

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

The screenshot shows the KL-67001 3-Axis Accelerometer Unit software interface. The left sidebar has buttons for Gravitational acceleration, Calculate, Tilt Angle, Main (highlighted), Capture, and QUIT. The main area is titled "Gravitational acceleration". It shows three sections: X-Axis, Y-Axis, and Z-Axis. Each section displays a 16-bit hex value, its decimal equivalent, offset values, scale factor, and the resulting Z-axis value in g.

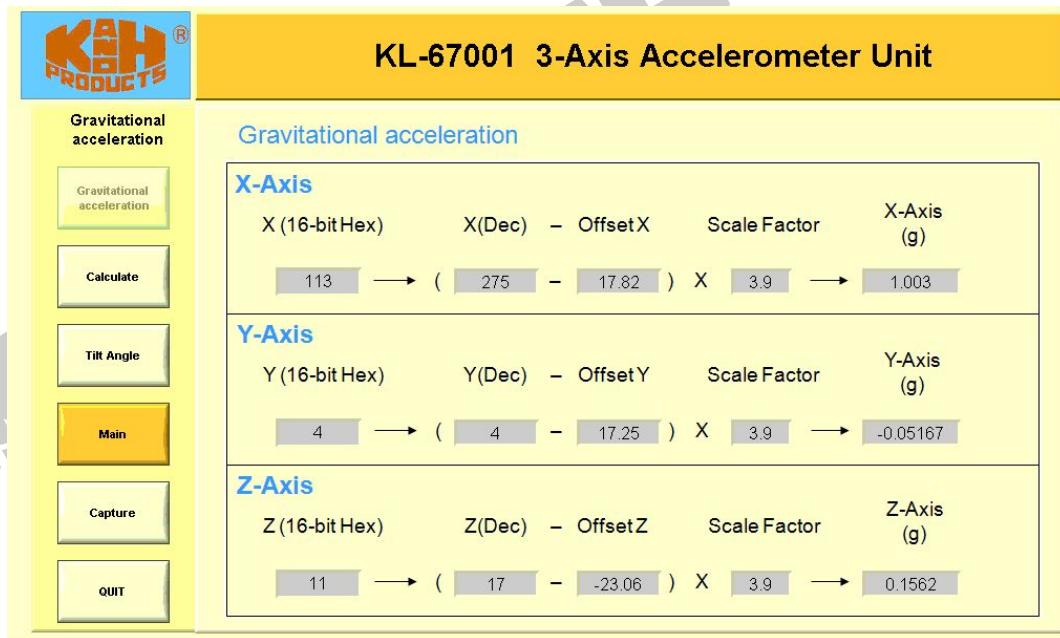
	X (16-bit Hex)	X(Dec)	- OffsetX	Scale Factor	X-Axis (g)
X-Axis	FFED	→ (-19)	- 17.82	× 3.9	→ -0.1436
Y-Axis	11	→ (17)	- 17.25	× 3.9	→ -0.000975
Z-Axis	EE	→ (238)	- -23.06	× 3.9	→ 1.018

7. Z-Axis (g) = minimum

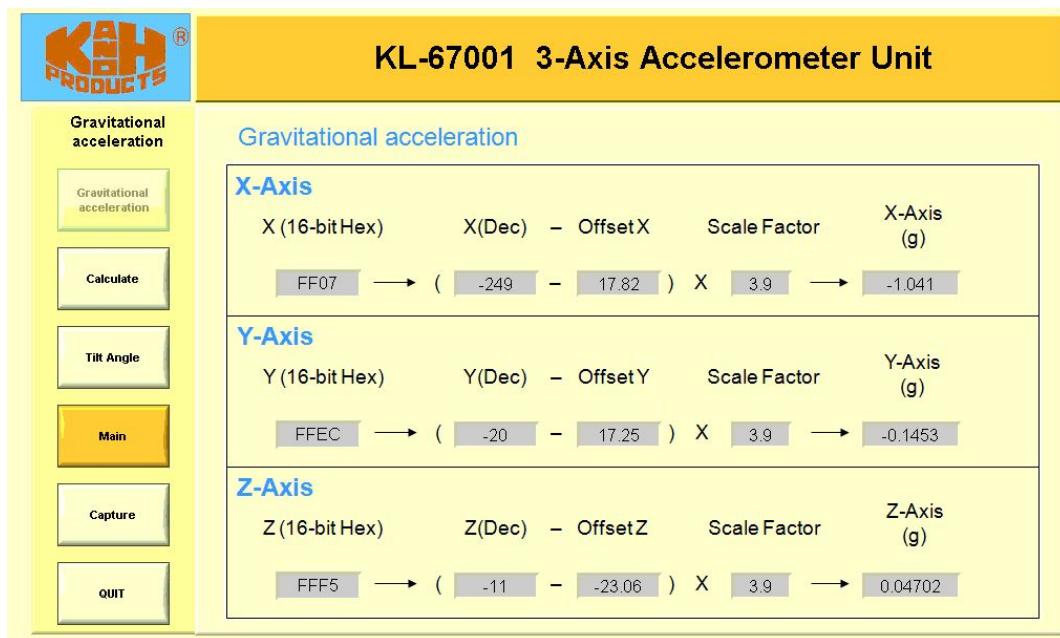
The screenshot shows the KL-67001 3-Axis Accelerometer Unit software interface. The left sidebar has buttons for Gravitational acceleration, Calculate, Tilt Angle, Main (highlighted), Capture, and QUIT. The main area is titled "Gravitational acceleration". It shows three sections: X-Axis, Y-Axis, and Z-Axis. Each section displays a 16-bit hex value, its decimal equivalent, offset values, scale factor, and the resulting Z-axis value in g.

	X (16-bit Hex)	X(Dec)	- OffsetX	Scale Factor	X-Axis (g)
X-Axis	F	→ (15)	- 17.82	× 3.9	→ -0.01101
Y-Axis	1F	→ (31)	- 17.25	× 3.9	→ 0.05362
Z-Axis	FEEA	→ (-278)	- -23.06	× 3.9	→ -0.9943

8. X-Axis (g) = maximum



9. X-Axis (g) = minimum



10. Y-Axis (g) = maximum

KL-67001 3-Axis Accelerometer Unit

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

Main

Capture

QUIT

11. Y-Axis (g) = minimum

KL-67001 3-Axis Accelerometer Unit

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

Main

Capture

QUIT

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.