Professional MEMS tool: ST MEMS adapters motherboard based on the STM32F401VE and compatible with all ST MEMS adapters

Features

- Compatible with all available ST MEMS adapter boards
- Controlled by the STM32F401VE high-performance ARM Cortex™ - M4 microcontroller
- Software-adjustable power circuitry to set sensor supply voltage from 0 to 3.6 V
- Includes a DIL24 socket for easy MEMS adapter connection
- Adjustable MEMS DIL24 power supply
- DFU-compatible for USB microprocessor firmware update
- USB 2.0 full-speed compliant
- Embedded power monitoring circuitry on sensor supply voltage and current
- Debugging connector for SWD/JTAG
- Can be used with PC software like Unico GUI to manage and analyze MEMS sensor data
- RoHS compliant

Description

ST’s ready-to-use MEMS motherboard (STEVAL-MKI109V3) development platform lets engineers monitor the behavior of ST MEMS sensors, which can help accelerate time to market and maximize the performance of new product designs. This board is compatible with ST MEMS adapter boards and supports I2C and SPI data modes for very high output data rates.

This professional MEMS tool features a high-performance STM32F401VE microcontroller and flexible power management with software-adjustable power circuitry that allows you to set the sensor supply voltage from 0 to 3.6 V and replicate the operating conditions in the intended application. The board includes accurate power monitoring on sensor supply voltage and current, so external instruments are not required.

You can run a graphical user interface (GUI) like Unico GUI (STSW-MKI109L for Linux, STSW-MKI109M for Mac OS X and STSW-MKI109W for Windows), on a host PC to manage data flow from MEMS sensors and analyze MEMS sensor waveforms, which can help you explore the operating modes and power settings to optimize sensor performance and accuracy in your application.

The STM32F401VE ARM Cortex-M4 microcontroller with DSP and FPU can process much more than sensor readings such as barometric pressure and accelerometer or gyroscope data; it can handle complex datasets like optical or electronic image stabilization (OIS and EIS, respectively) from ST’s advanced 6-axis inertial modules, and can be used to evaluate the latest generation of high-resolution MEMS sensors for industrial applications.

<table>
<thead>
<tr>
<th>Product summary</th>
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<tbody>
<tr>
<td>ST MEMS adapter motherboard based on STM32F401VE compatible ST MEMS adapters</td>
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<tr>
<td>High-performance access line, ARM Cortex-M4 core with DSP and FPU, 512 Kbytes Flash, 84 MHz CPU, ART Accelerator</td>
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<tr>
<td>MEMS evaluation kit software package for Linux</td>
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<td>MEMS evaluation kit software package for Mac OS X</td>
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<td>MEMS evaluation kit software package for Windows</td>
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Figure 1. STEVAL-MKI109V3 circuit schematic (1 of 8)
Figure 2. STEVAL-MKI109V3 circuit schematic (2 of 8)
Figure 3. STEVAL-MKI109V3 circuit schematic (3 of 8)

Dual channel Vdd control

PWM + Filter

PWM controlled Power Supply
Figure 4. STEVAL-MKI109V3 circuit schematic (4 of 8)

V1 - Dual Channel Idd measurement - lin
Figure 5. STEVAL-MKI109V3 circuit schematic (5 of 8)

Power Supply:
- +Vusb
- Power Supply:
  - VDD_3.6V ... Power supply for micro & BT
  - Vin ... 5V for Idd meas. analog circuits & VDD_DUT/VDDIO_DUT

USB Connection:
- USB device enumeration signal LED
- USB ESD filter

Ext. Power 5V
Automatic switching over from Vusb to Vext

*Power Supply:
- VDD_3.6V ... Power supply for micro & BT
- Vin ... 5V for Idd meas. analog circuits & VDD_DUT/VDDIO_DUT

*USB Connection:
- USB device enumeration signal LED
- USB ESD filter
Figure 6. STEVAL-MKI109V3 circuit schematic (6 of 8)

Level Translation:

DIL24 Device Adapter:

Logic signals1

DIL24 Device Adapter
- VDD and VDDIO pin separated

TEST_Adapter_Connected

DIL24 Device Adapter
- TEST_5

VDD_DUT

VDDIO_DUT

Logic_signals1

Log Signals

SN74AVC4T245RSVR

NTS0104GU12
Figure 7. STEVAL-MKI109V3 circuit schematic (7 of 8)

Bluetooth Module Connection:

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STEVAL-MKI109V3 Schematic diagrams

page 8/11

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Figure 8. STEVAL-MKI109V3 circuit schematic (8 of 8)
Revision history

Table 1. Document revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
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<tbody>
<tr>
<td>04-Jul-2016</td>
<td>1</td>
<td>Initial release.</td>
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<tr>
<td>12-Apr-2019</td>
<td>2</td>
<td>Updated cover page Section Features and Section Description&lt;br&gt;Added Section Product summary table</td>
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