NPI: SoftMotion GCode Interpreter

Motive:

To let customers import existing GCODE into LabVIEW and run the GCODE in using SoftMotion. This SW, along with cRIO/sbRIO, would be a basis to replace old CNC controllers with NI technology.

Requirements:

GCODE is an established standard since the 1970s.

There are many individual G-codes and M-codes to implement. Some are applicable, some are not. For ex: “G1” means move, but “M06” means change tool. If you don’t have a tool head, then this is not applicable.

Also, there can be different GCODE “styles”. For ex, you might have

O1000

T1 M6

G0 G90 G40 G21 G17 G94 G80

G54 X-75 Y-25 S500 M3 (Start Point)

G43 Z100 H1

Z5

G1 Z-20 F100

X-50 M8 (Position 1)

Y0 (Position 2)

X0 Y50 (Position 3)

X50 Y0 (Position 4)

X0 Y-50 (Position 5)

X-50 Y0 (Position 6)

Y25 (Position 7)

X-75 (Position 8)

G0 Z100

M30

(multiple G/M codes in one line)

("modal" codes, meaning that they stay in effect until they are cancelled or replaced by a contradictory code)

(N – line numbers…)

OR

N0001 G90

N0002 M03

N0003 G00 X0.0387 Y0.5609 Z0.5000

N0004 G00 X0.0387 Y0.5609 Z0.5000

N0005 G01 X0.0387 Y0.5609 Z-0.0500 F10.00

N0006 G01 X0.0405 Y0.5562 Z-0.0500 F40.00

N0007 G00 X0.0405 Y0.5562 Z0.5000

N0008 G00 X0.2363 Y0.9069 Z0.5000

N0009 G01 X0.2363 Y0.9069 Z-0.0500 F10.00

N0010 G01 X0.2686 Y0.8922 Z-0.0500 F40.00

N0011 G01 X0.3478 Y0.8751 Z-0.0500

N0012 G01 X0.6941 Y0.8870 Z-0.0500

N0013 G01 X0.6941 Y0.8910 Z-0.0500

N0014 G01 X0.6706 Y0.9037 Z-0.0500

N0015 G01 X0.4628 Y1.0331 Z-0.0500

N0016 G01 X0.4158 Y1.0477 Z-0.0500

…

OR

G20 G40 G90

G91.1

G0 Z0.250

G0 X-0.305 Y-0.127 Z0.250

G1 X-0.305 Y-0.127 Z-0.010 F50

G3 X0.304 Y-0.127 Z-0.010 I0.305 J0.115 F50

G2 X-0.305 Y-0.127 Z-0.010 I-0.305 J0.172

G0 X-0.305 Y-0.127 Z0.250

G0 X-0.372 Y-0.145 Z0.250

G1 X-0.372 Y-0.145 Z-0.010 F50

G3 X-0.267 Y-0.070 Z-0.010 I0.010 J0.097 F50

G0 X-0.267 Y-0.070 Z0.250

G0 X0.266 Y-0.070 Z0.250

G1 X0.266 Y-0.070 Z-0.010 F50

Possible Implementation Methods:

Object-Oriented?

Let each “G” is an object?

What will change?

SoftMotion/FlexMotion/WhateverMotion

Code function definitions? (But these should be pre-defined, unless I want to write a tool later that can be ported to WhateverCODE)

Different file formats? (But really, it’s all ASCII.)

So ideally, the code should look like this:

Integration efforts with other code.

You should set up into PARSER as one section. And ENGINE as the other.

If you just want the parser, that’s fine. Add your own actions.

Risks:

