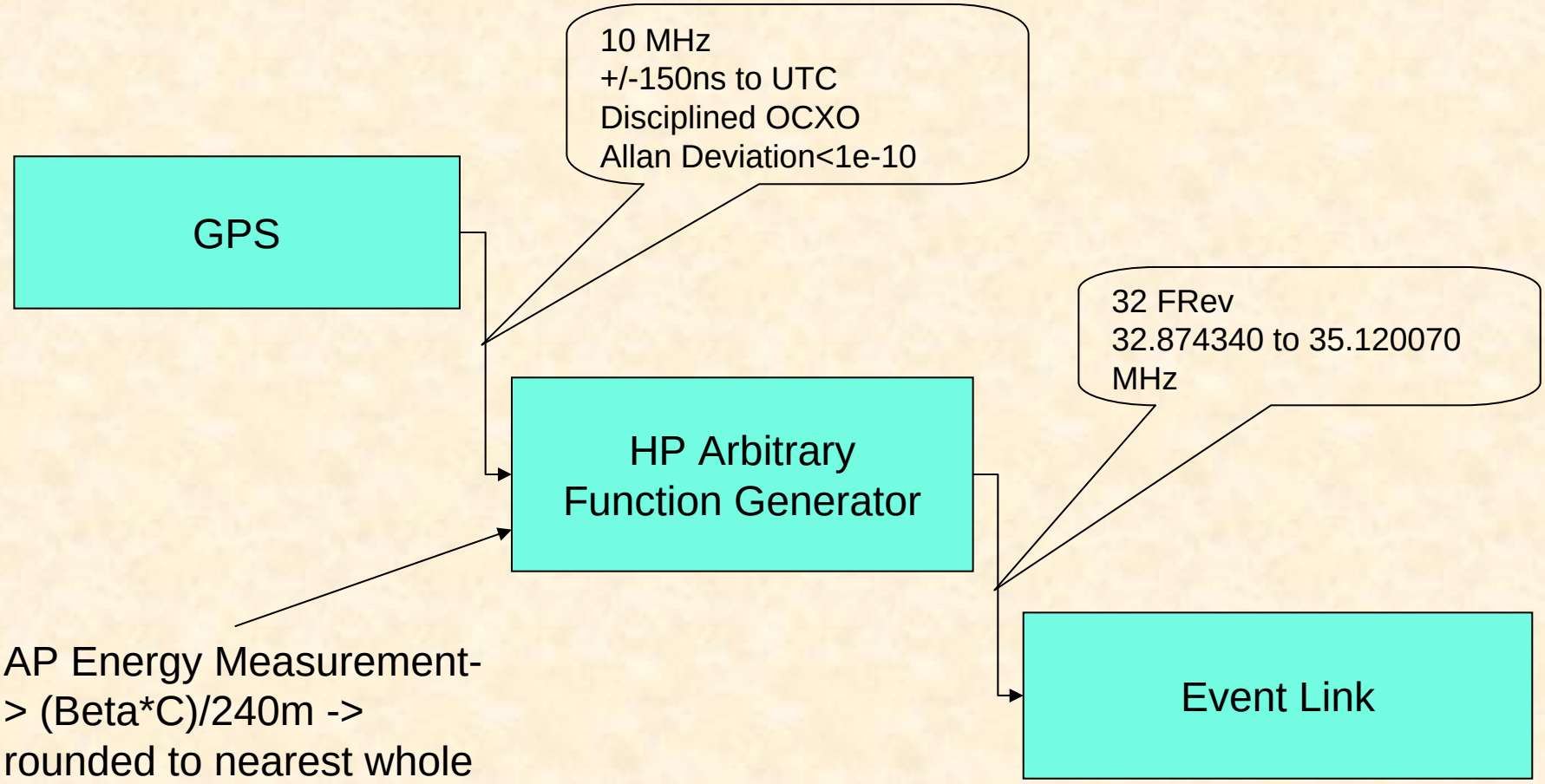
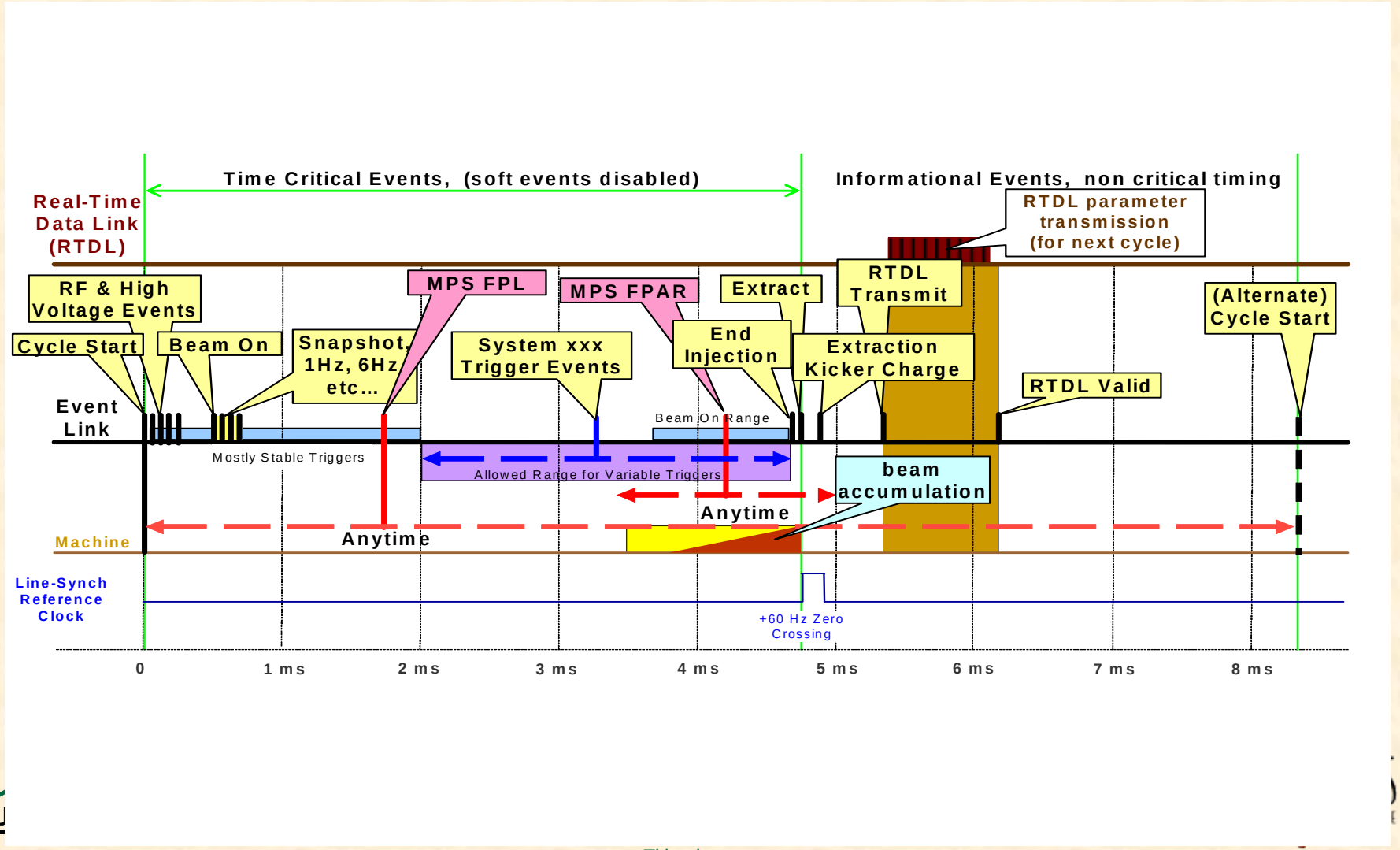
Frequency standard used by timing system



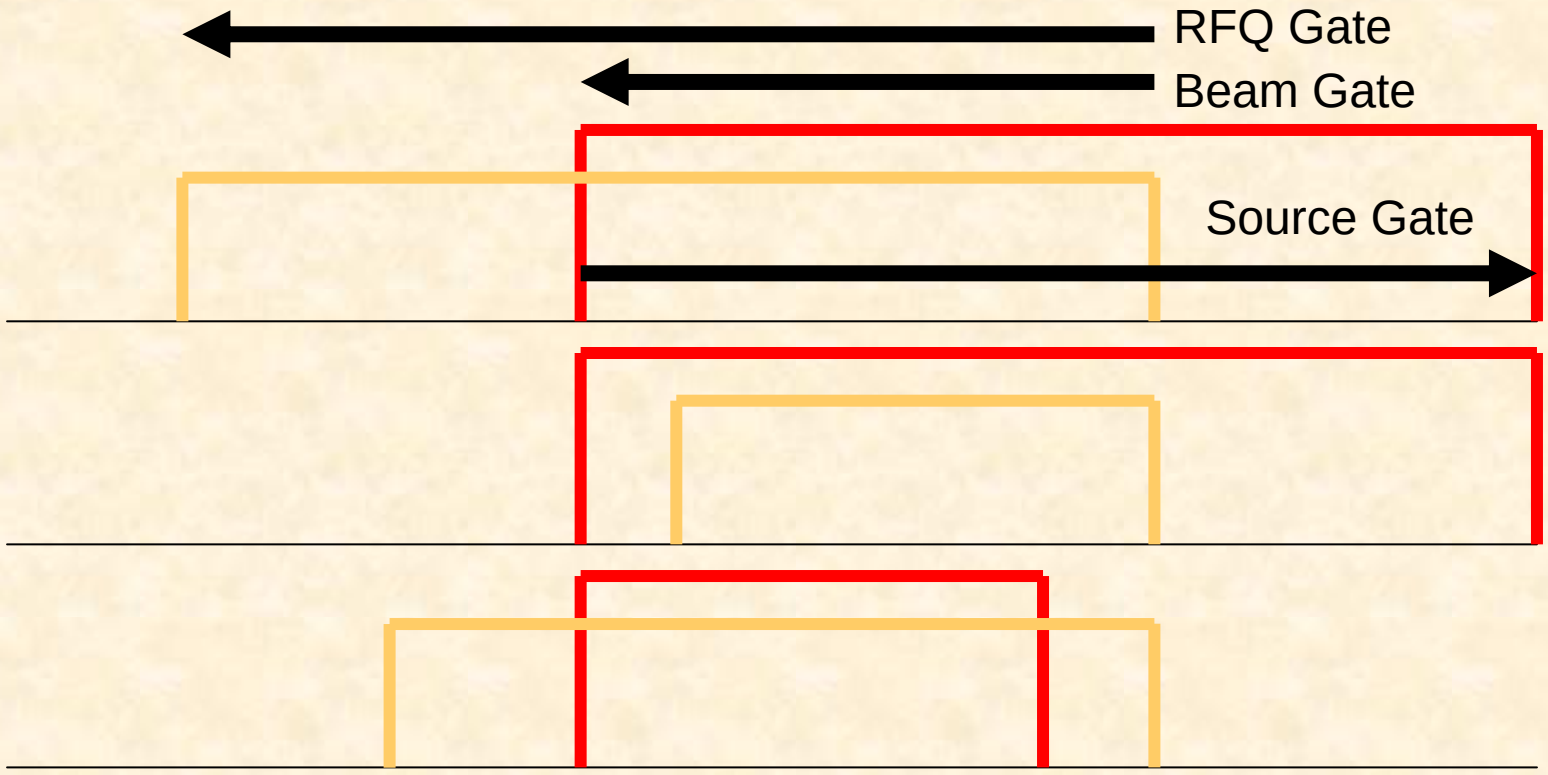
AP Energy Measurement-> (Beta*C)/240m -> rounded to nearest whole ps, and sent to ARB as 32 FRev.

Not locked to Linac RF or MO

Timing System Timeline

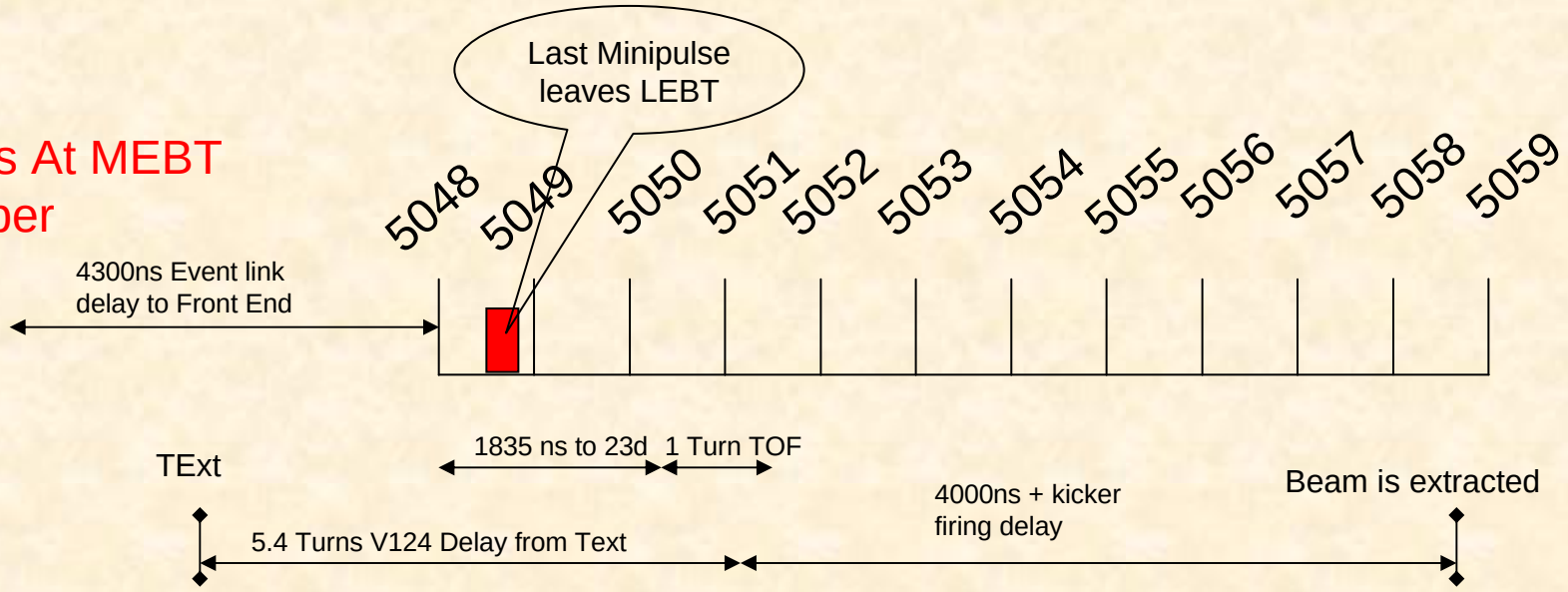


Possible Source/RFQ timing relationships.

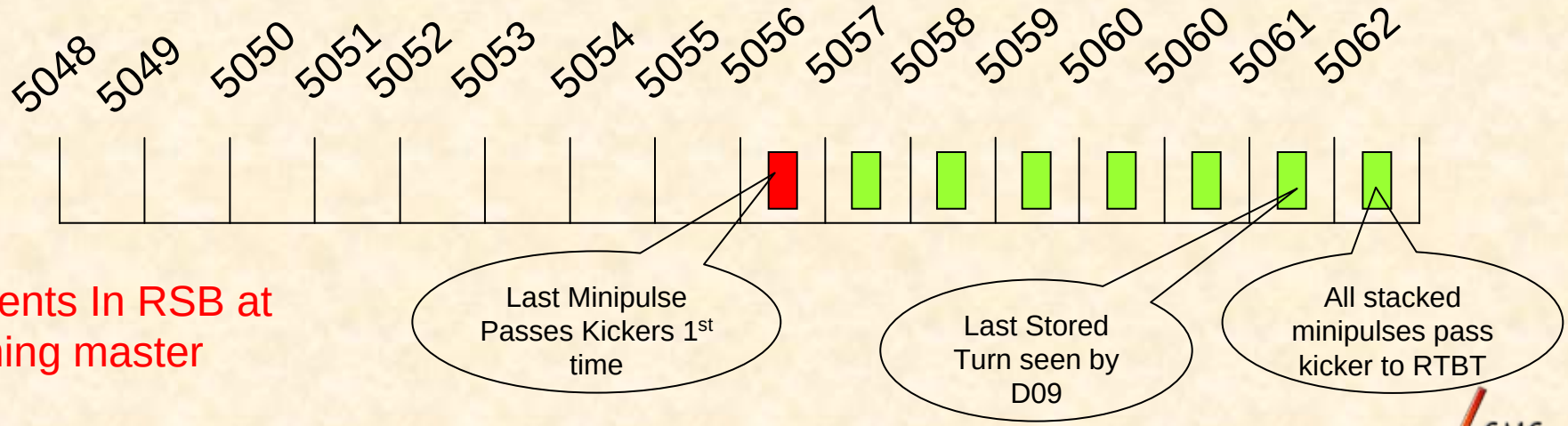


Extraction Kicker Timing

Events At MEBT Chopper



Events In RSB at timing master



Time In, end of linac to target:

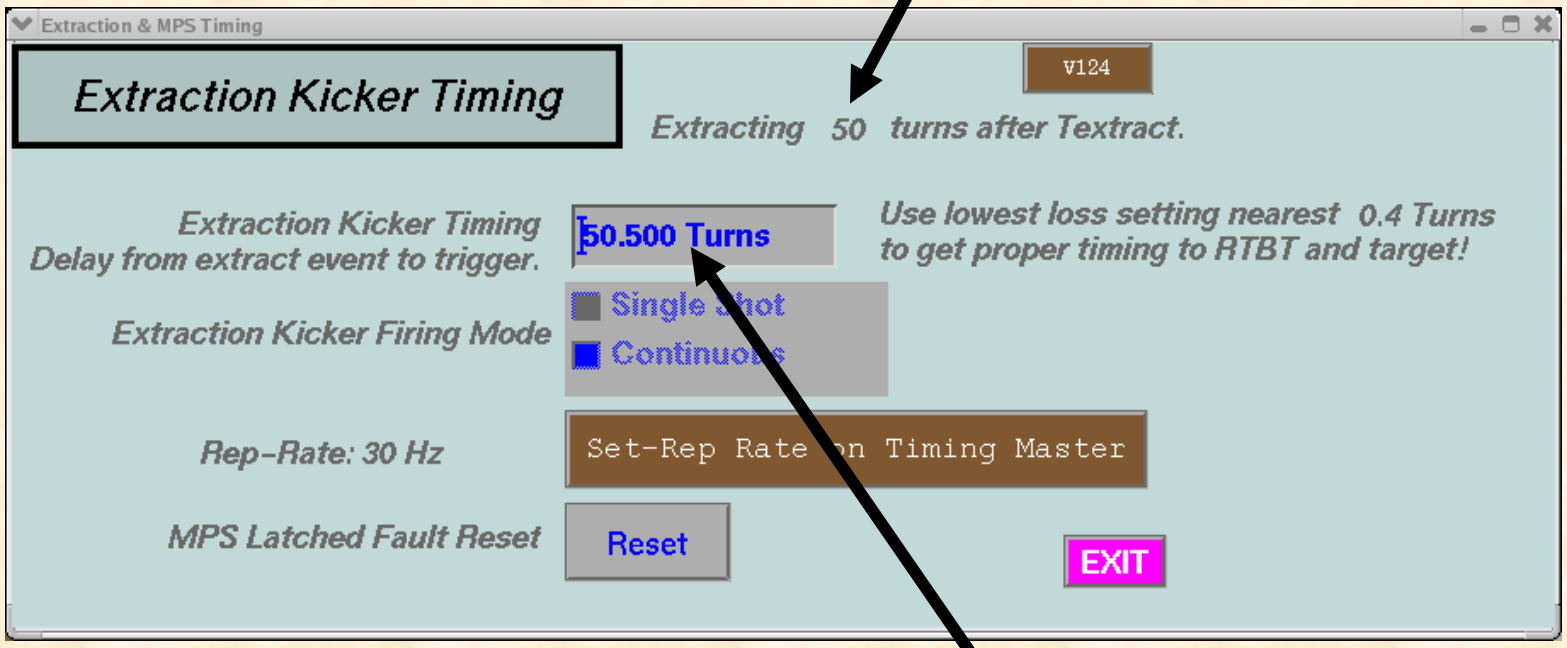
A/FRev+B/240m=C/FRev+D

- **A=1838 ns. (TOF thru linac) + measurement cable delays.**
- **B=Distance from end of linac**
- **C=cable delay of event link**
- **D=event to beam delay from timing system in turns.**
- **Usually only C needs to be unknown.**

A=C and B=D!

Extracted Beam Timing

Instruments and RTBT diagnostics must add this number (TURNS) to basic timing delay.



This is the gate delay from turn 5050.

Line Sync

If the slew rate is inside +/- 1:

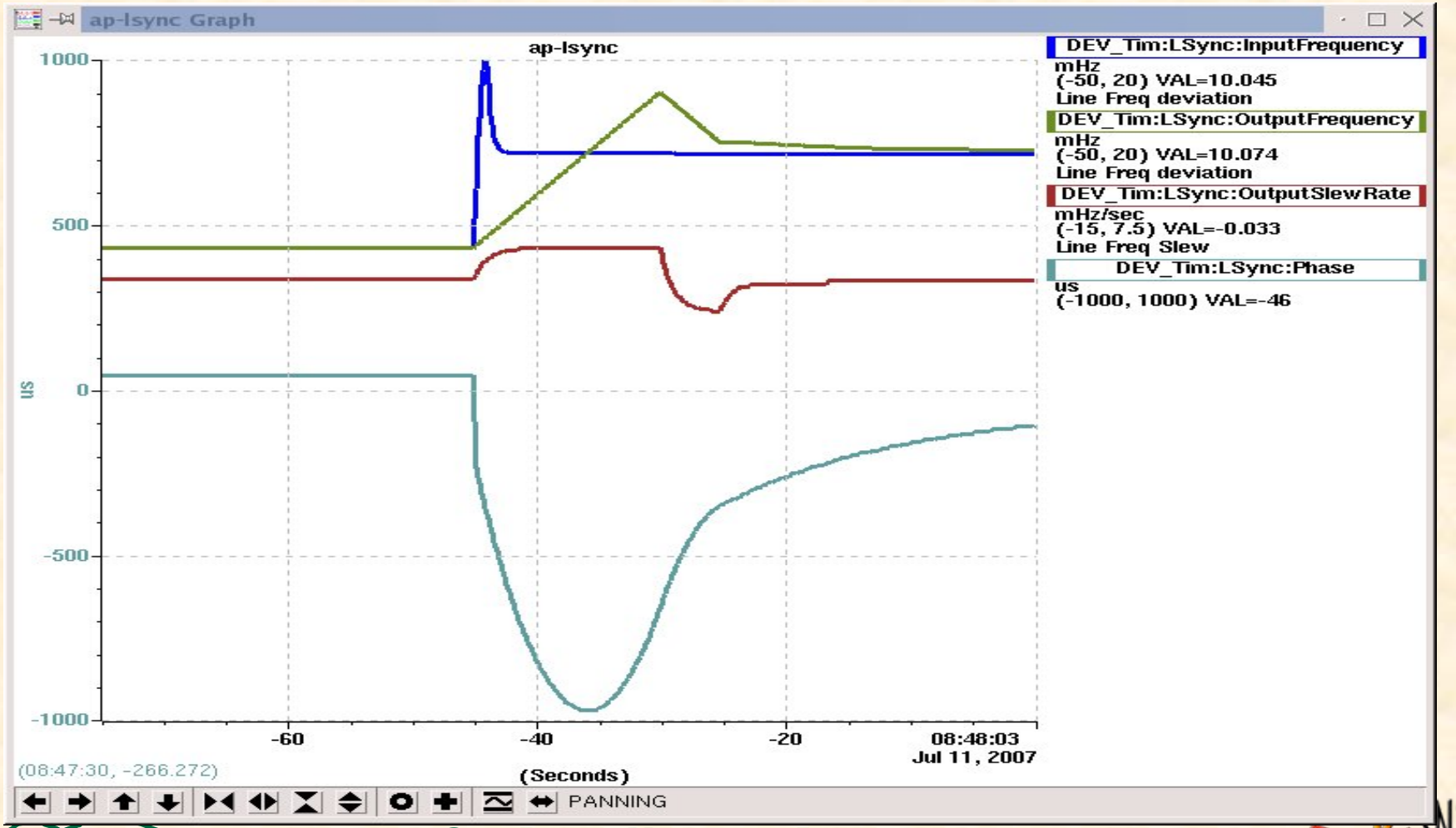
F-Out=filtered(F-In) + Phase*Reset Gain

Else

F Out = F Out+slew.

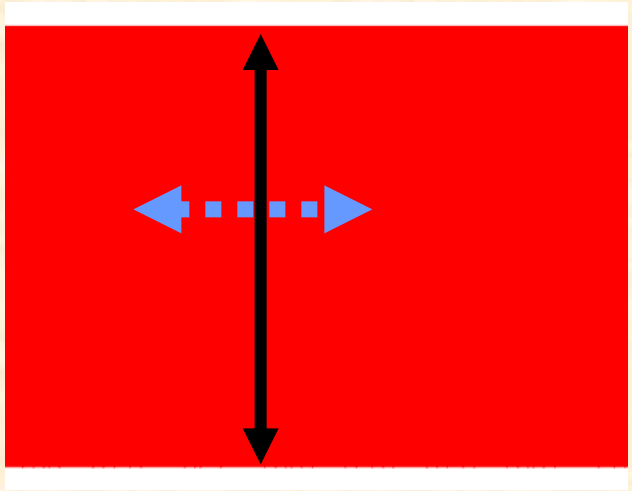
- **The Reset Gain is -8mHz/mSecond.**
- **A 50us dead band is used in the phase loop to provide damping.**
- **TVA's sensitivity to load is about 1 mHz/30MW.**

Line Sync Response to 10mHz Step

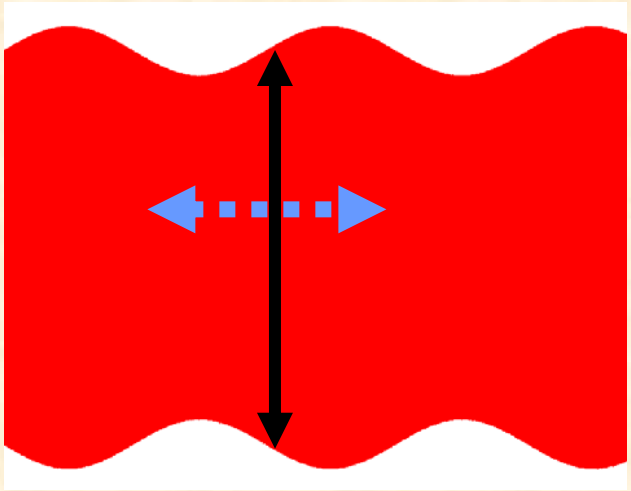


How Line Phase Affects Reference Line Signal

- **60*N Hz Sidebands=Modulation**
  (AM or FM Both bad)
- **Line Phase affects timing of reference sample.**
- **Line Phase is essentially random.**



No Sidebands



5% AM modulation