# PRESS RELEASE

**Würth Elektronik publishes Application Note for interference suppression**

**Filter and surge protection for I2C bus**

Waldenburg (Germany), August 3, 2023 – Würth Elektronik has published a new Application Note: [“ANP121 – Filter and surge protection for I2C-Bus”](https://www.we-online.com/en/support/knowledge/application-notes?d=anp121-filter-and-surge-protection). In this new note, the supplier of electronic and electromechanical components provides valuable support to developers who use the I²C bus (Inter-Integrated Circuit Bus) in cross-circuit-board scenarios. An extension of the interface via connectors or cables can, however, potentially make the I²C bus susceptible to external interference such as electrostatic discharge (ESD), burst, and radiated RF. The purpose of this Application Note is to present a suitable filter and protection circuit that increases the noise immunity of the I²C bus without compromising the signal quality of the data and clock lines.

The latest addition to the collection of application-specific tips on Würth Elektronik’s support sites comprises the sections “Overview I2C bus“, “Overview I2C specifications”, ”Selection of the filter and overvoltage protection components”, “LTspice simulation with 400 kHz clock rate“, and „”Measurement of a real application with 400 kHz clock rate“. The Application Note was created by building simulation models in LTspice and measuring them in a real-life application to verify the results of the simulation.

Test set-up with FeatherWing

To verify the simulation, additional measurements were made on a Würth Elektronik [SensorBLE FeatherWing kit](https://www.we-online.com/en/components/products/SENSOR_BLE__FEATHERWING_KIT?ajax=). This kit consists of a master board with a microcontroller and two other boards equipped with a WE Bluetooth module and a FeatherWing system with WE sensors (3-axis acceleration, temperature, humidity, pressure). The master board communicates with the other two boards via I²C bus at a maximum data rate of 400 kBit/s. A data cable 20 cm (7.87 inch) long was used to connect the sensor board to the rest of the I²C. A parasitic capacitance of 400 pF with respect to GND was simulated using MLCCs. The simulation and measurement showed that [SMT multilayer ferrite](https://www.we-online.com/en/components/products/WE-CBF?s)s in combination with [ESD protection diodes](https://www.we-online.com/en/components/products/WE-TVS-SS) have practically no effect on the data signal (SDA) and the clock signal (SCL) of the I²C bus, but rather enhance the noise immunity of the I²C bus.

**Available images**

The following images can be downloaded from the Internet in printable quality: <https://kk.htcm.de/press-releases/wuerth/>

|  |  |
| --- | --- |
| Image source: Würth Elektronik  **Block diagram of the test set-up with the WE SensorBLE FeatherWing kit to verify an I²C bus suppression.** | **Figure 5**  Image source: Würth Elektronik  **The WE SensorBLE FeatherWing kit is the tool of choice for the development of IoT applications.** |

About the Würth Elektronik eiSos Group

Würth Elektronik eiSos Group is a manufacturer of electronic and electromechanical components for the electronics industry and a technology company that spearheads pioneering electronic solutions. Würth Elektronik eiSos is one of the largest European manufacturers of passive components and is active in 50 countries. Production sites in Europe, Asia and North America supply a growing number of customers worldwide.

The product range includes EMC components, inductors, transformers, RF components, varistors, capacitors, resistors, quartz crystals, oscillators, power modules, Wireless Power Transfer, LEDs, sensors, radio modules, connectors, power supply elements, switches, push-buttons, connection technology, fuse holders and solutions for wireless data transmission.

The unrivaled service orientation of the company is characterized by the availability of all catalog components from stock without minimum order quantity, free samples and extensive support through technical sales staff and selection tools.

Würth Elektronik is part of the Würth Group, the global market leader in the development, production, and sale of fastening and assembly materials, and employs 8,200 people. In 2022, the Würth Elektronik Group generated sales of 1.33 Billion Euro.

Würth Elektronik: more than you expect!

Further information at [www.we-online.com](http://www.we-online.com)

|  |  |
| --- | --- |
| Further information:  Würth Elektronik eiSos GmbH & Co. KG Sarah Hurst Max-Eyth-Strasse 1 74638 Waldenburg Germany  Phone: +49 7942 945-5186 E-mail: [sarah.hurst@we-online.de](mailto:sarah.hurst@we-online.de)  [www.we-online.com](http://www.we-online.com) | Press contact:  HighTech communications GmbH Brigitte Basilio Brunhamstrasse 21 81249 Munich Germany  Phone: +49 89 500778-20 E-mail: [b.basilio@htcm.de](mailto:b.basilio@htcm.de)  [www.htcm.de](http://www.htcm.de) |