



The Multiple Slope Mode of AT laser triangulation cameras (as of 21st March 2016)

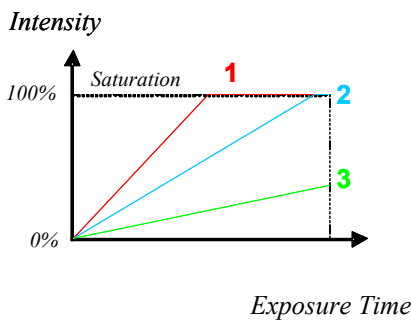
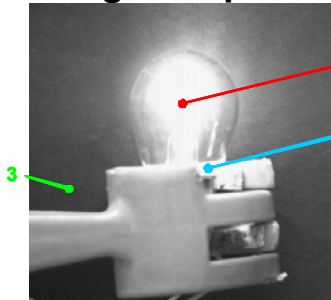
The Multiple Slope Mode is a function to increase the dynamic range of the sensor. It allows to capture very weak and very strong intensity signals at the same time without image saturation, thus enhancing the precision of laser line detection. Below is a procedure of how to set the parameters of Multiple Slope (example for Dual Slope mode):

- 1) Set the SingleSlope (ExposureSlopeKneePointCount=0)
- 2) Set the MAX algorithm
- 3) Enable DC0 in order to acquire the maximum intensity
- 4) Set ExposureTime to 1 us
- 5) Grab an image of DC0 of the target surface
- 6) Check if pixels of DC0 data are saturated (value 1023)
- 7) Reduce the laser power and repeat the image grab until no or few pixels of DC0 are saturated
- 8) Increase ExposureTime and repeat scan that long until you get as few zero intensity pixels in DC0 as possible (Attention: occluded regions must have zero values)
- 9) Set AoiThreshold to 0
- 10) Turn laser off
- 11) Grab an image of DC0 with laser turned off. The resulting image will contain the intensity of the background noise.
- 12) Detect the maximum intensity value of the background noise and set the AoiThreshold to a value slightly higher than that
- 13) Turn laser on
- 14) Enable DualSlope (ExposureSlopeKneePointCount=1, ExposureSlopeKneePointSelector=1)



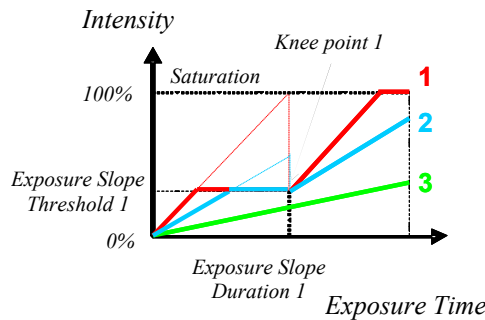
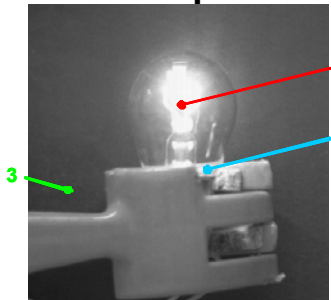
- 15) Set ExposureSlopeDuration equal to (ExposureTime – 1)/ExposureTime
- 16) Grab an image of DC0 and check the intensity values. If they are saturated then decrease ExposureSlopeThreshold and repeat until no or a few pixels are saturated
- 17) Change the algorithm to COG or FIR-Peak
- 18) Enable DC2 and if not required then disable DC0.

Single Slope Mode (default mode)



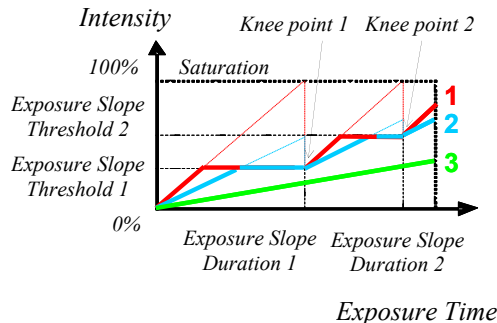
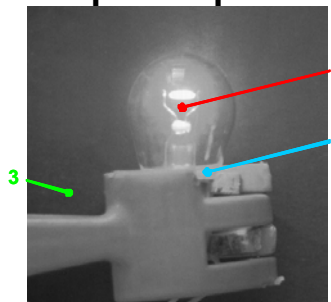
Property	Value
Root	
Device Control	
Image Format Control	
Acquisition Control	
Acquisition Start	Execute!
Acquisition Stop	Execute!
Acquisition Mode	Continuous
Acquisition Abort	Execute!
Acquisition Frame Count	1
Acquisition Frame Rate Absolute	25 Hz
Acquisition Status Selector	Acquisition Trigger Wait
Acquisition Status	False
Exposure Mode	Timed
Exposure Time	250
Exposure Slope Knee Point Count	0
Exposure Slope Knee Point Selector	1
Exposure Slope Duration	60 %
Exposure Slope Threshold	49.2063 %

Dual Slope Mode (1 Knee Point)



Property	Value
Root	
Device Control	
Image Format Control	
Acquisition Control	
Acquisition Start	Execute!
Acquisition Stop	Execute!
Acquisition Mode	Continuous
Acquisition Abort	Execute!
Acquisition Frame Count	1
Acquisition Frame Rate Absolute	25 Hz
Acquisition Status Selector	Acquisition Trigger Wait
Acquisition Status	False
Exposure Mode	Multi Sloped (HDR-3D)
Exposure Time	250
Exposure Slope Knee Point Count	1
Exposure Slope Knee Point Selector	1
Exposure Slope Duration	60 %
Exposure Slope Threshold	49.2063 %

Triple Slope Mode (2 Knee Points)



Property	Value
Root	
Device Control	
Image Format Control	
Acquisition Control	
Acquisition Start	Execute!
Acquisition Stop	Execute!
Acquisition Mode	Continuous
Acquisition Abort	Execute!
Acquisition Frame Count	1
Acquisition Frame Rate Absolute	25 Hz
Acquisition Status Selector	Acquisition Trigger Wait
Acquisition Status	False
Exposure Mode	Multi Sloped (HDR-3D)
Exposure Time	250
Exposure Slope Knee Point Count	2
Exposure Slope Knee Point Selector	2
Exposure Slope Duration	99 %
Exposure Slope Threshold	74.6032 %