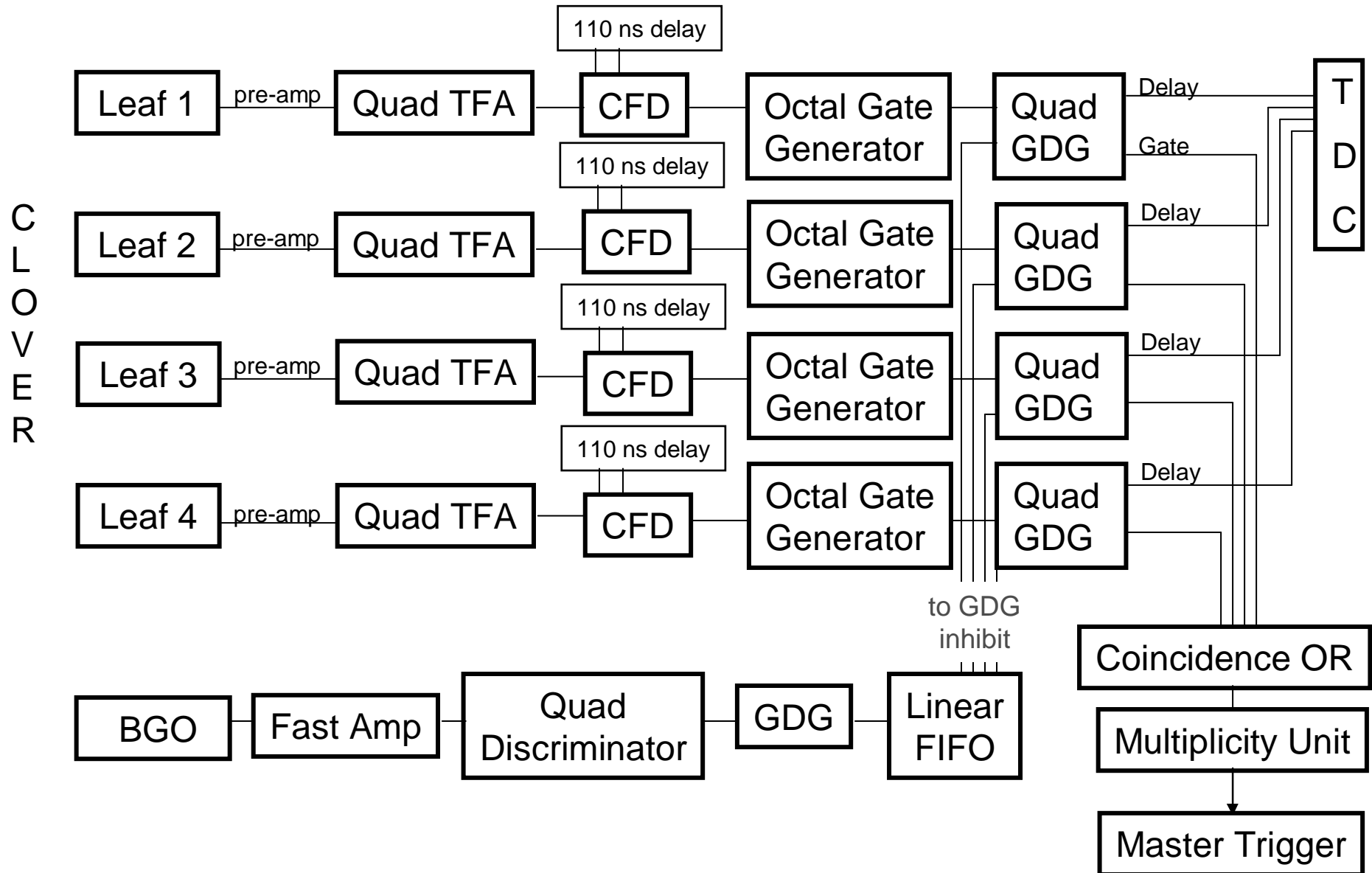


Timing electronics



Steps for timing optimization

Clover timing (important for time difference spectra, especially):

- Input pulser signal into patch panel for two leaves at a time. The first clover leaf will be your reference setup; all other timing will be set relative to this.
- Look at the pulser output in the quad TFA. Make sure the fine gain for the two leaves is adjusted so the outputs for both leaves have the same amplitude.
- Next, look at the CFD output and monitor for each clover with the scope. Make sure the walk is appropriate (if possible, get rid of double CFD outputs; further walk adjustment will be done with a source).
- Look at the output of the Octal Gate Generator (OGG) for both leaves on the scope. If the two pulses occur at different times, adjust the OGG delay until they begin at the same time. Then adjust the output widths so both outputs are the same length.
- Look at the Delay and Gate outputs of the Philips Quad GDG next. The Gate should be approximately 250 ns wide; this setting determines the time difference between the TDC input and the master trigger generated by each event. If not, make sure the knob is set to 1 μ s, and then adjust the Gate screw. Compare the Gate output for the two leaves, and make sure they are the same length and begin at the same time. Next, make sure the delay outputs for the two leaves match (as they should if the Gate widths match).
- Repeat this for all clovers; make sure all are lined up relative to the first clover. Once you're done, put a source in the center of the array and check the TDC spectra with the data acquisition system. The prompt peaks should be approximately aligned.

Steps for timing optimization

Making sure the clovers are properly vetoed:

- Put a source in the center of the array.
- Look at CFD and GATE output for one leaf of the BGO's corresponding clover, and the positive output for the BGO's GDG (the negative output should go to the FIFO, and then the inhibit input for each leaf's Quad GDG).
- Trigger on the CFD output.
- If you see a CFD signal occur in coincidence with a BGO GDG signal, you should not see a gate output by the leaf's Quad GDG. The CFD output will be near the start of the BGO gate; if this doesn't happen very often, check the delay setting on the BGO's GDG; it should be at the lowest possible setting, with the switch below the delay knob in the 1.1 μ s position.
- If you do see a Quad GDG gate output when the BGO gate is in coincidence with the CFD output, then increase the width of the BGO's gate until this no longer occurs.
- Repeat for the other three leaves in the same clover.