**Major changes in Pixie-16 firmware release: *fippixie16\_revfgeneral\_14b500m\_r45761.bin* (09/14/2021)**

Updated Pixie-16 RevF\_14\_500 general Fippi code's CFD computation. The main change is to increase the CFD zero crossing point's search period from a maximum value of 7 to 31. This is necessary to avoid the prematurely forced CFD trigger. Also, previously there is delay for the fast trigger before it triggers the start of looking for CFD zero crossing. However, that delay was hard coded to 7 in the FPGA, which is too short for fast pulses. Now, we use DSP parameter ResetDelay to set the delay value.

To summarize, the Pixie-16 firmware previously had a bug where CFD zero-crossing would be missed. This was most likely to happen for fast signals, or signals with lower amplitude, close to the threshold. The cause was a “blind” period just after the fast-trigger filter, a delay before the CFD filter would begin looking for a zero crossing. This caused fast pulses to often miss the first CFD crossing and find the next one, many nsec later. With the latest firmware bugfix, +4 additional pipelines stages were introduced, which effectively eliminated the “blind” period after the fast-trigger. None of the other functions should be effected by this change. There is a new parameter, ResetDelay, which is now available to add additional pipeline delay, but this is not necessary to change unless it is expected that the CFD zero-crossing would happen prior to the fast-trigger threshold.