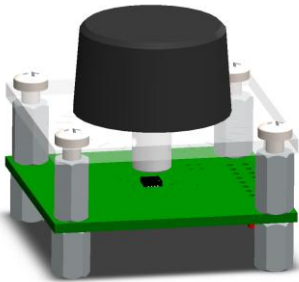


## Evaluation kit for MagAlpha

EVMA300-Q-00A

User guide 2014 REV. 1.0

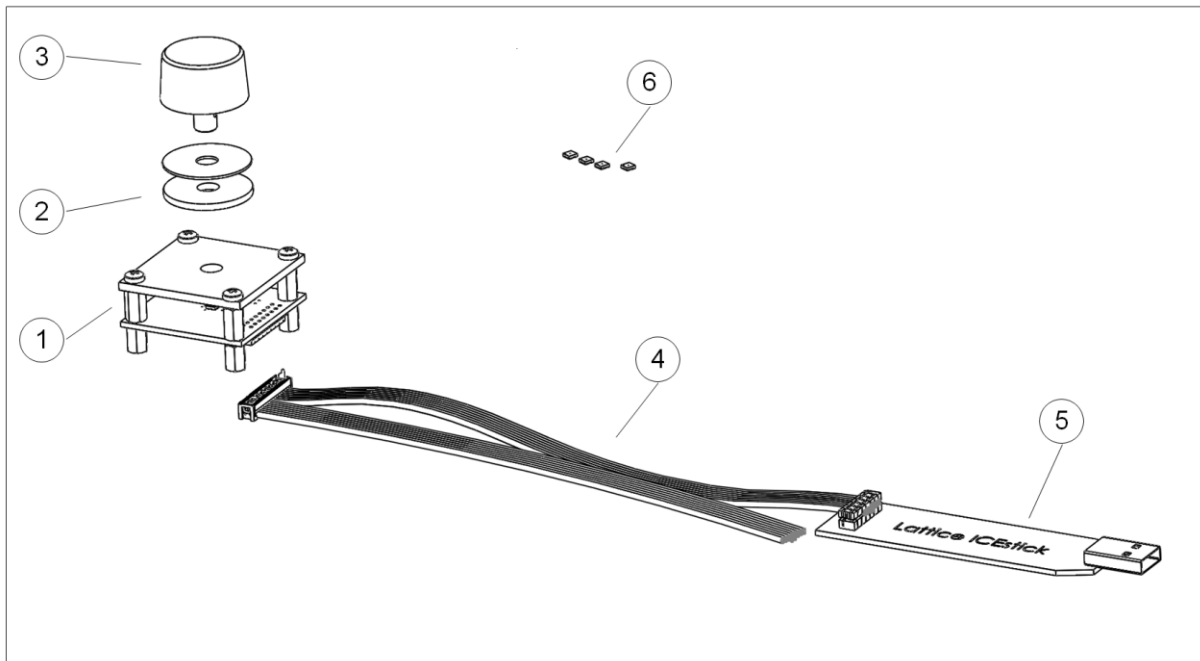
### 1. General description



The kit allows users to quickly run and test the MagAlpha sensor. The MagAlpha sensor is mounted in end-of-shaft configuration.

Using the USB interface Lattice ICEstick<sup>®</sup> included in this kit, the user can evaluate the MagAlpha functionalities, and performances such as the noise level, the refresh rate, the power up time, the magnetic field dependence, etc.

### 2. Kit content



1. Evaluation stage with MagAlpha mounted
2. 0.7 and 2.0 mm thick spacers
3. Knob with magnet

4. 20 cm flat ribbon cable (16 wires)
5. USB interface
6. Four additional MagAlpha samples

## 1. Circuit board

One MagAlpha sensor is soldered in the center of the printed circuit board. It is ready to be connected to the flat ribbon cable with the 16 pins Micro-Match connector. The Micro-Match connector is surface mounted and shall be unsoldered in case the user wants to directly access the board I/O pads.

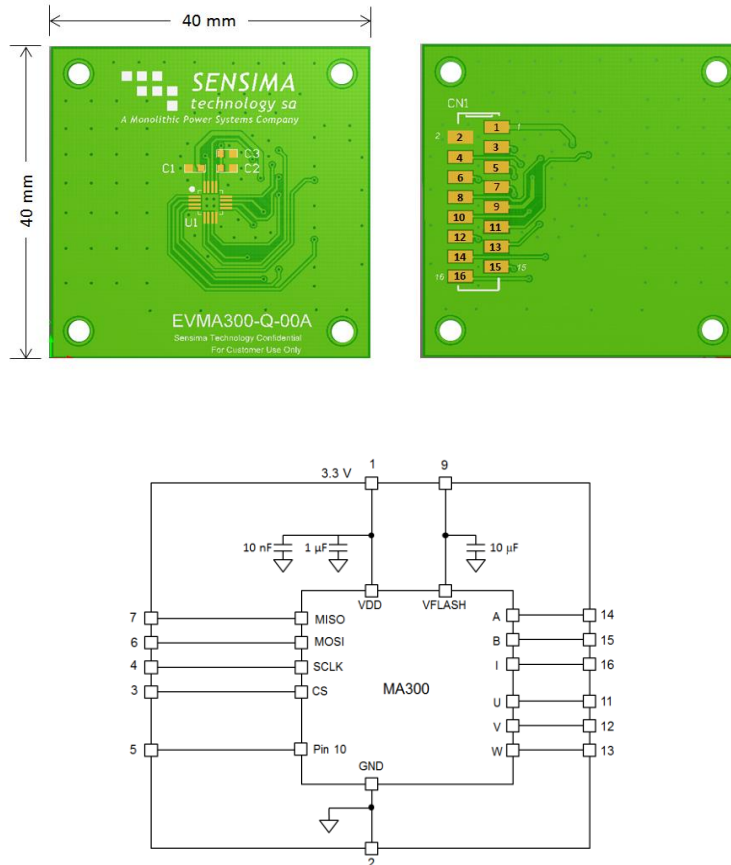


Figure 1: Evaluation Board Top View, Bottom View and Schematics

TABLE 1: CONNECTOR PINS

Pin	Name	Description	Pin	Name	Description
1	VDD	3.3V supply	9	VFLASH	supply for flashing
2	GND	Ground	10	-	-
3	CS	Chip select (serial)	11	U	U (motor commut.)
4	SCLK	Clock (serial)	12	V	V (motor commut.)
5	ANA	MA Pin 10 (option)	13	W	W (motor commut.)
6	MOSI	Master Out Slave In (serial)	14	A	A (incremental)
7	MISO	Master In Slave Out (serial)	15	B	B (incremental)
8	-	-	16	Z	Z (incremental)

TABLE 2: BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	10uF	Ceramic Cap, 6.3V, X5R	0603	muRata	GRM188R60J106ME47D
1	C2	10nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R7H103KA01D
1	C3	1uF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R7C105KA12D
1	CN1	SMD Connector	Temperature 16PIN SMD Connector with Ploarization and Latch	SMD	Würth Electronics	WR-MM 690367291676
1	U1	MA300GQ	Sensima MagAlpha Series Magnetic Angular Sensor	QFN3X3-16	MPS Sensima Technology	MA300GQ

## 2. Magnetic field

A NdFeB cylinder magnet is mounted at the end of the aluminum shaft.

TABLE 3: MAGNET CHARACTERISTICS

Material	NdFeB (N35H)
Remnant field	1.2 T
Diameter	5 mm
Height	2.5 mm
Magnetization	Diametrical



### How to change the magnetic field amplitude

The performance of the MagAlpha remains the same from 75mT to 150mT or even higher (the MagAlpha has no operation maximum field). The critical region is the lower end of the specified range: some parameters (noise, linearity) gradually deteriorates when the magnetic field gets weaker than 30mT. The two spacers enclosed in this evaluation kit offer the possibility to test the sensor (in particular its noise level) at low magnetic fields

The nominal magnet-sensor distance is 1.5 mm, providing a magnetic field of 75mT. With the spacers the field strength is reduced to 50mT or 25mT as depicted in Table 4.

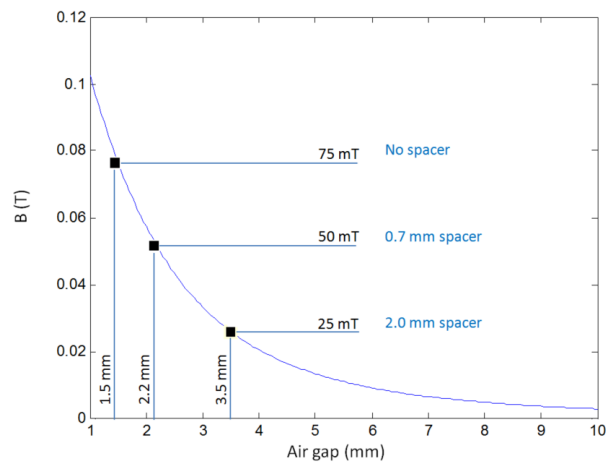
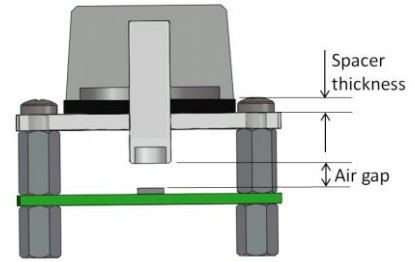


Figure 2: Magnetic Field vs. Air Gap for the Supplied Magnet

TABLE 4: SETTING OF THE AIR GAP

Spacer thickness (mm)	Air gap (mm)	Magnetic field (mT)
None	1.5	75
0.7	2.2	50
2	3.5	25



### 3. Communicate with MagAlpha using the USB interface

1. Download the Graphic User Interface (GUI) for the eval-kit on [www.sensimatech.com](http://www.sensimatech.com) and unzip the files.
2. Connect the MagAlpha evaluation stage to the Lattice ICEstick with the flat ribbon cable.
3. For Windows XP, Vista, 7 or 8, plug the ICEstick to a USB port. It will be automatically installed. (Should the corresponding driver not be already available, an Internet connection may be required.)
4. Run the GUI: it is ready to read angles, read the registers status and configure the registers.

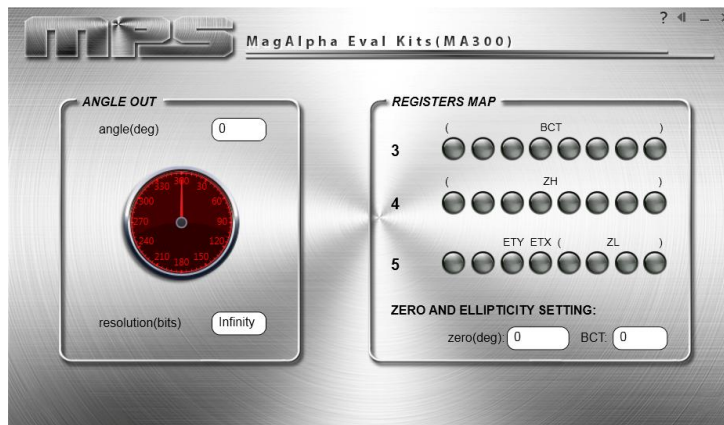


Figure 3: GUI Software Front Panel

Notes:

- The GUI is compatible with Windows XP, 7, 8, 8.1
- For LabView users: the file MA\_lib\_vi.2.2.0.zip available on Sensima Technology website contains a library of VI's and an example MA\_example.vi, which can be executed immediately after connecting the ICEstick to the PC.
- Read and write functions callable by any software are available in the MALib.dll library.
- Simple command lines (maread.exe and mareg.exe) are also available in mautil.x.x.x.zip. For more information please see "MA\_util\_guide.pdf" on Sensima Technology website.
- For more information about the MagAlpha sensors please refer to the product datasheets.

## 4. ABZ

The incremental output can be monitored on the pin 14, 15 and 16, for instance with an oscilloscope. The logic high level is 3.3V. The user can verify that the A or B signals have a raising edge every 1.4 degree (256 times per rotation).

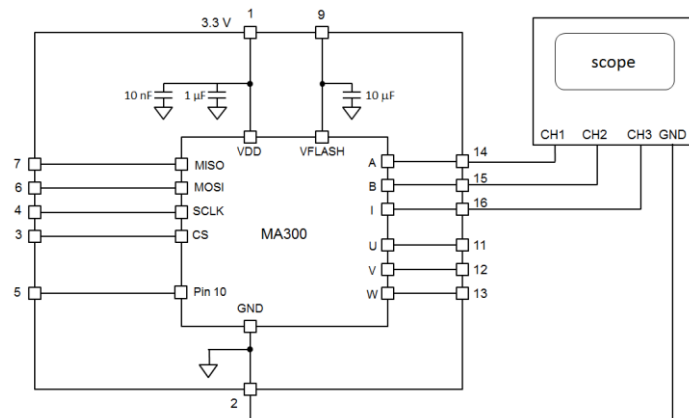


Figure 5: Probing the ABZ Output

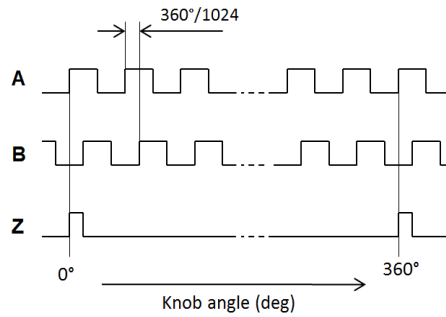


Figure 6: Incremental Signal Signals