User Instructions for IntraSense™ Evaluation Kit

The IntraSense™ evaluation kit is intended for quick set-up and initial functional testing. This document describes how to set up and use the evaluation kit. For more information about how to design parts containing IntraSense™, please refer to the Application Notes for Uncalibrated IntraSense™ and Calibrated IntraSense™.

Contact SMI Sales at (408) 577-0100 or sales@si-micro.com

Warnings

IntraSense™ is an investigational component and has not been approved in any device or application by the FDA. IntraSense™ is intended for one-time use.

Preparation

ESD protocols should be observed at all times while handling IntraSense™ devices.

Evaluation Kit includes:

• Three or five Compensated IntraSense devices
• One USB 2.0 A to B Cable (https://www.digikey.com/product-detail/en/qualtek/3021001-03/Q361-ND/1531288)
• One communications platform

Required tools:

• PC

Recommended tools:

• Fine-tip tweezers (For example: https://www.tdiinternational.com/esd-tweezers/)

Unpacking

Use scissors to cut the bag open, making sure not to contact the spool with the scissors.

Figure 1: IntraSense in ESD-protective shipping bag
Preparation -- PC

1) Download Arduino software (https://www.arduino.cc/en/Main/Software) and install. Choose your operating system from this menu:

![Arduino software menu]

Preparation -- IntraSense™

The distal (sensor) tip is located on the top of the spool. The proximal consists of a calibration board. Even though the soldered area and exposed wires are encapsulated, please handle with care. SMI suggests the following procedure for despooling to minimize risk of breakage.

![Despooling procedure]

Figure 2 Releasing procedure of the compensated IntraSense™

Step 1: Prepare a clean, ESD-controlled work space free from sharp objects or objects that could become entwined with the wire. Secure the board with fingers and then peel the tape off from the proximal end. Gently lift the board from the spool and unwrap as much wire as is needed for subsequent work.

Step 2: Flip the spool to expose the distal end.

Step 3: Peel the tape away from the center of the spool. After the tape has been removed from the spool, unwind the wire gently. Unwind as much wire as needed to perform the measurement.
Communication Platform

Figure 3: Communication Platform, including correct placement of sensor board into connector. While plugging the IntraSense™ board into the platform port, take care not to bend or break the port.

IntraSense™ Calibration Board Details

Figure 6: IntraSense™ Board (Left). Back, IntraSense™ Board (Right). Size (21.5 X 25.5 X 12.7 mm)

More information is available in the Calibrated IntraSense™ datasheet 40DS1110. The IntraSense Evaluation Kit reads the I2C digital signal from the small PCB board.
Test Procedure

- Connect the Communications Platform to the PC with the USB cable provided. Insert the other end of the cable into the platform. Be sure the USB cable is fully inserted into the platform. The clear plastic tray beneath the platform should remain in place to prevent accidental electrical connections on the bottom of the platform.

- Open Arduino software by double clicking arduino.exe
- Go to Tools
  - Find the active port and click it
  - Check that the selected board is “Arduino/Genuino Uno”
  - Check that the programmer is “AVRISP mkII”
  - If either of these conditions is not met, contact Sales@si-micro.com
Data Acquisition

Go to Tools → Serial Monitor or Go to Tools → Plotter

Example Outputs

Absolute Pressure Output: Absolute pressure is based on \( 0 = \text{perfect vacuum} \)

Monitor

![Monitor Image]

Plotter

![Plotter Image]

The default digital output unit is mmHg clinical, referenced to \( 0 = 760\text{mmHg} \) absolute pressure. On the Plotter output, a pressure spike was introduced for illustrative purposes. The blue curve is temperature and the red curve is pressure.
Saving data

In this version of the software, it is not possible to save data from the Plotter (except with screen captures.) To export and save data from the Monitor into Excel, follow these steps:

1. Click off the ‘Autoscroll’ box in the lower left corner when your measurement is finished
2. Use click-and-drag to select the data, then click ‘Copy’
3. Paste the data into a text editor such as Notepad. Save the file as .txt
4. Open Excel, go to the top ‘Data’ tab and select ‘From Text’
5. Select your .txt file. It may be necessary to select the ‘All Files’ option in the bottom-right corner
6. Click ‘Finish’ to complete the import.
Rework Information

In the event of wire breakage, it may be possible to re-work the device. Because the calibration is resistance-based, reworking could compromise the accuracy of the calibration.

WIRE STRIPPING

SMI has successfully used both chemical and wheel strippers. Laser stripping is also an option.

ENCAPSULANT

Encapsulated area

![Figure 5 Encapsulated Area](image)

SMI uses Loctite Super Glue Gel type for encapsulant. The purpose of encapsulant is to prevent breakage of trifilars.

SOLDERING

SMI recommends Kester SN96.5AG03CU.5 2.2%/275 0.4MM. This is lead-free solder that contains the required flux for soldering copper to aluminum bondpads. Documentation is available at https://www.kester.com/products/product/245-flux-cored-wire.

An appropriate solder tip is the Metcal STTC-106.

RESISTANCE CHECK

5-pin connector must be disconnected before performing resistance check. Resistance is most easily checked with the bondpads on the backside of the PCB board.

SVDD / Sig +: Range of 2400 to 2800 ohms
SVDD / Sig -: Range of 2400 and 3500 ohms

Check resistance here
**IntraSense™ Ordering Information**

To simplify ordering, IntraSense™ Evaluation kits are available in eight different standard configurations:

Sensor Type: Standard or light-shielded IntraSense. Light-shielded is recommended for use with endoscopes or in the presence of other bright lights during use.

Cable Length: Long or short cable. These are 60cm and 180cm in length, respectively.

Number of Sensors: 3 sensors or 5 sensors

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>INTRASENSE-1A-060-AP-3</td>
<td>Standard IntraSense, 60cm length, 3 sensors</td>
</tr>
<tr>
<td>INTRASENSE-1A-060-AP-5</td>
<td>Standard IntraSense, 60cm length, 5 sensors</td>
</tr>
<tr>
<td>INTRASENSE-1A-180-AP-3</td>
<td>Standard IntraSense, 180cm length, 3 sensors</td>
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<tr>
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<tr>
<td>INTRASENSE-1B-060-AP-3</td>
<td>Light-shielded IntraSense, 60cm length, 3 sensors</td>
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<tr>
<td>INTRASENSE-1B-060-AP-5</td>
<td>Light-shielded IntraSense, 60cm length, 5 sensors</td>
</tr>
<tr>
<td>INTRASENSE-1B-180-AP-3</td>
<td>Light-shielded IntraSense, 180cm length, 3 sensors</td>
</tr>
<tr>
<td>INTRASENSE-1B-180-AP-5</td>
<td>Light-shielded IntraSense, 180cm length, 5 sensors</td>
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</tbody>
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- An editable version of the copyrighted Readout code is available upon request; SMI does not assume responsibility for edited code. For custom cable lengths or other requests, contact SMI Sales at (408) 577-0100 or sales@si-micro.com.

**Qualification Standards**

REACH Compliant
RoHS Compliant
PFOS/PFOA Compliant
For qualification specifications, please contact Sales at sales@si-micro.com
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