

RESULTS & ANSWERS

Experiment 1 Gravity Measurement

4.

Table 6-1

Angle (Degree)	g displayed on LCM
0	1
30	0.8
60	0.5
90	0
120	-0.5
150	-0.8
180	-1
210	-0.8
240	-0.5
270	0
300	0.5
330	0.8

5. *The g value is always reference to the Z-axis data.*

Experiment 2 Measuring Gravitational Acceleration

6. Z-Axis (g) = maximum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	Offset X	Scale Factor	X-Axis (g)
FFED	(-19	- 17.82)	X 3.9	→ -0.1436

Y-Axis

Y (16-bit Hex)	Y(Dec)	Offset Y	Scale Factor	Y-Axis (g)
11	(17	- 17.25)	X 3.9	→ -0.000975

Z-Axis

Z (16-bit Hex)	Z(Dec)	Offset Z	Scale Factor	Z-Axis (g)
EE	(238	- -23.06)	X 3.9	→ 1.018

7. Z-Axis (g) = minimum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	Offset X	Scale Factor	X-Axis (g)
F	(15	- 17.82)	X 3.9	→ -0.01101

Y-Axis

Y (16-bit Hex)	Y(Dec)	Offset Y	Scale Factor	Y-Axis (g)
1F	(31	- 17.25)	X 3.9	→ 0.05362

Z-Axis

Z (16-bit Hex)	Z(Dec)	Offset Z	Scale Factor	Z-Axis (g)
FEEA	(-278	- -23.06)	X 3.9	→ -0.9943

8. X-Axis (g) = maximum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	OffsetX	Scale Factor	X-Axis (g)
113	275	17.82	3.9	1.003

Y-Axis

Y (16-bit Hex)	Y(Dec)	OffsetY	Scale Factor	Y-Axis (g)
4	4	17.25	3.9	-0.05167

Z-Axis

Z (16-bit Hex)	Z(Dec)	OffsetZ	Scale Factor	Z-Axis (g)
11	17	-23.06	3.9	0.1562

9. X-Axis (g) = minimum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	OffsetX	Scale Factor	X-Axis (g)
FF07	-249	17.82	3.9	-1.041

Y-Axis

Y (16-bit Hex)	Y(Dec)	OffsetY	Scale Factor	Y-Axis (g)
FFEC	-20	17.25	3.9	-0.1453

Z-Axis

Z (16-bit Hex)	Z(Dec)	OffsetZ	Scale Factor	Z-Axis (g)
FFF5	-11	-23.06	3.9	0.04702

10. Y-Axis (g) = maximum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	Offset X	Scale Factor	X-Axis (g)
21	(33	- 17.82)	X 3.9	→ 0.05919

Y-Axis

Y (16-bit Hex)	Y(Dec)	Offset Y	Scale Factor	Y-Axis (g)
10B	(267	- 17.25)	X 3.9	→ 0.974

Z-Axis

Z (16-bit Hex)	Z(Dec)	Offset Z	Scale Factor	Z-Axis (g)
FFEE	(-18	- -23.06)	X 3.9	→ 0.01972

11. Y-Axis (g) = minimum

KL-67001 3-Axis Accelerometer Unit

Gravitational acceleration

Gravitational acceleration

Calculate

Tilt Angle

Main

Capture

QUIT

Gravitational acceleration

X-Axis

X (16-bit Hex)	X(Dec)	Offset X	Scale Factor	X-Axis (g)
FFAF	(-81	- 17.82)	X 3.9	→ -0.3854

Y-Axis

Y (16-bit Hex)	Y(Dec)	Offset Y	Scale Factor	Y-Axis (g)
FF0E	(-242	- 17.25)	X 3.9	→ -1.011

Z-Axis

Z (16-bit Hex)	Z(Dec)	Offset Z	Scale Factor	Z-Axis (g)
FFDD	(-35	- -23.06)	X 3.9	→ -0.04658

12.

Table 6-2

	Maximum (g)	Minimum (g)
X axis	1.003	-1.041
Y axis	0.974	-1.011
Z axis	1.018	-0.9943

Experiment 3 Gravitational Acceleration Calculation and Offset Calibration

9.

Table 6-3

Offset X	Offset Y	Offset Z
65	8	-22

10. When the accelerometer is horizontally placed, 3-axis acceleration should be X-axis= 0, Y-axis=0, and Z-axis=1. In the instance of 3-axis accelerometer, Offset X is positive, Offset Y is positive, and Offset Z is negative.