACQ_CTRL is set to the necessary values for using input G1 of our V1495 scaler as a test signal input. Each of these tests has roughly 10,000 events.

QWAD Pulse Test(s): Tests invlolving using a pulse generator to test the QWAD on the calibration line. Tests are specified by channel bank (numbered from left to right with the calibration input and ribbon cable connections facing the user), voltage of pulse signal, signal rate for the QWAD calibration input, and trigger rate for the V1495. Unless otherwise specified, the pulses are 100us in duration with 4.0ns leading and falling edges, no phase shift, and no voltage offset. The signal generator used was a Keysight 33600A Series Waveform Generator. Each of these tests has roughly 10,000 events.

QWAD Noise Control: This is a control experiment for any QWAD experiments. No incoming pulses and no incoming detector data, and nothing is plugged in on the calibration input or the detector input. This is purely used to determine noise rates for statistical analysis of other QWAD tests. Each of these tests has roughly 100,000 events.

These are just plotted from the raw data files that I have gathered through a simple VME program designed to capture the raw output from the V1495 board that we are using, and each of the histograms is representative of totals across all events gathered for the run. Each of these is a TH1D histogram, with channel number along the x-axis and channel counts along the y-axis. I am not sure what ROOT is doing with these error bars, so the only meaningful thing is the central value of these histograms. The next step for these data will be to create bar graphs with a per event average and standard deviation so we can get a better picture of precisely how noisy some channels are and to compare those across results from future efforts to reduce QWAD noise in our facility.

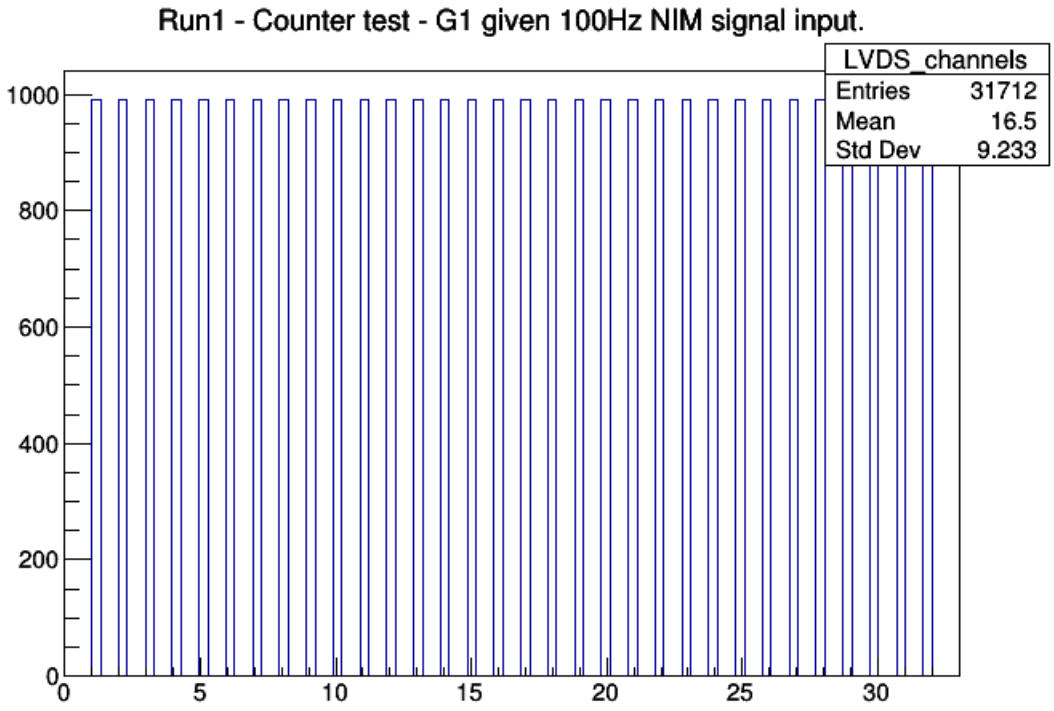

Figure 1: Run1 - Counter test - G1 given 100Hz NIM signal input.

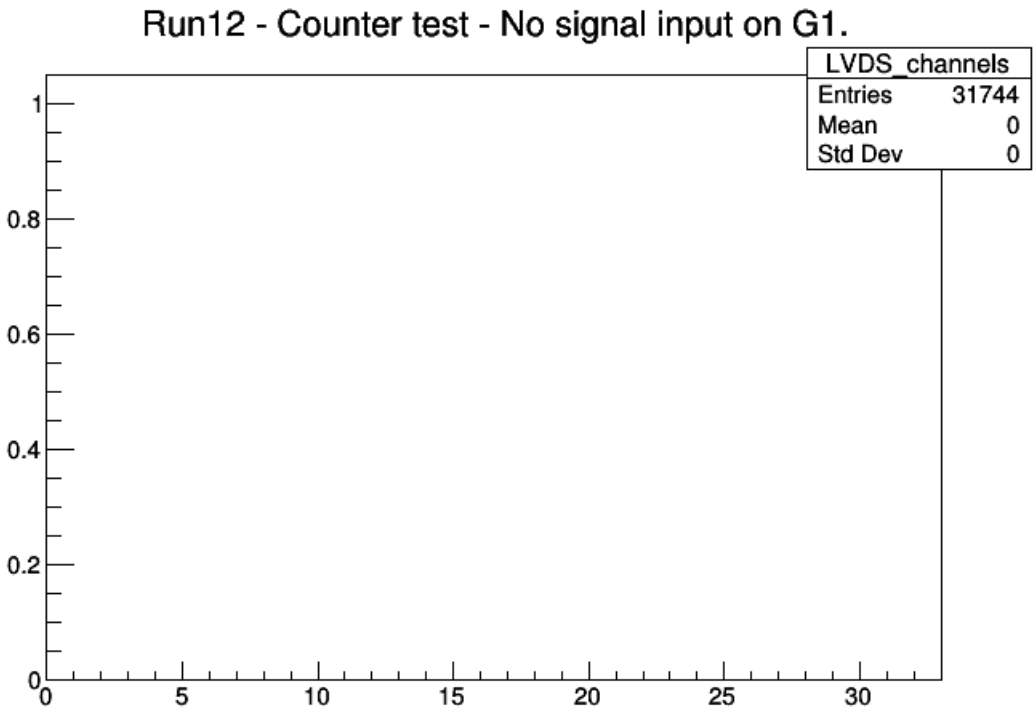

Figure 2: Run12 - Counter test - No signal input on G1.

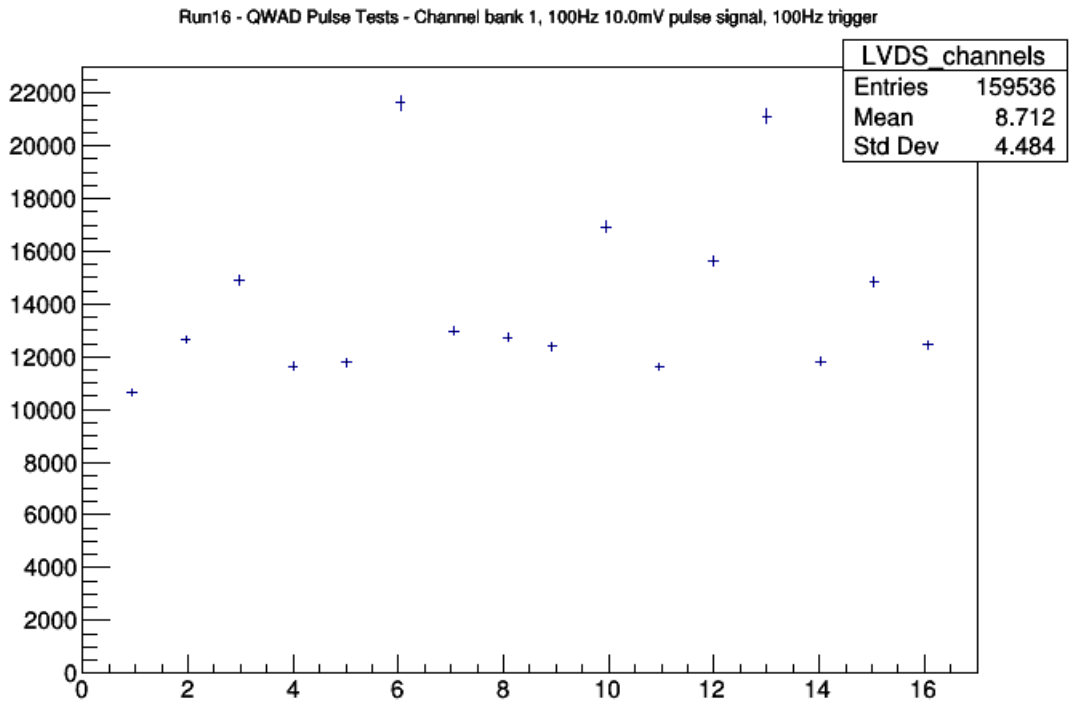

Figure 3: Run16 - QWAD Pulse Tests - Channel bank 1, 100Hz 10.0mV pulse signal, 100Hz trigger

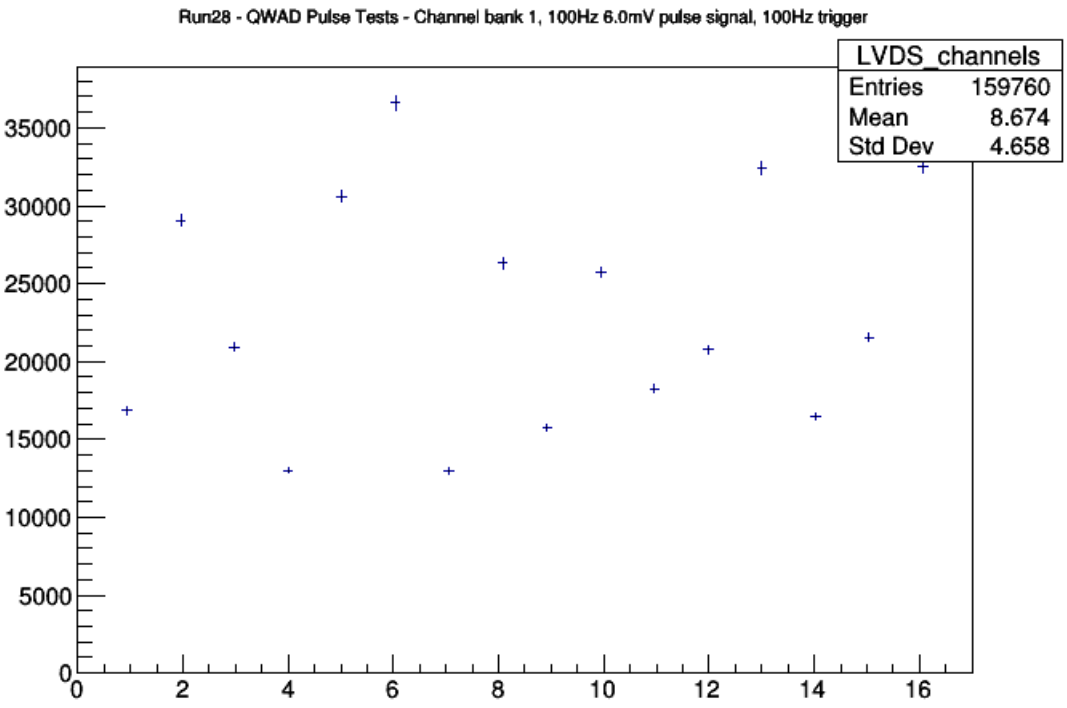

Figure 4: Run28 - QWAD Pulse Tests - Channel bank 1, 100Hz 6.0mV pulse signal, 100Hz trigger

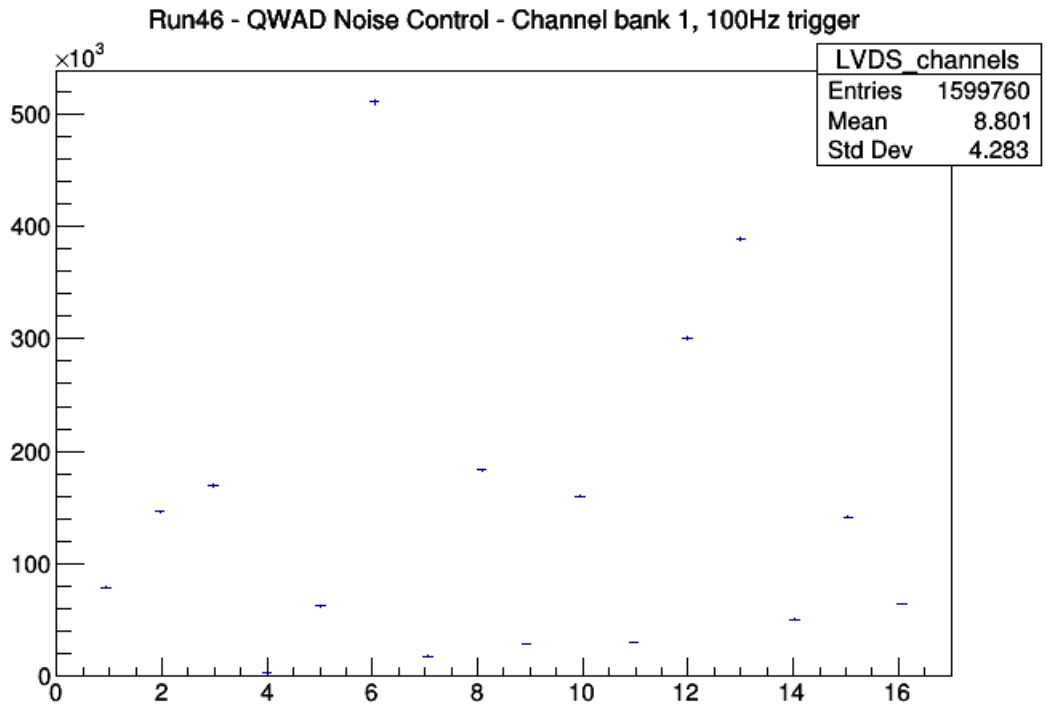

Figure 5: Run46 - QWAD Noise Control - Channel bank 1, 100Hz trigger

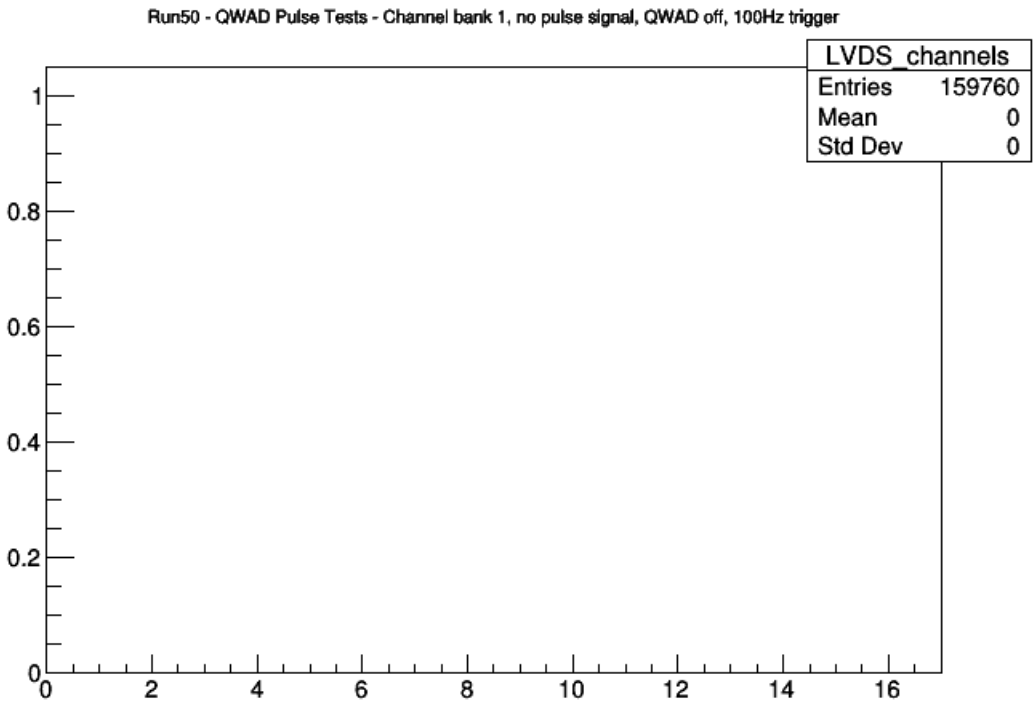

Figure 6: Run50 - QWAD Pulse Tests - Channel bank 1, no pulse signal, QWAD off, 100Hz trigger

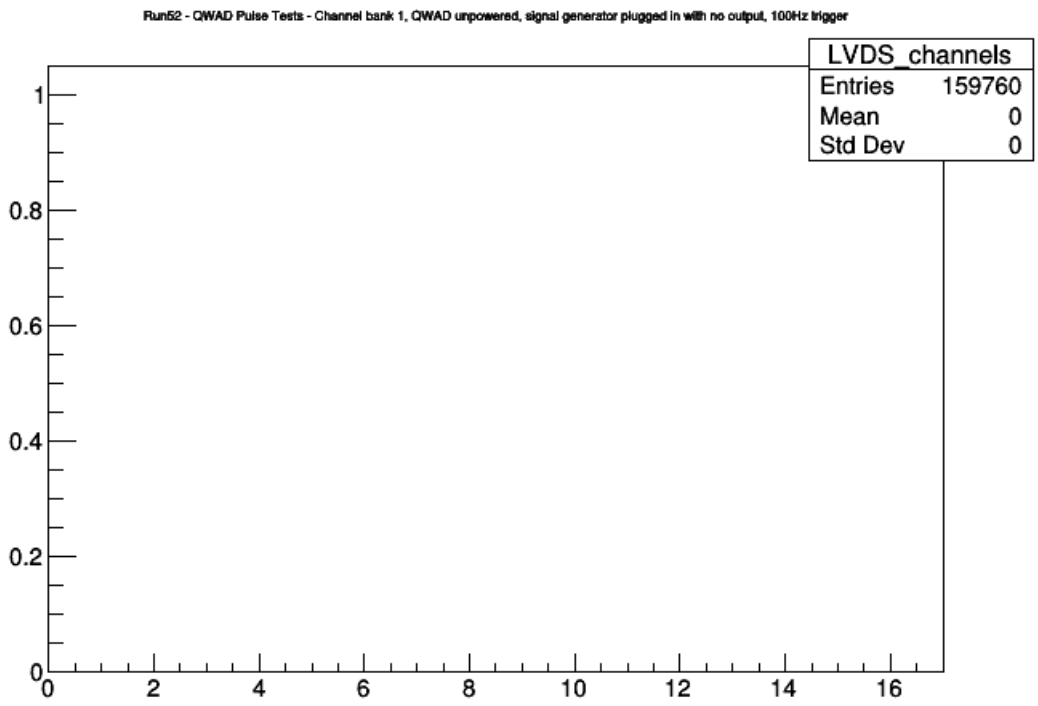

Figure 7: Run52 - QWAD Pulse Tests - Channel bank 1, QWAD unpowered, signal generator plugged in with no output [pulse signal], 100Hz trigger

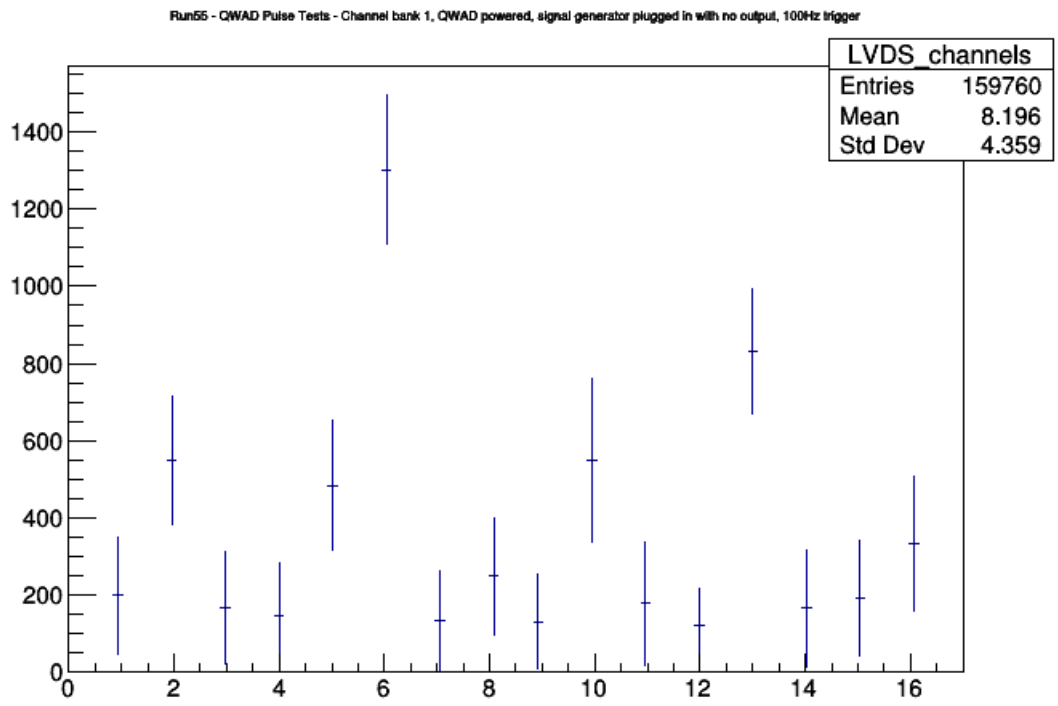

Figure 8: Run55 - QWAD Pulse Tests - Channel bank 1, QWAD powered, signal generator plugged in with no output [pulse signal], 100Hz trigger

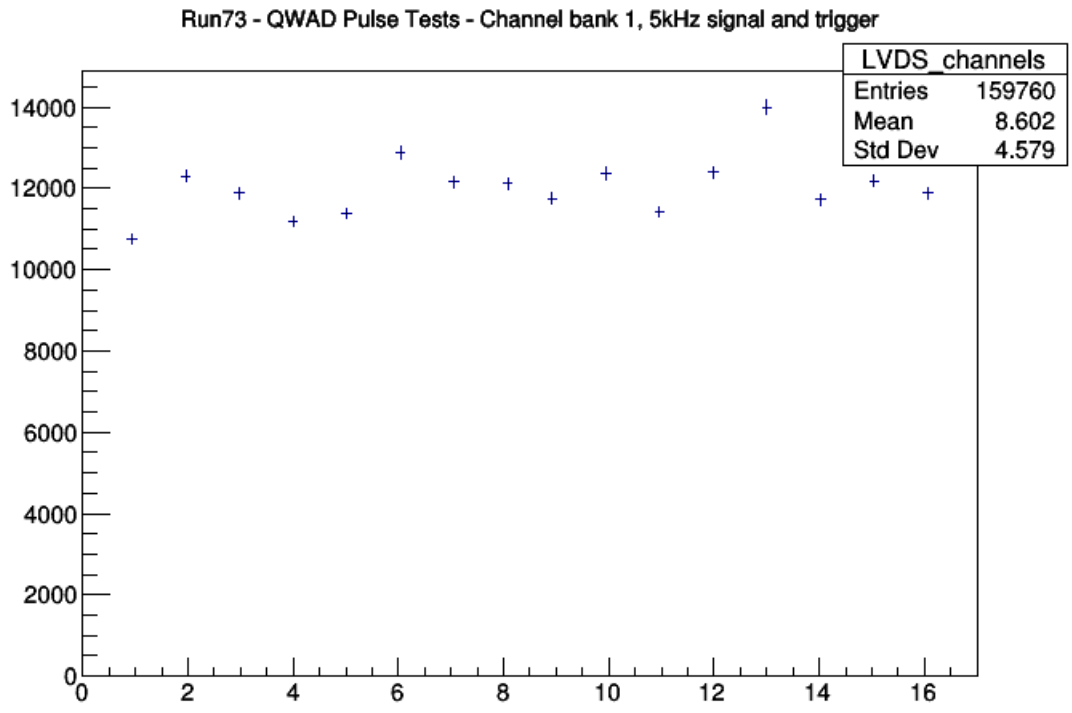

Figure 9: Run73 - QWAD Pulse Tests - Channel bank 1, 5kHz signal and trigger

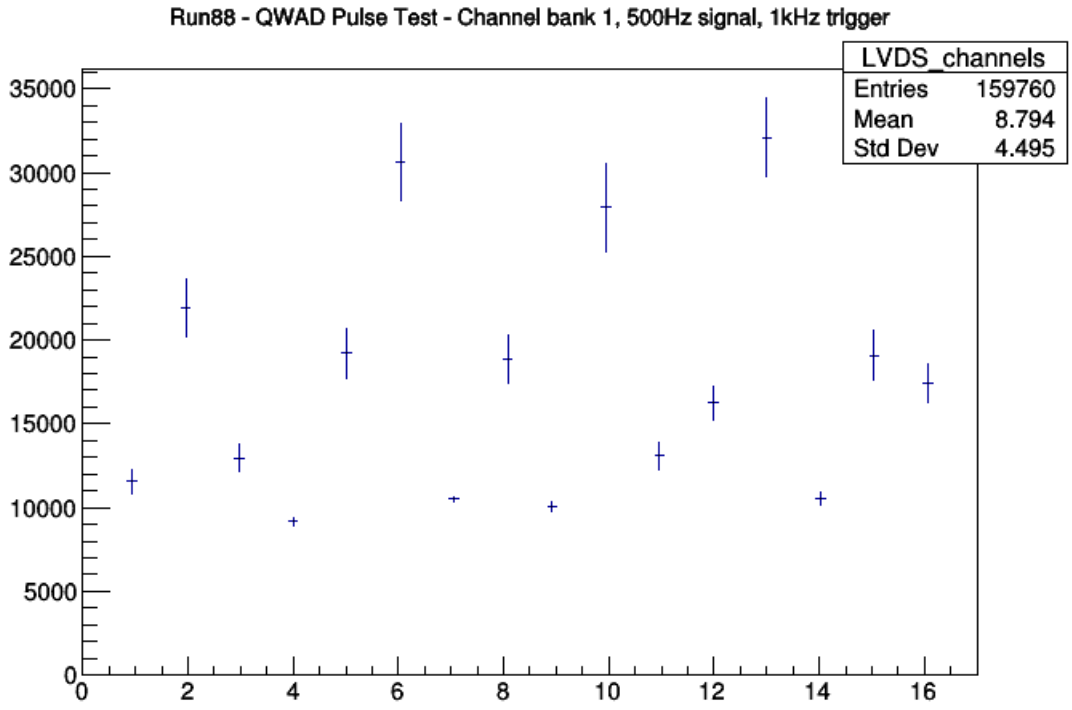

Figure 10: Run88 - QWAD Pulse Test - Channel bank 1, 500Hz signal, 1kHz trigger