Freedom Sensor Toolbox-Community Edition shows only zeroes in the plot data-how to fix it

The Freedom Sensor Toolbox-Community Edition GUI (Graphic User Interface) offers quick and easy demonstration and evaluation of the NXP sensors.

The GUI can be downloaded from this link: <u>https://www.nxp.com/design/software/development-software/sensor-toolbox-sensor-development-ecosystem/freedom-sensor-toolbox-community-edition-sensor-evaluation-and-visualization-software:SENSOR-TOOLBOX-CE</u>

NXP sensor demonstration kits compatible with the GUI are available at this link: <u>https://www.nxp.com/design/sensor-developer-resources/sensor-toolbox-sensor-development-</u> <u>ecosystem/evaluation-boards:SNSTOOLBOX?tid=vanSENSOREVALUATIONBOARDS</u>

There is an User Guide available, for the Freedom Sensor Toolbox-Community Edition GUI, describing installation, running and also troubleshooting of some common problems with the GUI. Please find the User Guide at this link: <u>https://www.nxp.com/docs/en/user-guide/STBCEUG.pdf</u>

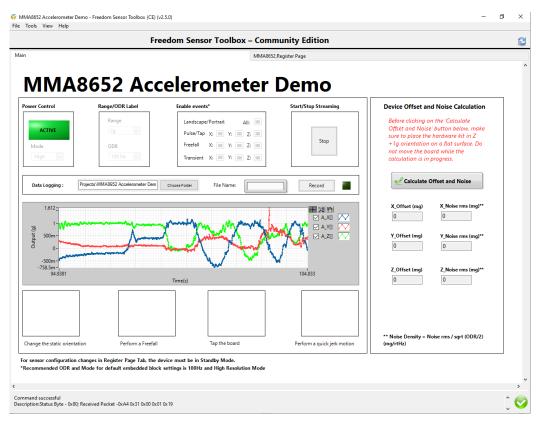


Figure 1. The Freedom Sensor Toolbox GUI is running correctly, Main Page

When the toolbox is running correctly, after pressing the Stat button, user can observe change in individual axis in the plot, according to the change of the individual axis on the sensor evaluated. See Figure 1. for an example with the MMA8652 accelerometer. Note the green mark in the right down corner

indicating, that the GUI and kit is working correctly. User can also observe change in Parameter Details in the Register page. See Figure 2.

Freedom Sensor Toolbox – Community Edition													
MMA8652.Register Page													
Select All Register													
gister Details						Parameter Details							Name
oup/Register Name	Address	Access	Size	Data	•	7 6	5	4	3	2	1	0	MMA8652
Group 1						OUT_X[11] OUT_X[OUT_X[8]	OUT_X[7]	OUT_X[6]	OUT_X[5]	OUT_X[4]	Interface Type
STATUS/F_STATUS	0x00	R	0x08			0 0	1	1	1	0	1	0	12C
OUT_X_MSB	0x01	R	0x08	0x3A					58				Slave Address
OUT_X_LSB	0x02	R	0x08			<						>	
OUT_Y_MSB	0x03	R	0x08			·						,	0x1D
OUT_Y_LSB	0x04	R	0x08	0x80		Description							Write Data
OUT_Z_MSB	0x05	R	0x08										3A 🗘
OUT_Z_LSB	0x06	R	0x08	0xA0		OUT_X_MSB :- [7:0] an	e 8 MSBs of 12-bit	sample				A	
Reserved	0x07	R	0x08	0x00		OUT_X:-X-axis Data							Write
F_SETUP	0x09	R/W	0x08	0x00									
TRIG_CFG	0x0A	R/W	0x08	0x00									Read Data
SYSMOD	0x0B	R	0x08										× 3A
INT_SOURCE	0x0C	R	0x08	0x00									
WHO_AM_I	0x0D	R	0x08	0x4A									- Read
XYZ_DATA_CFG	0×0E	R/W	0x08	0x00									
HP_FILTER_CUTOFF	0x0F	R/W	0x08	0x00									
PL_STATUS	0x10	R	0x08										Read All
PL_CFG	0x11	R/W	0x08										~
PL_COUNT	0x12	R/W	0x08	0xFF									Save Config
PL_BF_ZCOMP	0x13	R/W	0x08									_	Save Coning
P_L_THS_REG	0x14	R/W R/W	0x08	0x84									
FF_MT_CFG	0x15 0x16	R	0x08 0x08	0x38 0x3A									Coad Config
FF_MT_SRC	0x16 0x17	R/W	0x08	0x3A 0x82									<u></u>
FF_MT_THS	0x17	R/W	0x08	0x82 0x01									
TRANSIENT_CFG	0x10	R/W	0x08	0x0F									
TRANSIENT_SRC	0x1E	R	0x08										
TRANSIENT_THS	0x1E	R/W	0x08	0x90									
TRANSIENT_COUNT	0x20	R/W	0x08	0x90									
PULSE CFG	0x20	R/W	0x08	0x0C									
PULSE_SRC	0x22	R	0x08										
PULSE_THSX	0x23	R/W	0x08										
DULSE_THSY	0x24	R/W	0x08										
PULSE_THSZ	0x25	R/W	0x08	0x52									
	0x26	R/W	0x08										
PULSE_LTCY	0x27	R/W	0x08										
PULSE_WIND	0x28	R/W	0x08		U								
ASLP_COUNT	0x29	R/W	0x08										
CTRL_REG1	0x2A	R/W	0x08	0x19									
CTRL_REG2	0x2B	R/W	0x08	0x02									
CTRL_REG3	0x2C	R/W	0x08										
CTRI REGA	0x2D	R/W	0~08	0x3D	•							Ŧ	
te: The <u>Data</u> column in the Register st register values, use <u>Read</u> or <u>Read</u>		not updat	e real t	ime. For									

Figure 2. The Freedom Sensor Toolbox GUI is running correctly, Register Page

Some users might come across an issue, where after pressing the start button, the plot in the Main Page of the Toolbox shows only zeroes for all three axis, no matter how the tilt for any of the axis, of the evaluated sensor changes. See Figure 3. Note the red exclamation mark in the right down corner, indicating an issue with the GUI. Although the Parameter Details in the Register Page shows correct values according the change of individual axis on the evaluated sensor. See Figure 4.

	Fr	eedom Sensor Toolbox – Cor	nmunity Edition	
		MMA	652.Register Page	
ИМА	8652 Acc	celerometer	Demo	
ver Control	Range/ODR Label	Enable events*	Start/Stop Streaming	Device Offset and Noise Calculation
	Range	Landscape/Portrait All:		Before clicking on the 'Calculate
ACTIVE	2g 🗸	Pulse/Tap X: Y: Z:		Offset and Noise' button below, make sure to place the hardware kit in Z
Mode	ODR	Freefall X: Y: Z:	Stop	+1g orientation on a flat surface. Do not move the board while the
High 🗸	100 Hz 🗸	Transient X: Y: Z:		calculation is in progress.
				Calculate Offset and Noise
Data Logging :	Projects\MMA8652 Accelerometer Dem	Choose Folder File Name:	Record	
1			王 泡約	X_Offset (mg) X_Noise rms (mg)**
500m -				0
				Y_Offset (mg) Y_Noise rms (mq)**
Output (g)				
-500m -				
-1- 1544,25			1554,14	Z_Offset (mg) Z_Noise rms (mg)**
		Time(s)		0
		Tap the board	Perform a quick jerk motion	** Noise Density = Noise rms / sqrt (ODR/2) (mg/rtHz)
ange the static orient	ation Perform a Freefall][
		device must be in Standby Mode		
ensor configuration	n changes in Register Page Tab, the	device must be in Standby Mode. k settings is 100Hz and High Resolution Mode		

Figure 3. Plot in the Main Page of the GUI shows only zeroes for all three axis

					MMA8652.Register Page	
					Parameter Details	Name
Address	Access	Size	Data 4	-	7 6 5 4 3 2 1 0	MMA8652
					OUT X[11] OUT X[10] OUT X[9] OUT X[8] OUT X[7] OUT X[6] OUT X[5] OUT X[4]	Interface Type
0x00	R					12C
					212	Slave Address
						0x1D
					Description	Write Data
						D4
						Write
						Read Data
						× D4
0x0E	R/W					Read
0x0F	R/W					
0x10	R	0x08	0x06			Read All
0x11	R/W	0x08	0xC0			
0x12	R/W	0x08	0xFF			- ~
0x13	R/W					Save Config
0x14	R/W					
						Load Config
						2 Load Coning
0x27	R/W					
0x28	R/W			1		
0x29	R/W					
0x2A	R/W					
0x2B	R/W					
0x2C	R/W	0x08	0x02			
0x2C	R/W	0x08	0x3D 1			
	0x01 0x02 0x03 0x04 0x05 0x06 0x06 0x07 0x09 0x07 0x04 0x07 0x04 0x02 0x04 0x02 0x04 0x02 0x04 0x02 0x04 0x02 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x12 0x12 0x12 0x12 0x12 0x12 0x14 0x12 0x14 0x12 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x13 0x14 0x15 0x16 0x15 0x16 0x16 0x16 0x16 0x16 0x16 0x16 0x16	Both R 0.02 R 0.03 R 0.042 R 0.054 R 0.056 R 0.057 R 0.056 R 0.057 R 0.056 R 0.057 R 0.050 R 0.050 R 0.050 R 0.050 R 0.050 R 0.050 R 0.051 R 0.051 R 0.112 R 0.131 R 0.131 R 0.131 R 0.131 R 0.131 R 0.221 R 0.231 R 0.24 R 0.23 R 0.24 R	Or010 R Or02 Ch022 R Ch03 Ch033 R Ch03 Ch034 R Ch03 Ch035 R Ch03 Ch036 R Ch03 Ch037 R Ch03 Ch037 R Ch03 Ch037 R Ch038 Ch037 R Ch038 Ch038 R Ch038 Ch039 R Ch038 Ch040 R Ch038 Ch041 R Ch038 Ch141 R/W Ch038 Ch13 R/W Ch038 Ch141 R Ch038 Ch141 R Ch038 Ch141 R Ch038 Ch141 R Ch038 Ch142	6661 R 6662 R 6668 6624 6022 R 6038 6616 6663 6672 6034 R 6038 6616 6663 6672 6663 6672 6663 6672 6673 6673 6674	0x01 R 0x08 0x04 0x02 R 0x08 0x08 0x10 0x03 R 0x08 0x10 0x08 0x10 0x04 R 0x08 0x10 0x09 0x09 0x09 0x05 R 0x08 0x00 0x09 0x09	0.000 R 0.068 0.00 T 0 1 0 <th1< th=""> 0 1 0 1 0 1 0 1 0 <th< td=""></th<></th1<>

Figure 4. Parameter Details in the Register Page of the GUI

The issue with the wrong scaling in the Freedom Sensor Toolbox-Community Edition GUI is linked to the local preference and format on the computer.

The GUIs have been designed in Chandler/USA where decimal symbol is a simple point.

In Europe and in some Asian countries, it is usually a comma, hence this can cause issue with the plot.

The workaround to fix the issue with the unresponsive plot in the Main Page of the GUI is to change the decimal point in Windows operational system from comma to point. Follow the instructions according the following Figures.

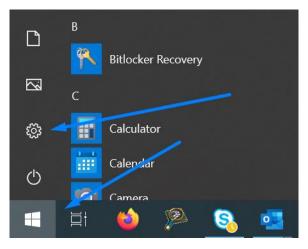


Figure 5. In Start menu press the Settings button

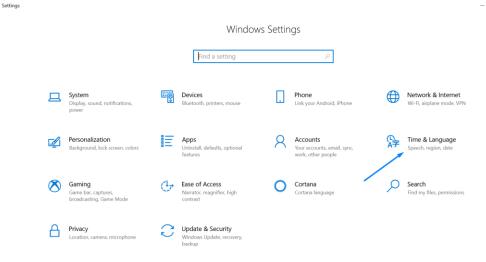


Figure 6. In the Windows Settings choose Time & Language

← Settings		- 0 ×
යි Home	Region	
Find a setting	Country or region	Related settings
Time & Language	United States	Additional date, time, & regional settings
👼 Date & time	Windows and apps might use your country or region to give you local content.	Get help
🔯 Region \prec	Regional format	Give feedback
	Current format: English (United States)	
x [≇] Language	English (United States)	
₽ Speech	Windows formats dates and times based on your language and regional preferences.	
	Regional format data	
	Select Change data formats to switch among calendars, date, and time formats supported by the region.	

Figure 7. In the Time & Language window choose Region following with Additional date, time & regional settings

🔿 Clock and Region		
$\leftarrow \hspace{0.1 cm} ightarrow \hspace{0.1 cm} \uparrow \hspace{0.1 cm} ilde{\hspace{1 cm} } $	> Cloc	k and Region
Control Panel Home	-	Date and Time
System and Security		Set the time and date Change the time zone Add clocks for different time zones
Network and Internet	Â	Region
Hardware and Sound		Change date, time, or number formats
Programs		
User Accounts		
Appearance and Personalization		
Clock and Region		
Ease of Access		

Figure 8. In the Clock and Region choose Change date, time or number formats

🔗 Region		\times
Formats Administrative		
Format:		
English (United State	25) ×	
Language preference	<u>25</u>	
Date and time form	nats	
Short date:	M/d/yyyy ~	
Long date:	dddd, MMMM d, yyyy	
Short time:	h:mm tt 🗸 🗸	
Long time:	h:mm:ss tt 🗸	
First day of week:	Sunday ~	
Examples		
Short date:	2/21/2021	
Long date:	Sunday, February 21, 2021	
Short time:	3:01 PM	
Long time:	3:01:17 PM	
	Additional settings	
	OK Cancel Appl	у

Figure 9. In Region window press Additional settings

🔗 Customize Format						
Numbers Currency Time Date						
Example Positive: 123 456 789,00	Negative: -123 456 789,00					
Decimal symbol:	. ~					
No. of digits after decimal:	2 ~					
Digit grouping symbol:	~					
Digit grouping:	123 456 789 ~					
Negative sign symbol:	- ~					
Negative number format:	-1,1 ~					
Display leading zeros:	0,7 ~					
List separator:	, ×					
Measurement system:	U.S. ~					
Click Reset to restore the system defa numbers, currency, time, and date.	ault settings for Reset					
	OK Cancel Apply					

Figure 10. In the Customize Format window change the Decimal symbol to point

After changing the Decimal symbol to point, simply turn on the Freedom Sensor Toolbox GUI and the plot will show changes in the individual axis according to the change in tilt of the sensor for individual axis.