Subject: Multihit TDCs in the PreSPEC setup (CAENv1290)
Posted by miree on Tue, 07 Oct 2014 12:18:37 GMT
View Forum Message <> Reply to Message

The CAENv1290 multihit TDC is a very common module in the PreSPEC setup.
In addition, there is more than one way to analyze v1290 data.
This topic is a place to collect successful methods for multihit-TDC analysis.

A CAENv1290 module has 32 channels with 25ps each. The trigger signal, to which the individual channels are referenced, has a resolution of (25ns I believe). You can think about it as if all of the 32channels have a 25ns random jitter. That jitter disappears if you look at differences between two channels. If there are several v1290 in one VME crate, the jitter is common to all channels in all modules, i.e. you can make differences even between channels of different modules.

A nice description of the module can be found in the first part of this document:
http://docs.nscl.msu.edu/daq/samples/CAEN%20V1290/CAEN_V1290_1.0.pdf
If you need really detailed information, read the v1290 manual:
http://www.tunl.duke.edu/documents/public/electronics/CAEN/caen_v1290.pd f

One way to do the reference subtraction: A single channel of one v1290 is said to be the "reference". This reference is then subtracted from all other channels. This is implemented for example in the UTILS.MhTdcPreprocessor (there are other versions of multihit TDC preprocessors around).
It gets some channels from a v1290 module into the input array called "input". It subtracts the value in "reference" from all of the values in "input". The differences are then calibrated (channel into units of ns) and written to the "diff" output array.
Because the active window of the module is very long (typically 10us) and the events of interest are typically within a few hundred ns, it is possible to set a gate around the interesting region in "diff". Every value outside that gate is dropped. All values of "diff" inside that gate survive and will be copied to "ouptut" array after subtracting the left border of the respective gate. Subtracting the gate boundary shifts the outputs in the range from 0 to a few hundred nanoseconds (depending on the size of the gate).