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CPR E 185

Lab 1 HW 1

Question	Input	Output	RAM	System (bytes/bits)	CPU
1.1	Switches	LED lights	256B – 64KB	64000	Intel 8080 2.0 MHz
1.2	Hex keypad	6 digital LED	1024KB	1024000	MOS 6502 1MHz
1.3	Keyboard	Monochrome 280x192, 40x24 text	4KB - 65KB	4000	MOS 6502 1MHz
1.4	Keyboard	80x24 text	16KB – 640KB	16000	Intel 8088 4.77 MHz
1.5	Keyboard Mouse	9” monochrome 512x342 pixels	128KB – 512KB	128000	Motorola 68000 7.83 MHz

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Left & Right

Position = X/128

Up & down

Position = Y/128

Base Conversion

Do Decimal, Binary, Octal, and Hex

Decimal: 1, 10, 42, 255

Hex: F, DF, 81, 04

Binary: 10010011, 111111

Decimal	Binary	Octal	Hex
1	1	1	1
10	1010	8	A
42	101010	48	2A
255	11111111	365	FF
15	1111	17	F
223	11011111	337	DF
129	10000001	201	81
4	100	4	04
147	10010011	223	93
63	111111	77	3F

$0 \cdot 8^0 + 1 \cdot 8^1$

32 16 8 4 2 1

42 101010

-32 001010

10 2 A

8

$2 \cdot 8^0 + 4 \cdot 8^1$

16 + 32

48

255

128 64 32 16 8 4 2 1

128 10000000

127 01111111

64 F F

63

32

255

$8^2 8^1 8^0$

320 + 40 + 5

365

D F 3

13 15 6 4 2

1101 1111

128 64 32 16 8 4 2 1

223

$8^2 8^1 8^0$

337

8 1

1000 0001

128 + 1

129

01000 0001

2 0 1

4

100

38

32

4

2

1

63

2 2 3

1001 0011

129 + 16 + 2 + 1

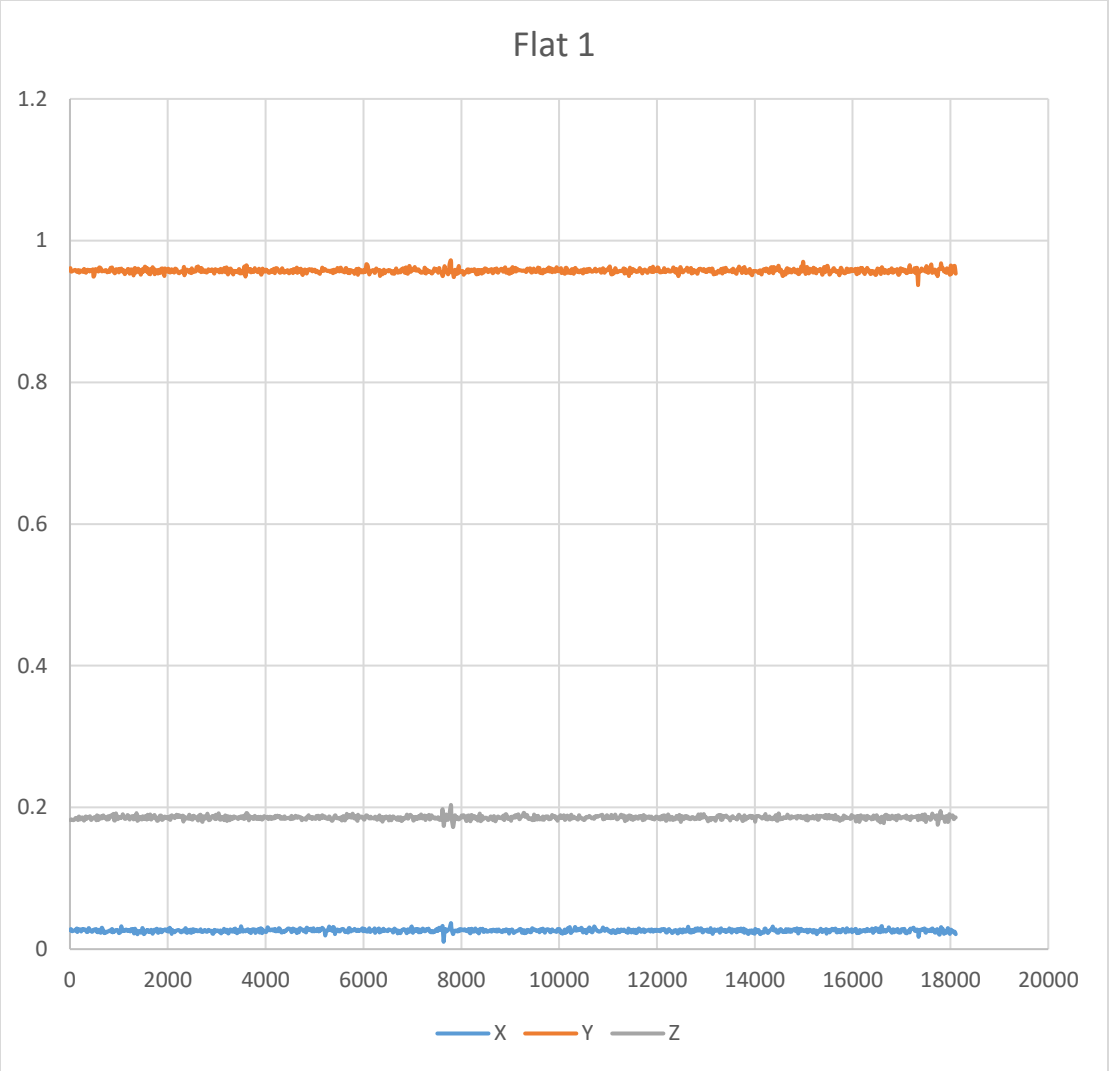
128

16

2

1

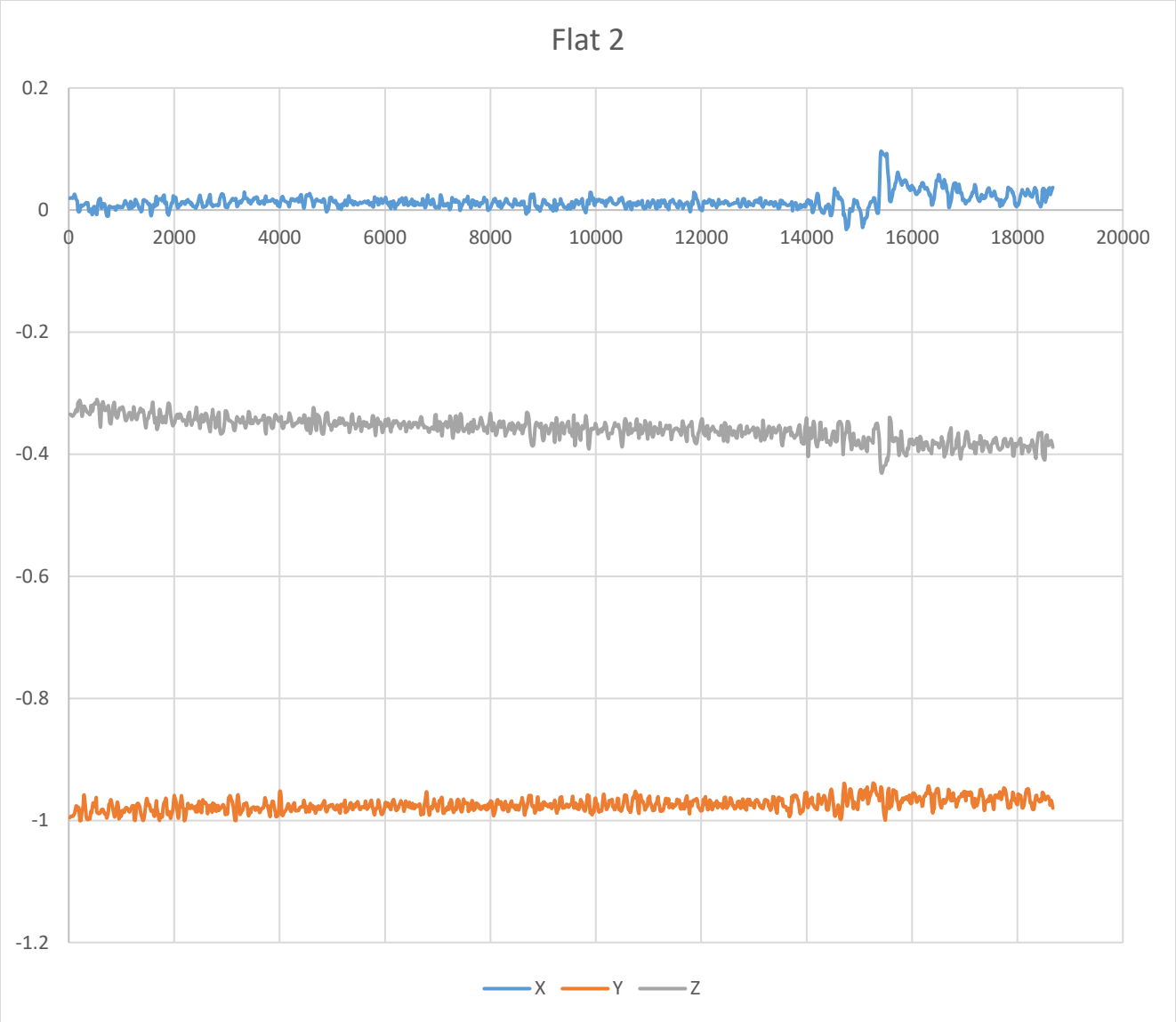
147



The X location is zero/near zero due to the lack of movement along that axis as it is not tilting

The Y location is almost constant at just below 1 with only minor spikes caused by random error

The Z location is just under .2 with random error causing fluctuations



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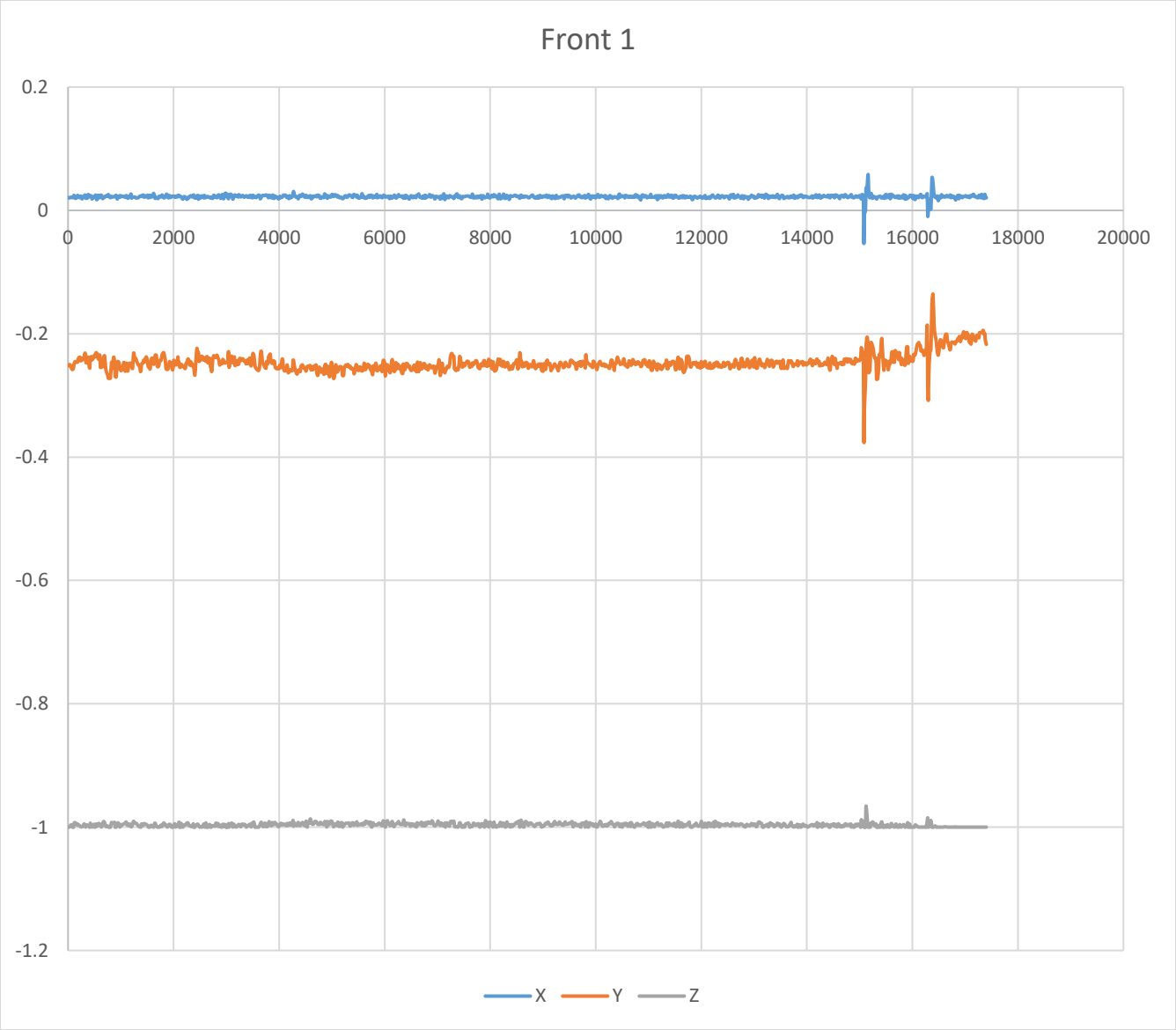
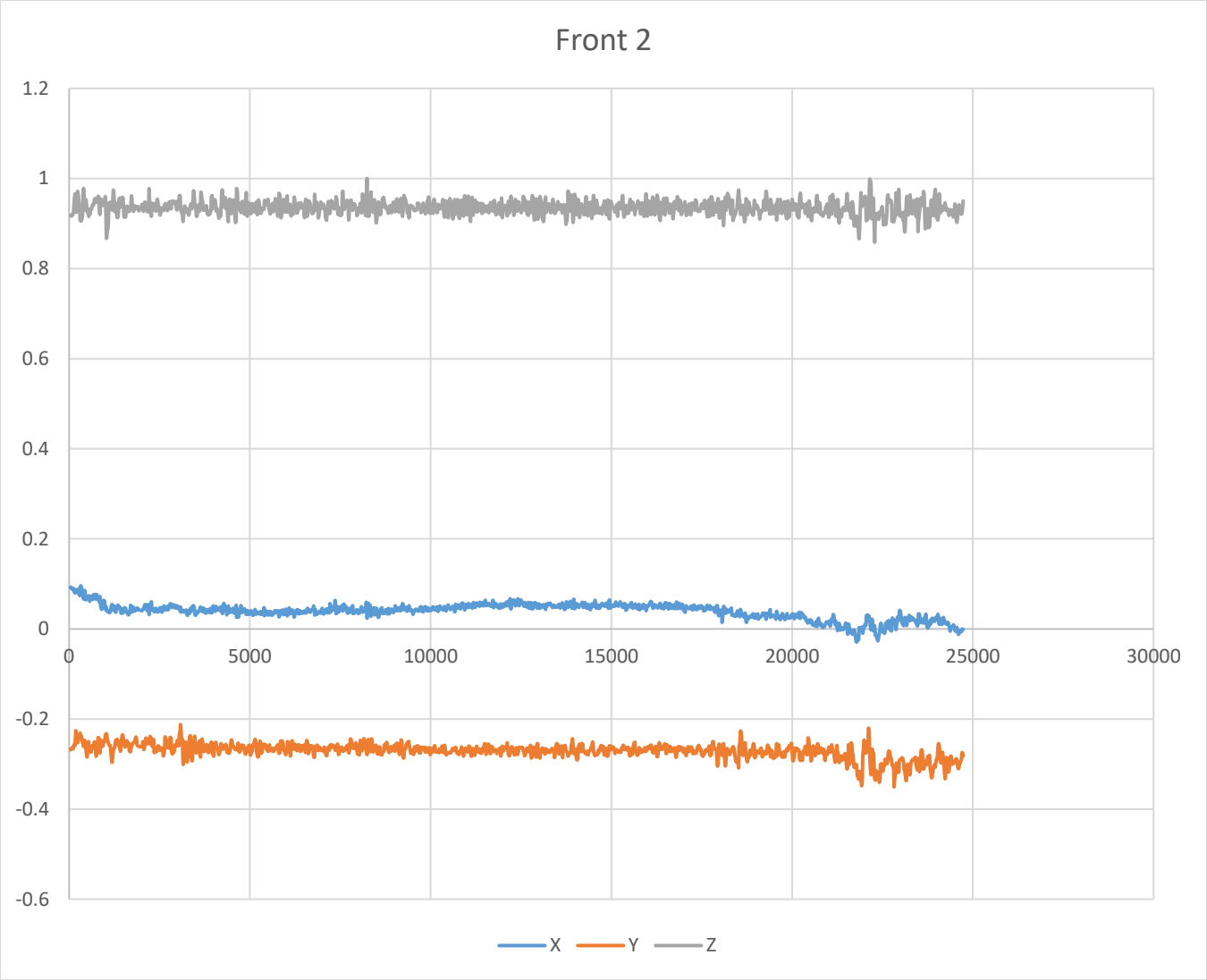


The X location is zero/near zero due to the lack of movement along that axis as it is not tilting

The Y location is hovering around -.25 due to the orientation and the fluctuation near the end is caused by the random error

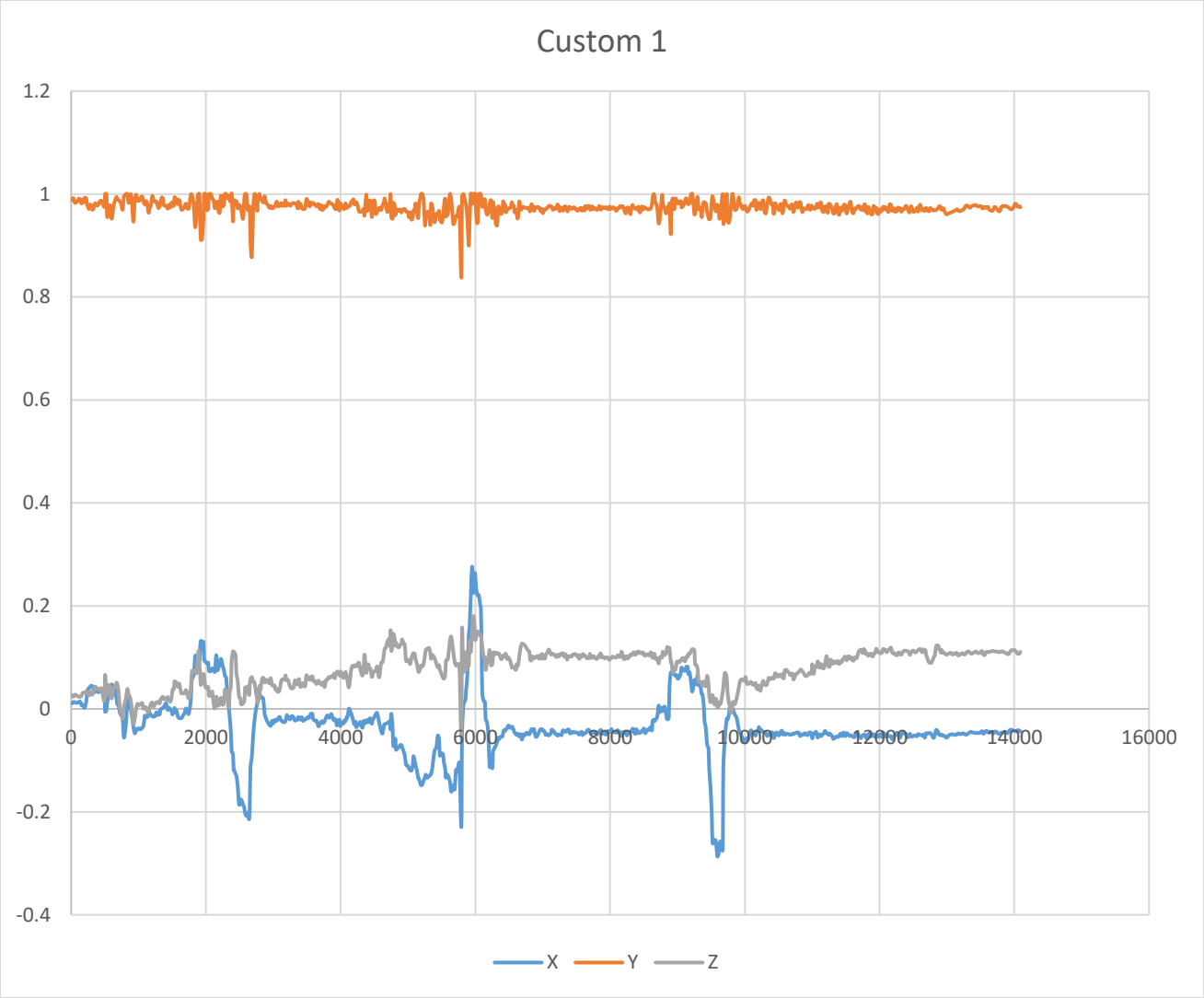
The Z location is negative one due to the orientation of the controller



The X location is zero/near zero due to the lack of movement along that axis as it is not tilting/angled

The Y location is almost constant at just below -.2 with only minor spikes caused by random error

The Z location is 1 due to the sensor being straight up



The X location is fluctuating as it shifts forward and back on that axis

The Y location is trying to be a constant 1, with some error due to human interference and my lack of ability of holding something perfectly levelled mid-air

The Z location is mainly above zero as it moves right, back to the origin and then right again

Exploration

1. What do you think each column of data represent?
   Each column of data in order accounts of time, the X data value, Y data value, and Z data value
2. How does this relate the flags (-t and -g) that you used?
   -t records the values over a time
   -g induces the gyroscope to be used
3. What unit of measure are the data in?
   The X axis on the graph represents time in milliseconds

   The Y axis on the graph represents the distance

Joystick Calibration

1. What are you vertical and horizontal joystick equations? Are they similar or not? Why or why not?
    a. Vertical = y/-128
    b. Horizontal = x/128
    c. They are similar because they are restricted by the same bounds for both axis, having a minimum of -128 and a max of 127
2. What did you find as the centre point? Explain why it is or is not 0?
    a. The point I had found to be the centre was (-.5, -.5). I believe this is due to the domain/range not being -128 to 128 but instead -128 to 127 instead.
3. What could cause the centre to not be 0?
    a. The centre not being 0 is caused by the lack of symmetric bounds, but it could also just be a calculation/recording error's
4. What could you change to make the centre be 0?
    a. Adding one to each value would technically solve the issue of the centre not being 1 seeing as it is one off however that would cause all the bounds to shift up by one, making the domain and range -127 to 128, making the -1 centre to 0