

SYNTIANT®

Making Edge AI a Reality™

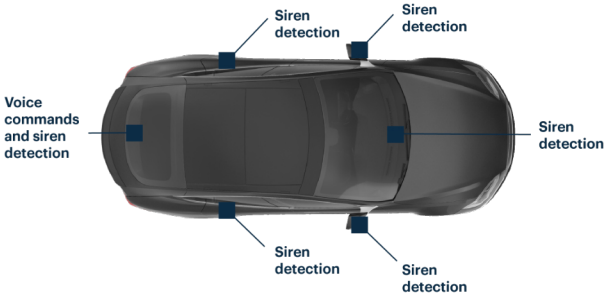
SYNTIANT SELECTION GUIDE

VIBRATION SENSORS FOR CONSUMER, AUTOMOTIVE, AND INDUSTRIAL APPLICATIONS

Introducing Vibration Sensing for Consumer, Automotive and Industrial Applications

Syntiant's V2S is a high bandwidth, low-power specialized vibration sensor optimized for a number of applications ranging from consumer to automotive, industrial and more.

V2S is designed to selectively pick up the speaker's voice while suppressing all the other sounds, allowing for a comfortable and frustration-free voice call experience. The V2S's small size, high signal-to-noise ratio (SNR), and low power offer an ideal solution to OEMs/ODMs looking to enhance the user experience of their products while working with significant industrial design (ID) and battery life constraints. In addition, upon integration into the system, the V2S emulates a digital microphone with a pulse density modulation (PDM) interface, which makes hardware and software development hassle-free.



Syntiant's V2S, with superior environmental robustness compared to a traditional MEMS microphone, enables reliable sound pick-up in exterior automotive applications, supporting many cases such as emergency vehicle detection and voice commands. The absence of an acoustic porthole makes the V2S an ideal candidate to operate in harsh environments such as the outside of a vehicle, where MEMS microphones are prone to failure.

Finally, V2S offers an excellent alternative to MEMS accelerometers for industrial applications ranging from fault detection and condition-based monitoring to predictive and preventive maintenance. The V2S's low noise and large bandwidth enable early detection of failure mechanisms, while still benefiting from the environmental robustness of porthole-free packaging.

APPLICATIONS

ENVIRONMENTALLY ROBUST SOUND PICKUP FOR EXTERNAL AUTOMOTIVE APPLICATIONS

The V2S is a high bandwidth, low-power specialized vibration sensor which enables sound pickup, including in harsh environments. It can be mounted on a car (windscreen, side mirror, or body panel) to:

1. Pick up external sounds including emergency vehicle sirens;
2. Process voice UI commands (e.g., "open car trunk").





BENEFITS:

- Unlike a traditional microphone which requires extensive environmental protection when mounted to a car's exterior, a vibration sensor does not have a port hole and is therefore inherently robust to wind, dust, dirt, snow, and water.

Listen to the **V2S200DZA** difference on www.syntiant.com/automotive-v2s

Recommended sensor: **V2S200DZA**

BACKGROUND NOISE ISOLATION FOR SMART/AR GLASSES, TWS EARBUDS, HELMETS



In head worn devices, vibrations from the speaker's head couple to the V2S, which picks up voice while suppressing background noise.

BENEFITS:

- Clear speech in windy/noisy environments.
- Environmental robustness (no meshes or membranes needed to prevent particle or liquid ingress).
- Rejects outside talkers
- Combine with Syntiant's NDP120 neural decision processor and AI noise suppression for crystal clear and frustration-free voice call experience in challenging environments.

Listen to the **V2S200DZ** difference on www.syntiant.com/v2s

Recommended sensor: **V2S200DZ**

PREDICTIVE MAINTENANCE FOR INDUSTRIAL APPLICATIONS

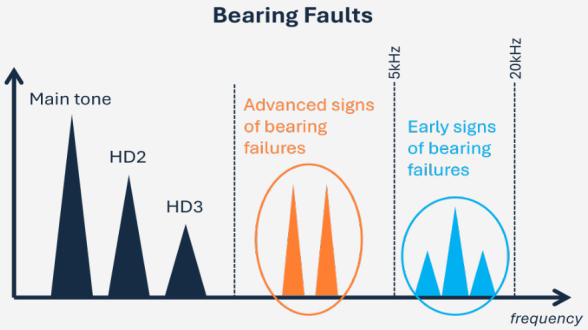
Several industrial use cases in predictive maintenance and condition-based monitoring require high-bandwidth and low-noise sensors capable to operate in harsh environments. V2S can be used to detect misalignment, imbalance or wear of pumps, motors, turbines, and other machinery and trigger early maintenance.

BENEFITS:

- High bandwidth and low noise sensor facilitates early detection of bearing failures.
- Environmental robustness: sealed package suitable for deployment in harsh industrial environments.

Recommended sensor: **V2S200DZA**





ENVIRONMENTALLY ROBUST VOICE COMMAND INTERFACES FOR CONSUMER, IOT, AND APPLIANCES



Attaching a V2S to a glass, metal, or plastic panel enables a voice-controlled user interface without the need for microphones.

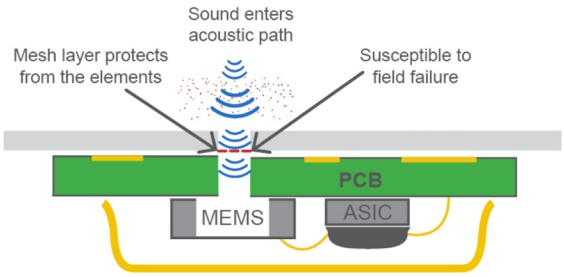
BENEFITS:

- Ease of integration: no acoustic port hole needed.
- Environmental robustness: inherently immune to liquid and particle ingress, no meshes or membranes needed.

Recommended sensor: **V2S200D, V2S200DZ, or V2S200DZA**

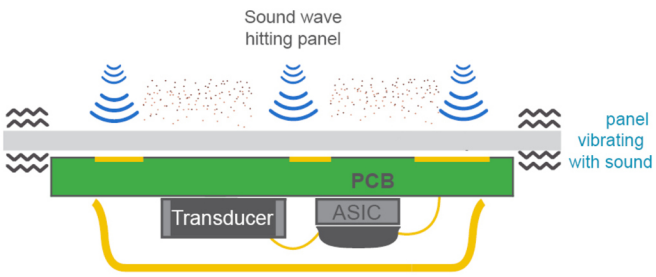
Comparison between V2S vibration sensor and traditional MEMS microphone

Traditional bottom-port MEMS mic integration

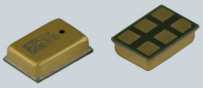
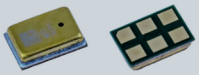
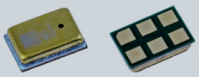


- Exposed to outside world (open port hole).
- Prone to failure in harsh environments.
- Trade-off between environmental protection and acoustic performance (high protection required).

V2S Vibration Sensor integration



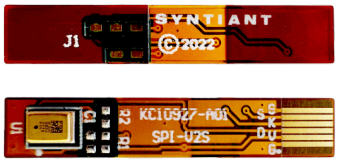
- Mechanically attached to any surface.
- Not exposed to outside environment.
- V2S picks up sound-induced panel vibration.

SENSOR	DESCRIPTION	SIZE	NOISE DENSITY	BANDWIDTH	1% THD	CURRENT	
V2S200D On flex: KAS-700-0177	Vibration Sensor - PDM output - IPx7 waterproof rating	3.30 x 2.30 x 0.93mm	9μG/√Hz	10kHz	> 10 g	290μA @ 768kHz 700μA @ 2.4MHz	
V2S200DZ *NEW* On flex: KAS-700-0190	Low profile Vibration Sensor - PDM output - IPx7 waterproof rating	3.30 × 2.30 × 0.70mm	9μG/√Hz	10kHz	> 10 g	290μA @ 768kHz 700μA @ 2.4MHz	
V2S200DZA *NEW* On flex: KAS-700-0191	Automotive Vibration Sensor - AEC-Q103-003 - PDM output - IPx7 waterproof rating - Extended temperature range (-40 to +125°C operating temperature)	3.30 × 2.30 × 0.70mm	9μG/√Hz	10kHz	> 10 g	290μA @ 768kHz 700μA @ 2.4MHz	

EVALUATION KITS

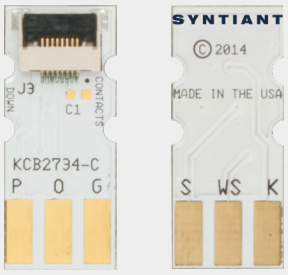
TEST FLEX PCBs

Syntiant utilizes flex PCBs when testing vibration sensors. Once the V2S is mounted on flex circuits, it is much easier to access the signals. Testing a larger sample size of devices is facilitated if the flexes and coupons are inserted into an 8 position 0.5mm Kyocera connector (MPN 046288008000846).



FLEX-TO-COUPON ADAPTER

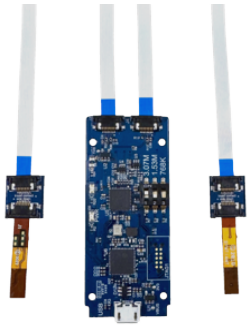
Syntiant uses an adapter to be able to use flex circuits with a 2x3 Sullins connector (MPN EBM03DSEN-S243) or for convenient connection with flying wires.



KCA2733 Flex-to-Coupon adapter

EVALUATION KIT

The V2S200Dx Evaluation Kit allows for basic evaluation of Syntiant Voice Vibration Sensor (V2S) along with a SiSonic Digital MEMS microphone, via USB audio streaming.



KAS-33100-0011 Evaluation kit

ADDITIONAL RESOURCES

V2S200D and V2S200DZ Datasheets, evaluation kit user guide, and sample recordings: www.syntiant.com/v2s
V2S200DZA Datasheet and sample recordings: www.syntiant.com/automotive-v2s

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