Evaluation Board

for TLV493D-A1B6

3D Magnetic Sensor 2 Go Kit with TLV493D-A1B6

Board User's Manual

Rev. 1.0 2015-05-11

Sense & Control

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1 Overview and Introduction

This guide will lead you through the installation process in order to configure the TLV493D sensor using the 3D demo software for customer evaluation.

The hardware and software environment need to be established. This contains the USB driver and firmware for the sensor.

The software **Infineon 3D Magnetic Sensor 2 Go** will be used to enable a communication between the sensor and to set the different modes possible. In those modes the update rate of the magnetic field measured (X, Y and Z components) and current consumption vary. The modes can be changed according to a table, providing the bytes for proper sensor configuration.

The hardware is based on the XMC2Go-Kit. More technical documents and detailed description you can find at **http://www.infineon.com/xmc2go**.

The provided code, software or software parts are only an example how an implementation can look like.

2 Software and Tools

- Infineon 3D Magnetic Sensor 2 Go
  - Delivered by Infineon and located only for execution at **http://www.infineon.com/3dmagnetic**
  - Convenient way to set different modes in the TLV493D
  - Read out of Magnetic-field (X, Y, Z components)
- Magnet
- USB cable

Note: The provided codes, software, ... are only examples to show the principles of function.

This description is based on Microsoft Windows 7.

3 Startup Guide

3.1 How to Install the Software

1. Download **3D Magnetic Sensor 2 Go** software.
2. Start the installation of the software.
   The Welcome of the Setup wizard appears (see **Figure 1**).
   In a few steps the installation process is finished and the program is installed.
3. Click Install.
   After Installation button is pressed, please accept the terms of the preceding license agreement in order to keep on with installation.
   The required drivers for the device are installed automatically, see **Figure 2**.
   Please be aware that 2 boxes circled (rounded) are checked, see **Figure 2**.
4. Choose a folder where the drivers should be stored.
   In a few steps the drivers are installed and the device is ready for use.

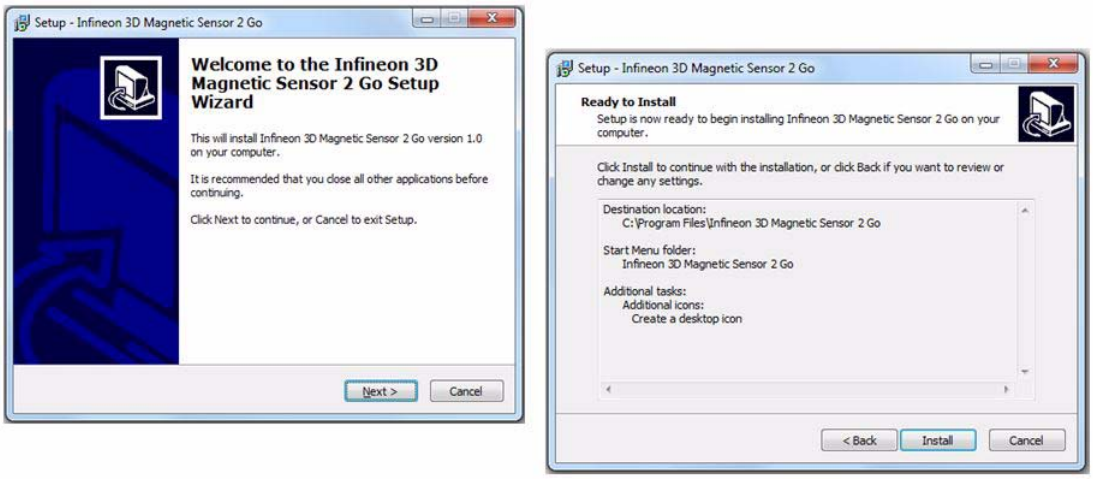

Figure 1 Setup Wizard

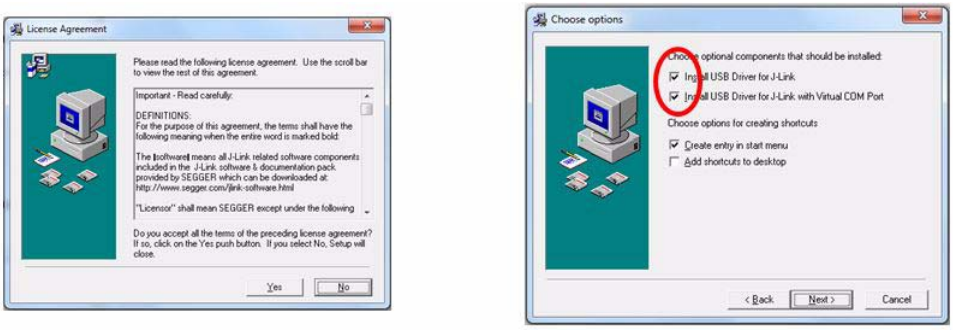

Figure 2 Driver Installation

3.2 3D Magnetic Sensor 2 Go-Kit: How to Connect the Hardware

Connect the Micro USB port of the 3D Magnetic Sensor 2 Go Kit with an USB port of your PC (see **Figure 3**).

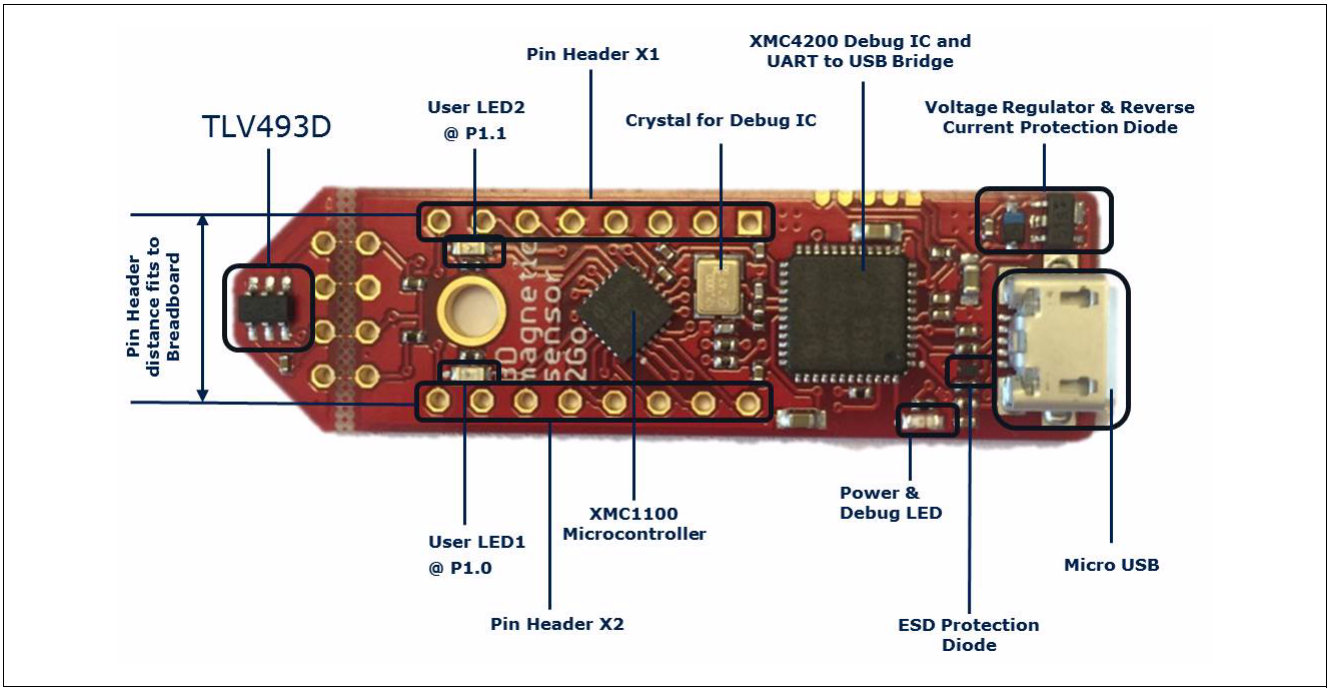

Figure 3 Connecting the Hardware

3.2.1 Hardware Description

Detailed description of the board hardware and how it can be used.

The 3D Magnetic Sensor 2 Go Kit must be supplied by external 5 Volt DC power supply connected to the Micro UBS plugs . Out of the box with the pre-programmed application and the on-board debugger in operation the 3D Magnetic Sensor 2 Go typically draws about 75 mA. This current can be delivered via the USB plug of a PC, which is specified to deliver up to 500 mA. The Power & Debug LED indicates the presence of the generated 3.3V supply voltage.

An on-board reverse current protection diode will ensure safe operation and protects the USB port of the Laptop/PC in case power is provided through the pin header X1.

If the board is powered via the USB plug, it´s not recommended to apply an additional power supply to the VDD pin of X1 (3.3V), because this power supply could drive against the on-board power supply. The VDD pin can be used to power an external circuit. But care must be taken not to draw more current than 150mA, which is the maximum current the on-board voltage regulator can deliver.

After power-up the Debug LED starts blinking. In case there is connection to a PC via the Debug USB plug X101 and the USB Debug Device drivers are installed on this PC, the Debug LED will turn from blinking to constant illumination.

3.2.2 Pin Header Connector

The pin headers X1 and X2 can be used to extend the evaluation board or to perform measurements on the XMC1100. The order of pins available at X1 and X2 corresponds to the pinning schema of the XMC1100 Microcontroller in the TSSOP-16 pin package. The pinning table is also printed onto the bottom side of the PCB.

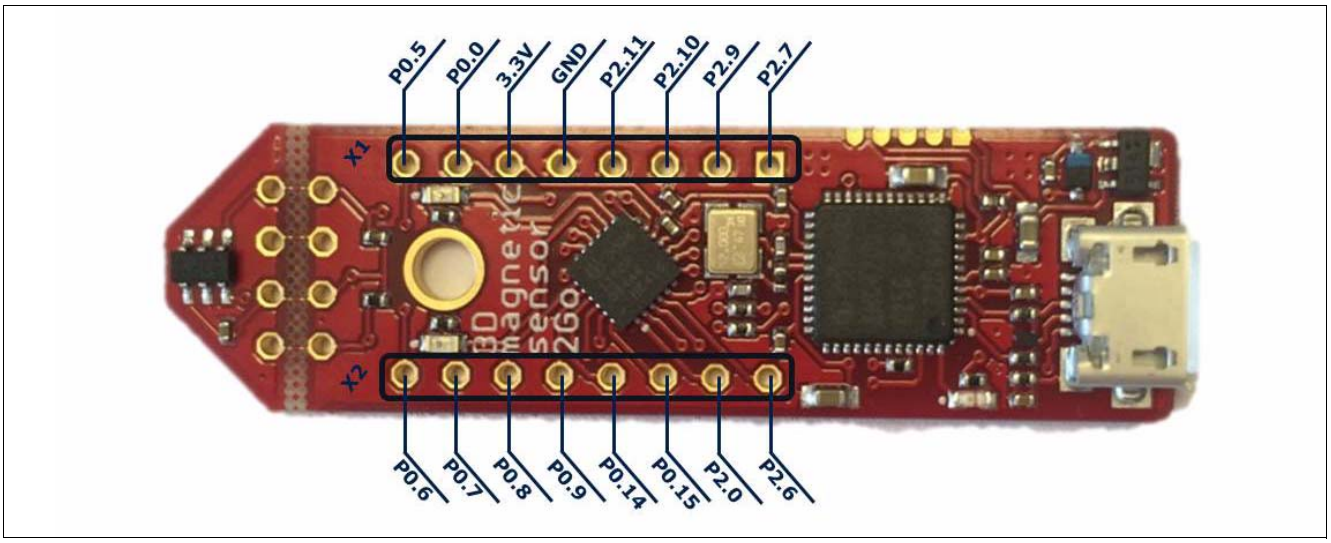

Figure 4 Connecting the Hardware

User LEDs

The port pins P1.0 and P1.2 of the XMC1100 on the 3D Magnetic Sensor 2 Go Kit are connected to LEDs exclusively.

Table 1 Pins Used for the User LEDs

LED	Port Pin
LED1	P1.1
LED2	P1.0

3.3 How to Use the Demo-Software

1. Start "Infineon 3D Sensor to Go".
   The Demo-Software Window appears (see **Figure 5**).
2. Choose the correct COM Port.
3. Click "Connect" (see **Figure 6**).
   Result: "… Connected on Port …"
4. In the Configuration area choose the mode (see **Figure 7**).
5. Click "Write".
   The sensor is configured.
6. Click "Start" (see **Figure 8**).
   B-field readout is started in the chosen mode of the sensor's B-field.
7. Click "Stop".
   B-field readout is stopped.
   The read out in bits is shown in the "Raw Data" area.
8. If you want to store the data of the next measurement, use the "DataLogger" feature.
   The next measurement will be logged.
9. If you want to view a joystick simulation, click the "3D Visual" tab.
   The acquired sensor values are transferred into spherical coordinates. With an algorithm the joystick movement is simulated (see **Figure 9**).
10. If you want to view a graph of the magnetic field, click on the "Graph" tab.
    The values of the magnetic field of each axis are displayed across time (see **Figure 10**).

Note: Always use "Power down" as intermediate mode when changing the modes.

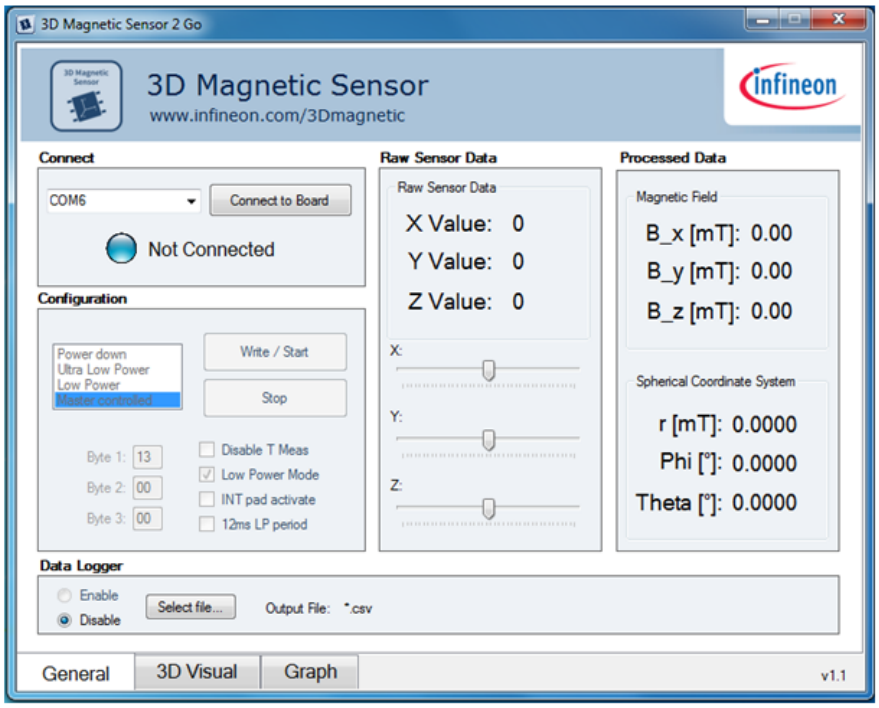

Figure 5 Demo-Software Window

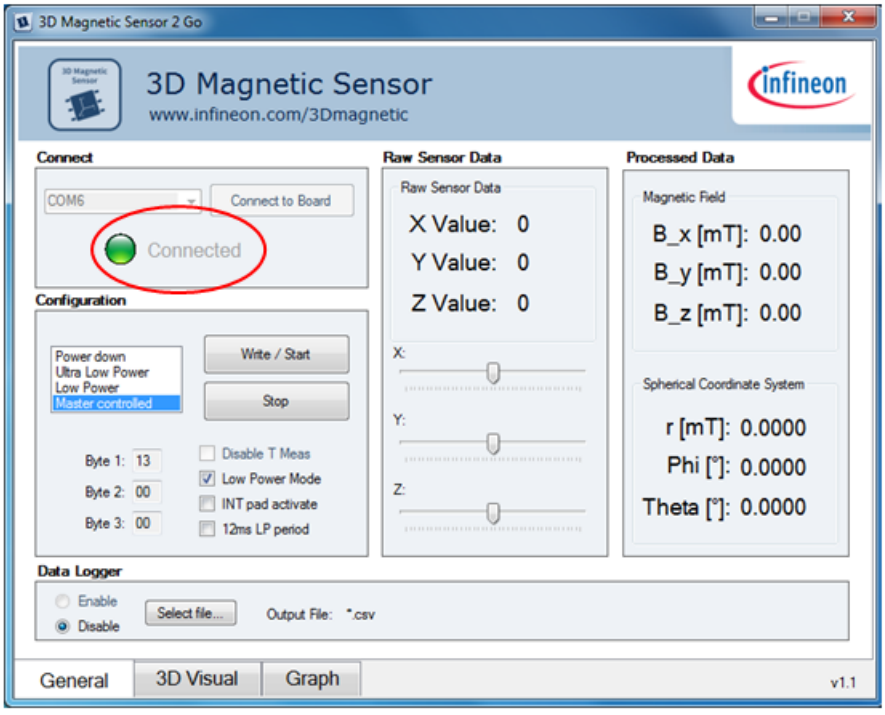

Figure 6 Demo-Software - Connect

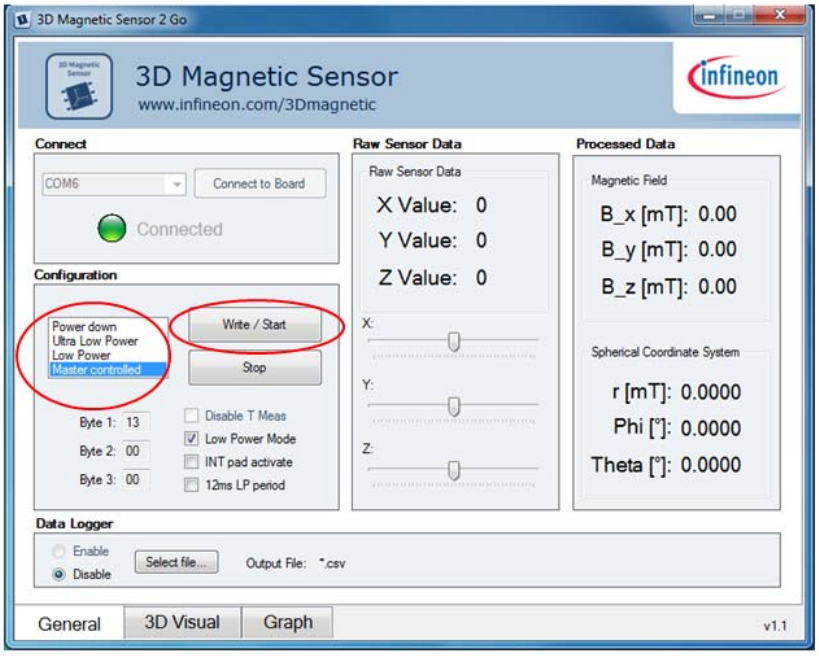

Figure 7 Demo-Software - Configuring the Sensor

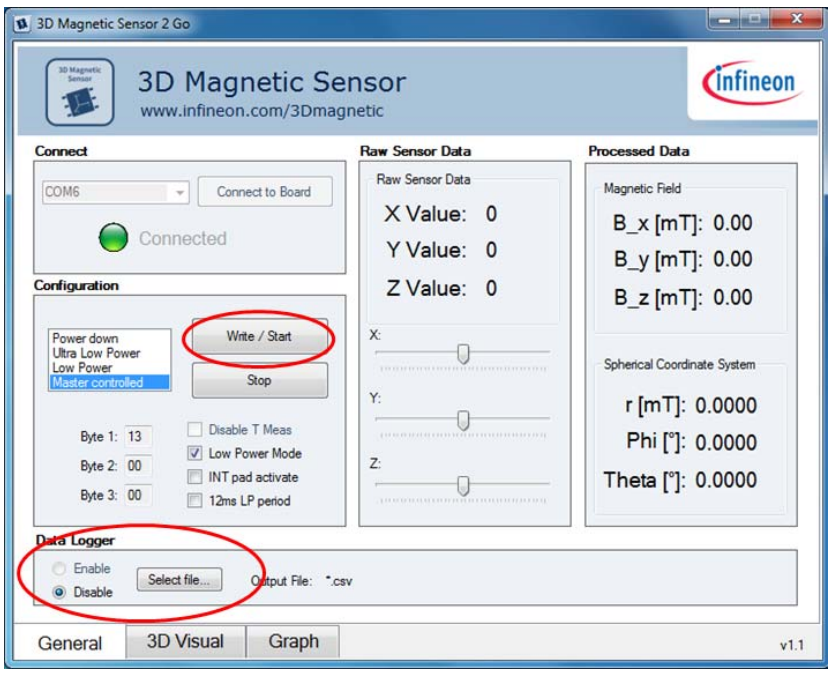

Figure 8 Demo-Software - Sensor Readout

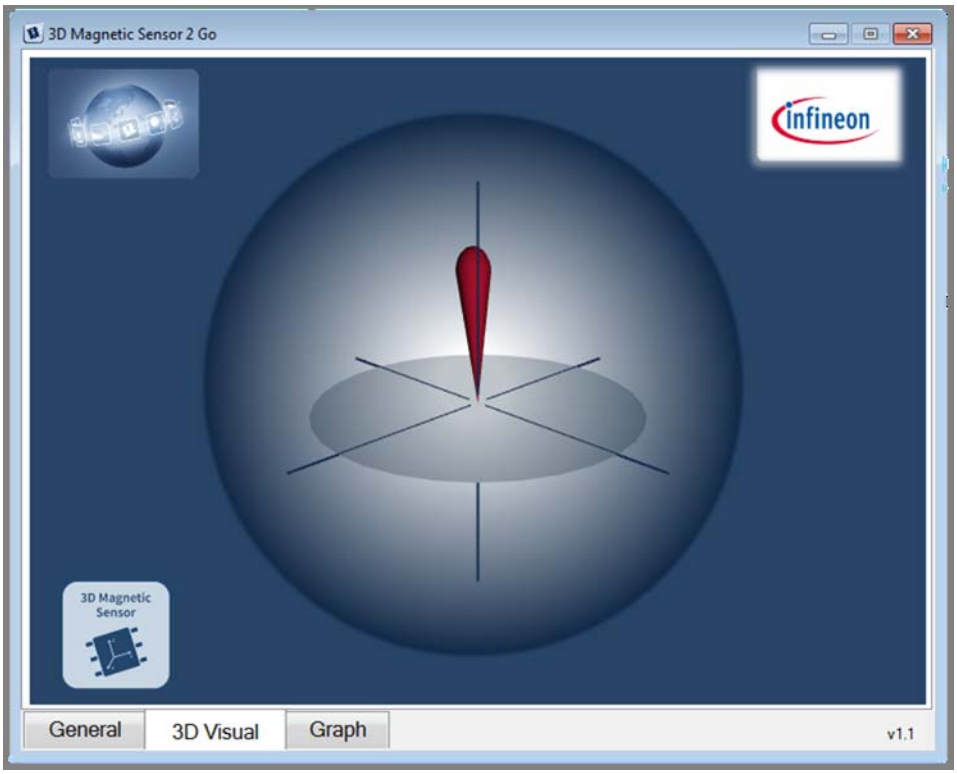

Figure 9 Demo-Software - Joystick Simulation

Every movement of the magnet is shown and can be seen in spherical coordinate system. All three axes of magnetic field that are given by senor are transferred in spherical coordinates and shown here, including the angles of directions in which ones magnet moves. By rotating the sphere in the picture, more detailed and clear position of the magnet is shown. With an algorithm the joystick movement is simulated. Red orbital figure inside of sphere is showing how sensor detects moving of the magnet or movement of the joystick.

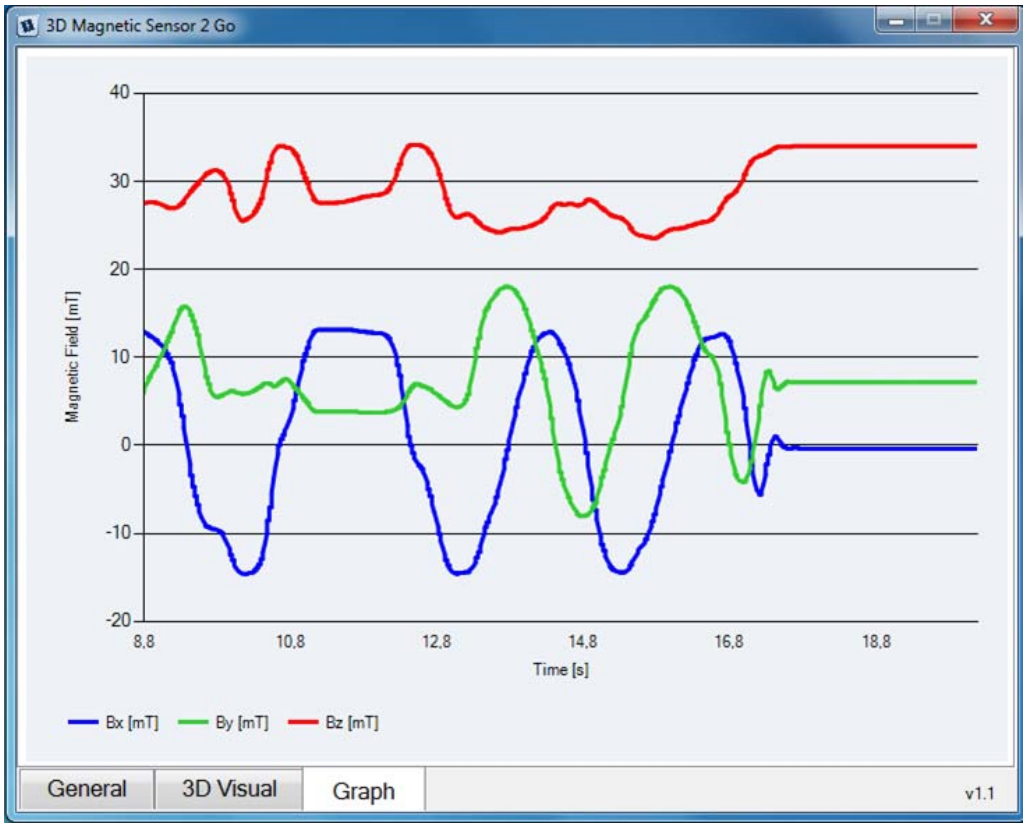

Figure 10 Demo-Software - Graph of the 3-Axis Magnetic Field

Three axes of the magnetic field are shown in three different colors in this graph. X axes are presented with the blue line, Y axes with the green and Z axes with the red line. Depending on the mode in which one sensor works, these values are changing with the time and all changes can be seen in the graph.

Table 2 Modes

Mode	Byte1	Update rate	Current consumption[1)]
	Byte2		
	Byte3		
Fast mode	06	3.3 kHz	3.7 mA
	00		
	00		
Master controlled version	13	2.2kHz	
	00		
	00		
Low power mode	05	100 Hz	100 µA
	00		
	00		
Ultra Low Power Mode	01	10 Hz	10 µA
	00		
	00		

1) only IDD, current at pull-ups is not considered

4 Revision History

Revision	Date	Changes
1.0	2015-05-11	Initial version

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