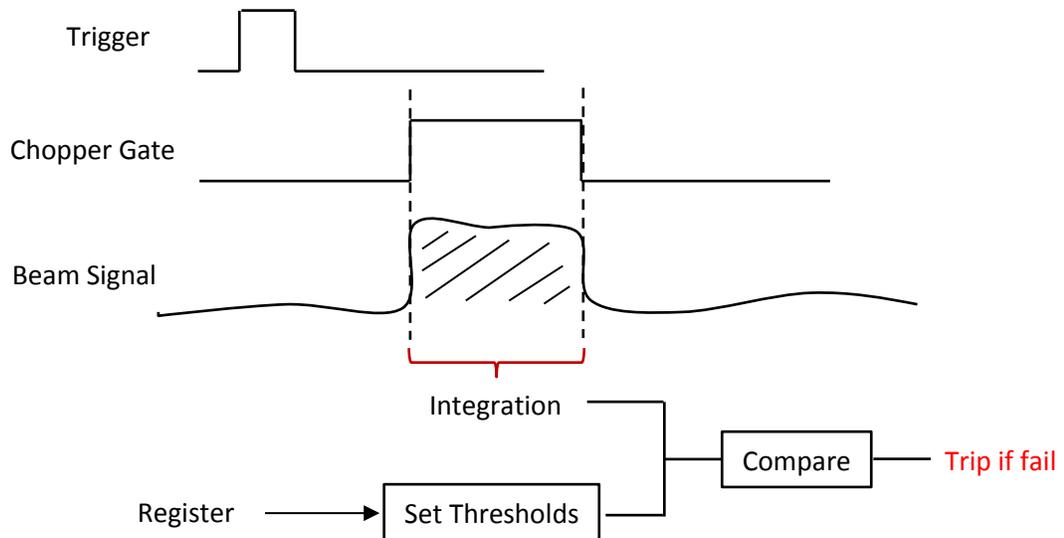


# PXIE Pulse Mode Machine Protection Scheme [Draft for review]

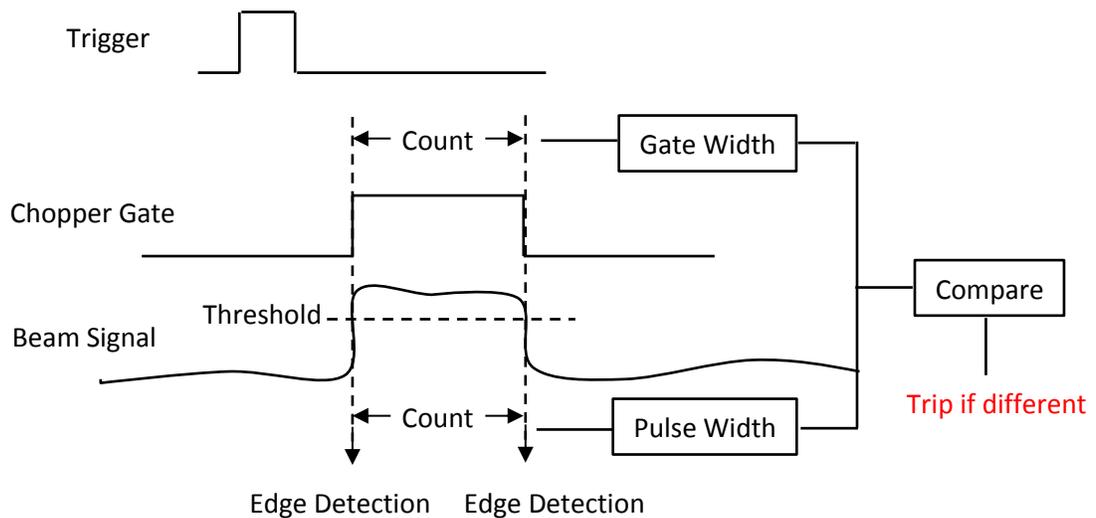
Built based on 125MHz Digitizer firmware ver. ABB0F

The machine protection scheme described here checks two different criteria. Failure to meet either would cause the system to trip:

1. Check Pulse Intensity, this is what we currently have



2. Check Pulse Width, this will be added:



**New registers for machine protection:**

<b>Register</b>	<b>Address</b>	<b>Data Width</b>	<b>Description</b>	<b>Initialize to:</b>
MPS Timing Check Switch	0x2CA	8	Turning ON/OFF timing check for each channel. Bits 7-0: Channels 8-1. '1' = ON. '0' = OFF.	0x1 for Ring Pickup, 0x00 for others.
MPS Timing Check Margin	0x2CB	8	Margin of error allowed when comparing Calculated Pulse Width to Gate Width. Unit: clock cycles.	0xA
Edge Detection Threshold	0x2D8	16	Signed 16 bits. Used to compare against ADC raw samples.	Create Acnet Device?
Calculated Pulse Width Ch1	0x2E8	32	Unsigned. Pulse width calculated from edge detector. Channel 1	Read only.
Calculated Pulse Width Ch2	0x2EC	32	Unsigned. Pulse width calculated from edge detector. Channel 2	Read only.
Calculated Pulse Width Ch3	0x2F0	32	Unsigned. Pulse width calculated from edge detector. Channel 3	Read only.
Calculated Pulse Width Ch4	0x2F4	32	Unsigned. Pulse width calculated from edge detector. Channel 4	Read only.
Calculated Pulse Width Ch5	0x2F8	32	Unsigned. Pulse width calculated from edge detector. Channel 5	Read only.
Calculated Pulse Width Ch6	0x2FC	32	Unsigned. Pulse width calculated from edge detector. Channel 6	Read only.
Calculated Pulse Width Ch7	0x300	32	Unsigned. Pulse width calculated from edge detector. Channel 7	Read only.
Calculated Pulse Width Ch8	0x304	32	Unsigned. Pulse width calculated from edge detector. Channel 8	Read only.
Pulse Direction	0x3C2	8	Pulse direction: '1' = positive, '0' = negative. Bits 7-0: Channels 8-1. This register was not used so far, since they were okay with seeing a negative reading. For our negative pulse at PXIE, this bit is required to be '0'. Setting it to '0' would cause the Intensity and Current readings to become positive. If they prefer a negative reading, we might have to flip it on D80.	Default is 0xFF now. Need 0x0 for Ring Pickup. Other boards unsure yet.