Calculations for the Cutting – Trajectory Planner

Known Parameters:

Lead Screw = 20 TPI (.050” Pitch)

Stepper Motor: 2-Phase

 Step Angle=1.8eg./Step (360deg./1.8 = 200 Steps/Rev.)

 Rated Voltage=3.0 VDC

 Current/Phase=5.0 Amps

 Resistance/Phase=0.6 Ohms

 Induction/Phase=2.5 mH

 Holding Torque=570 Oz-In.

MicroSteps/Rev. = 200 steps \* 16 Microsteps (KFLOP) = 3200 Steps (MicroSteps)

Step/Inch (Resolution) = 20 Rev. \* 3200 Steps = **64,000 Steps/In**

Based off KFLOP Step Response testing Values … and if I use these Values for 3rd Order Motion – Rapid:

V=44,000 Counts/In

A=320,000 Counts/Sec2

J=4e+06 Counts/Sec3

And these values for the 2nd Order Motion – Cutting:

V=44,000 Counts/Sec

A=320,000 Counts/Sec2

J=450,000 Counts/Sec3

The following would be values used for the Trajectory Planner in CNCKmotion.

Counts/Inch = **64,000**

Velocity = $\frac{44,000 Counts}{Sec}\* \frac{1 In}{64,000 Counts}= \frac{44,000 In}{64,000 Sec}= \frac{.6875 In}{Sec}= \frac{.6875 In}{Sec}\* \frac{60 Sec}{1 Min.}=\frac{41.25 In}{1 Min.}=41.25\frac{In}{Min} $

Acceleration = $\frac{320,000 Counts}{Sec^{2}}\* \frac{1 In}{64,000 Counts}= \frac{320,000 In}{64,000 Sec^{2}}=5\frac{In}{Sec^{2}} $