

# **MOD-MAG development board** **USER'S MANUAL**

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Designed by OLIMEX Ltd, 2012



All boards produced by Olimex LTD are ROHS compliant

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**Thank you for purchasing MOD-MAG module assembled by OLIMEX LTD**

## Table of Contents

<b>CHAPTER 1.....</b>	<b>4</b>
<b>OVERVIEW.....</b>	<b>4</b>
<b>1. Introduction to the chapter.....</b>	<b>4</b>
1.1 Features.....	4
1.2 Organization.....	4
<b>CHAPTER 2 .....</b>	<b>5</b>
<b>SETTING UP THE MOD-MAG BOARD.....</b>	<b>5</b>
<b>2. Introduction to the chapter.....</b>	<b>5</b>
2.1 Electrostatic warning.....	5
2.2 Target market and purpose of the module.....	5
2.3 Requirements.....	5
2.4 Powering the board.....	6
2.5 Prebuilt software.....	6
<b>CHAPTER 3.....</b>	<b>7</b>
<b>THE MAG3110FCR2 DIGITAL MAGNETOMETER.....</b>	<b>7</b>
<b>3. Introduction to the chapter.....</b>	<b>7</b>
3.1 The magnetometer.....	7
<b>CHAPTER 4.....</b>	<b>8</b>
<b>HARDWARE.....</b>	<b>8</b>
<b>4. Introduction to the chapter.....</b>	<b>8</b>
4.1 UEXT.....	8
4.2 Additional hardware components.....	9
<b>CHAPTER 5.....</b>	<b>10</b>
<b>SCHEMATICS.....</b>	<b>10</b>
<b>5. Introduction to the chapter.....</b>	<b>10</b>
5.1 Eagle schematic.....	10
5.2 Physical dimensions.....	12
<b>CHAPTER 6.....</b>	<b>13</b>
<b>REVISION HISTORY.....</b>	<b>13</b>
<b>6. Introduction to the chapter.....</b>	<b>13</b>
6.1 Document revision.....	13
6.2 Web page of your device.....	13

# CHAPTER 1

## OVERVIEW

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### 1. Introduction to the chapter

Thank you for choosing the MOD-MAG extension module from Olimex! This document provides a User's Guide for the Olimex MOD-MAG module. As an overview, this chapter gives the scope of this document and lists the board's features. The document's organization is then detailed.

The MOD-MAG module provides easy way of implementing Freescale's MAG3110 digital magnetometer to any Olimex board via the UEXT extension.

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### 1.1 Features

- MAG3110 3-axis magnetometer
  - UEXT connector
  - 10-pin female-female ribbon cable
  - Tiny size: 29 x 18 mm (1.1" x 0.7")
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### 1.2 Organization

Each section in this document covers a separate topic, organized as follow:

- Chapter 1 is an overview of the board usage and features
  - Chapter 2 provides a guide for quickly setting up the board
  - Chapter 3 describes the component that is the heart of the board: the MAG3310 microcontroller
  - Chapter 4 covers the connector pinout, peripherals and jumper description
  - Chapter 5 provides the schematics
  - Chapter 6 contains the revision history
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## CHAPTER 2

# SETTING UP THE MOD-MAG BOARD

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## 2. Introduction to the chapter

This section helps you set up the MOD-MAG extension module for the first time.

Please consider first the electrostatic warning to avoid damaging the board, then discover the hardware and software required to operate the board.

The procedure to power up the board is given, and a description of the default board behavior is detailed.

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### 2.1 Electrostatic warning

MOD-MAG is shipped in a protective anti-static package. The module must not be exposed to high electrostatic potentials. A grounding strap or similar protective device should be worn when handling the board. Avoid touching the component pins or any other metallic element.

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### 2.2 Target market and purpose of the module

MOD-MAG is a magnetic module that can be used as extension to existing Olimex boards delivering compass and orientation functions among others.

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### 2.3 Requirements

In order to set up the MOD-MAG, the following items are required:

- Host board (one that has free I2C) – preferably Olimex one for the ease of connection
- 3.3V – either from the host board or external (the 3.3V must be provided on the UEXT connector)

Note: Of course the host board doesn't need to be Olimex one as long as you can create (connect) the I2C on it.

The MAG3110 doesn't require programming.

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## **2.4 Powering the board**

The board is powered by 3.3V from pin 1 of the UEXT.

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## **2.5 Prebuilt software**

The board is not programmed. However, it is tested via the UEXT with PIC-P26J50 board before being. Search for the demo example in the software section of the Olimex site.

## CHAPTER 3

### THE MAG3110FCR2 DIGITAL MAGNETOMETER

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#### 3. Introduction to the chapter

In this chapter is located the information about the heart of MOD-MAG – the MAG3110 digital magnetometer manufactured by Freescale. The information is a modified version of the datasheet provided by its manufacturers.

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#### 3.1 The magnetometer

- 1.95V to 3.6V supply voltage (VDD)
- 1.62V to VDD IO Voltage (VDDIO)
- Ultra small 2 mm by 2 mm by 0.85 mm, 0.4 mm pitch, 10-pin package
- Full-scale range  $\pm 1000 \mu\text{T}$
- Sensitivity of  $0.10 \mu\text{T}$
- Noise down to  $0.25 \mu\text{T rms}$
- Output Data Rates (ODR) up to 80 Hz
- I2C digital output interface (operates up to 400 kHz Fast Mode)
- 7-bit I2C address = 0x0E
- One-shot triggered measurement mode to conserve power
- RoHS compliant

For comprehensive information on the microcontroller visit the Freescale's web page for a datasheet.

At the moment of writing the microcontroller datasheet can be found at the following link:  
[http://cache.freescale.com/files/sensors/doc/data\\_sheet/MAG3110.pdf?pspll=1](http://cache.freescale.com/files/sensors/doc/data_sheet/MAG3110.pdf?pspll=1)

## CHAPTER 4

### HARDWARE

#### 4. Introduction to the chapter

In this chapter are presented the connectors that can be found on the board all together with their pinout. Proto area is shown. Jumpers functions are described. Notes and info on specific peripherals are presented. Notes regarding the interfaces are given.

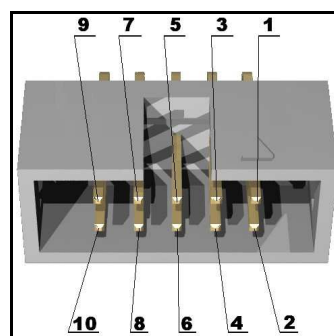
#### 4.1 UEXT

MOD-MAG board has UEXT connector and can interface Olimex's UEXT modules. There is I2C formed on that connector.

For more information on UEXT please visit:

<http://www.olimex.com/dev/OTHER/UEXT.pdf>

Pin #	Signal Name
1	+3.3V
2	GND
3	Not connected
4	MAG_IRQ
5	SCL
6	SDA
7	Not connected
8	Not connected
9	Not connected
10	Not connected





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## **4.2 Additional hardware components**

The board comes with a female-female 10-pin extending ribbon cable (as shown in the picture on the title page of the manual).

## CHAPTER 5

### SCHEMATICS

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#### 5. Introduction to the chapter

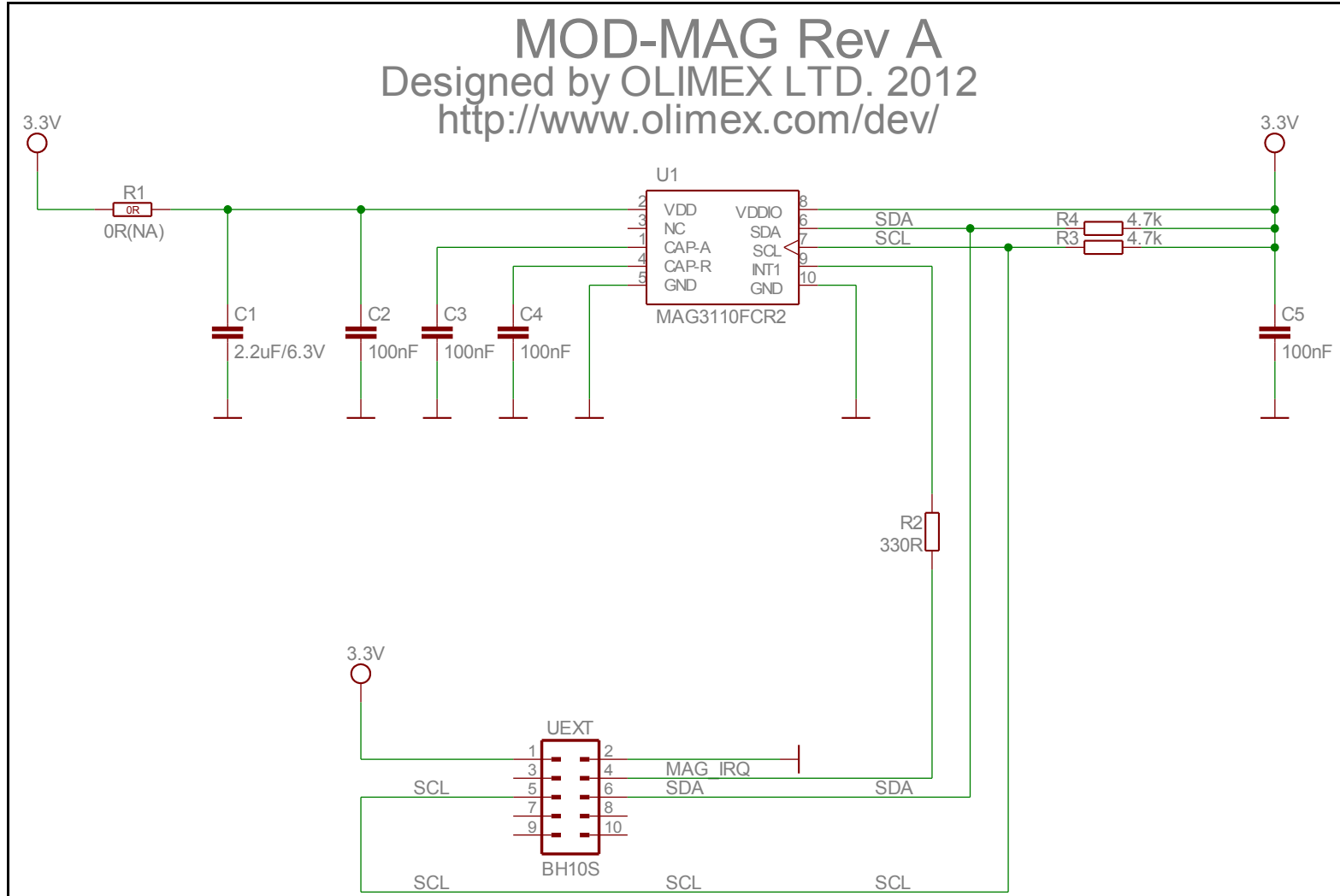
In this chapter are located the schematics describing logically and physically MOD-MAG.

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#### 5.1 Eagle schematic

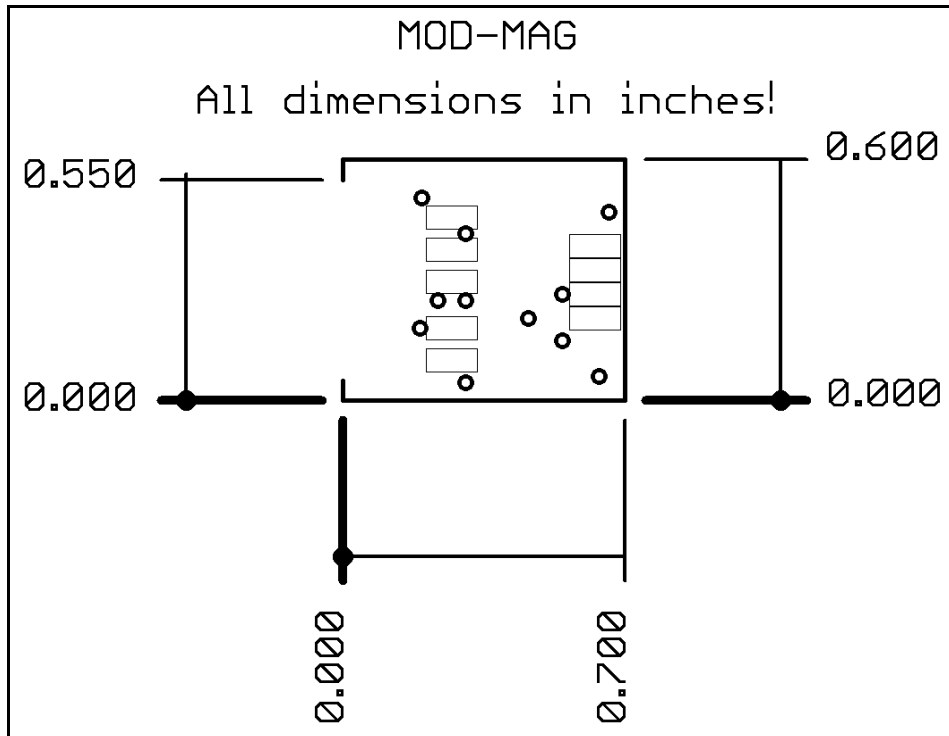
MOD-MAG schematic is visible for reference here. You can also find them on the web page for MOD-MAG at our site: <http://www.olimex.com/dev/mod-mag.html>. They are located in HARDWARE section.

The EAGLE schematic is situated on the next page for quicker reference.



## 5.2 Physical dimensions

Note that all dimensions are in inches.



## CHAPTER 6

### REVISION HISTORY

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#### 6. Introduction to the chapter

In this chapter you will find the current and the previous version of the document you are reading. Also the web-page for your device is listed. Be sure to check it after a purchase for the latest available updates and examples.

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#### 6.1 Document revision

Revision	Changes	Modified Pages
A	Initial Creation	All

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#### 6.2 Web page of your device

The web page you can visit for more info on your device is <http://www.olimex.com/dev/mod-mag.html>. There you can find more info and some examples.

#### ORDER CODES:

**MOD-MAG** - completely assembled and tested

**PIC-P26J50** – a suitable host for MOD-MAG, with a ready software example

How to order?

You can order to us directly or by any of our distributors.

Check our webpage <http://www.olimex.com/> for more info.