

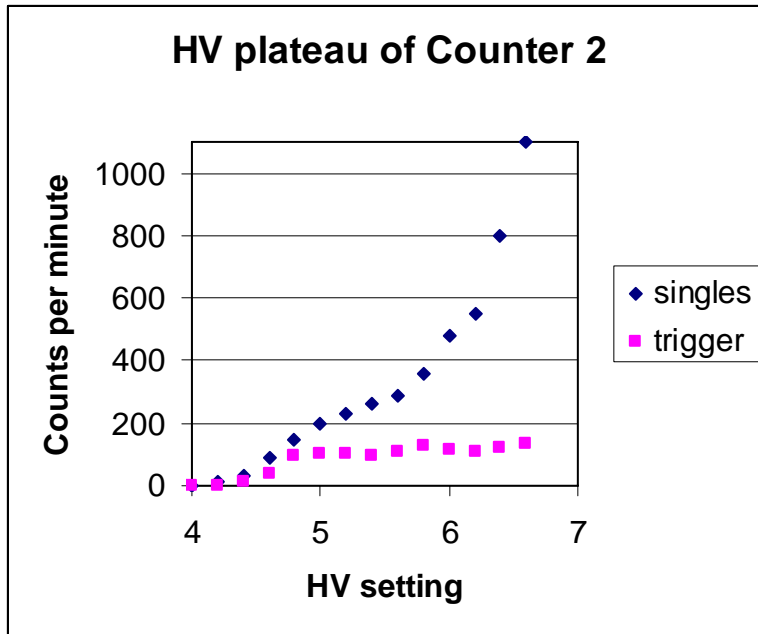
Plateauing Procedure for the QNET DAQ series 6000

By Steve Klierwer

Plateauing the counters

1. Connect all parts together.
 - a. Stack all 4 detectors and orient horizontally
 - b. Set all tube voltages on 4-way power supply (PS) to minimum (~ 0.3 V, fully CCW)
 - c. Connect all cables before applying power. Double check. Then apply power to DAQ.
 - d. Initialize communications to the DAQ via Hyperterminal.
2. Set starting values:
 - a. Type HE for help and V1 to display current settings.
 - b. Set the discriminator voltage (V_D) for all 4 counters on the QNET board to 0.300 V (Tl 4 300). This can be measured between TPGND1 and TPVTH 0, 1, 2, & 3 on the DAQ board.
 - c. Set parameters on the QNET board for singles counts on all counters, with
 - i. RE, CD, WT 01 00, WT 02 02, WC 00 0F
 - ii. Check all settings using V1
 - d. Vary the tube voltage (V_T) to determine the range of voltage to produce zero counts up to no more than 200 Hz ($\sim 0.8 - 1.2$ V). V_T is measured at the tube power supply (PS). Use the on-board display scaler and the reset button next to it to measure this rate. Keep all tube voltages except the one being tested, adjusted to the minimum setting.
 - e. Set one tube of each pair (Reference counters) so that it yields about 40 Hz of singles counts.
 - f. Set parameters on the QNET board for 2-fold coincidence counts, d = 40 ns, and w = 100 ns.
3. Pair up the counters as Reference and Test as follows
 - a. Step 1 Ref: Ch 0 Test: Ch 1
 - b. Step 2 Ref: Ch 1 Test: Ch 0
 - c. Step 3 Ref: Ch 0 Test: Ch 2
 - d. Step 4 Ref: Ch 0 Test: Ch 3

4. Open the Excel spreadsheet: Plateau Procedure.xls. Use the command V1 to display and record the following parameters and settings:
 - a. Date, QNET DAQ serial #, coincidence level, d, w, layout, & timing interval
5. Plan the sequence of measurements for each channel
 - a. Determine a test time interval that will give you a large enough count (N) that the uncertainty (\sqrt{N}) will be small enough (~10%) but not so large that the measurements take too long. This will probably be 1 or 2 minutes.
 - b. Vary only the tube voltage designated as Test. Change the voltage carefully and slowly. Wait until the count rate stabilizes after every change.
6. Measure the counts at several tube voltages for the Test counter.
 - a. Use the command sequence:
 - i. CD, RB (start clock), wait for end of test interval, DS, CD stops the scrolling of event lines, RB reset the scaler registers, and DS displays the scalers. Scalers 0, 1, 2, & 3 contain the singles rates for each of the channels, Scaler 4 contains the coincidence count.
 - ii. Be sure to accurately hit enter on DS exactly the test interval after hitting enter on RB.
 - b. Record this data into the spread sheet
 - i. Time of day at start.
 - ii. Tube voltage of Test counter.
 - iii. Scaler counts. These registers read in Hexadecimal. Record the readings for both counters as well as S4 (coincidence count) in hex into the spreadsheet.
 - iv. The spreadsheet will immediately calculate the singles count rates, the coincidence rate, the uncertainties in each, as well as the probable accidental coincidences as a percent of actual coincidence rate.
 - v. Observe the Charts of these values after each measurement.
 - c. Locate the plateau region for the tube under test.
7. Repeat paragraph 6 for each Step of the test (see paragraph 3).



8. Save the spreadsheet as documentation of this process.
9. Acquire data overnight with all counters collecting data at optimum (plateaued) settings in 2-fold coincidence mode. Upload to eLab and run Performance test. Look for equal performance between channels with only one peak in frequency vs Time over Threshold graph.

