Setup of MoNA/Sweeper timing.

There are two hardware delays at the MoNA electronics that need to be correctly timed. Here is outlined a to insure they are set correctly. The two delays are the delay for the common stop and for the external valid trigger (or AUXA or AUXB). These setups should be done with RAW uncalibrated 4096 channel tdc spectra such as for layer A bar 8, right side and its neighbors. Remember the gamma peak will be wide due to light propagation from different positions in the bar. (It should be narrow in tmean)

Make the delay for the external trigger something reasonable (10-20 ns shorter than that estimated). This will cut into the right, low-channel side of the time spectra but leave the higher channels (early gamma ray side visible). Make this delay longer until counts are observed in the TDC spectra down to about channel 250. At some point adding delay will not result in change to the spectra. DO NOT INCREASE THE DELAY IF THE SPECTRA ARE NOT CHANGING. It is a bad idea to "give some extra" to this delay. If this delay is too long the efficiency at extremes of the time ranges could begin to decrease in subtle ways. This delay will vary with the particular fragments passing through the sweeper detectors. Faster nuclei or short distances will need longer delays. Slow particles and long distances need shorter delays. A 4 Tm 6He with the thin scint all the way back is estimated to be 50ns. A 2 Tm 24O with the thin scint pushed back should only need 20ns.

Adjust the delay for the common stop (from the pot scint) so that the gamma peak arrives at the correct place in the spectrum. The last 256 channels are not linear and there should be about 10 ns to the left of the gamma peak. This would be channel 3700 to 3800. Be aware that pushing the gamma to the left in the spectrum reduced the coincidence window and will eliminate slow neutrons and the random events needed for understanding the data.

Note added 5/11/05
The above instructions for the trigger timing are correct but somewhat misleading. It turns out that the coincidence window is significantly bigger than the TDC range. There is 90 ns of leeway in setting this timing. Using a time calibrator and appropriate delays one can see the coincidence window cut in on both sides of the TDC spectra. However, with real data it is difficult to set this time wrong and miss coincidences. To actually cut the low values in the TDC spectra, one must make the trigger come too early. However, the fragment flight times and distance between MoNA and the Sweeper make it almost impossible to do except for the very fastest fragments. To cut the other side (long times) requires a longer than normal trigger delay that one generally does not event think of using. This wide window will result in a significant number of multiplicity zero events. These are events where the trigger was satisfied with an early or late random but where the TDC did not register it.