

ON Semiconductor

Is Now

onsemi™

To learn more about onsemi™, please visit our website at
www.onsemi.com

onsemi and **onsemi** and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi** product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner. Other names and brands may be claimed as the property of others.

AND9738/D

SPSDEVK1MT-GEVK: Getting Started Guide

Introduction;

The SPSDEVK1MT Predictive Maintenance Turnkey Solution kit enables fast installation of full Smart Passive Sensor™ systems. This evaluation kit includes:

- SPSDEV1-8 UHF SPS Reader
- 2 SPS1DEVA1-W UHF Antennas w/ RF cables
- 20 SPSxT001PCB Temperature Sensors
- 20 SPSxT001PET Temperature Sensors
- 20 SPSxM001FOM Moisture Sensors
- 20 SPSxT001CER Temperature Sensors
- 20 SPSxTM01PET Moisture Sensors
- 12 V DC Universal Power Supply
- Ethernet Cable

Note: Frequency band of sensor tags is determined by version of kit ordered.

Software Tools

ON Semiconductor has developed an application specifically for reading Smart Passive Sensors that unlocks the full functionality of the tags. This is done by automatically detecting the type of tag and reading back sensor data over time graphically. This application is known as TagReader and can be found on this kit's landing page under "Software".



ON Semiconductor®

www.onsemi.com

APPLICATION NOTE



Figure 1. Turnkey Solution Kit Components

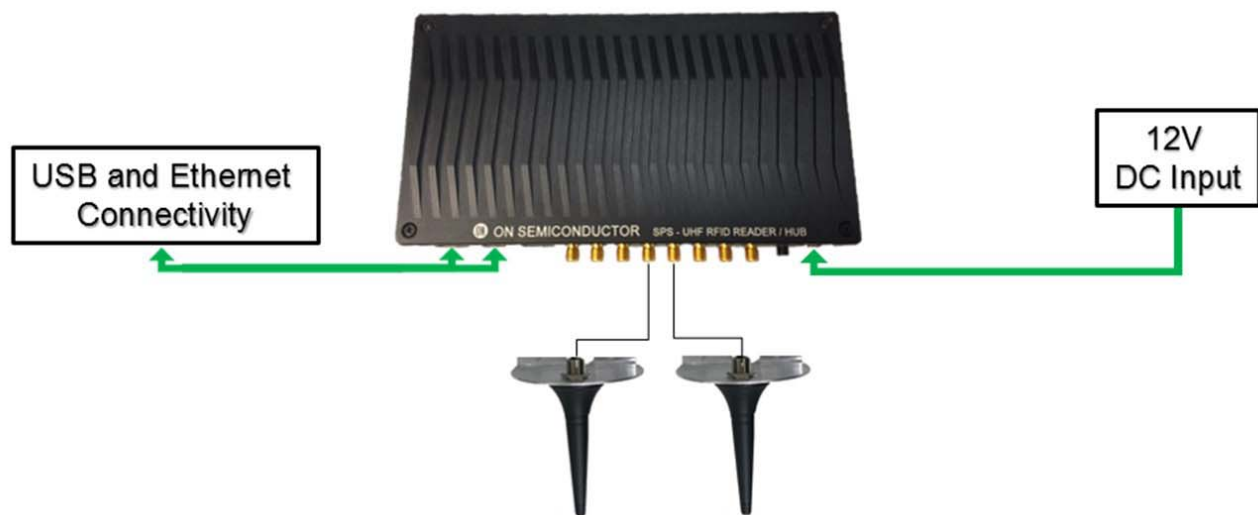


Figure 2. SPSDEVK1MT-GEVK Hardware Setup

Hardware Setup

The SPSDEVK1MT requires three hardware connections to be made in the following order:

- Connect at least one antenna to the RF SMA port on the SPSDEVR1–8 reader
- Connect a USB or Ethernet cable from the SPSDEVR1–8 to the host computer that will be running the application software
- Plug in the 12 VDC supply that was included with the kit

Note: please refer to SPS tag and antenna datasheets to verify optimal positioning of each to achieve best results.

TagReader Software Setup

Once the reader is connected and the correct drivers are installed, please run the TagReader application downloaded from the ON Semiconductor website. Figure 3 shows the

setup screen that will open when the TagReader application is run. The ON Semiconductor SPSDEVR1–8 will be autodetected and should be displayed in the “Select Reader” drop–down menu. If the drop–down menu is empty, confirm that the reader is powered on and the USB/Ethernet is connected to the host PC and click the “Rescan Readers” button.

With “ON Semiconductor SPSDEVR1–8” selected, please select the antenna port(s) that the antenna(s) is connected to as well as the correct UHF region for your location (North America, Europe, etc). The rest of the settings will depend on the test environment and the type of tags being used and will be discussed further in the next section. When the settings are finalized, click “Read” and tag information will begin being displayed under the “Tags” tab as shown in Figure 4 on the next page.

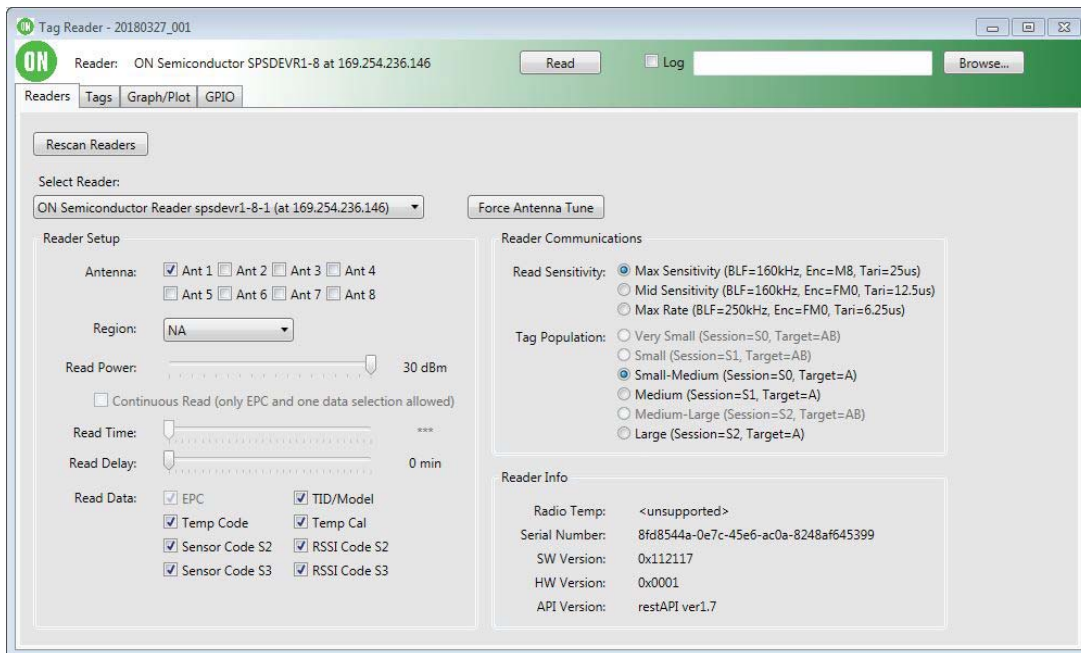


Figure 3. TagReader Setup Screen

Advanced Reader Settings Descriptions

Read Power – maximum transmit power is set by which region is used, power may need to be reduced if sensors appear to be overpowered.

Read Time – defines how long the reader will look for sensors each cycle. Default value of 150 ms is good for small amounts of sensors while using a single antenna.

Read Delay – delay inserted between read cycles. Useful for reducing power consumption if only occasional reads are required.

Read Data – select the information that is of interest in the particular application. Sensor codes are used for moisture and pressure measurements and are read differently

depending on the generation of Magnus chip used (S2 or S3). Please refer to the datasheet of the particular sensor to verify which version is being used.

Read Sensitivity – the UHF protocol can be optimized to either maximize sensitivity or read rate. If tags are placed far from the reader, higher sensitivity will be required. If all tags are near the reader, the sampling rate of the sensor data can be increased without having to worry about missing distant, less sensitive sensors.

Tag Population – another performance tuning parameter similar to Read Sensitivity. UHF protocol can be optimized to work with different tag population sizes, ranging from Very Small (a handful of tags) to Large (50+ tags).

| # | EPC | Model | Antenna | Frequency | RSSI | Sensor Code | Temp (°C) | Temp Code | Time (UTC) | Count |
|----|--------------------------|------------------|---------|-----------|------|-------------|-----------|-----------|-------------------------|-------|
| 1 | F001 | Magnus S2 (402D) | 1 | 905250 | 20 | 18 | NA | NA | 2017-08-14T17:35:41.634 | 40 |
| 2 | 09101FFFFFFFFFFFFFFFF | Magnus S3 (403B) | 1 | 906750 | 19 | 194 | 21.32 | 2263 | 2017-08-14T17:35:40.850 | 64 |
| 3 | FFFFFFFFFFFFFFFFFFFFFF | Magnus S3 (403B) | 1 | 906750 | 17 | 184 | 27.18 | 2290 | 2017-08-14T17:35:40.824 | 78 |
| 4 | 00000000000000000000503 | Magnus S3 (403B) | 1 | 923250 | 6 | 278 | 22.29 | 2195 | 2017-08-14T17:35:41.332 | 34 |
| 5 | F015 | | 1 | 906750 | | | | | 2017-08-14T17:34:49.863 | 1 |
| 6 | 000000000000000000001350 | Magnus S2 (402D) | 1 | 922250 | 13 | 22 | NA | NA | 2017-08-14T17:35:37.328 | 5 |
| 7 | F006 | Magnus S3 (403B) | 1 | 923750 | 3 | 268 | 20.49 | 2238 | 2017-08-14T17:35:41.820 | 19 |
| 8 | 000000000000000000004925 | Magnus S2 (402D) | 1 | 922250 | 12 | 23 | NA | NA | 2017-08-14T17:35:37.362 | 7 |
| 9 | 000000000000228510000028 | 1130 | 1 | 920750 | | | NA | NA | 2017-08-14T17:34:55.400 | 2 |
| 10 | 000000000000000000003267 | Magnus S2 (402D) | 1 | 906750 | 9 | 22 | NA | NA | 2017-08-14T17:35:06.519 | 4 |
| 11 | 000000000000000000000003 | Magnus S2 (402D) | 1 | 926750 | | | NA | NA | 2017-08-14T17:35:34.807 | 2 |
| 12 | 000000000000000000000143 | Magnus S2 (402D) | 1 | 926250 | | | NA | NA | 2017-08-14T17:35:08.003 | 2 |
| 13 | ABCD | Magnus S3 (403E) | 1 | 924250 | 11 | 200 | 21.78 | 2251 | 2017-08-14T17:35:22.521 | 9 |

Figure 4. Sensor Information Displayed Under “Tags” Tab