# V2S200D Lite Evaluation Kit – Quick Start Guide

The V2S200D Lite Evaluation Kit allows for basic evaluation of Syntiant Voice Vibration Sensor (V2S) along with a SiSonic™ Digital MEMS microphone, via USB audio streaming.

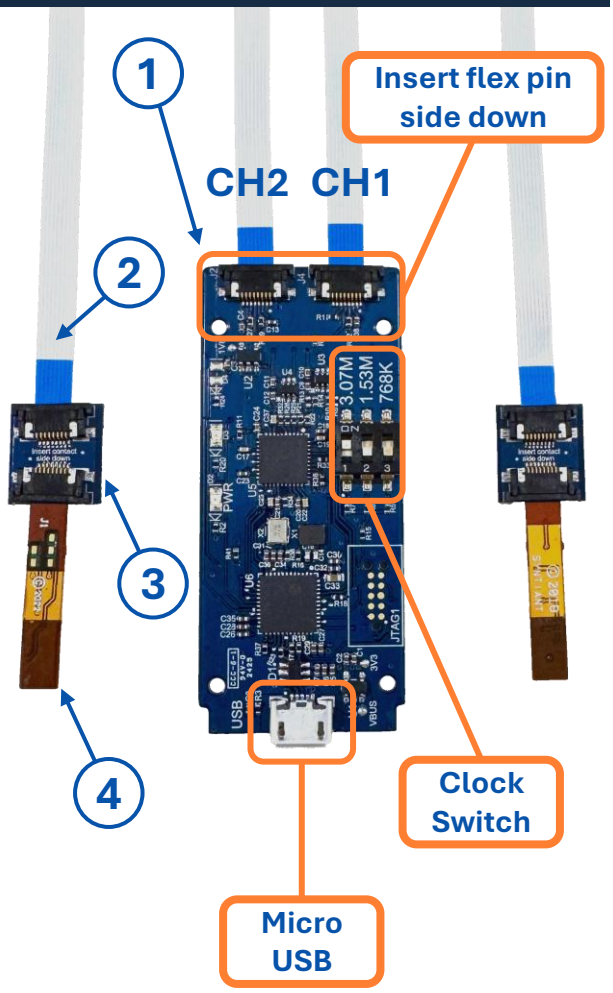
For more information, visit *syntiant.com/sensors*, email us at sales@syntiant.com, or contact Syntiant representative.

## IN THE BOX

1. PDM to USB signal conversion audio interface board
2. 2x Flat Flexible Cables, 8 pin 0.5mm pitch, 12” length
3. 2x Flex PCB to FFC junction boards
4. 2x Sensors on Flex PCBs:
   - 1x V2S200D on Flex
   - 1x SPH18R1LM4H-1 Titan Microphone on Flex
5. Micro USB to USB-A cable

## HARDWARE SETUP

- Plug-in Sensor-on-Flex or FFC to the top connectors, contact side down
  - NOTE: Audio channels correspond to the inputs as labeled, Ch1 is the rightmost input and Ch2 is the left, when viewed from the populated side of the interface board.
- Connect the streaming board to a PC using a USB cable
- Move dip switch up for desired clock rate
  - NOTE: The streaming board will default to the highest clock selection raised




## USB DEVICE INFO

- V2S200D Lite Evaluation kit will be recognized by PC as an external USB recording device. No special driver is needed to start the recording.
- Supported operating system: Windows PC, MAC
- Recording device details: 16bit, Stereo, 48kHz sampling rate

## GETTING STARTED

- Make physical connections as noted above
- Select “USB V2S-Demo” as desired audio input.
- Any commercial audio software that supports recording from external sources is compatible with this device. Alternatively, Syntiant V2S evaluation GUI software is available for a simple testing on Windows OS (next page)
- Please contact Syntiant if you face any issues when using V2S200D Lite Evaluation Kit

The intended use of all tools and software discussed in this guide is to support R&D activity and is not intended for qualification or production test use.

## V2S SENSOR SOFTWARE GUI TOOL

Optional software GUI tool to aid in sensor evaluation. Please download and install from the Syntiant V2S webpage, *syntiant.com/v2s* *or syntiant.com/automotive-v2s*

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

## V2S SENSOR SOFTWARE GUI TOOL

V2S200D Lite evaluation kit comes with several software programs. Various V2S sensor applications are covered with several GUI software programs. Please refer to the table below to identify the right program for your application. Installers for each program are available inside ZIP archive upon download from Syntiant V2S Webpage, *https://www.syntiant.com/v2s* or *https://www.syntiant.com/automotive-v2s*

For more information, visit *syntiant.com/sensors*, email us at sales@syntiant.com, or contact Syntiant representative.

| Program name *in downloaded ZIP archive* | General surface demo | Mobile Earphone mode | TWS | Industrial |
|---|---|---|---|---|
| **Recommended sensor to use in the kit** | V2S sensor on flex attached to sensing surface | V2S sensor + mic extended w/ FFC, Stereo Config. Mic channel for reference attached to wearable device | V2S sensor + mic extended w/ FFC, Stereo Config | V2S sensor on flex attached to machine under test |
| **V2S application (devices)** | Car panel<br>TV<br>Laptop Screen<br>Tablet<br>Smartphone in speakerphone mode<br>TV remote<br>Smartwatch | Any wearable device with good contact to head<br><br>Mobile in Earphone mode<br><br>Helmet | TWS or OWS wireless headset | Rotating machines<br>Pumps, engines<br>Fans, turbines, propellers |
| **Purpose** | Sensing sound-induced vibrations from any object under impact of falling audio wave | Sensing speech vibration via direct head contact when user is talking | | Sensing changes in machine vibration |
| **V2S value proposition** | Picking up audio without sound port – maximum environmental robustness against contamination (water, dust, ect.). Advantage over microphone – protection via sealed consumer device enclosure | Selectively picking up self-voice while rejecting external noise from wind, traffic, chatter, etc | | Preventive maintenance, failure prediction, machine monitoring |
| **Sensor input in GUI** | Only V2S sensor | V2S sensor and mic for reference comparison | | Only V2S sensor |
| **Notes** | GUI features:<br>EQ (equalization) to compensate for sensor resonance and noise suppression | Use in applications with tight contact with user body. Full speech bandwidth pickup via V2S vibration sensor | Use in applications with imperfect body contact (ex.: TWS rubber eartip). Speech pickup via V2S vibration sensor limited to lower frequency range | Demo allows convenient analysis of vibration spectrum with various signal acquisition settings |

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

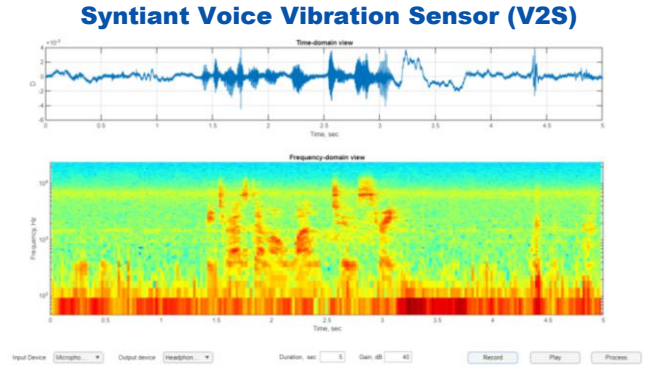
INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

# V2S200D Lite Evaluation Kit – Quick Start Guide

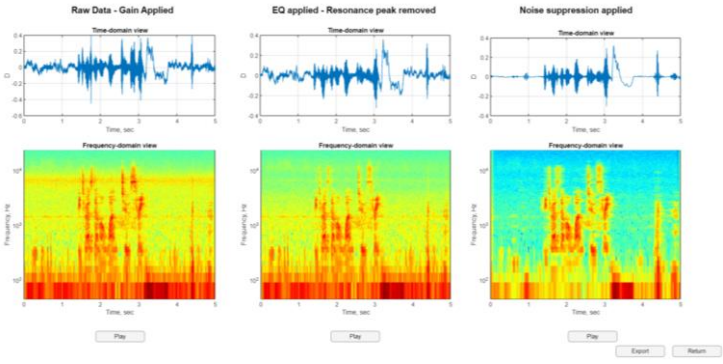
## General Surface Demo: evaluation software for sound-induced vibrations
## Automotive and consumer applications

Sensing sound-induced vibrations from any object under impact of falling audio wave. Picking up audio without sound port – maximum environmental robustness against contamination (water, dust, ect.)

## Screen 1: Recording




## Screen 2: Data analysis






**Requirements:**

In order to run V2S software tool installation of Matlab Runtime 2023b or later is required

**Recording:**

1. Connect evaluation kit hardware
2. Use V2S sensor on wires assembly (included)
3. Attach V2S sensor to desired surface with tape
4. Start the GUI software
5. Select input device. Syntiant evaluation kit shows up on PC as *Syntiant USB V2S-Demo*
6. Select output device for sound playback
7. Select recording duration. Above 30 sec is not recommended
8. Gain can be adjusted – applied on next screen during post-processing
9. Hit *Record* button. Button turns red during recording
10. Allow 0.5sec for noise-suppression algorithm to adopt
11. Start speaking
12. When recording is completed, raw data is displayed on time-domain chart and spectrogram is shown. No post-processing is applied to data on this screen
13. *Play* button can be used to hear recorded data. Note: no gain is applied at this step, expect very soft playback
14. Press *Process* to go to the next screen

**Listening and data analysis:**

1. 3 options with different post-processing are displayed. Each includes time-domain view and frequency domain-view
   - *Raw Data – Gain applied*. Data is scaled according to gain setting on recording screen. Limited to +/-1D peak value
   - *EQ applied – Resonance peak removed*. A notch filter is applied to do data from previous step in order to compensate for sensor resonance in 7kHz region. High-frequency noise hiss should be reduced
   - *Noise suppression applied* – basic noise suppression algorithm is applied to the data from previous step. Uses initial 0.5sec of the recording to establish noise mask.
2. Press *Play* button to hear the data with corresponding processing. ***Note***: gain is applied, please use caution when listening in headphones to avoid hearing damage
3. Press *Export* button to save recorded and processed files on your PC. File location will match with folder where GUI software is installed
4. Press *Return* to go back to the recording screen

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

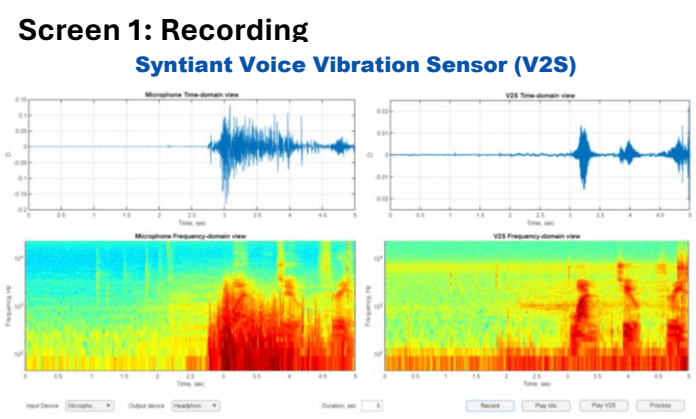
# SYNTIANT®

# V2S200D Lite Evaluation Kit – Quick Start Guide

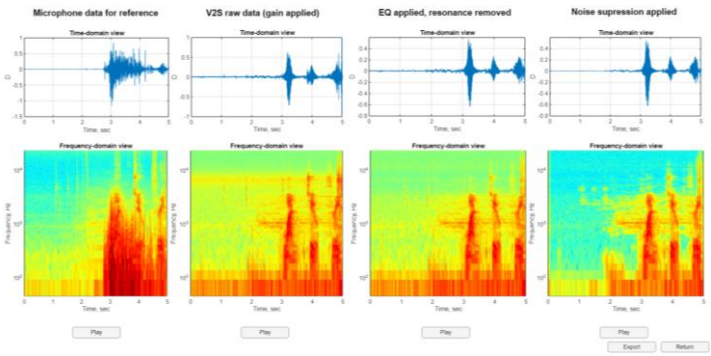
## Mobile Earphone mode Demo: evaluation software for devices with good head contact
## Wearable devices and smartphones

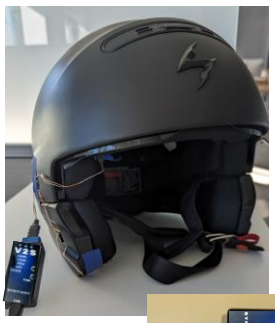
Sensing speech vibration via direct contact when user is talking. Sound isolation from loud external signals: wind, traffic noise, chatter. Use in applications with tight contact with user body. Full speech bandwidth pickup via V2S vibration sensor

## Screen 1: Recording

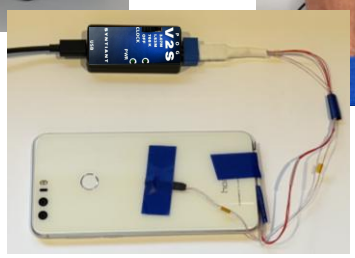



## Screen 2: Data analysis







**Requirements:**
In order to run V2S software tool installation of Matlab Runtime 2023b or later is required

**Recording:**

1. Connect evaluation kit hardware
2. Use wired assembly: V2S sensor and microphone for reference (included)
3. Using tape attach V2S sensor to the device in optimal location to pickup vibrations
4. Using Tape attach microphone to the device to record reference sound for comparison. Make sure not to cover the porthole
5. Start the GUI software
6. Select input device. Syntiant evaluation kit shows up on PC as *Syntiant USB V2S-Demo*
7. Select output device for sound playback
8. Select recording duration. Above 30 sec is not recommended
9. Hit *Record* button. Button turns red during recording
10. Allow 0.5sec for noise-suppression algorithm to adopt
11. Start speaking. Wind noise test recommended to observe V2S advantage
12. When recording is completed, raw data is displayed on time-domain chart and spectrogram is shown. No post-processing is applied to data on this screen
13. *Play Mic* and *Play V2S* buttons can be used to hear recorded data. Note: no gain is applied at this step, expect very soft playback
14. Press *Process* to go to the next screen

**Listening and data analysis:**

1. 4 options with different post-processing are displayed. Each includes time-domain view and frequency domain-view
   - *Microphone data for reference*
   - *Raw Data – Gain applied*. Data is scaled for comfortable listening.
   - *EQ applied – Resonance peak removed*. A notch filter is applied to do data from previous step in order to compensate for sensor resonance in 7kHz region. High-frequency noise hiss should be reduced
   - *Noise suppression applied* – basic noise suppression algorithm is applied to the data from previous step. Uses initial 0.5sec of the recording to establish noise mask.
2. Press *Play* button to hear the data with corresponding processing. ***Note***: gain is applied, please use caution when listening in headphones to avoid hearing damage
3. Press *Export* button to save recorded and processed files on your PC. File location will match with folder where GUI software is installed
4. Press *Return* to go back to the recording screen

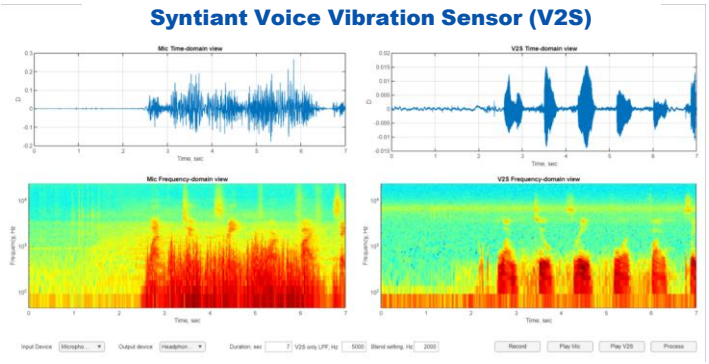
DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

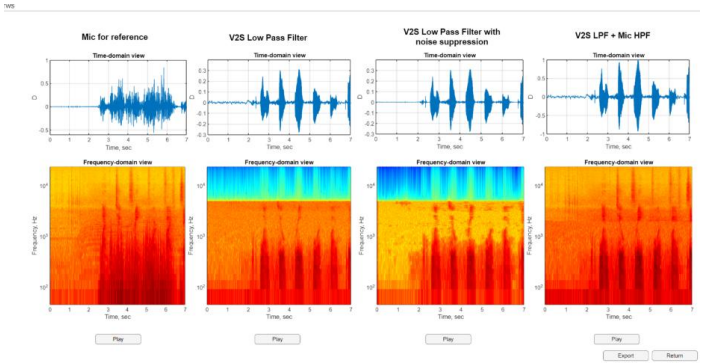
## TWS Demo: evaluation software for wireless TWS and OWS headsets

Sensing speech vibration via direct contact when user is talking. Sound isolation from loud external signals: wind, traffic noise, chatter. Use in applications with imperfect body contact (ex.: TWS rubber eartip). Speech pickup via V2S vibration sensor limited to lower frequency range

### Screen 1: Recording




### Screen 2: Data analysis







**Requirements:**
In order to run V2S software tool installation of Matlab Runtime 2023b or later is required

**Recording:**

1. Connect evaluation kit hardware
2. Use TWS prototype included in the kit with V2S sensor and microphone integrated. Alternatively, use wired assembly: V2S sensor and microphone on wires
3. Start the GUI software
4. Select input device. Syntiant evaluation kit shows up on PC as *Syntiant USB V2S-Demo*
5. Select output device for sound playback
6. Select recording duration. Above 30 sec is not recommended
7. *V2S only LPF* setting controls low-pass filter cutoff frequency for V2S channel listening on the next screen
8. *Blend setting* controls frequency for mixing V2S data in low range with microphone data in high range on next screen
9. Hit *Record* button. Button turns red during recording
10. Allow 0.5sec for noise-suppression algorithm to adopt
11. Start speaking. Wind noise test recommended to observe V2S advantage
12. When recording is completed, raw data is displayed on time-domain chart and spectrogram is shown. No post-processing is applied to data on this screen
13. *Play Mic* and *Play V2S* buttons can be used to hear recorded data. Note: no gain is applied at this step, expect very soft playback
14. Press *Process* to go to the next screen

**Listening and data analysis:**

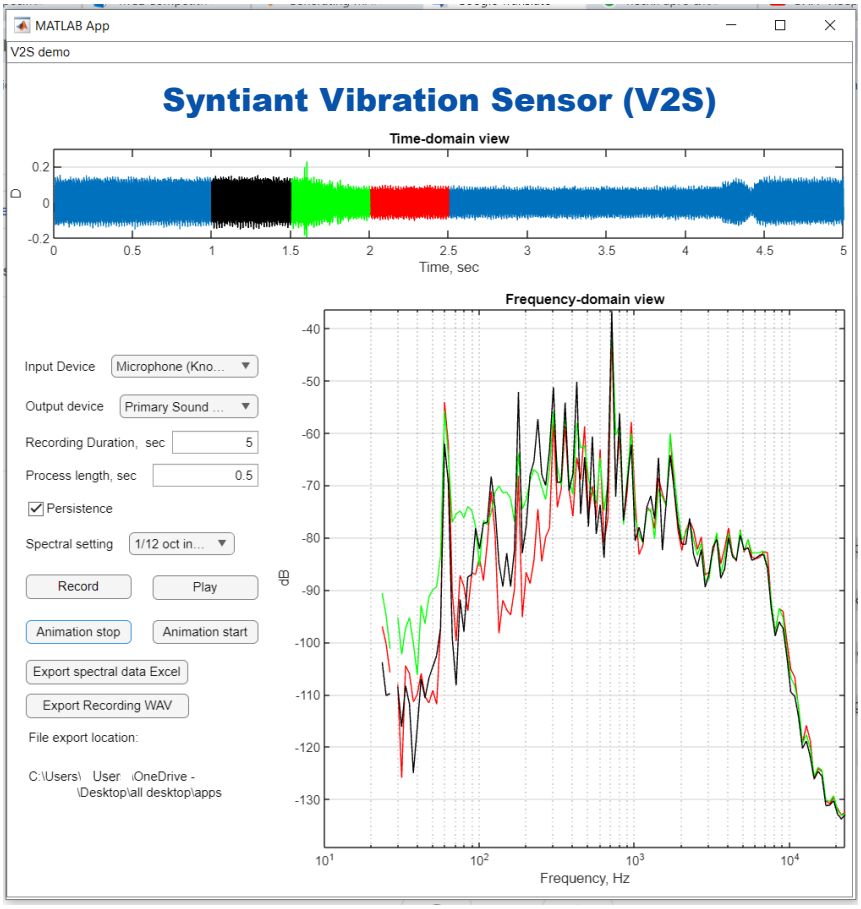
1. 4 options with different post-processing are displayed. Each includes time-domain view and frequency domain-view
   - *Microphone data for reference*
   - *V2S Low Pass filter*. Data is scaled for comfortable listening. Low pass filter applied from the setting on recording screen
   - *V2S Low Pass filter with noise supression*. Basic noise suppression algorithm is applied to the data from previous step. Uses initial 0.5sec of the recording to establish noise mask.
   - *V2S LPF + Mic HPF*. Low-frequency V2S data is mixed with high-frequency mic data according to Blend setting from previous screen
2. Press *Play* button to hear the data with corresponding processing. ***Note***: gain is applied, please use caution when listening in headphones to avoid hearing damage
3. Press *Export* button to save recorded and processed files on your PC. File location will match with folder where GUI software is installed
4. Press *Return* to go back to the recording screen

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

## Industrial Demo: evaluation software for preventive maintenance of rotating machines

Sensing machine vibration and plotting spectrum. Allows various configuration settings for optimal spectral view. Before-and-after comparison of the spectrum to demonstrate preventive maintenance capability




**Requirements:**
In order to run V2S software tool installation of Matlab Runtime 2023b or later is required

**Recording:**

1. Connect evaluation kit hardware
2. Use V2S sensor on wires assembly (included)
3. Start the GUI software
4. Select input device. Syntiant evaluation kit shows up on PC as *Syntiant USB V2S-Demo*
5. Select output device for sound playback
6. Select *Recording Duration*. Above 30 sec is not recommended
7. Select *Process Length*. This value determines how much data is used for calculation of a single spectrum
8. *Persistence* checkbox allows plotting 3 spectra at the same time from consecutive data fragments
9. *Spectral Setting* dropdown allows selection between various spectral integration settings
10. Attach V2S sensor to machine under test
11. Hit *Record* button. Button turns red during recording
12. Recommended to change the state/condition of the machine to conduct before-vs-after comparison
13. When recording is completed, raw data is displayed on time-domain chart and spectrum is shown.
14. *Play* can be used to hear recorded data. Note: no gain is applied at this step

**Listening and data analysis:**

1. Animation is continuously updating spectral view for sections of data defined by *Processing length*
2. Color of time-domain data segment matches the color of corresponding spectral plot
2. Use *Animation Start* and *Animation Stop* buttons to control spectral chart updates
3. *Export Recording WAV* saves an audio file with entire time-domain dataset for general post-processing elsewhere
4. *Export Spectral data Excel* saves spectral data plotted on the screen in table format
5. Note: *File export location* is specified in bottom-left corner of the window to help locate exported files easier. In order to guarantee successful file export, it is recommended to launch the program from a shortcut on desktop

**Example analysis:**

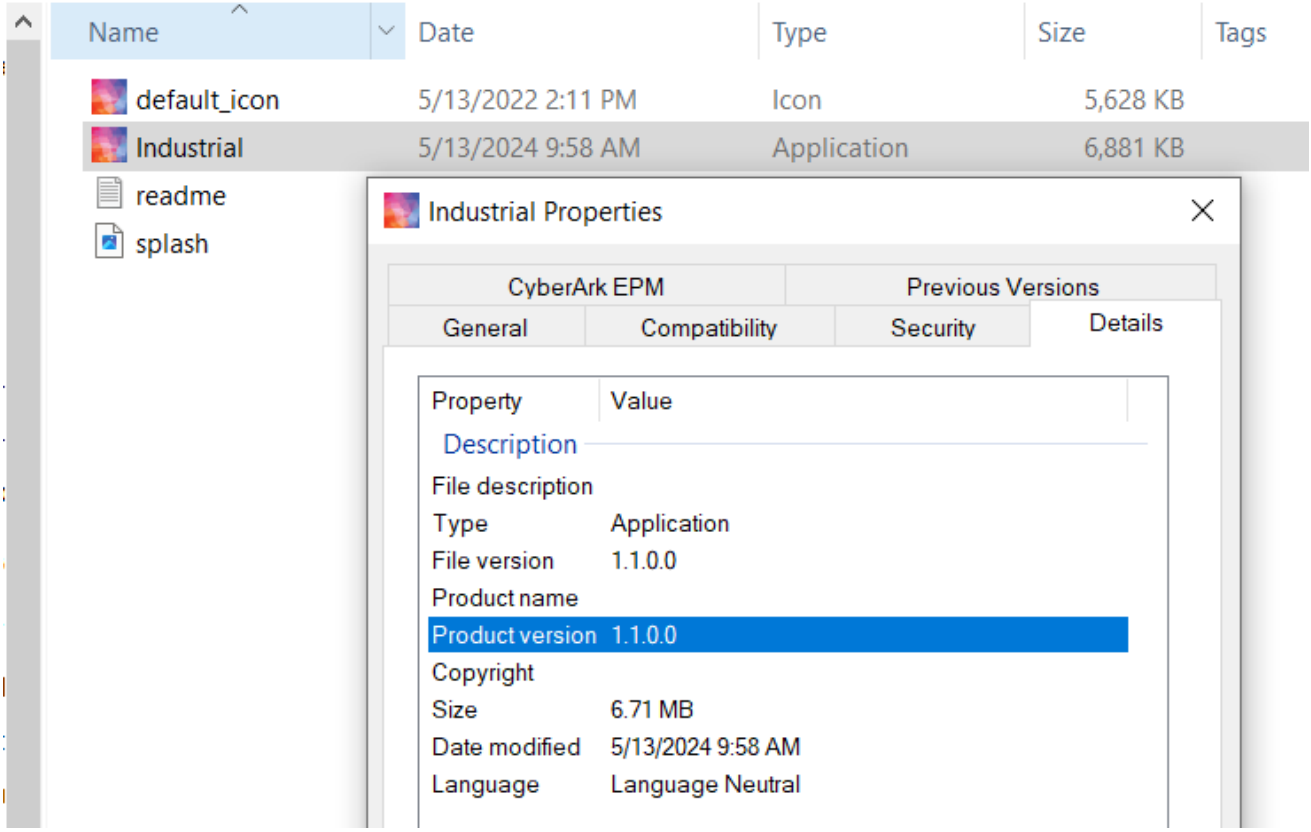
1. Image above shows vibration analysis of electrical motor under mechanical stress applied to the housing
2. Fundamental frequency detected about 700Hz
3. Black segment shows normal operation, green section is transition region, red section is operation with additional stress on housing
4. Conclusion: under stress, low frequency vibration is significantly reduced

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

## Demo revision control

1. Demo software is continuously updated with new features
2. Software revision can be found by:
    1. Open the installed application file in explorer
    2. Right click – Properties - Details




DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.

# Revision control table

| Revision | Date | Changes |
|---|---|---|
| V1 | 1/21/1016 | Initial Release |
| | | |
| | | |
| | | |
| | | |
| | | |

DISCLAIMER
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples given herein, any typical values stated herein and/or any information regarding the application of the device, Syntiant Corporation hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

INFORMATION
V2S200D Lite Evaluation Kit - Quick Start Guide v1
For further information on technology, delivery terms and conditions and prices, please contact a Syntiant representative.
© 2025, Syntiant Corporation, Irvine, CA, USA. All Rights Reserved.