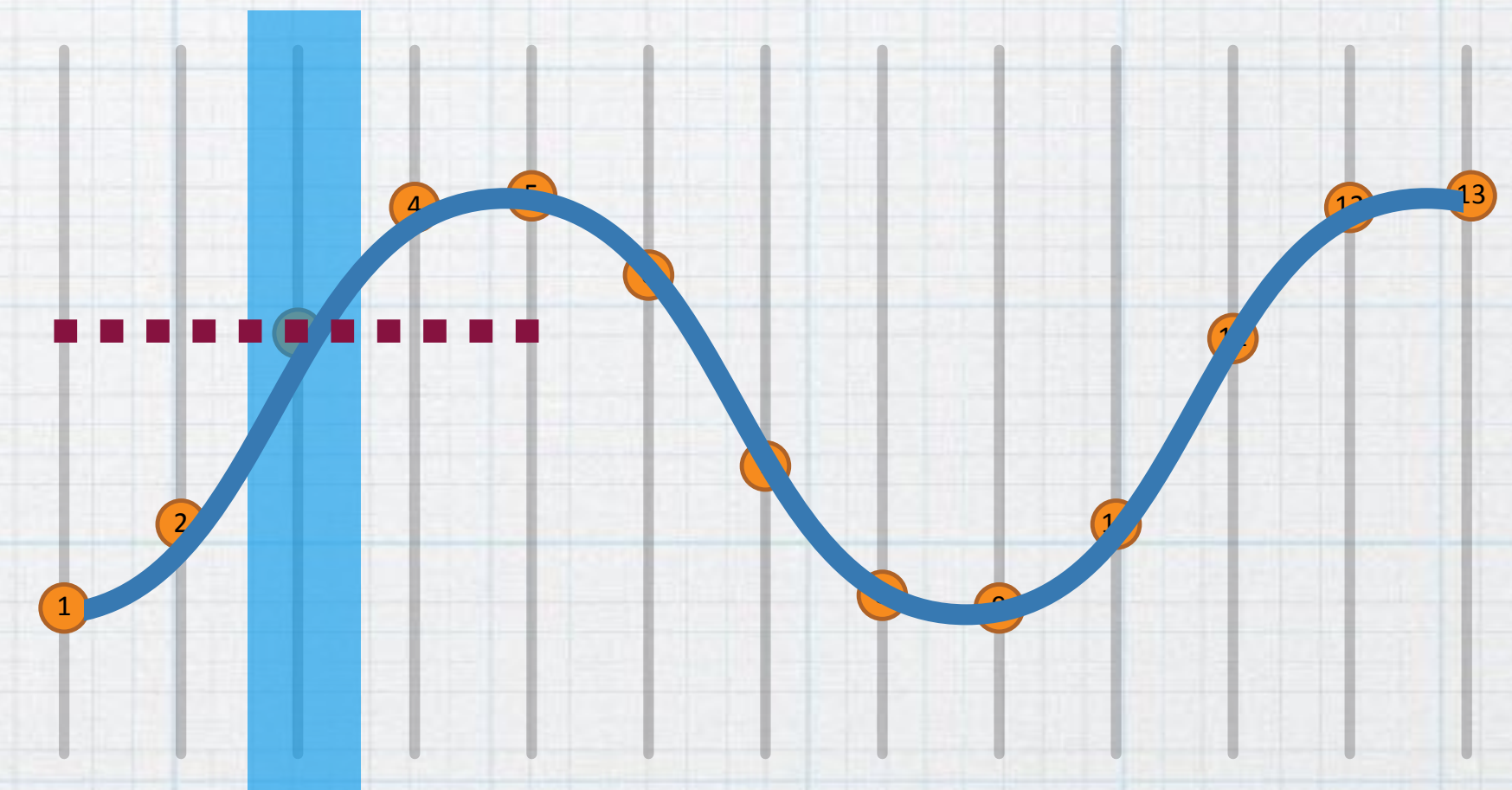
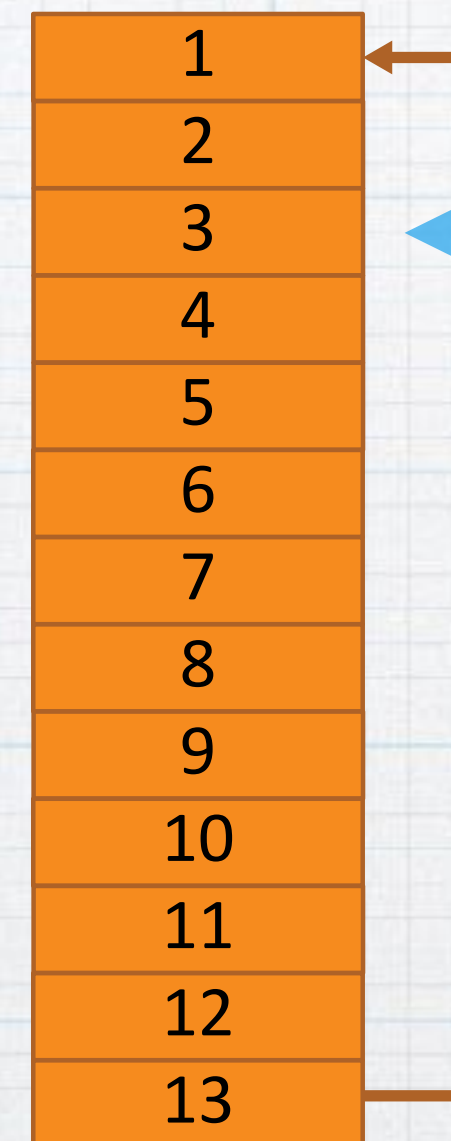
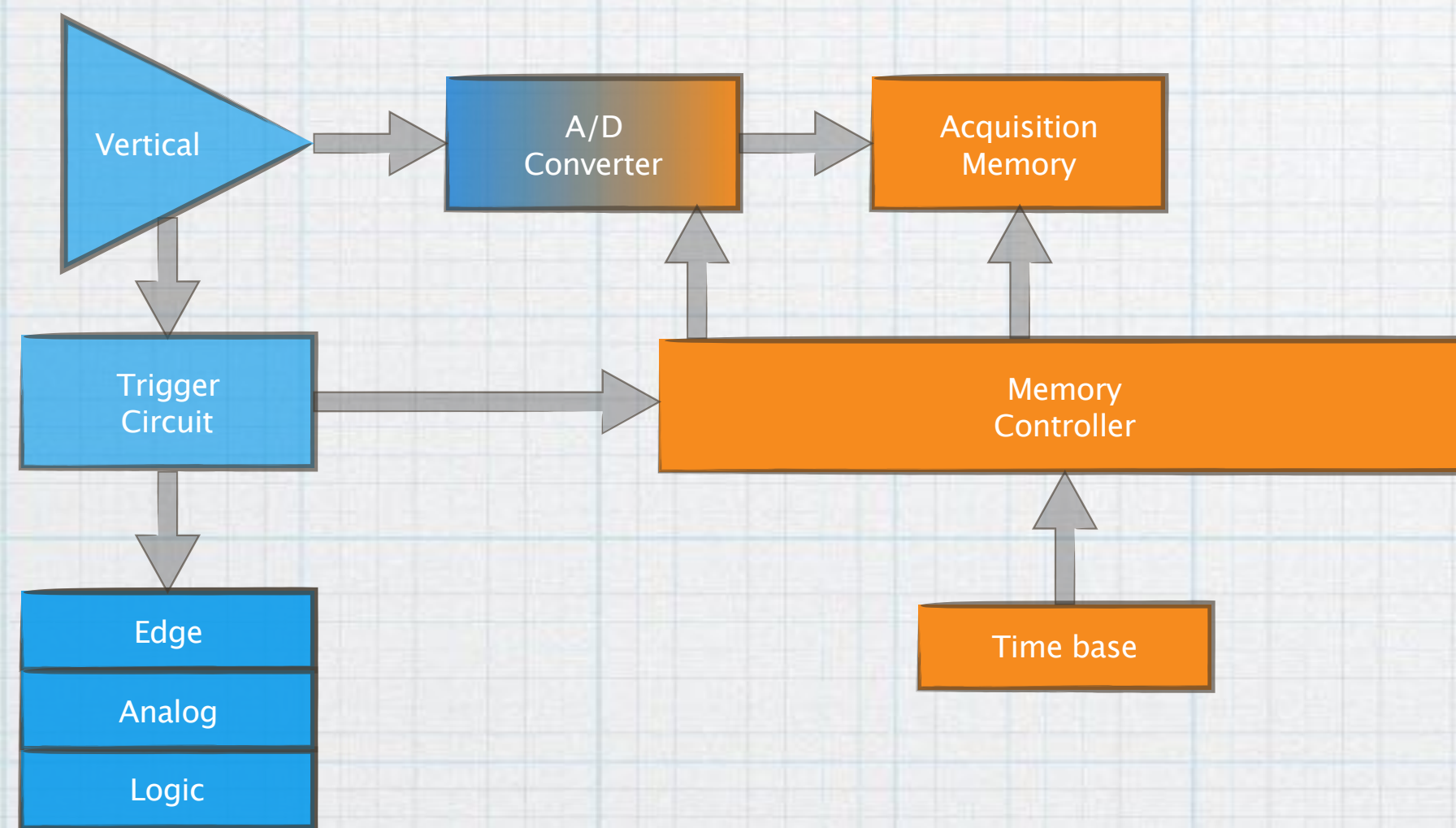


Oscilloscope Triggers

And other things you never knew...



Top of the P(acq)

James Lewis

james@baldengineer.com

email | [twitter](#) | [www](#)



Have you ever used an oscilloscope?



Inside Oscilloscope

Have you ever looked inside one?

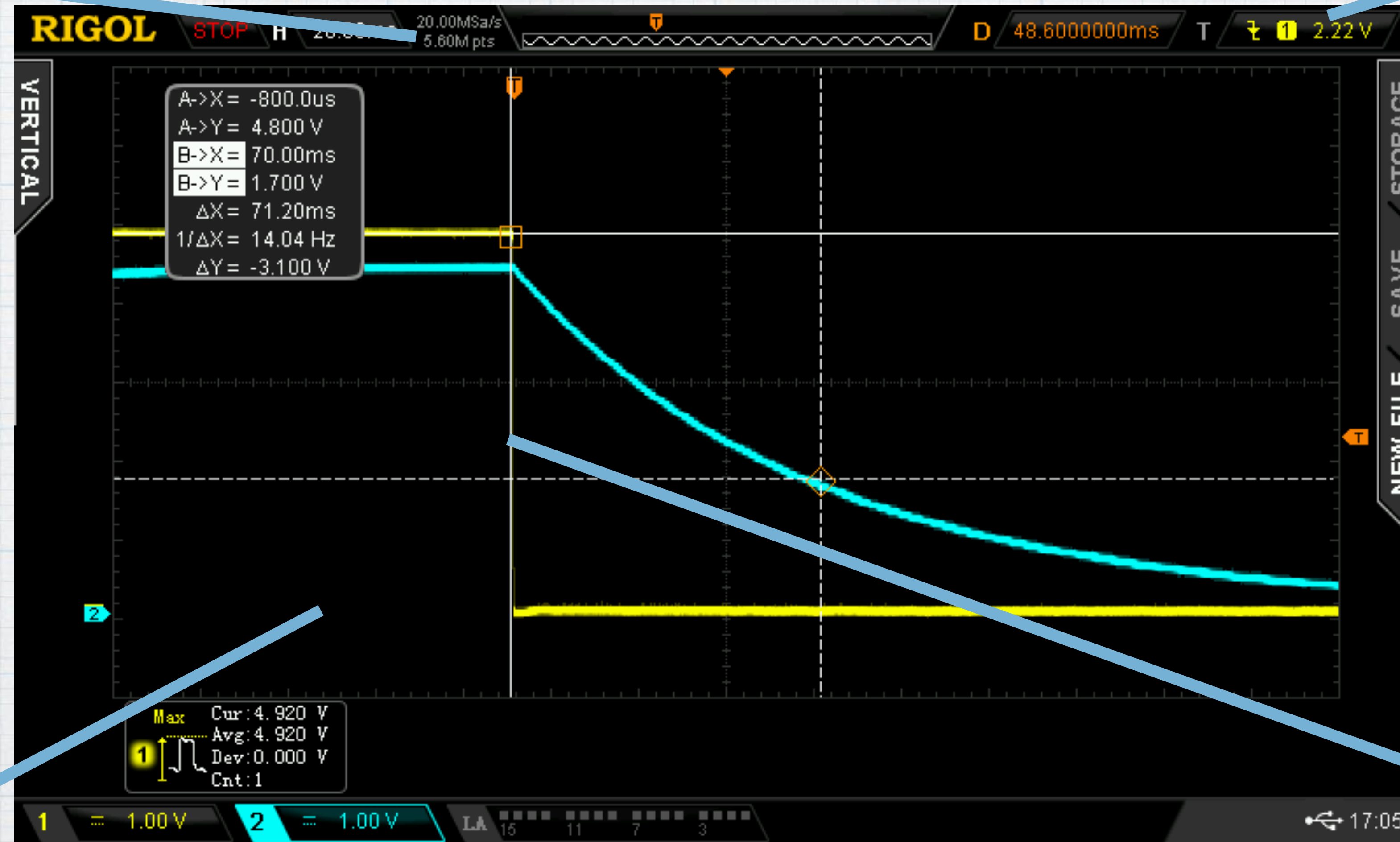
Scope Screen

Sampling

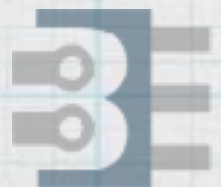
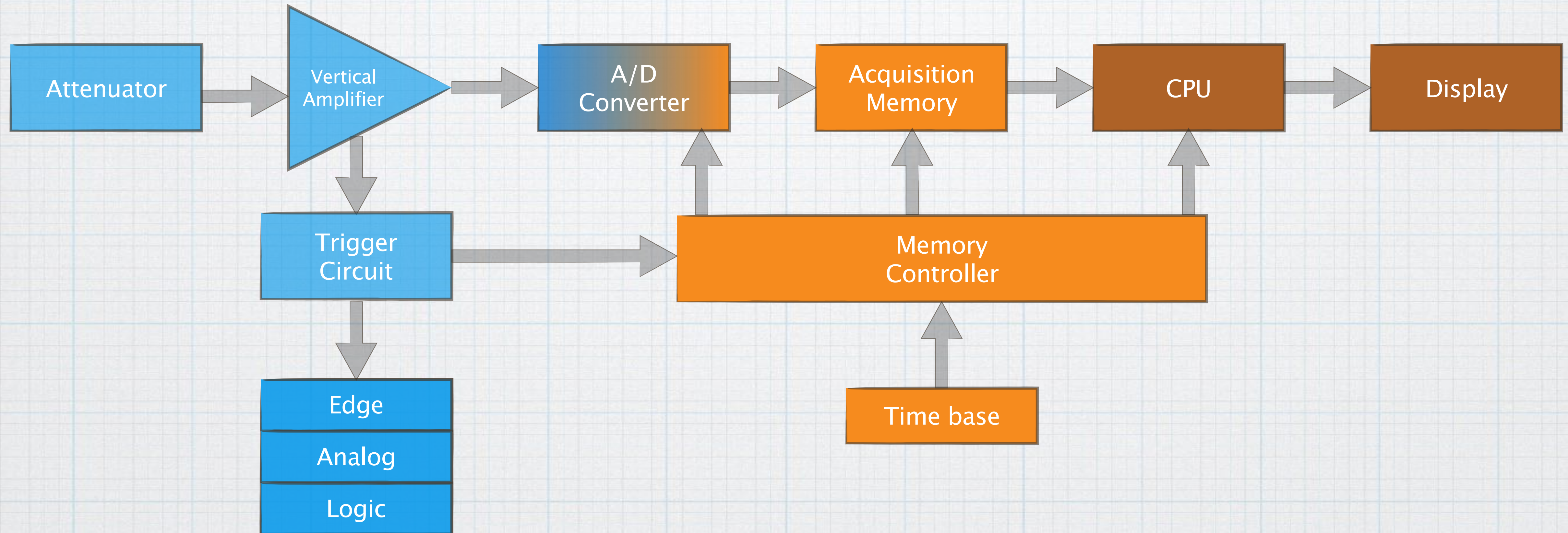
Trigger Type

Graticules are overrated

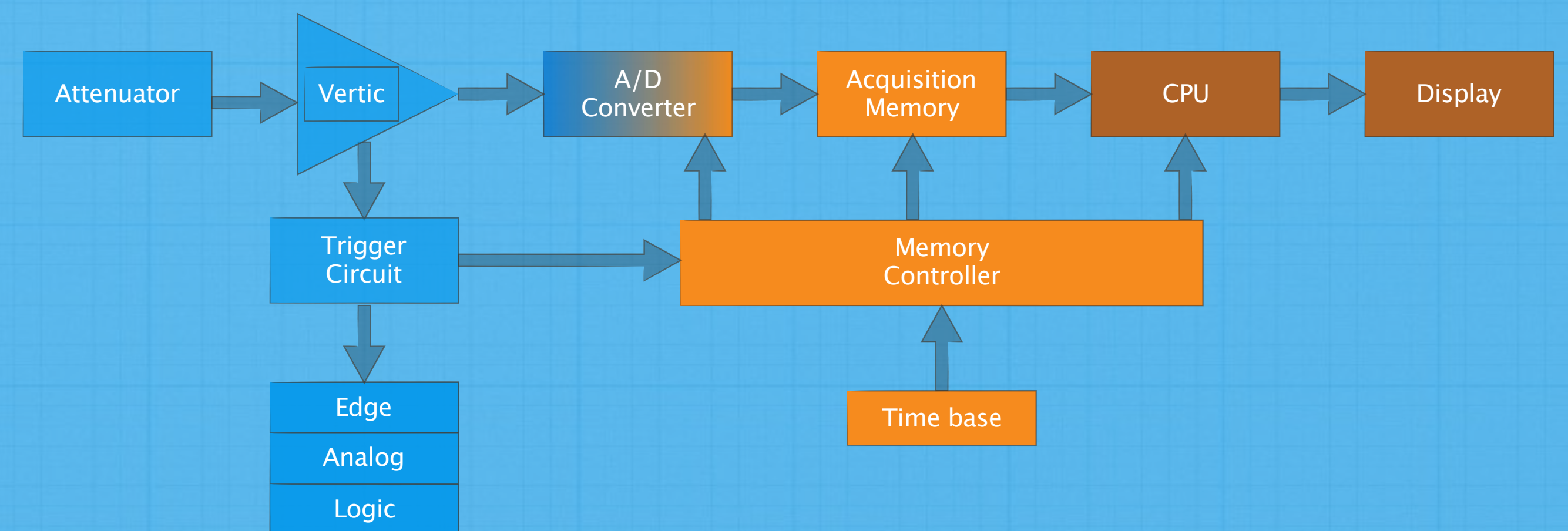
Trigger Point



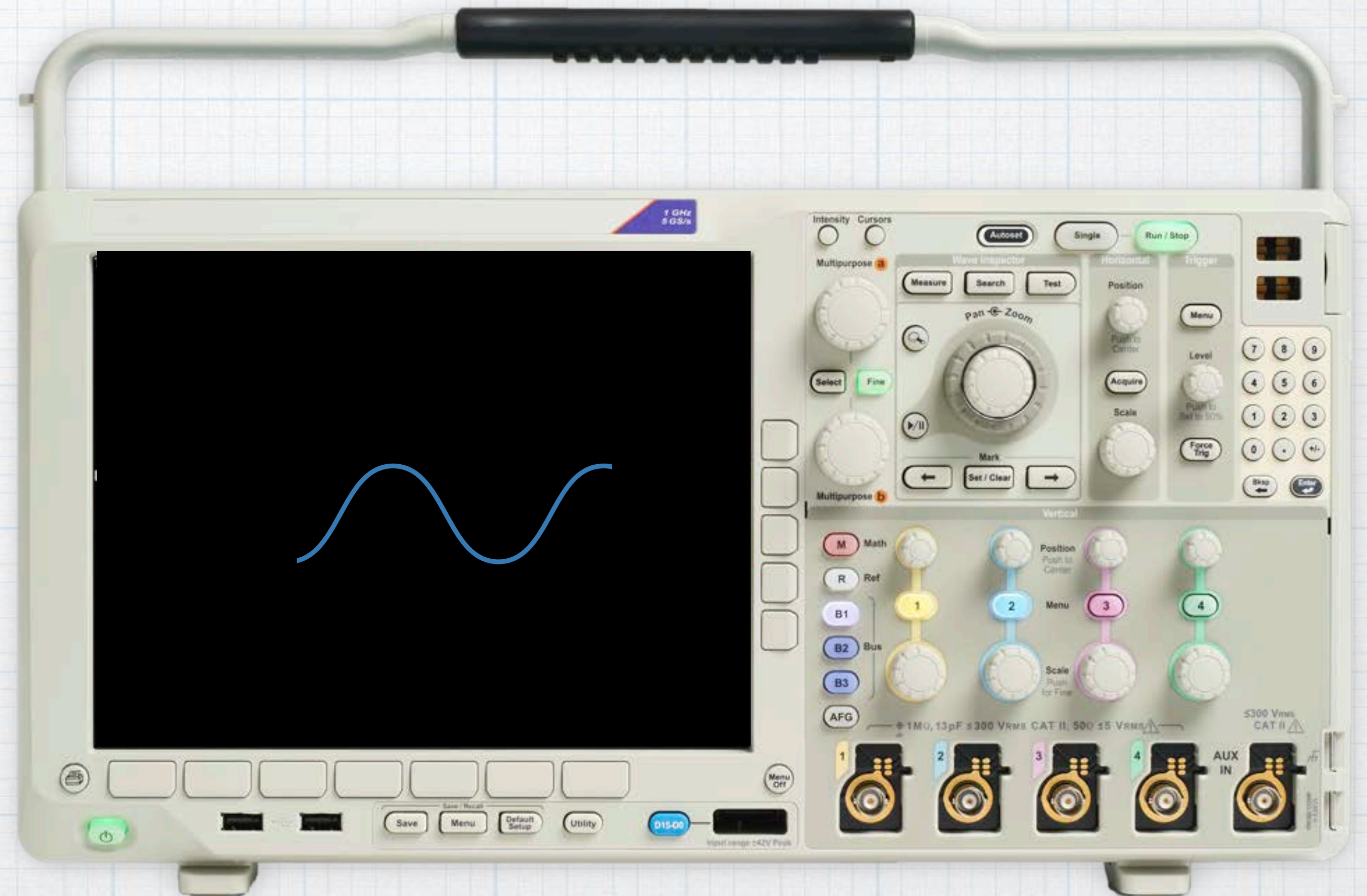
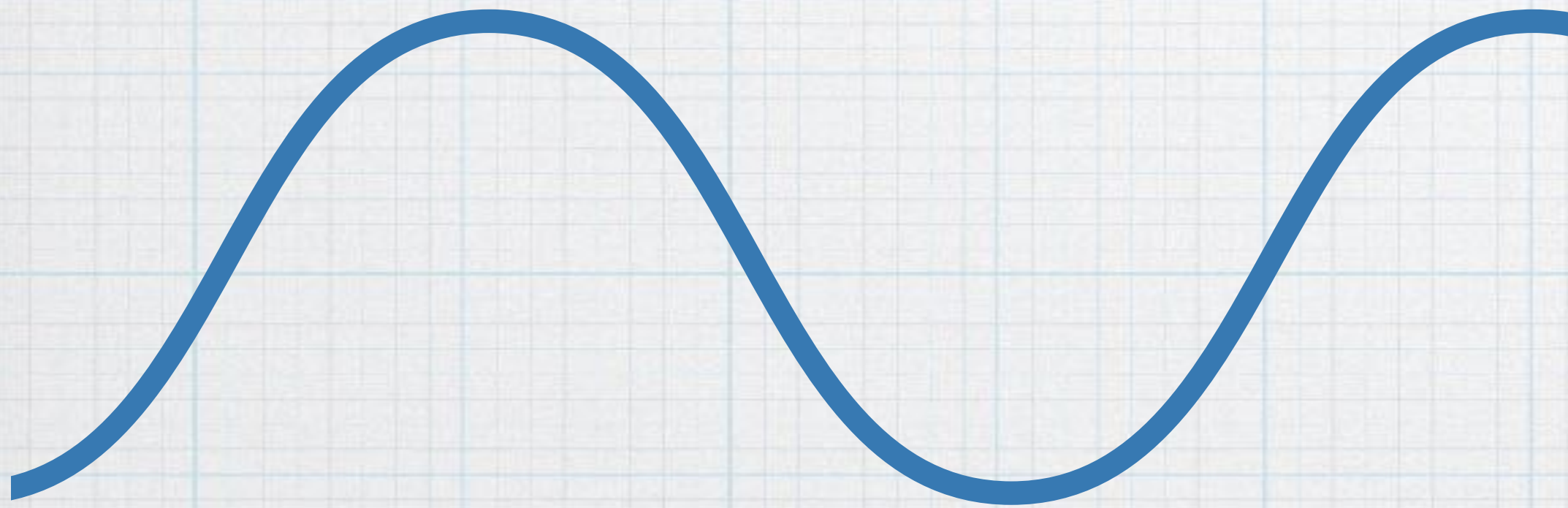
Scope Block Diagram



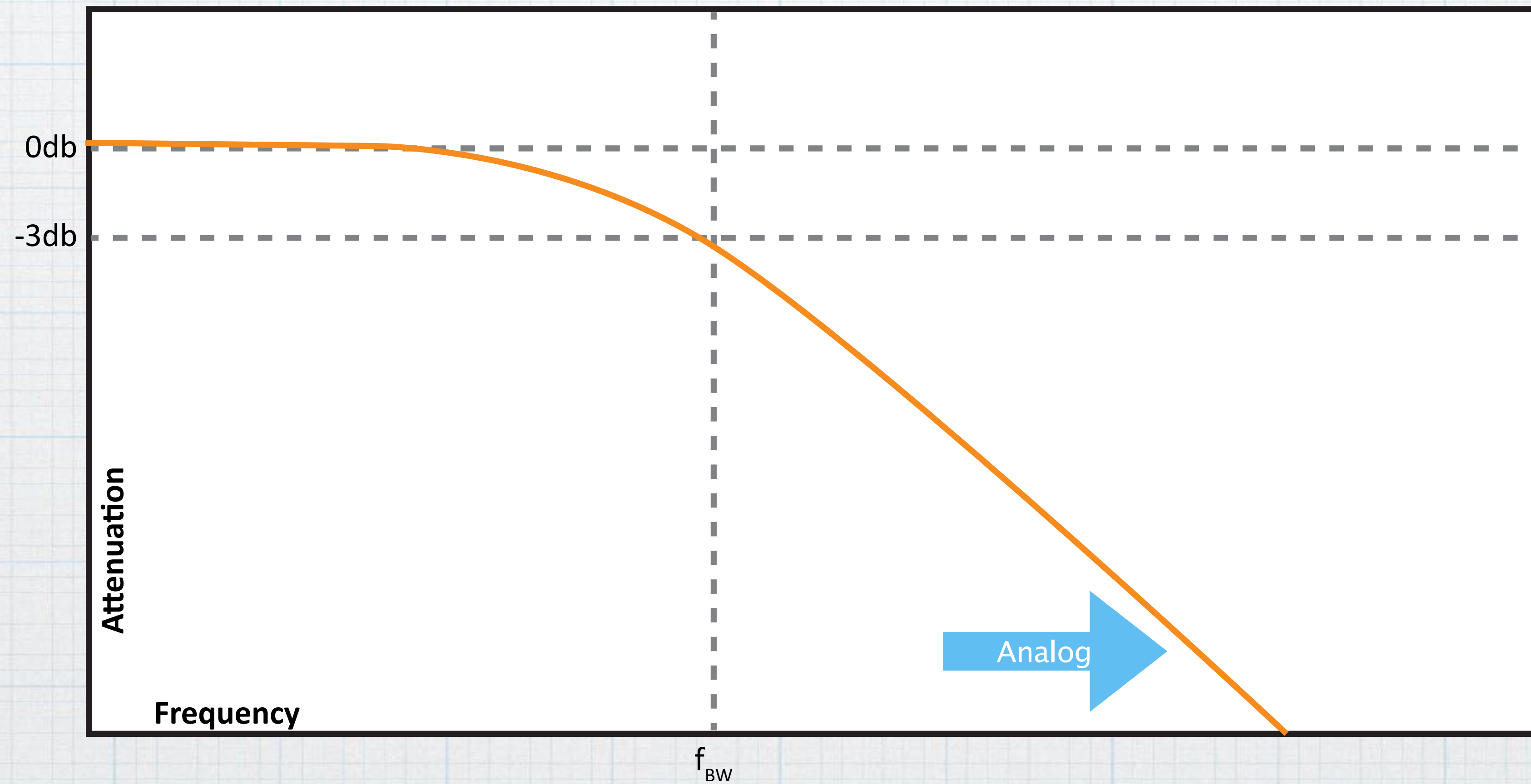
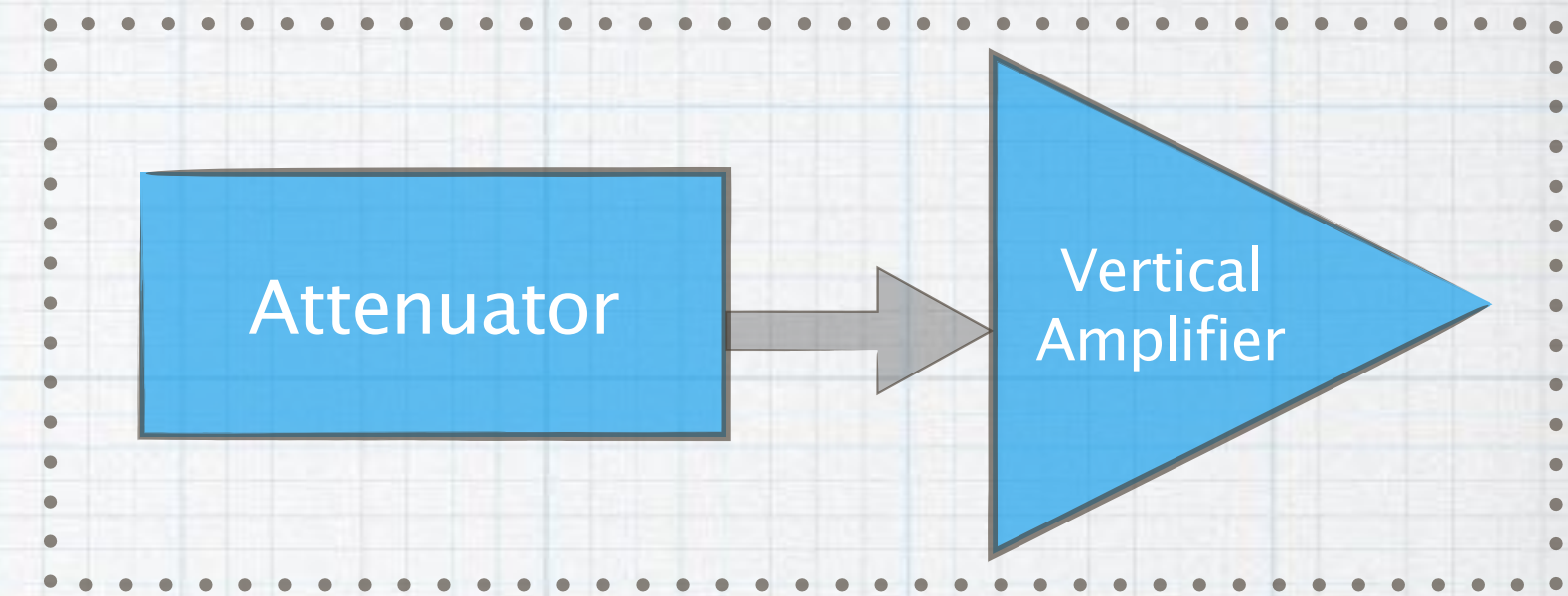
Front-End Amplifier



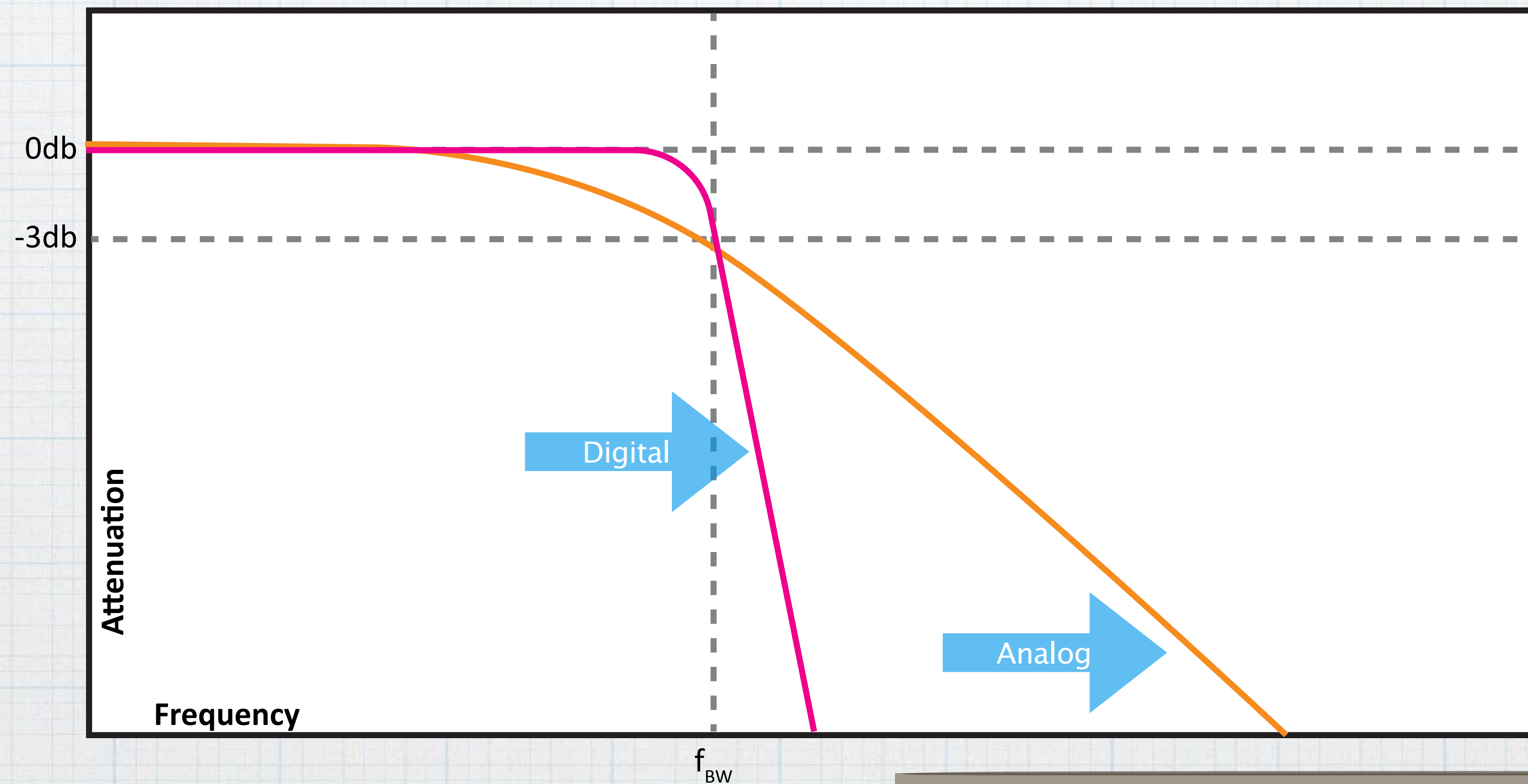
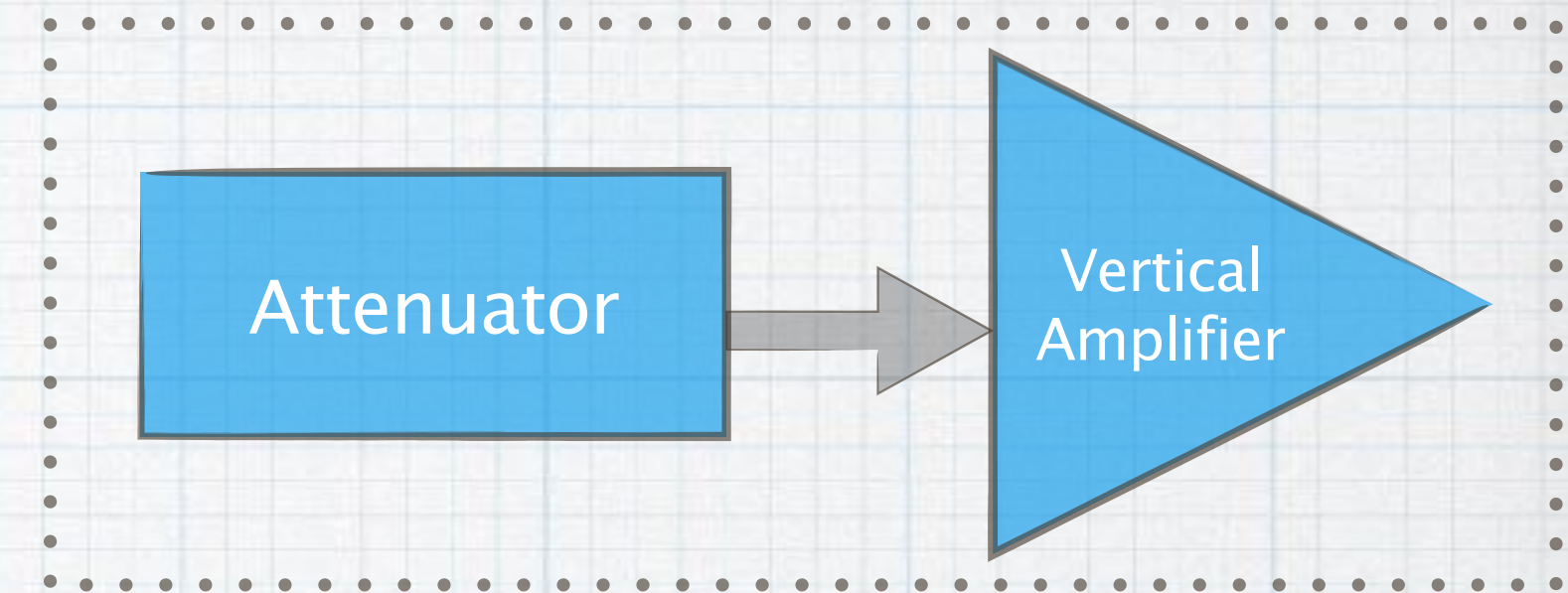
Where'd my signal go?



-3db Magic



-3db Magic



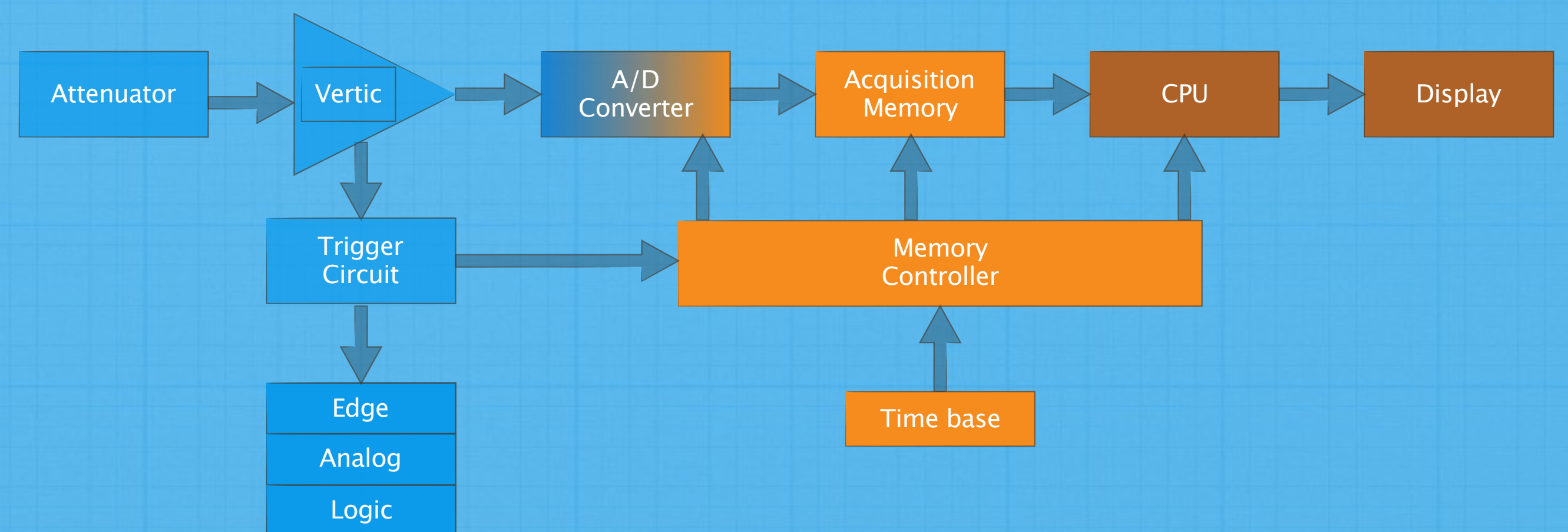
Modern digital oscilloscopes don't roll-off like traditional analog did.
Their Bandwidth IS their bandwidth.



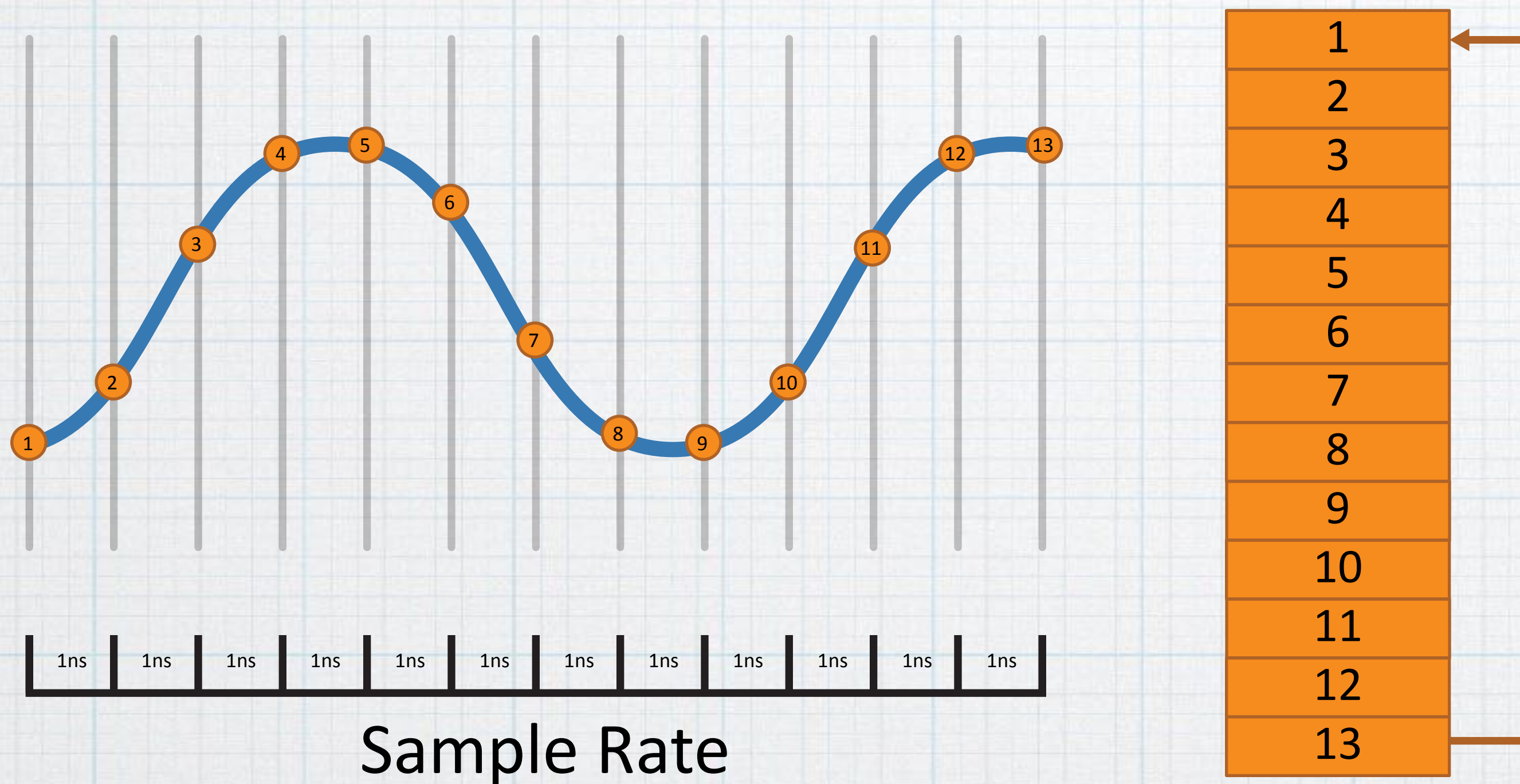
Avoid Overdrive



Acquisition



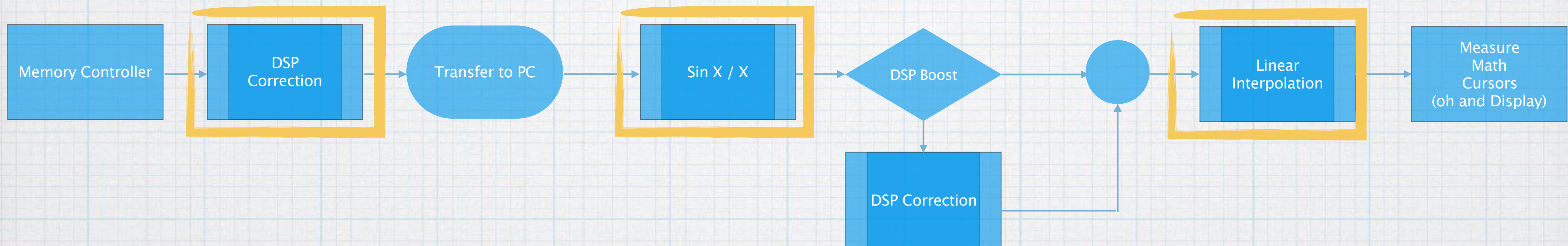
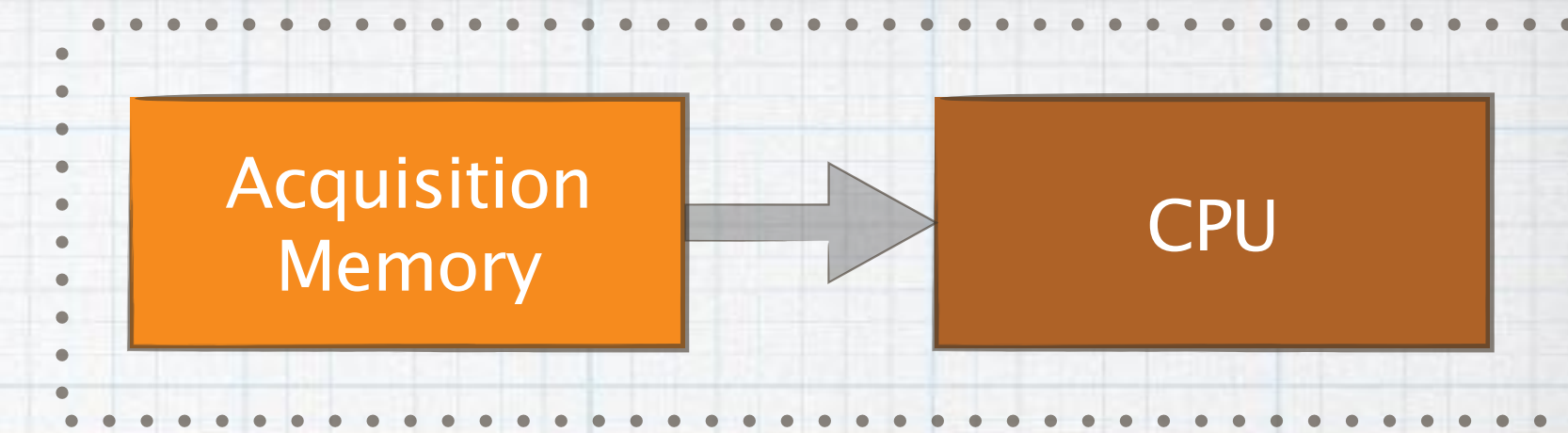
Real-time Sampling



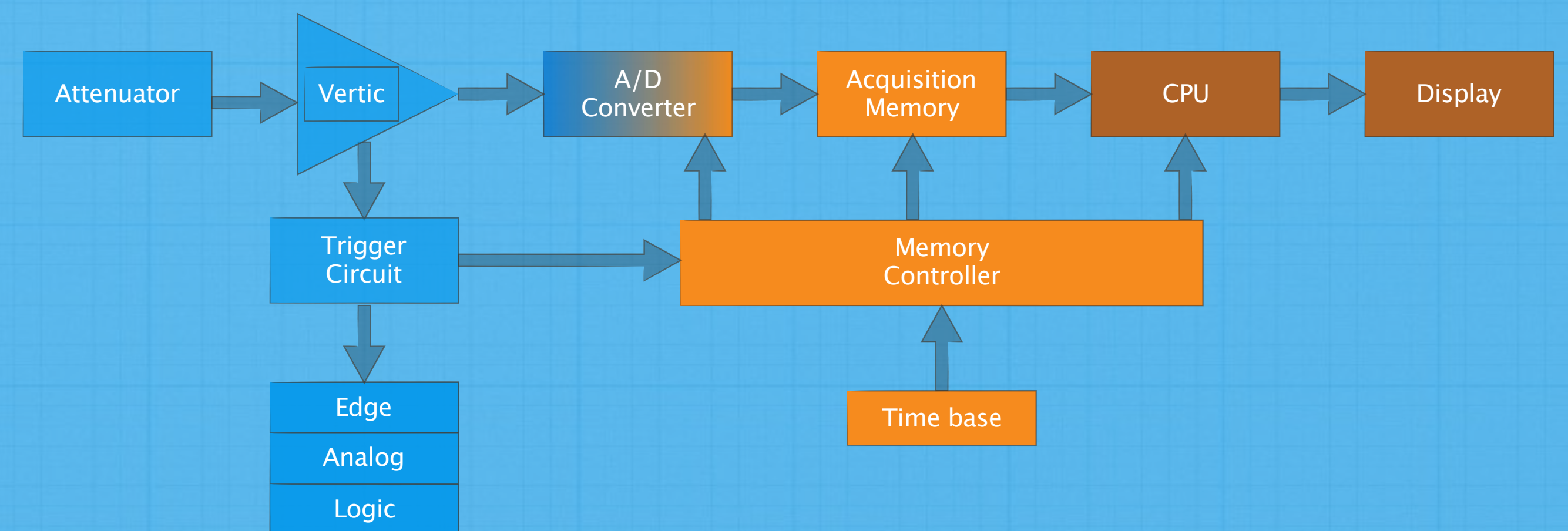
$$\text{Digital Resolution} = \frac{1}{\text{Sample Rate}} = \frac{1}{1\text{Ga/s}} = 1\text{ns}$$



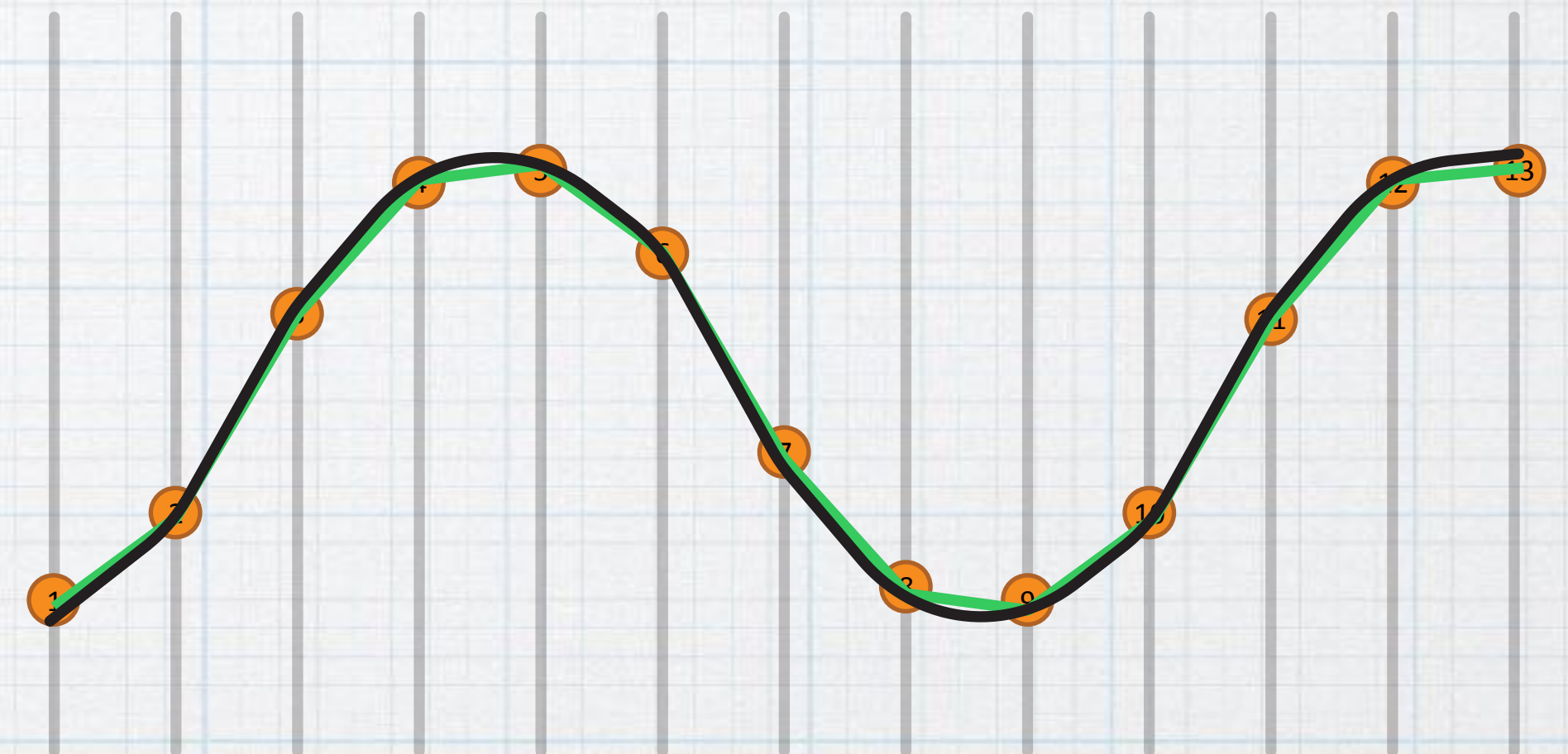
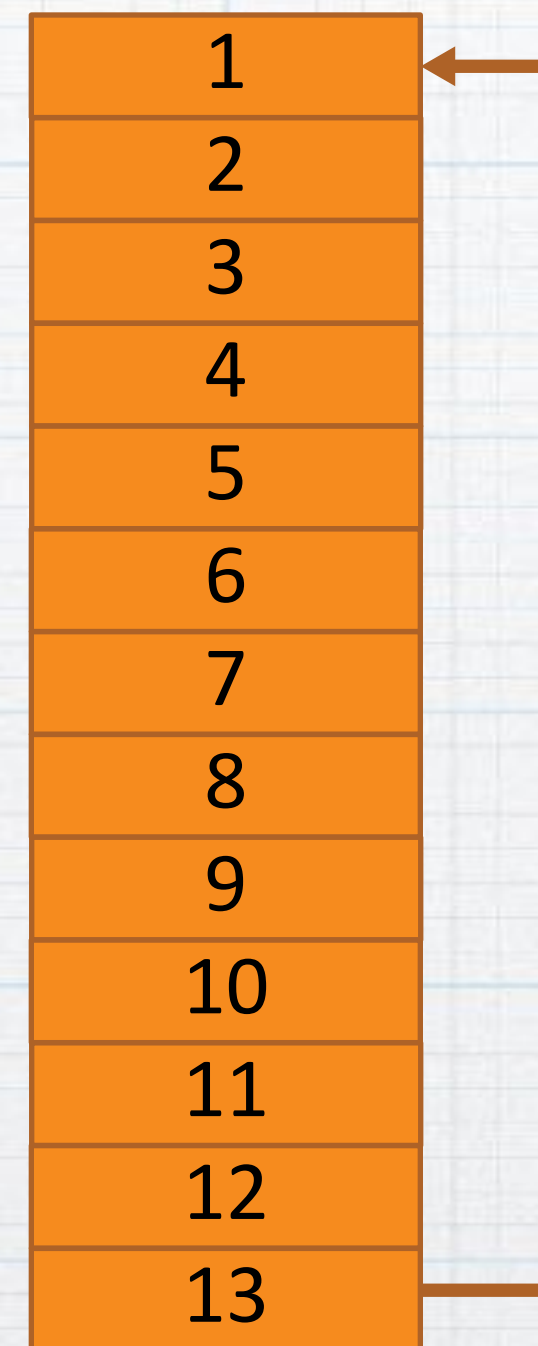
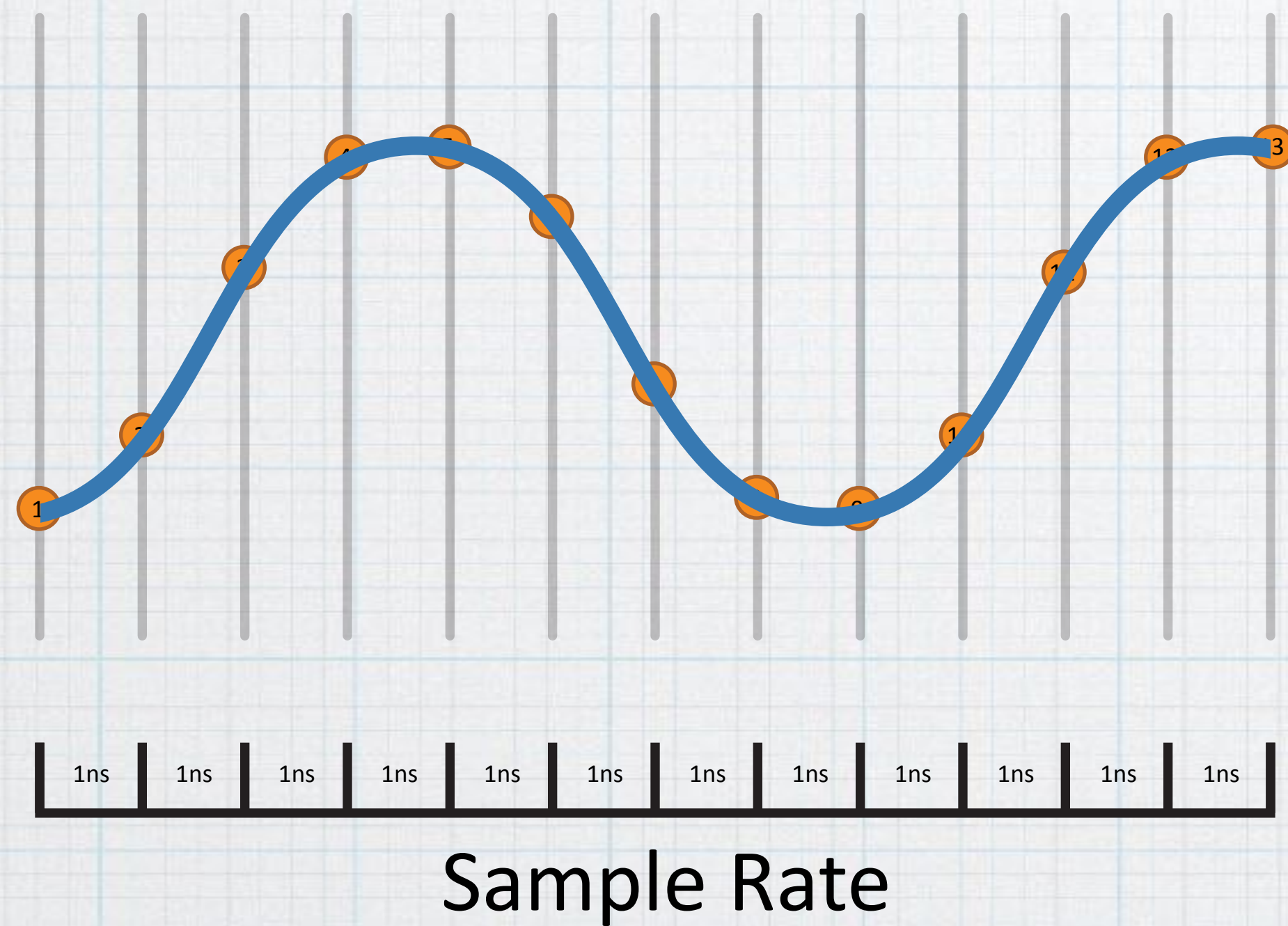
DSP Path

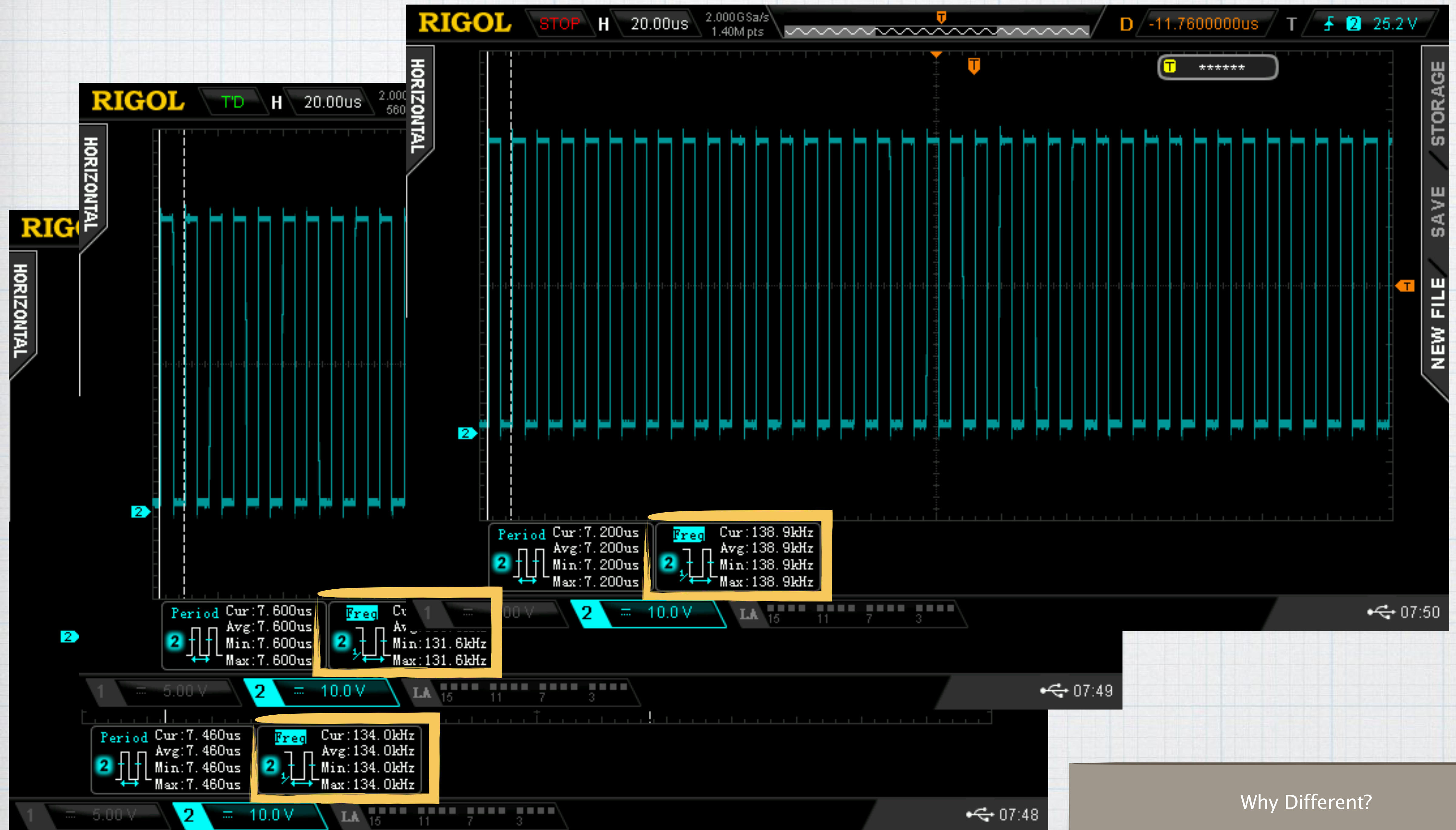


Display



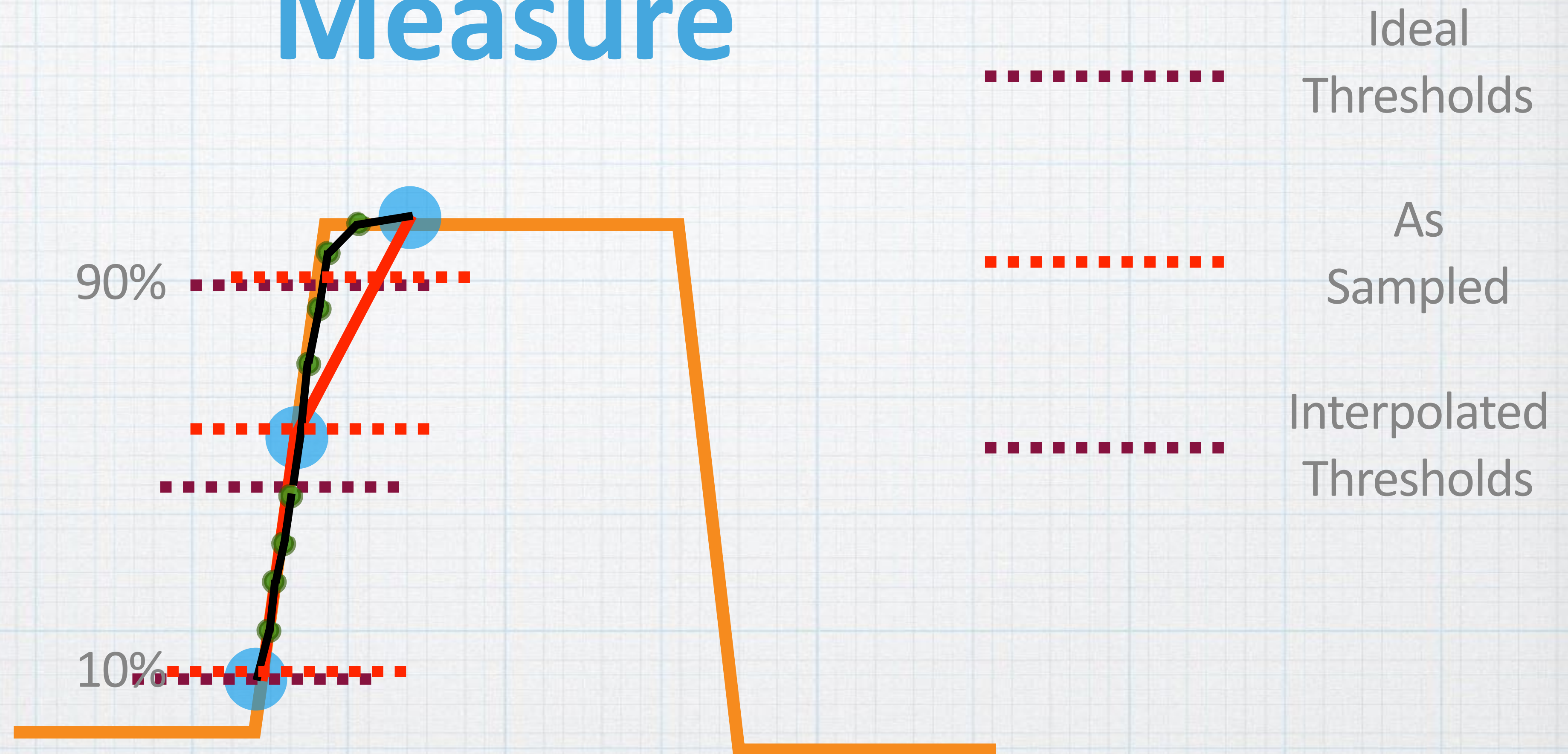
Display



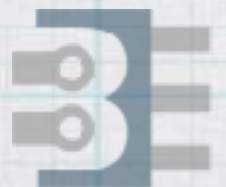


Why Different?

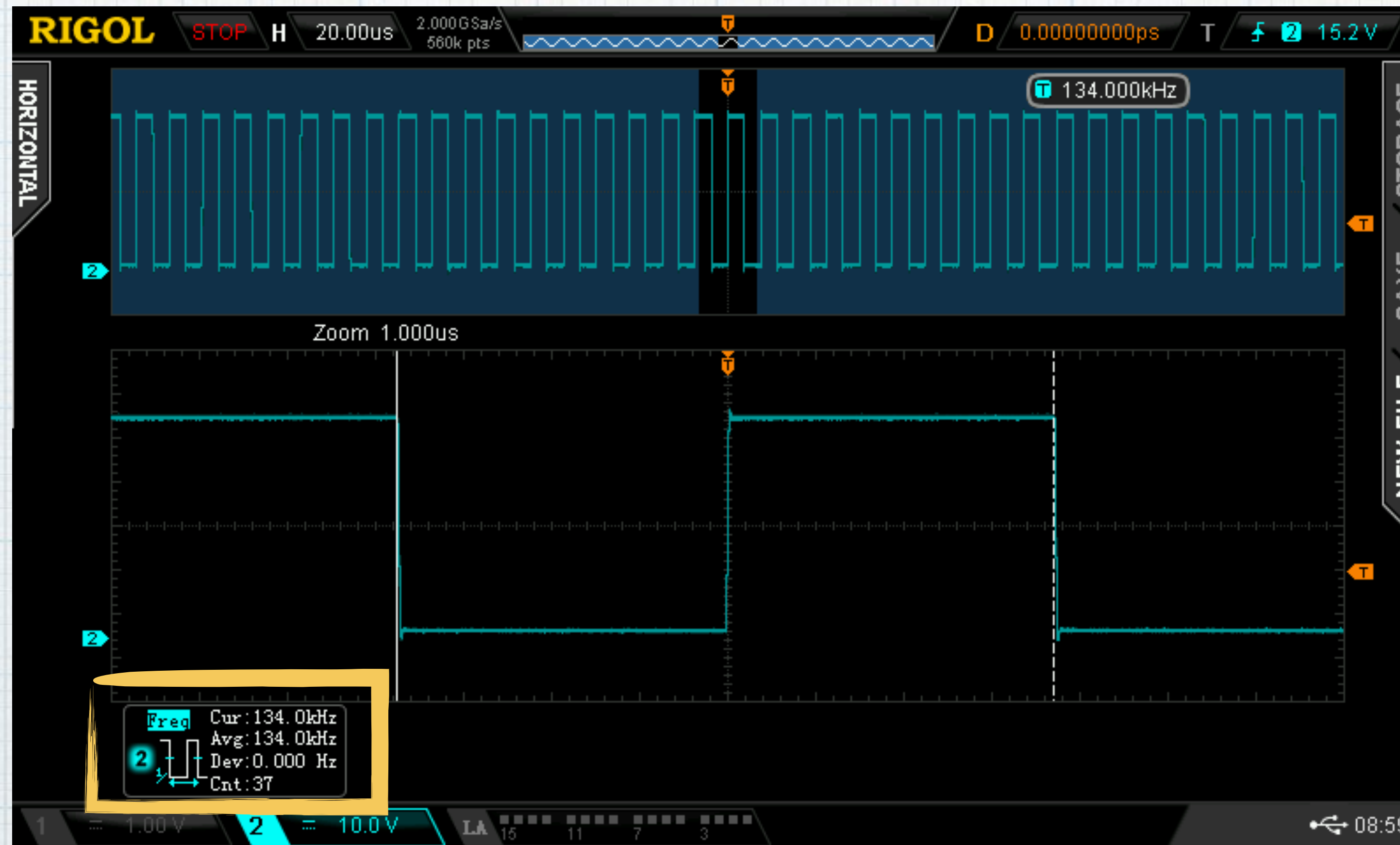
Measure



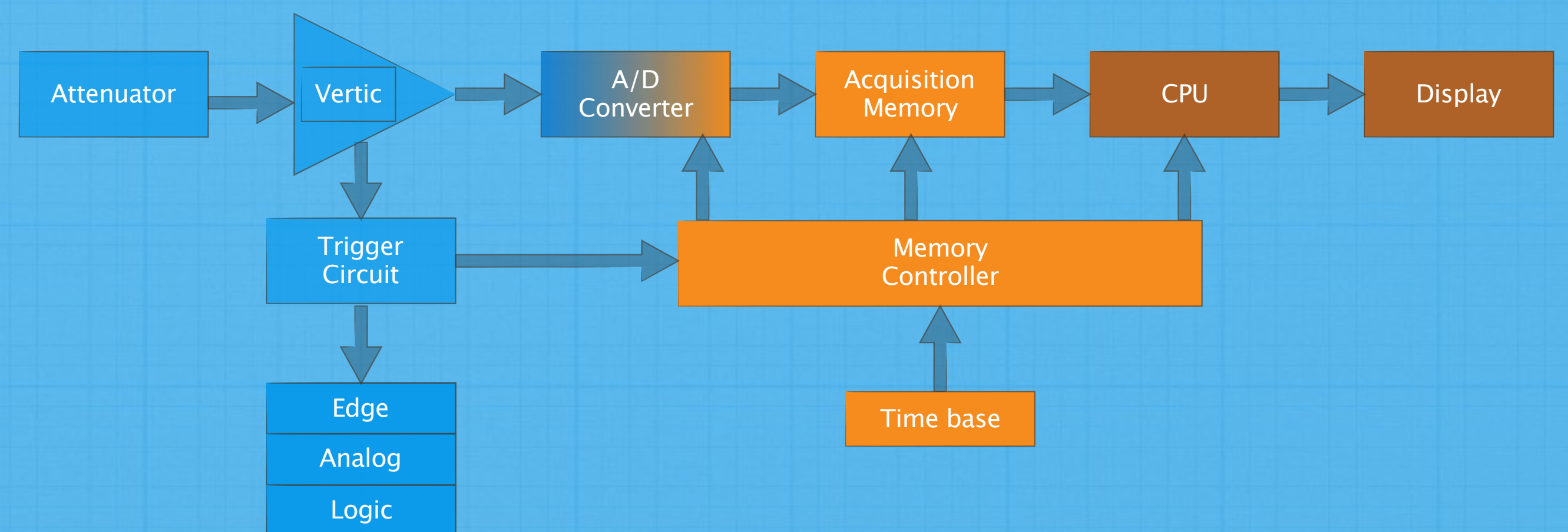
When making measurements, most scopes default to “10–90” points. Interpolation method matters.



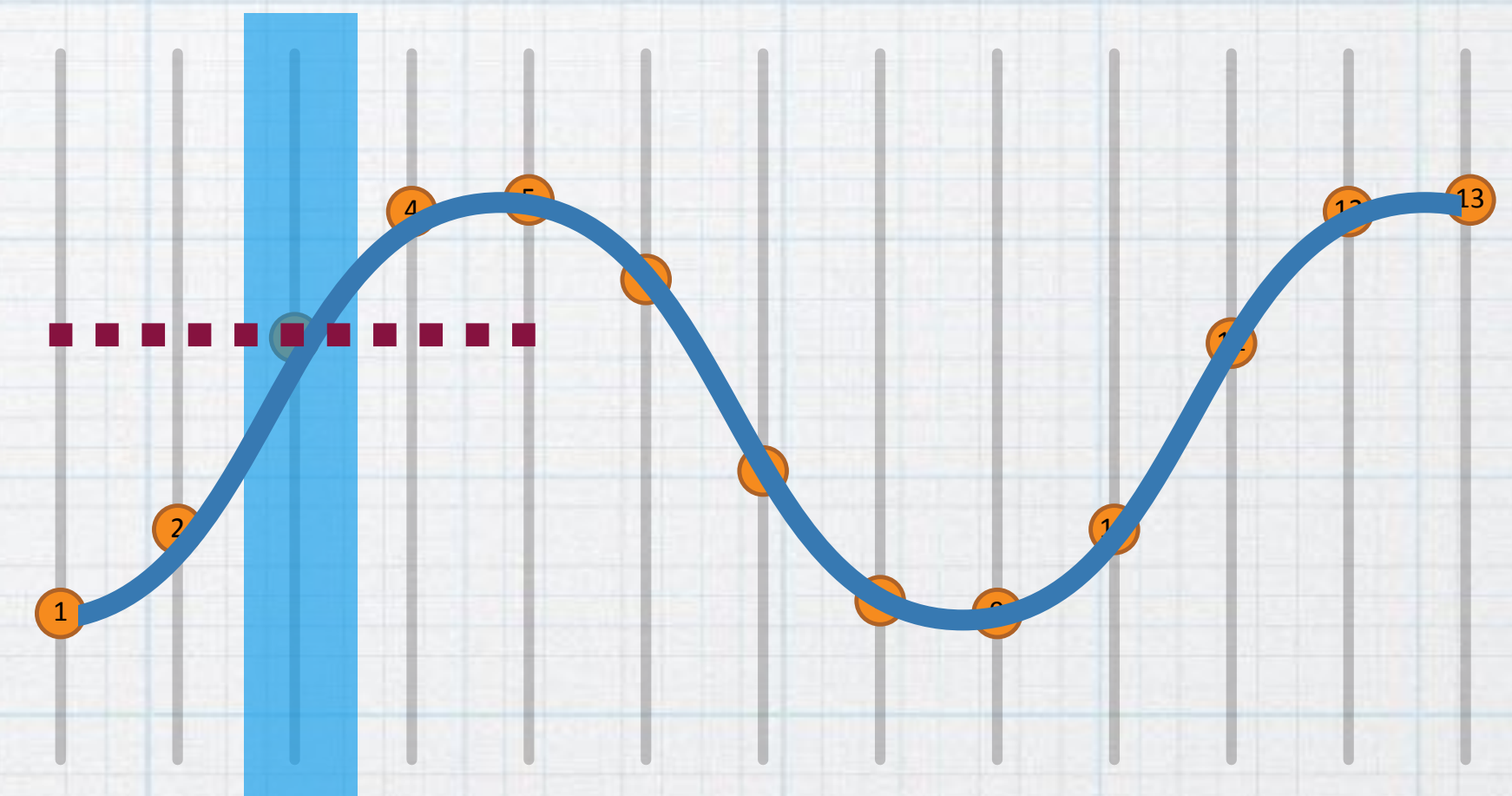
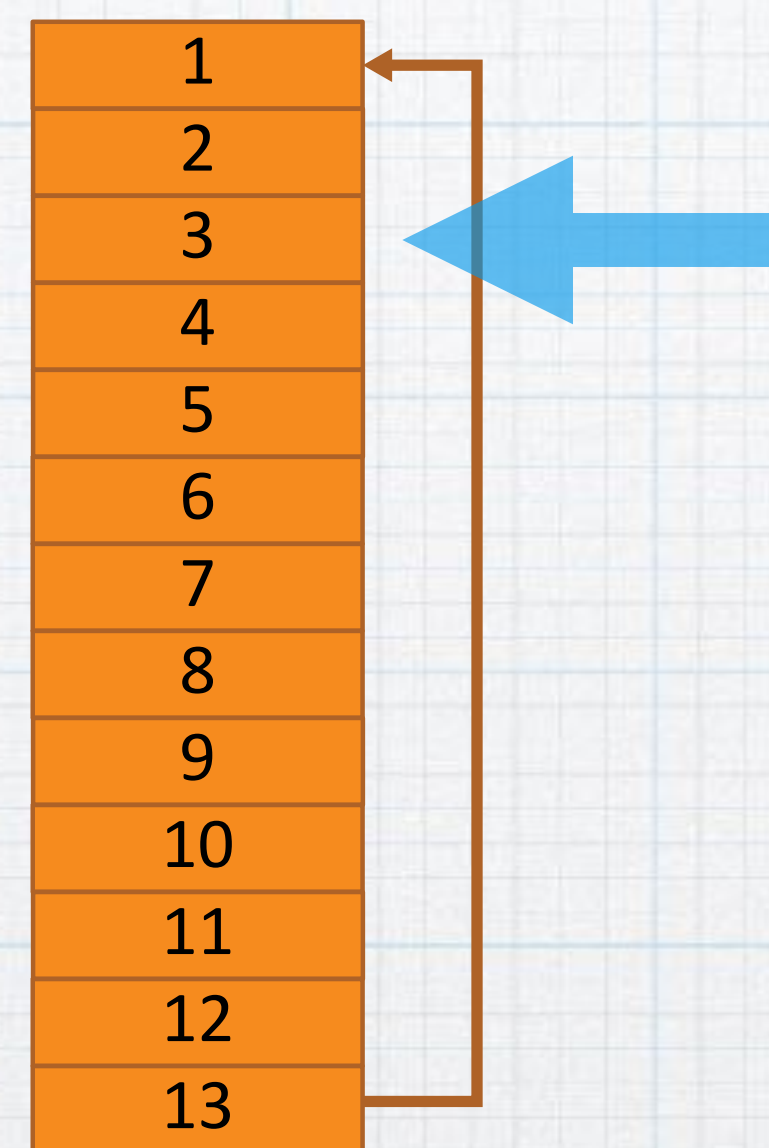
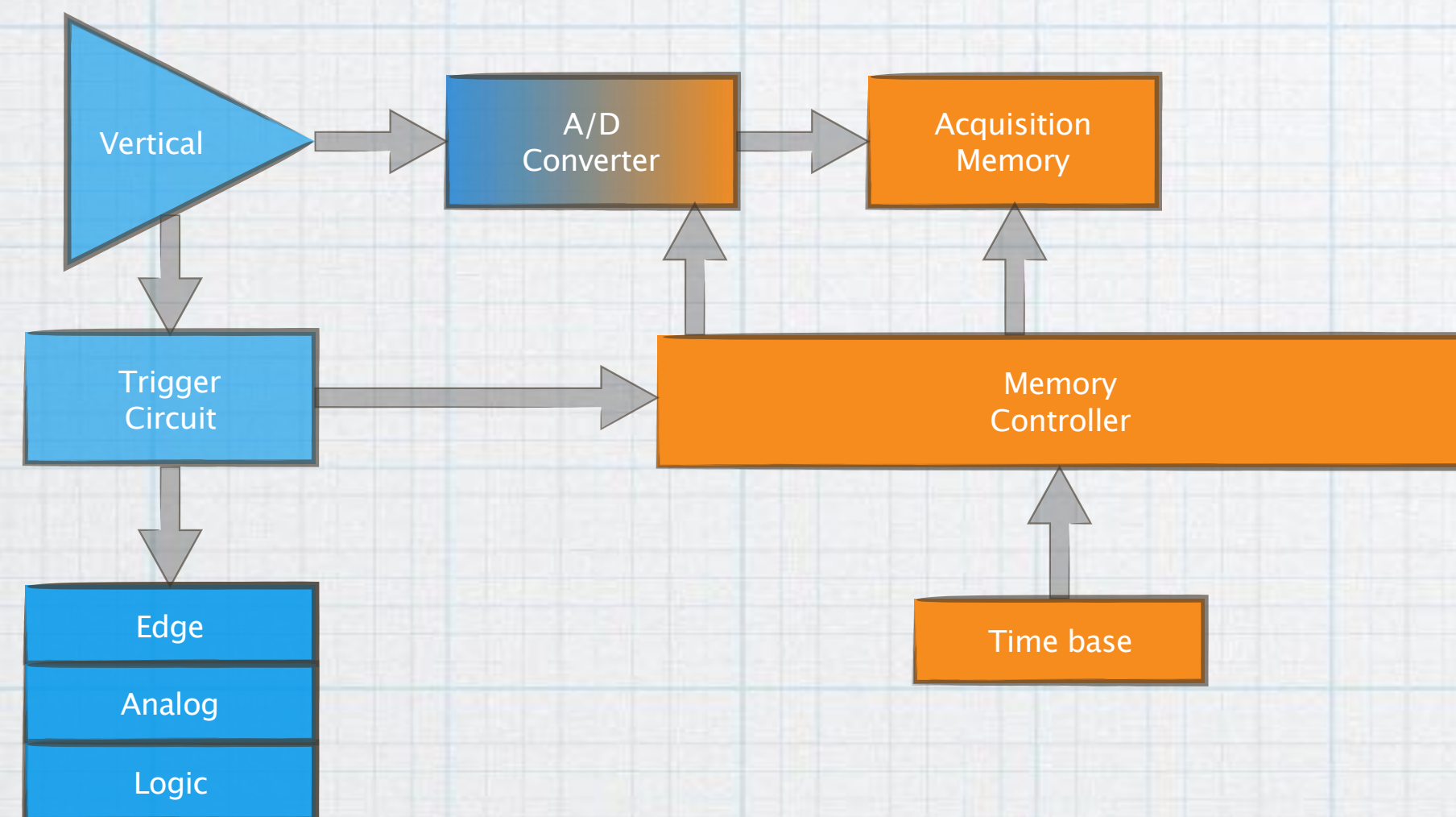
Make use of “Zoom”



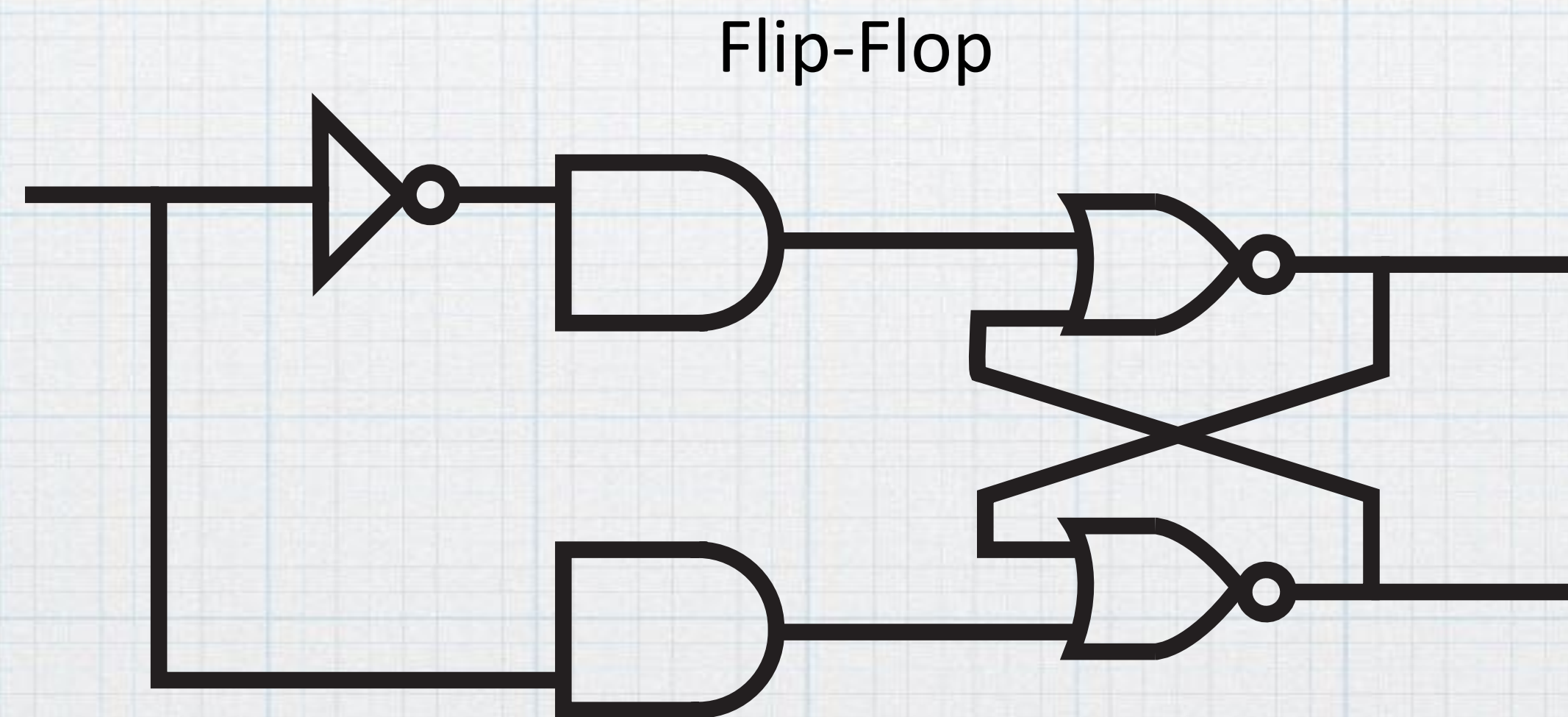
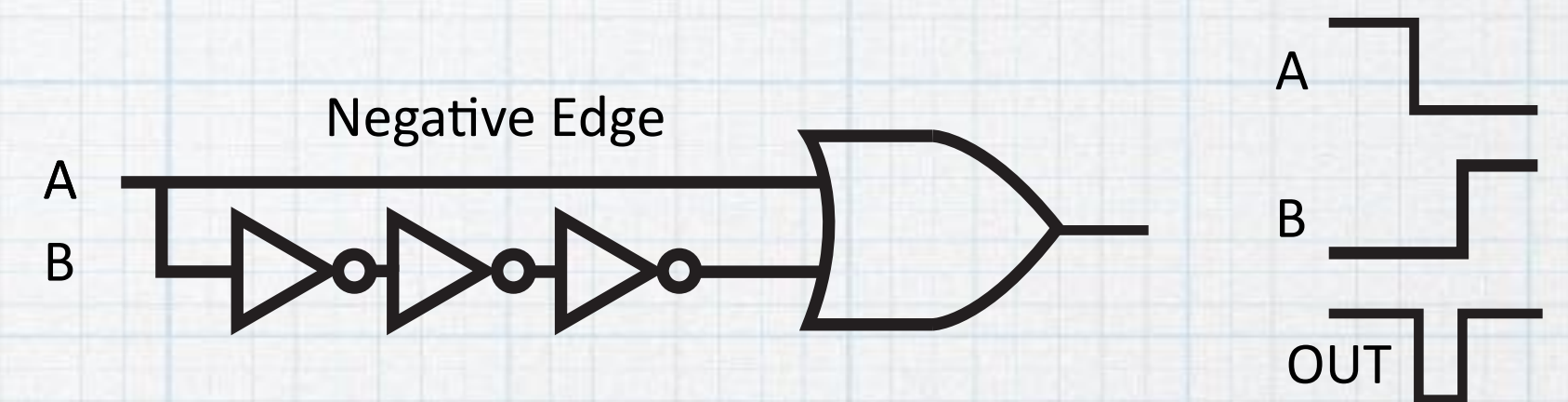
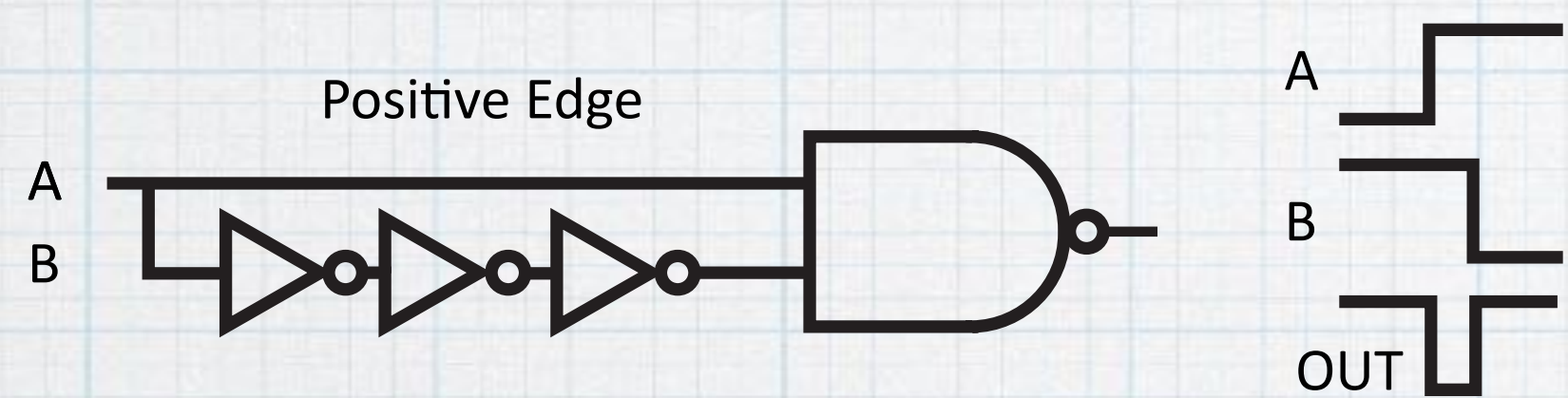
Trigger



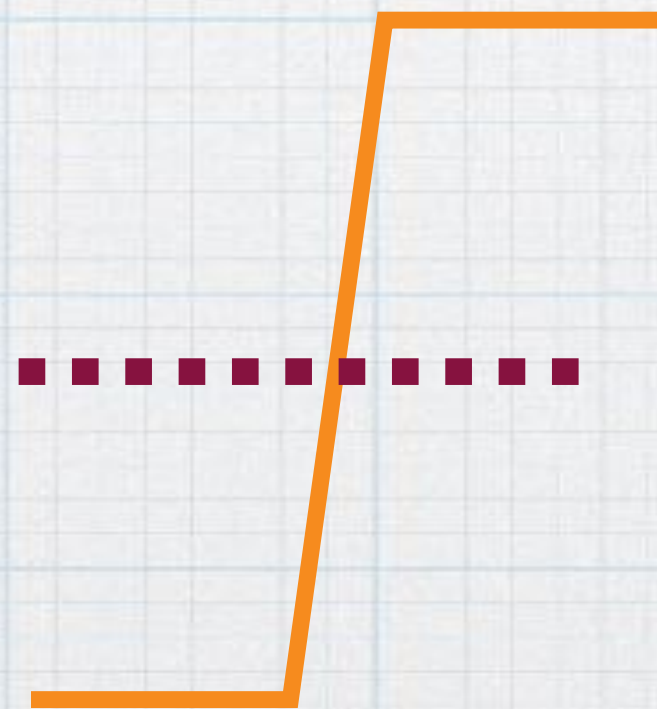
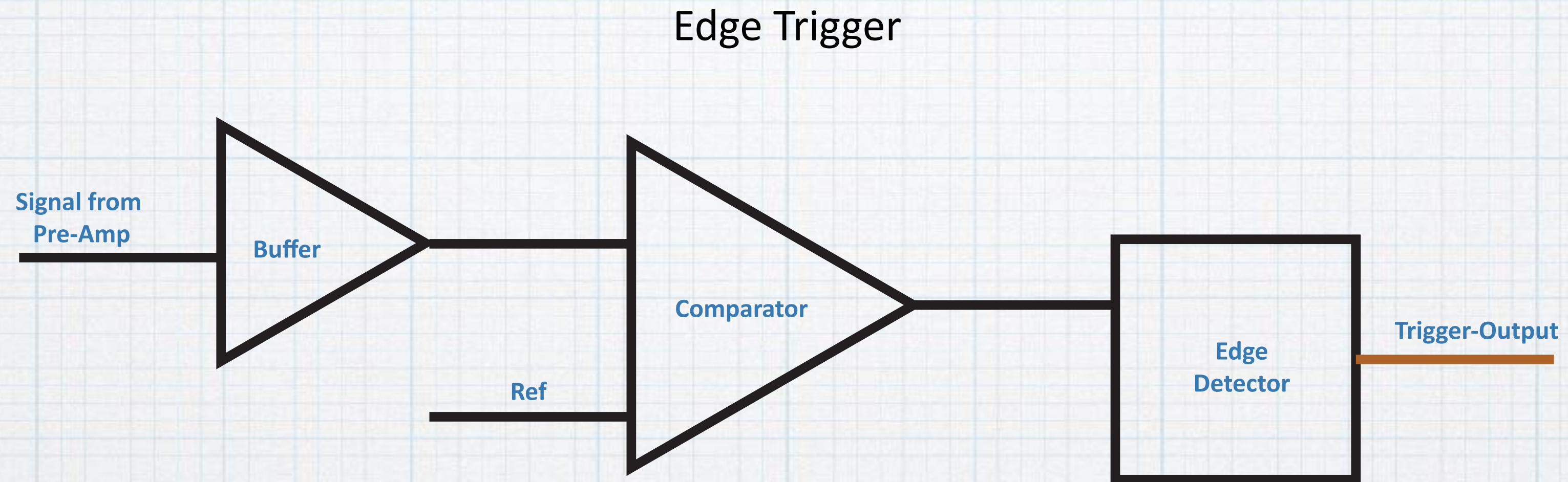
What does Trigger Do?



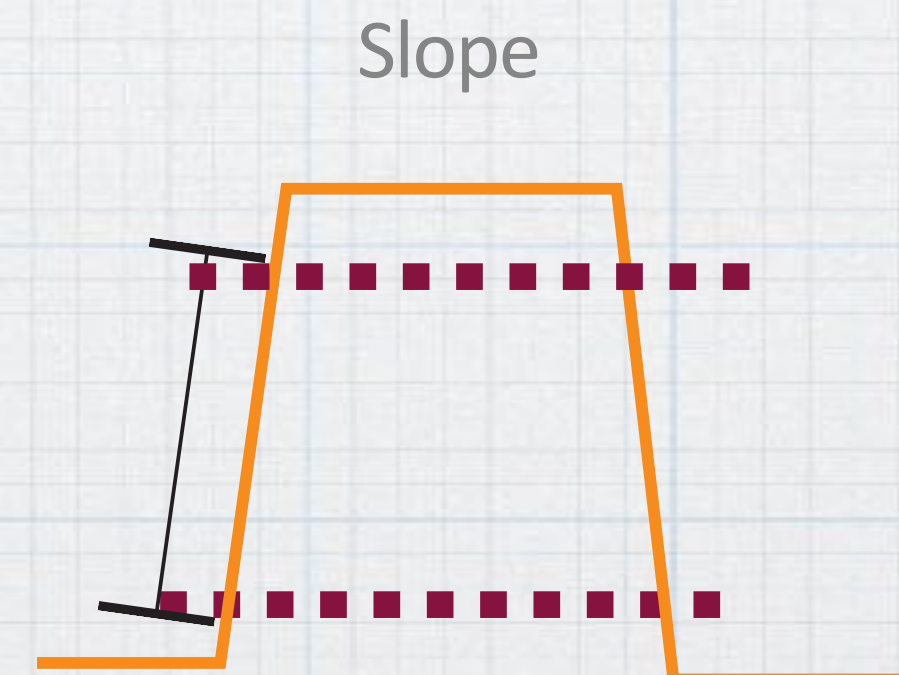
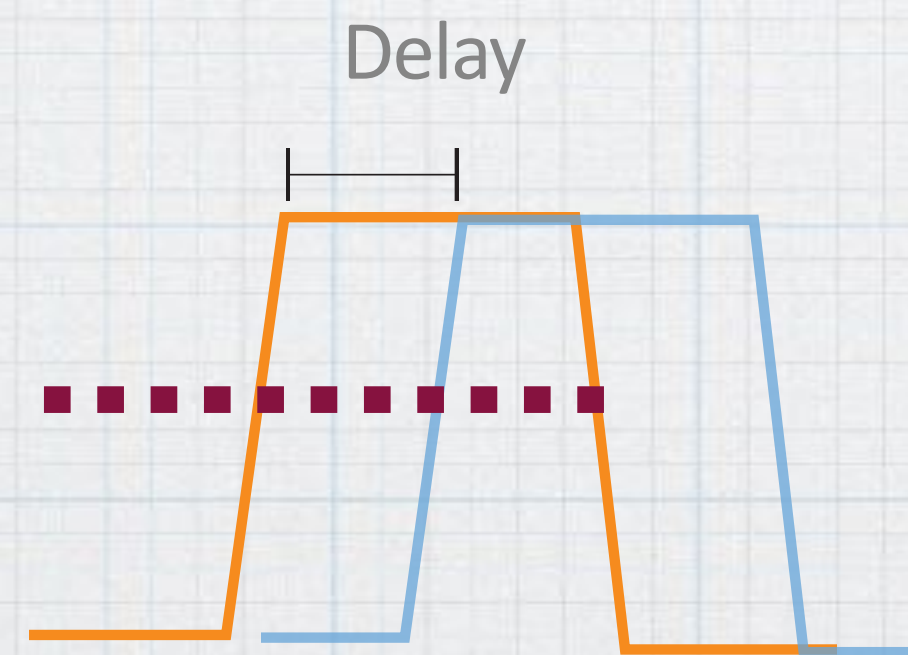
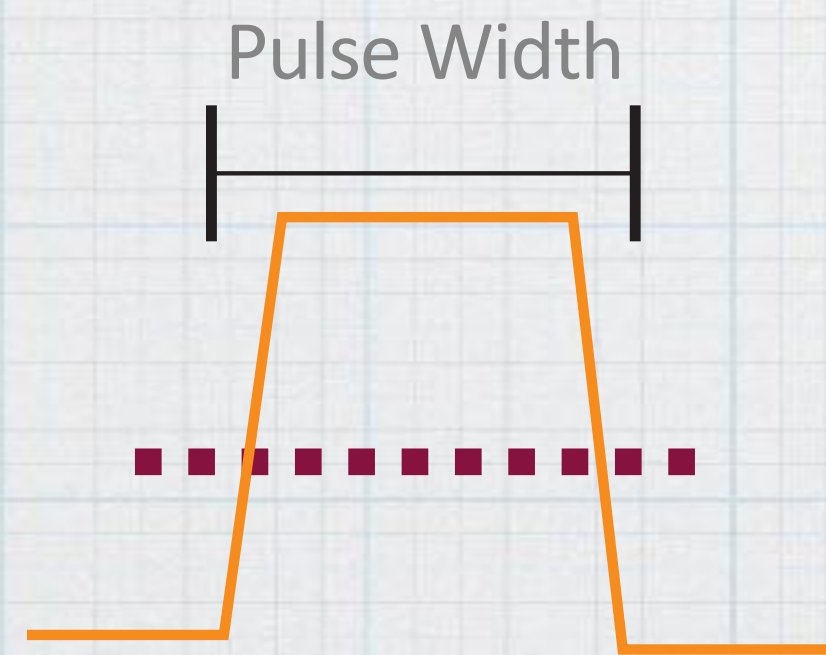
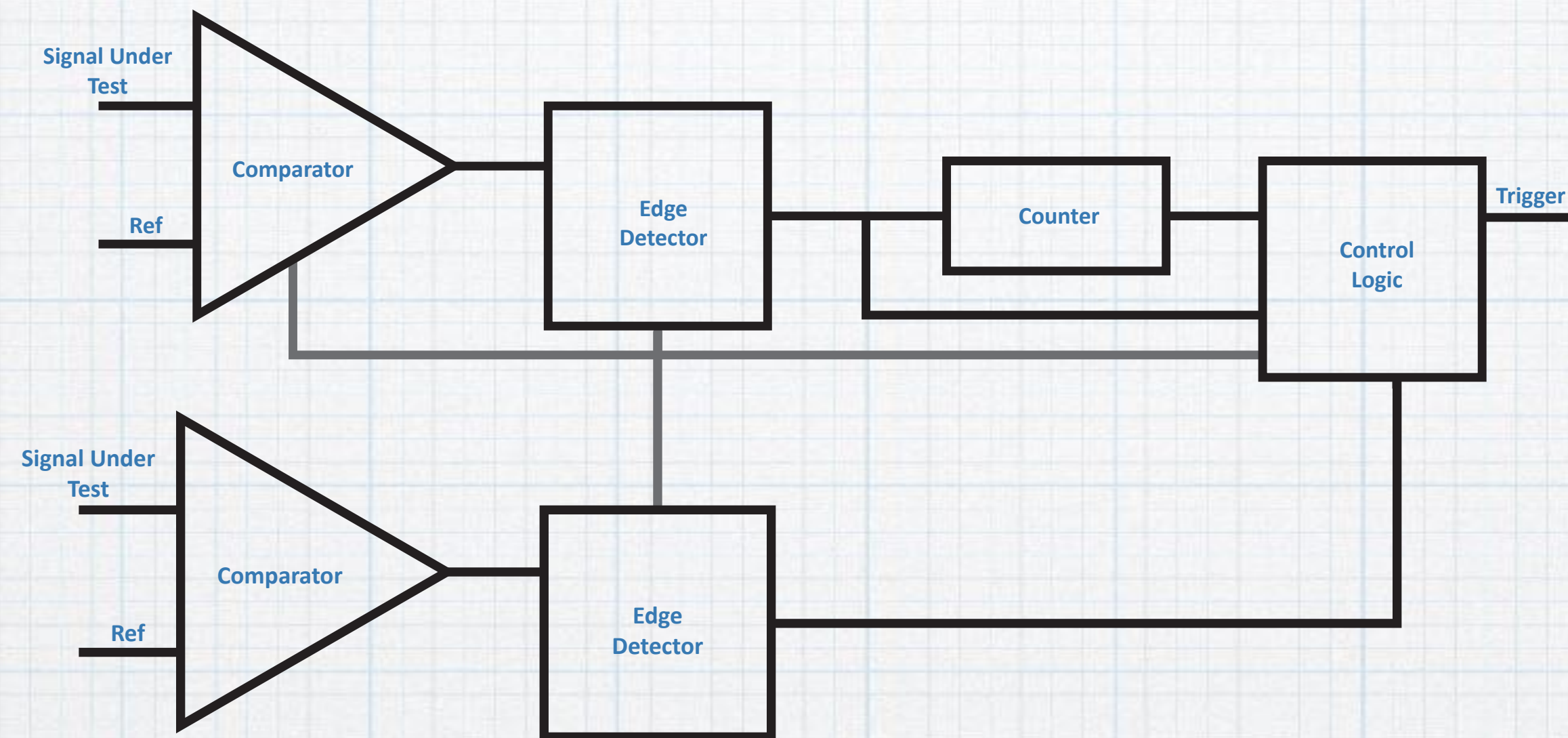
Do you even Edge, Bro?



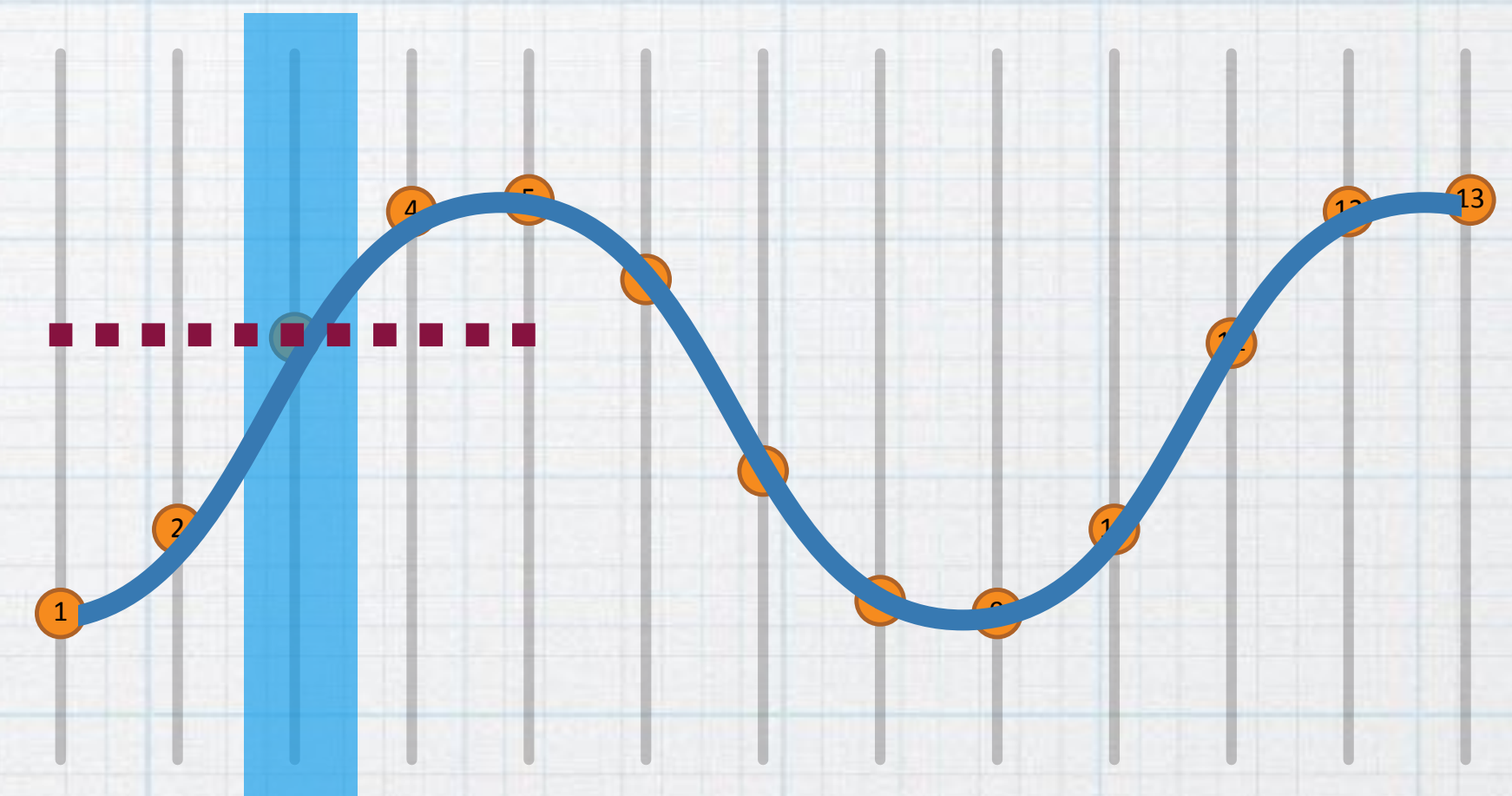
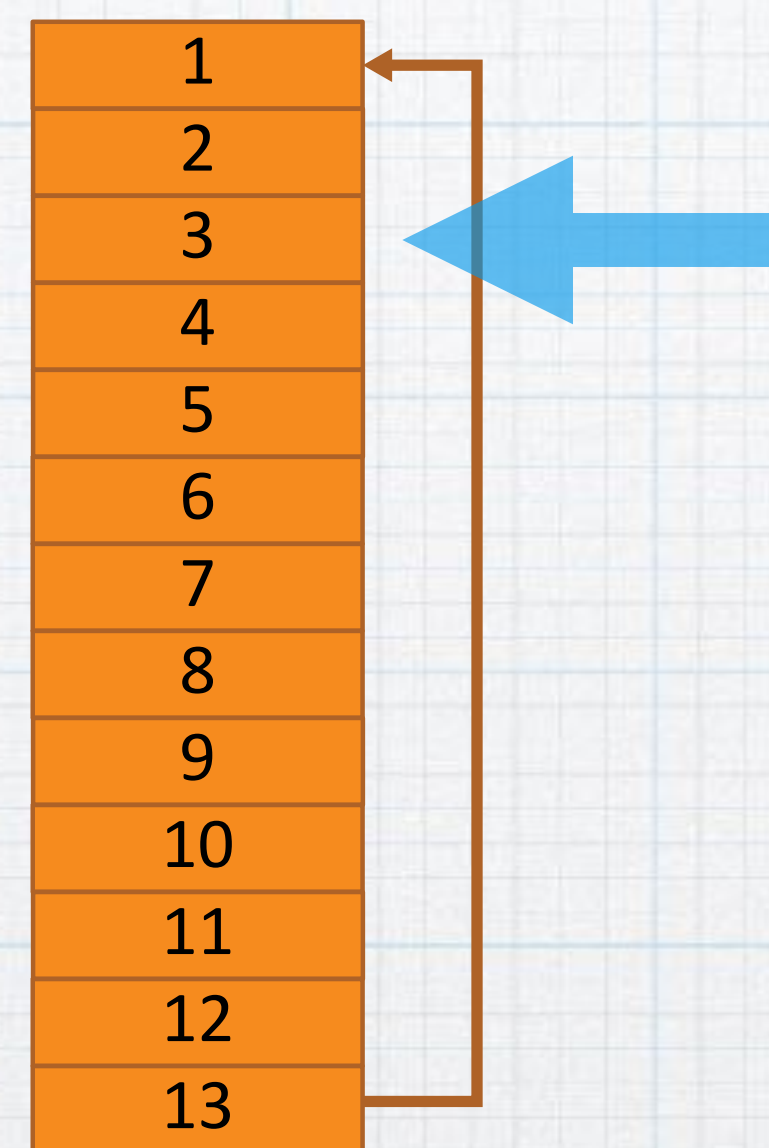
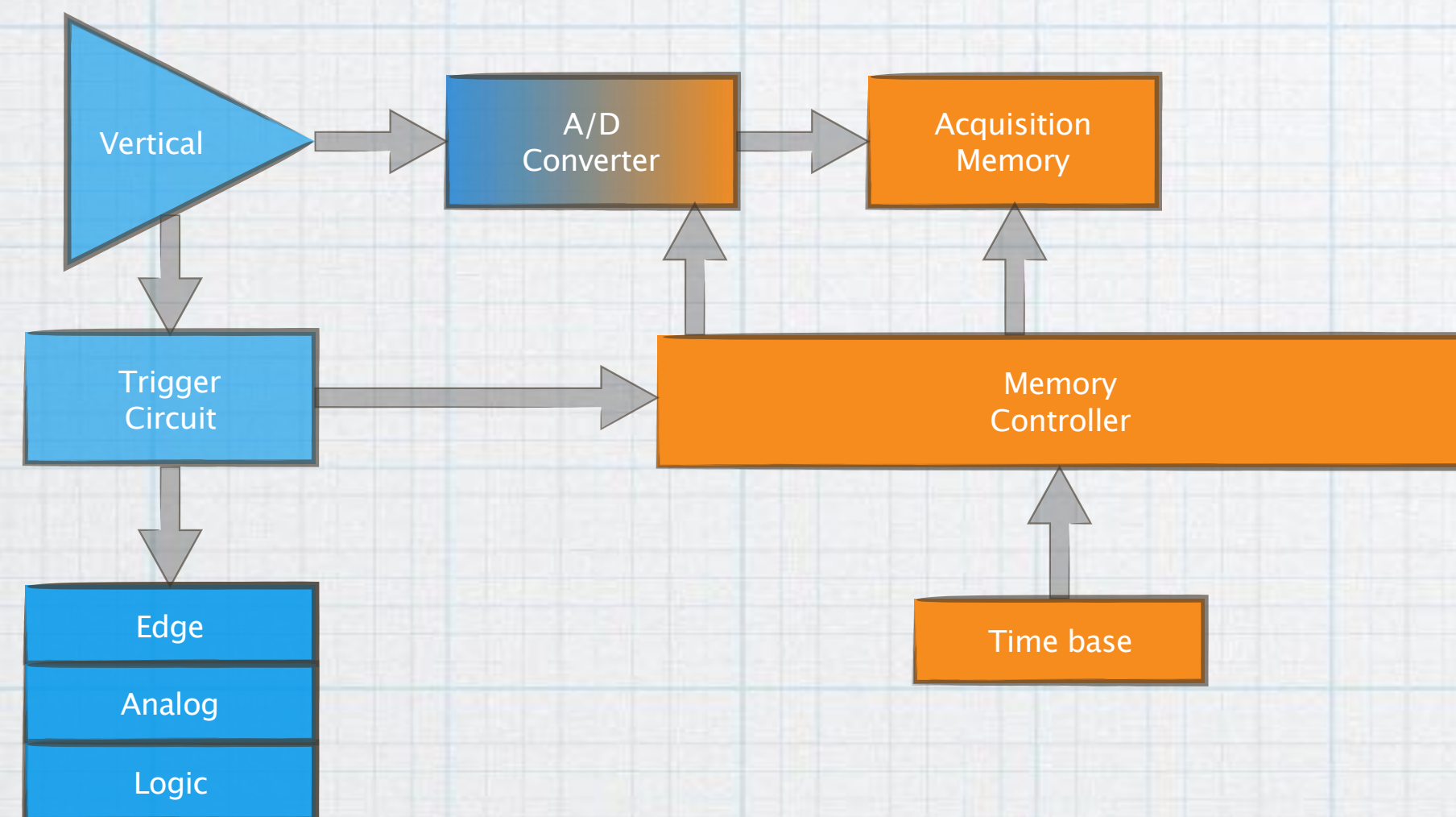
Do you even Edge, Bro?



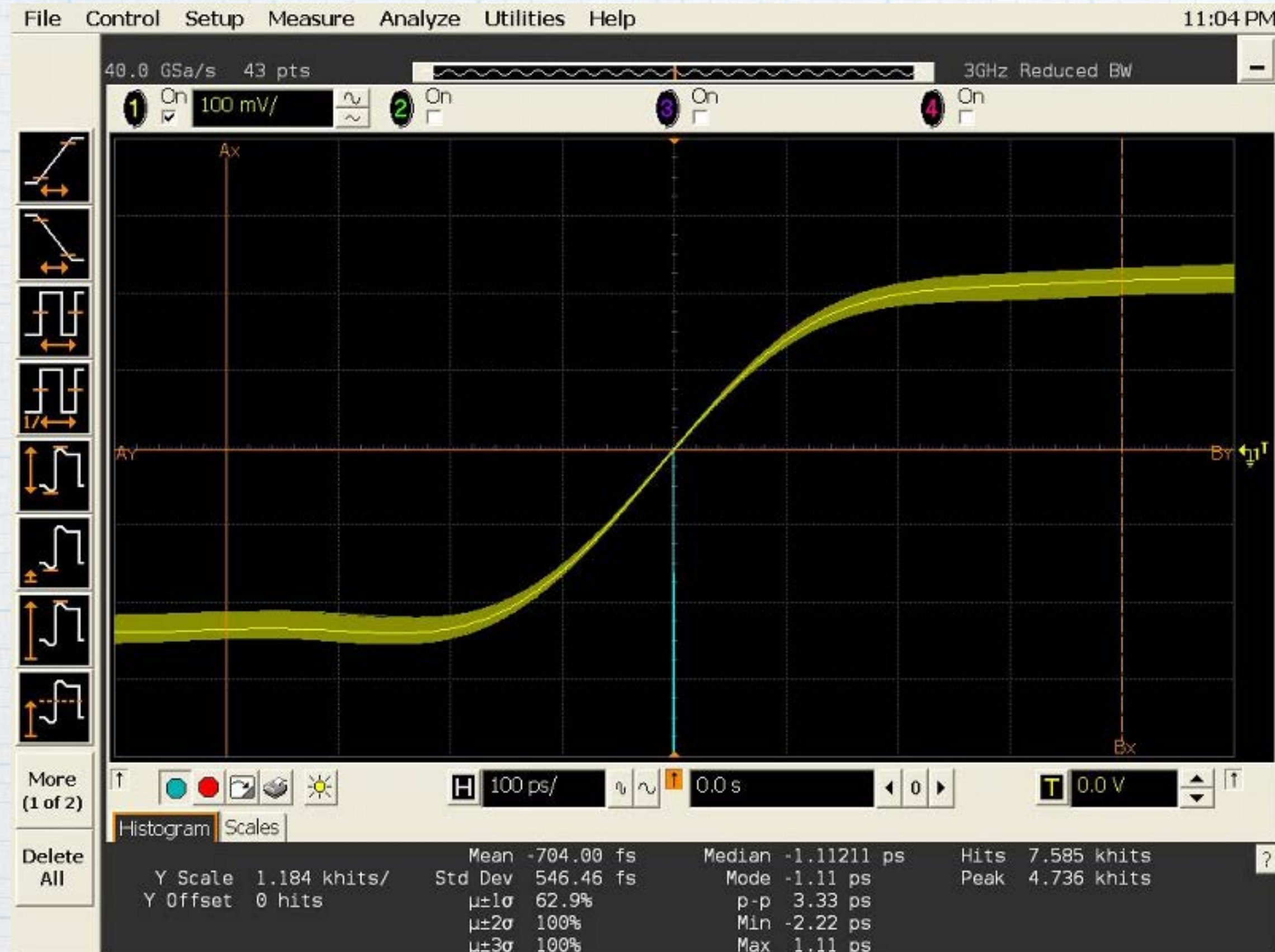
Moar Modes



Triggers aren't perfect

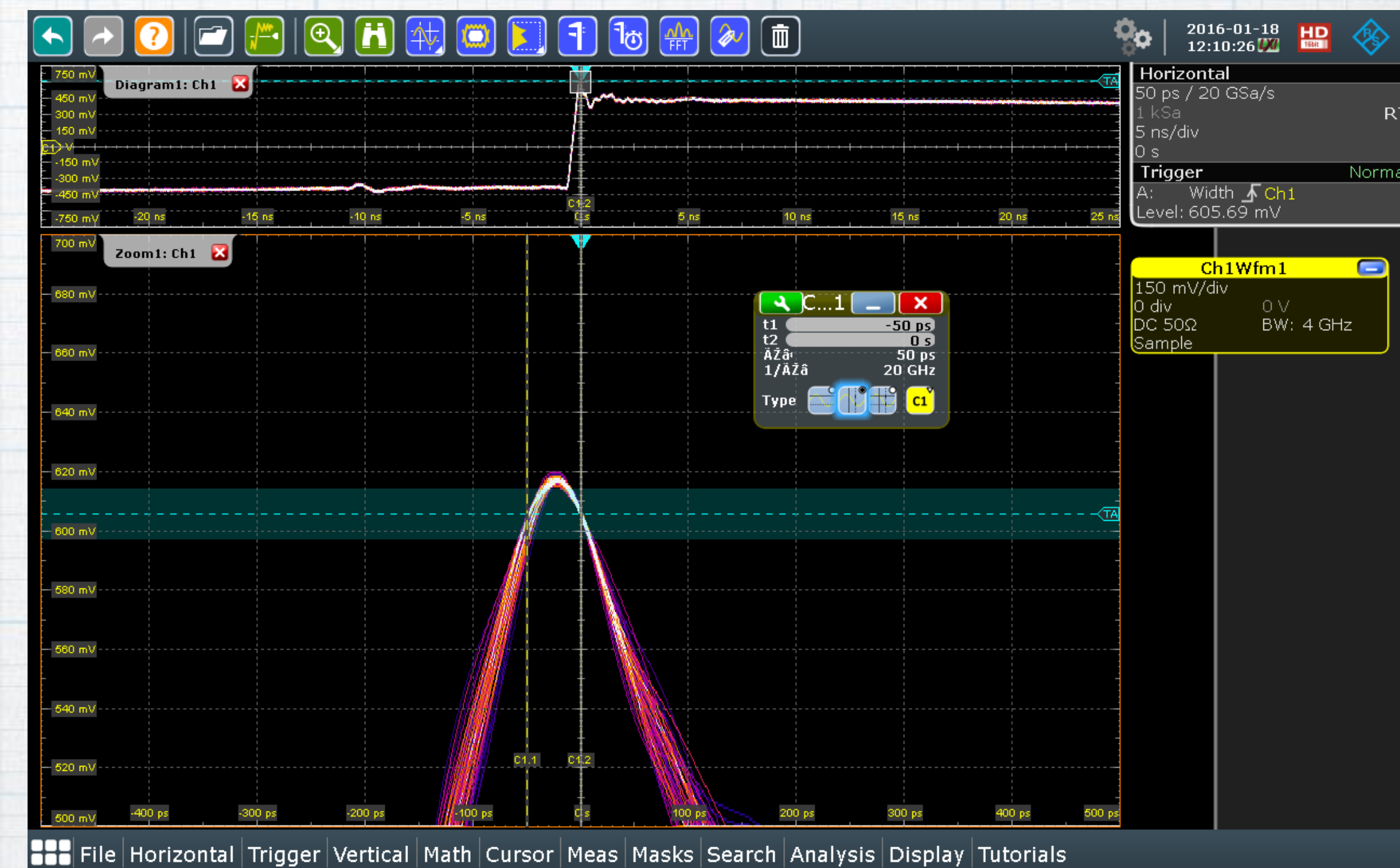
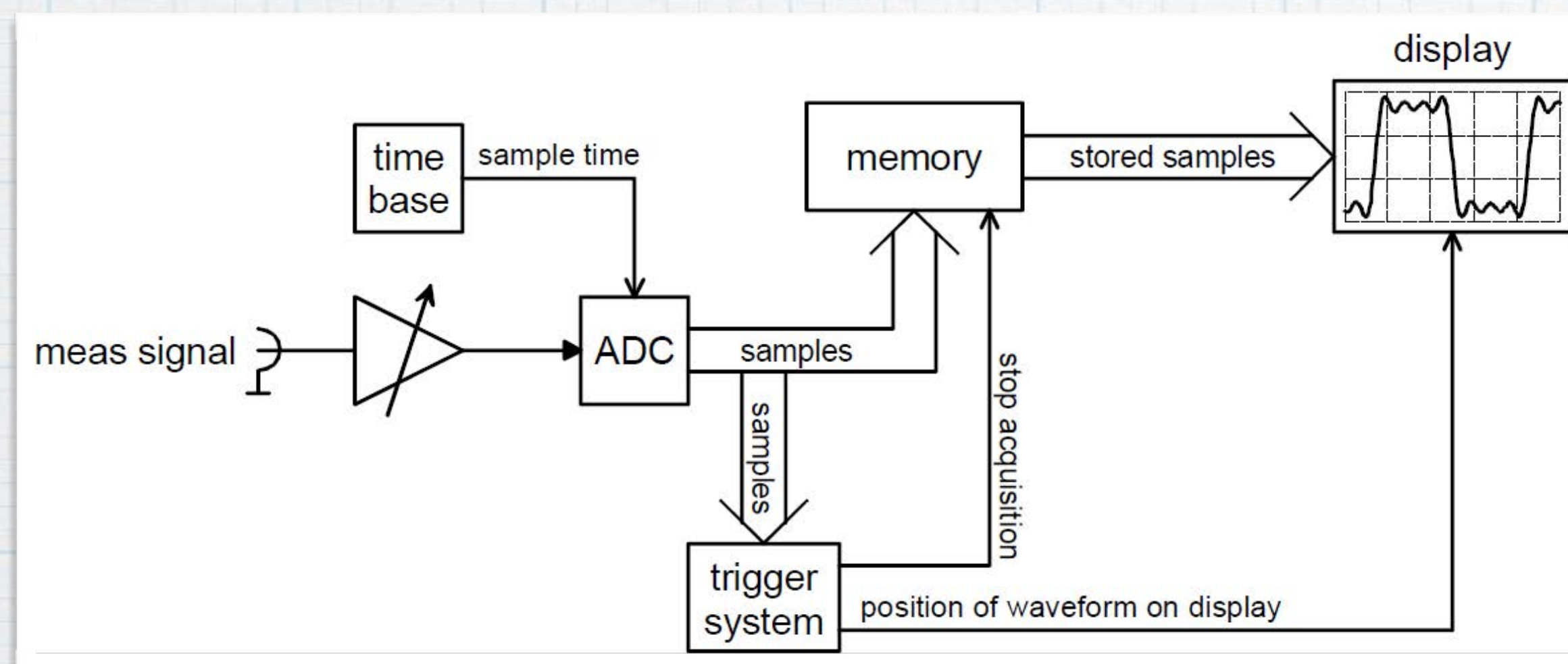


Trigger Jitter



Trigger jitter is a cumulation of error
It doesn't specify any one "good" or "bad" aspect

Digital Trigger



R&S has a unique digital trigger system

Interesting Content

- * <https://www.youtube.com/user/KeysightOscilloscope>
Tons of Scope Videos
- * <http://www.scope-of-the-art.com>
R&S Scope Dedicated Site
- * <http://teledynelecroy.com/events/?capid=107&mid=555>
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