

# Analog Output MEMS Microphone Flex Evaluation Board User Guide

## GENERAL DESCRIPTION

This user guide applies to the following MEMS microphone evaluation boards:

- EV\_INMP404-FX
- EV\_INMP405-FX
- EV\_INMP504-FX
- EV\_INMP510-FX
- EV\_ICS-40180-FX
- EV\_ICS-40181-FX
- EV\_ICS-40310-FX

This is a simple evaluation board that allows quick evaluation of the performance of single-ended analog MEMS microphones. The small size and low profile of the flexible PCB enables direct placement of the microphone into a prototype or an existing design for an in situ evaluation. The evaluation board consists of a bottom port microphone soldered to a flexible PCB with color-coded wires attached. The only other component on the board is a 0.1  $\mu$ F supply bypass capacitor.

Table 1 describes the functions of the three connection wires. Table 2 describes the functional differences between the different microphones that are used with this flex circuit.

**TABLE 1. PIN FUNCTION DESCRIPTIONS**

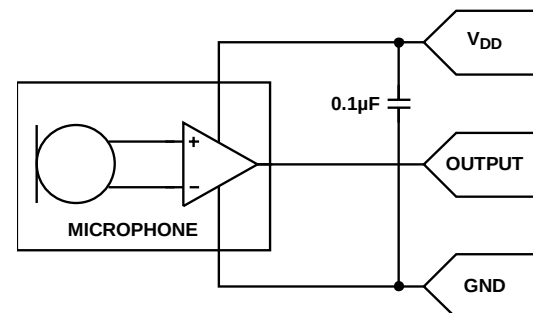
| Wire Color | Microphone Pin | Description                                                              |
|------------|----------------|--------------------------------------------------------------------------|
| Red        | VDD            | Power Supply. 1.5 V DC to 3.6 V DC; (0.9 V DC to 1.3 V DC for ICS-40310) |
| White      | OUTPUT         | Analog Output Signal                                                     |
| Black      | GND            | Ground                                                                   |

**TABLE 2. MICROPHONE FUNCTIONAL DIFFERENCES**

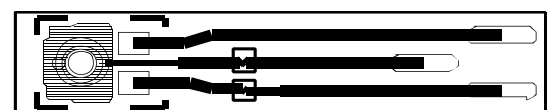
| Microphone | Maximum Supply Current | Maximum Output Voltage | Output Impedance | DC Offset |
|------------|------------------------|------------------------|------------------|-----------|
| INMP404    | 250 $\mu$ A            | 0.18 V rms             | 200 $\Omega$     | 0.8 V     |
| INMP405    | 250 $\mu$ A            | 0.18 V rms             | 200 $\Omega$     | 0.8 V     |
| INMP504    | 225 $\mu$ A            | 0.18 V rms             | 200 $\Omega$     | 0.8 V     |
| INMP510    | 250 $\mu$ A            | 0.40 V rms             | 350 $\Omega$     | 0.7 V     |
| ICS-40180  | 260 $\mu$ A            | 0.40 V rms             | 350 $\Omega$     | 0.7 V     |
| ICS-40181  | 250 $\mu$ A            | 0.40 V rms             | 350 $\Omega$     | 0.7 V     |
| ICS-40310  | 25 $\mu$ A             | 0.12 V rms             | 4.5 k $\Omega$   | 0.57 V    |

## EVALUATION BOARD CIRCUIT

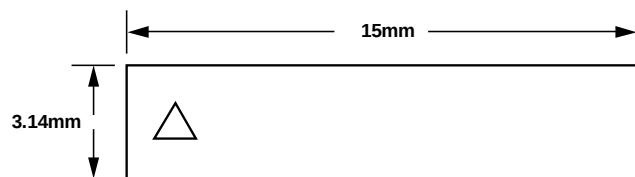
Figure 1 shows the schematic of the evaluation board, and Figure 2 shows the flex board layout. See the respective microphone data sheets for complete descriptions and specifications of the microphones. Note that the layout for the EV\_ICS-40181-FX differs slightly from what is shown in Figure 2 because of this part's different package footprint, but the routing of the three signals is consistent.



**Figure 1. Evaluation Board Schematic**

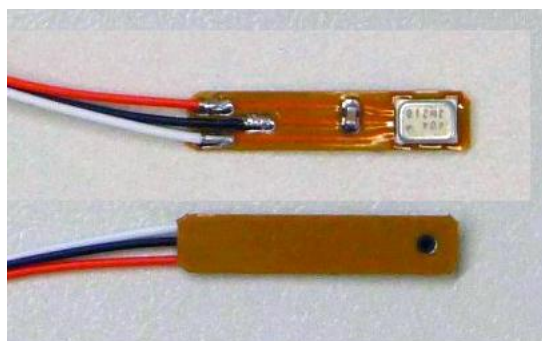


**Figure 2. Evaluation Board Layout (Top View)**



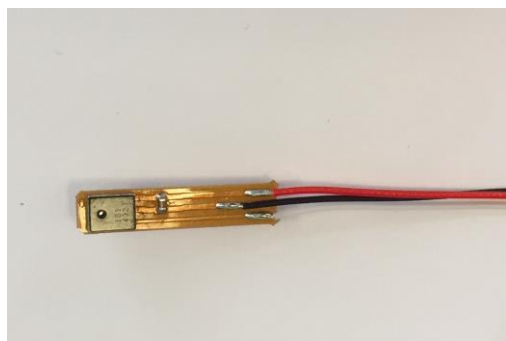
**Figure 3. Evaluation Board Dimensions in Millimeters (Wires Not Included)**

### **BOTTOM PORT EVALUATION BOARD PHOTOGRAPH**



**Figure 4. Top and Bottom View**

### **TOP PORT EVALUATION BOARD PHOTOGRAPH**



**Figure 5. Top View**

**REVISION HISTORY**

| REVISION<br>DATE | REVISION | DESCRIPTION                                                                      |
|------------------|----------|----------------------------------------------------------------------------------|
| 10/14/2015       | 1.3      | This v1.3 is the initial release in Agile. Previous revisions were uncontrolled. |
| 03/26/2015       | 1.4      | Updated part names, added Figure 5                                               |

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