Scaler Analysis

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Outline

- Intro to GEN scalers
- Rates v. Counts
- Conversion to useful numbers
- Deadtime

Intro to GEN scalers

For each of the scalers listed on the following table represent 3 scalers: postive helicty gated, negative helicty gated, and ungated.

Scaler	Description
Trigger 1, 2,3,7,8	T1, T2, T3, T7, T8
bcm_u1, etc	"upstream" current monitors
bcm_d1, etc	"downstream" monitors
TS_accept	Count of triggers accepted
dclock	number of clock cycles
clock	105kHz clock

Rates v. Counts

The scalers are counters, but what is saved to the Tree are rates. For many applications, the counts themselves are desired.

This is where the `dclock` and `clock` variables are useful.

To convert scaler rates to counts:

count = scaler*dclock/clock

For helicity gated rates, use the corresponding helicity gated clocks:

P_count = P_scaler*P_dclock/P_clock
M_count = M_scaler*M_dlcock/M_clock

Conversion to Useful Numbers

This is not a concern for triggers: they are just counts.

However, the current monitors output a DC voltage level that is converted to a frequency. This conversion can be determined by comparing scaler output of BCMs to EPICs output of BCMs.

This conversion is underway.

Deadtime

Main concern is scaler deadtime. Looking into rate limitations for CAEN 3800 and 3801 counters.

However, also working on using scaler trigger information to calculate event deadtime.

Just started on this – more next week.