

**I<sup>2</sup>S/TDM Output MEMS Microphone Flex Evaluation Boards**

**GENERAL DESCRIPTION**

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

- EV\_INMP441-FX
- EV\_ICS-43432-FX
- EV\_ICS-52000-FX

These are simple evaluation boards that allows quick evaluation of the performance of the INMP441, ICS-43432 and ICS-52000 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 board consists of an I<sup>2</sup>S-output microphone soldered to a flexible PCB. The only other component on the board is a 0.1 μF supply bypass capacitor.

The flex PCB is designed to mate to a ZIF connector with 1.0 mm pin spacing. The Molex 52610-1071 connector is included in the kit with the flex PCB. The flex PCB can be mated to the connector by first pulling out the connector’s tan clamp, inserting the flex PCB, and then pushing the clamp closed. Wires can be soldered directly to this connector’s pins or it can be mounted directly on a rigid PCB for evaluation. It is recommended to use 28 AWG or smaller wire for soldering to this connector’s pins. The PCB thickness at the pin edge is 0.3 mm.

The only functional differences between the boards with the different microphones mounted are the functions of pins 5 and 9 on the connector. On the EV\_INMP441-FX, pin 5 is the L/R channel select and pin 9 is an active-high enable for the microphone. For the EV\_ICS-43432-FX, pin 5 is also the L/R channel select and pin 9 should be set to ground. For the ICS-52000, pin 5 is the WS output and pin 9 should be set to VDD. All pin function descriptions are described in .

**TABLE 1. PIN FUNCTION DESCRIPTIONS**

| Wire Color | Microphone Pin           | Description  |
|------------|--------------------------|--|
| 1          | GND                      | Ground   |
| 2          | SD                       | Serial digital output signal for I <sup>2</sup> S or TDM interface |
| 3          | SCK                      | Serial clock for I <sup>2</sup> S or TDM interface                 |
| 4          | WS                       | Word select for I <sup>2</sup> S or TDM interface                  |
| 5          | L/R (INMP441, ICS-43432) | Left/right channel select  |
|            | WSO (ICS-52000)          | WS Output  |
| 6          | GND                      | Ground   |
| 7          | VDD                      | Power supply (1.8-3.3 V and 2 mA maximum)                          |
| 8          | GND                      | Ground   |
| 9          | CHIPEN (INMP441)         | Chip enable: Set to GND  |
|            | CONFIG (ICS-43432)       |  |
|            | CONFIG (ICS-52000)       | Set to VDD   |
| 10         | GND                      | Ground   |

**EVALUATION BOARD CIRCUIT**

Figure 1 and Figure 2 show the schematics of the evaluation boards, and Figure 4 and show the flex board layouts. See the respective microphone data sheets for complete descriptions and specifications of the microphones.

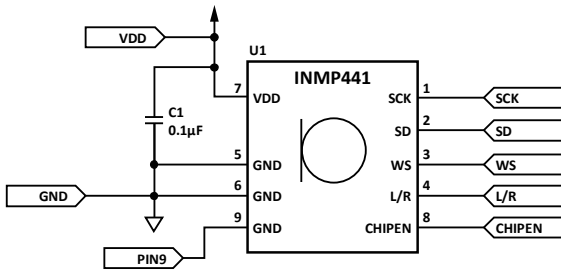


Figure 1. EV\_INMP441-FX Evaluation Board Schematic

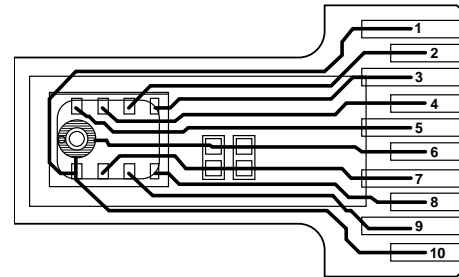


Figure 4. EV\_INMP441-FX Evaluation Board Layout (Top View)

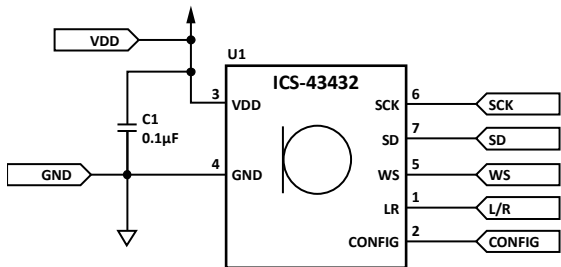


Figure 2. EV\_ICs-43432-FX Evaluation Board Schematic

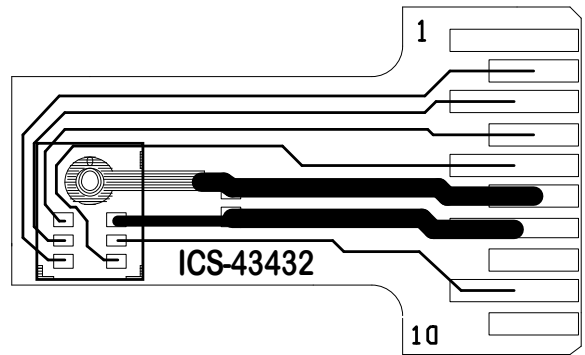


Figure 5. EV\_ICs-43432-FX and EV\_ICs-52000-FX Evaluation Board Layout (Top View)

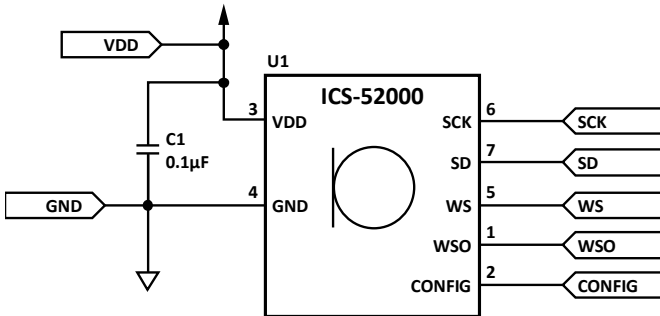


Figure 3. EV\_ICs-52000-FX Evaluation Board Schematic

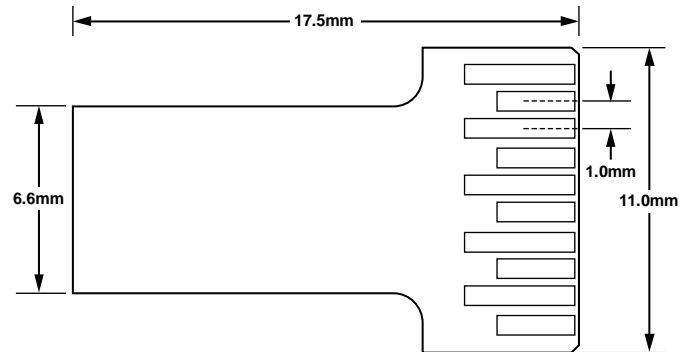
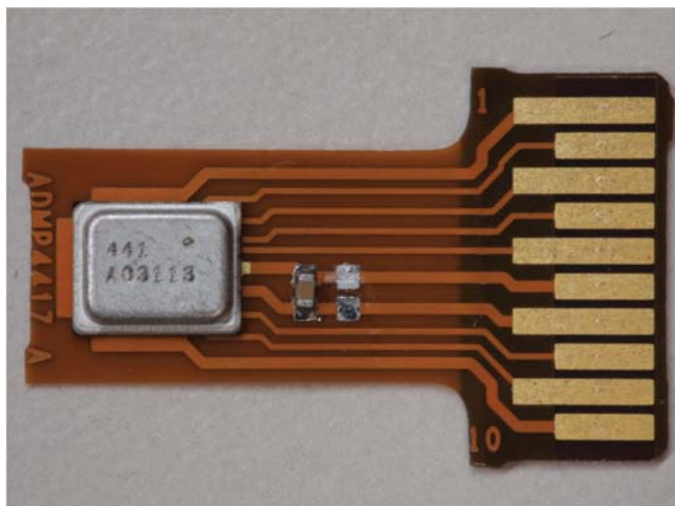
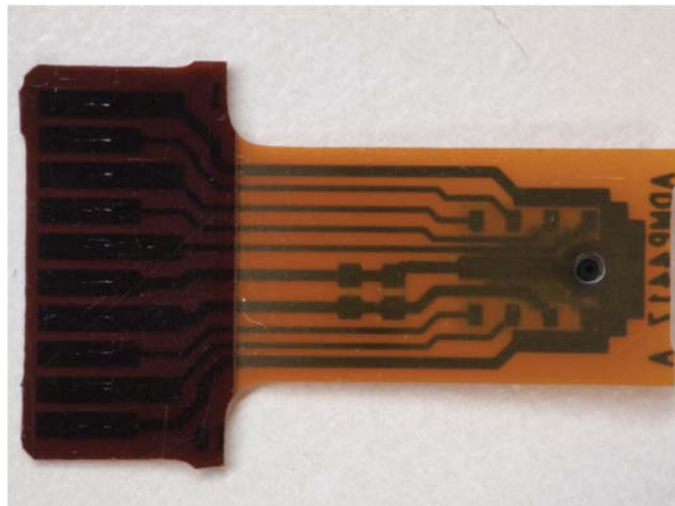


Figure 6. Evaluation Board Dimensions in Millimeters

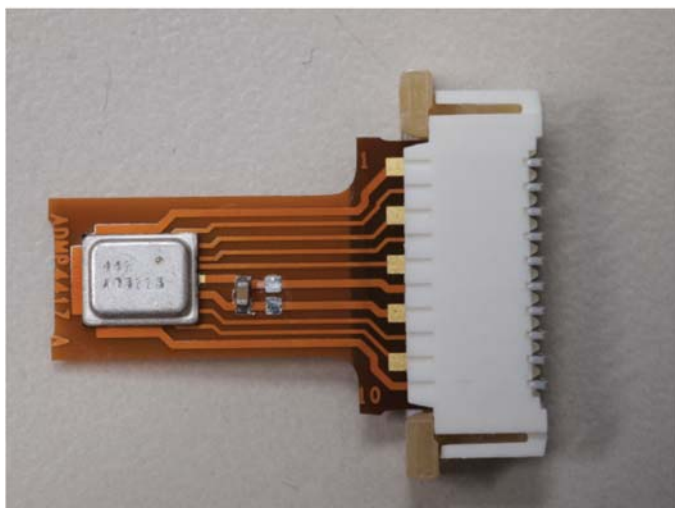
**EVALUATION BOARD PHOTOGRAPHS**



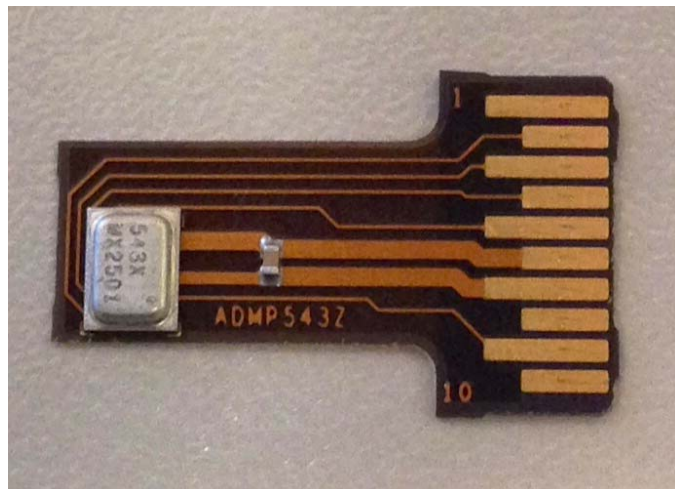
**Figure 7. EV\_INMP441-FX Top View**



**Figure 9. EV\_INMP441-FX Bottom View**



**Figure 8. EV\_INMP441-FX Flex PCB with Molex ZIF Connector**



**Figure 10. EV\_IC5-43432-FX and EV\_IC5-52000-FX Top View**

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**REVISION HISTORY**

| <b>Revision Date</b> | <b>Revision</b> | <b>Description</b>                      |
|----------------------|-----------------|---|
| 07/23/2014           | 1.2             | Initial Release                         |
| 8/26/2016            | 1.3             | Added documentation for EV_ICS-52000-FX |

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