

### Scope

This application note describes the schematic, the layout and the use of the series of small breakout boards for MLX90609 angular rate sensor. It is fully applicable to EVB90609L-N2, EVB90609L-E2 and EVB90609L-R2 boards and can be used as reference for populating the EVB90609L board.

### General Description

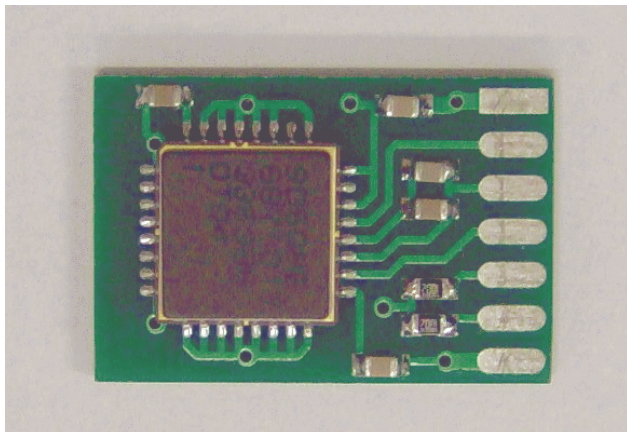


Figure 1. Top view of EVB90609L board.

EVB90609L-xx PCB is a small board, which uses the MLX90609 chip in a typical configuration. It can be directly connected to customer's system to ease the development process. The EVB90609L-xx boards provide the possibility to work both in analogue and in digital mode. Both modes are available on different connector pins of the board. Next to the MLX90609 chip the board includes several passive components which are recommended according to the typical schematic. The board communicates with outside world through edge-type 14 pin connector. Pin names, numbers and functions are explained in table 1.

### Detailed Description

#### Variants

There are 4 variants of the EVB90609L-xx board, which differs only in MLX90609 chip type used (see Table 2).

Table 2. Board variants

Board	Order option "xx"	Chip type	Note
EVB90609L		No	Clear board
EVB90609L	N2	MLX90609N2	75 deg/s full range
EVB90609L	E2	MLX90609E2	150 deg/s full range
EVB90609L	R3	MLX90609R2	300 deg/s full range

For more information about the MLX90609 chip and its operation, check the MLX90609 datasheets at [www.melexis.com](http://www.melexis.com).

**ATTENTION:** Breakout boards shipped before 2008 do not have the analog output available at the edge connector. You are NOT concerned if:

- You intend to only use the digital SPI output.
- The carry boxes do have an additional sticker on the top "For the latest documentation check out our website [www.melexis.com](http://www.melexis.com)"
- The OUTAR edge connector pin is sensitive to angular rate applied for instance by hand.

In all other cases, contact the Melexis representative, distributor or local sales engineer. A rework instruction can also be found at the end of this document.

### Pinout

Table 1. Pin out of the edge connector

Pin Number	Pin Name	Pin Function
1	VCC	Power pin +5V
2	VCC	Power pin +5V
3	VREF	Internal reference voltage
4	SCLK	Clock for SPI
5	OUTAR	Angular rate output voltage
6	-SS	Slave select for SPI (negative logic)
7	OUTTMP	Temperature output voltage
8	MISO	Master-input-slave-output signal for SPI
9	SLFT1	Self test selection pin 1
10	MOSI	Master-output-slave-input-signal for SPI
11	SLFT2	Self test selection pin 2
12	ERROR	Gyro internal error signalization
13	GND	Ground pin
14	GND	Ground pin

### Dimensions

A top view of EVB90609L-xx boards is represented in Figure 1. The dimensions of the boards are: 28 mm (length) x 18 mm (height) x 3.5 mm (thickness).

### Schematics

Electrical schematic of the EVB90609L-xx board is presented at Figure 2 as it is based on the typical schematic from MLX90609 datasheet.

The value of the capacitor C3 defines the output bandwidth of gyro. The -3dB bandwidth set by C3 is:

$$f_{OUT} = 0.16 / (R_{OUT} * C3), \text{ with } R_{OUT} = 200k\Omega \text{ (typ.)}$$

For instance, with C3=82nF the bandwidth is 50Hz.

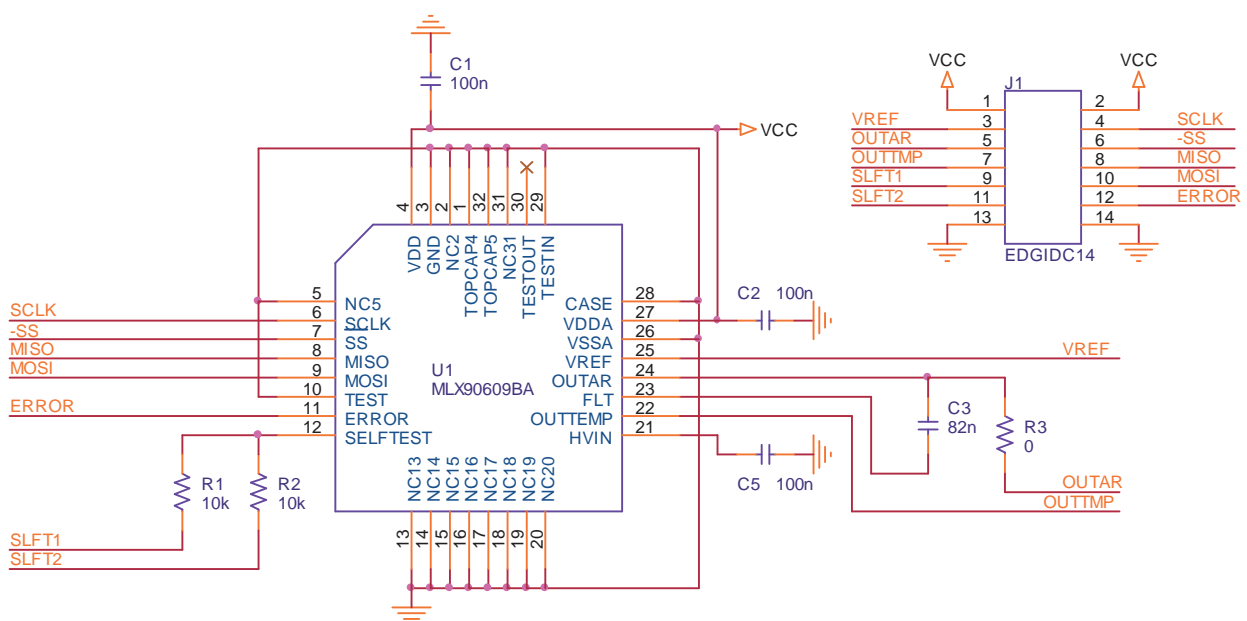


Figure 2. Electrical schematic of the MLX90609 boards.

### Component placement and PCB Layout

Component placement at the board is presented at Figure 3.

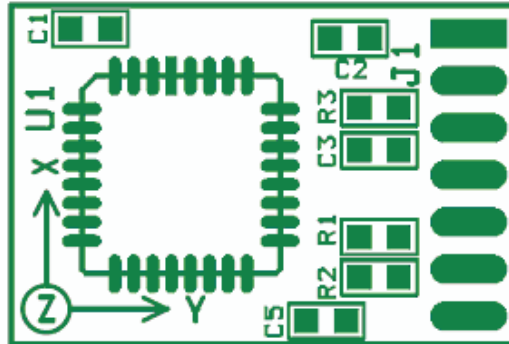


Figure 3. Component placement.

The layouts of the top and bottom side of the board are presented at Figure 4.

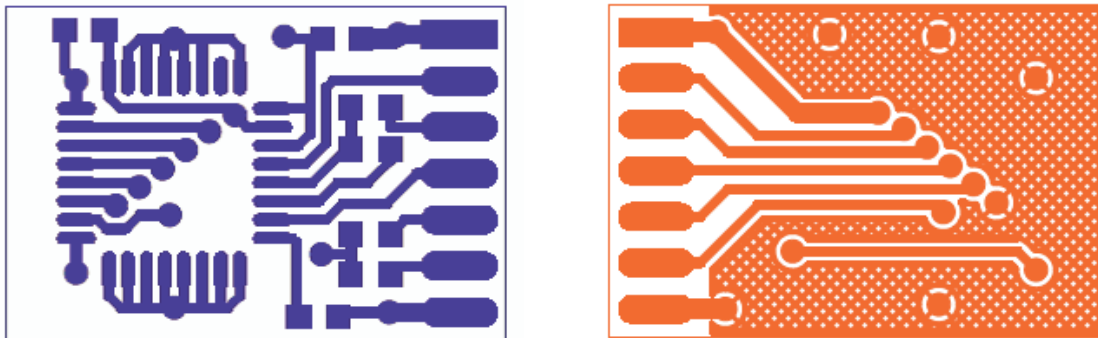


Figure 4. Board top (blue) and bottom (red) side layout.

## Rework Instructions

### Do you need to rework?

Rework instructions for breakout boards shipped before March 2008, which do not have the analog output available at the edge connector. You are NOT concerned if:

- You intend to only use the digital SPI output.
- The carry boxes do have a sticker on the top:

For the latest documentation

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[www.melexis.com](http://www.melexis.com)

- The OUTAR edge connector pin is sensitive to angular rate applied for instance by hand. In all other cases, contact the Melexis representative, distributor or local sales engineer or follow the following rework instruction.

### How to rework?

An error had been detected on the first boards. The analog output was not routed correctly to the output pin of the breakout board. It is however quite easy to modify those boards. The necessary modification is shown at Figure 5. The green square indicates and addition of a zero Ohm resistor (short circuiting, R3 in Figure 2 and 3).

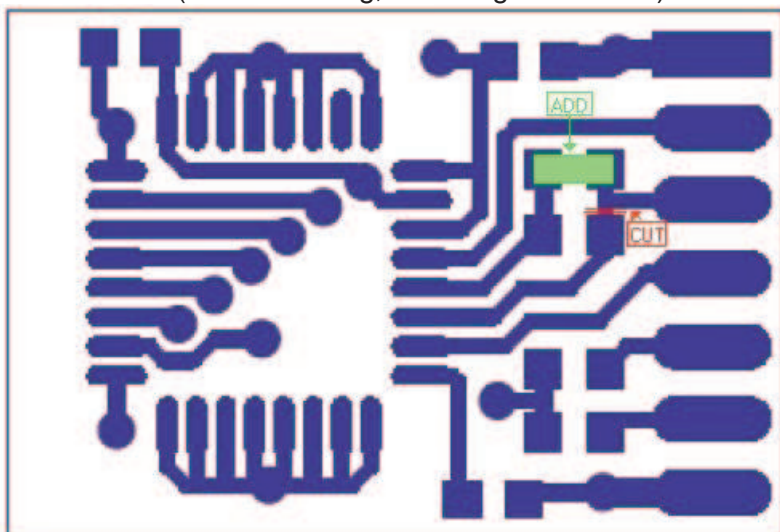


Figure 5. The modification of the PCB

## Revision history

Rev.001 from July 2007. Initial release.

Rev.002 from January 2008. Figure 2 was corrected. The output signal “OUTAR” which had been erroneously connected to pin 23 “FLT” of U1 was reconnected to pin 24 “OUTAR” of U1 through jumper R3, which replaced capacitor C4. Figure 3 and Figure 4 were corrected too to reflect changes of the schematic. Text at page 2 was corrected. The paragraph “Rework Instructions” which contains explanations how customers themselves can modify boards was added.