

GRAS microphones provide the low noise floor HARMAN needs

HARMAN uses GRAS 46BL-1 ¼" microphones to fine-tune their high-end automotive sound systems.

✓ **CUSTOMER**
Harman International

✓ **PRODUCT**
• GRAS 46BL-1

✓ **PERSONS**
• **Greg Sikora**, Acoustic Systems Engineering Sr. Director, and head of HARMAN's Automotive Acoustic Systems Engineering department.

• **Niels Kjærgaard**, VP Business Development, GRAS Sound & Vibration.



CHALLENGE:

End user demands for acoustic quality and new functionalities in automotive sound and infotainment systems are constantly increasing – and can affect their choice of automobile brand.



ACTION:

To satisfy and surpass demands, HARMAN's Automotive Acoustic Systems Engineering Department rigorously tests and tunes their automotive sound systems. To raise the bar, they decided to find a measurement microphone with a lower noise floor, to further elevate their already high testing standards.



SOLUTION:

HARMAN found that the GRAS 46BL-1 ¼" microphone was a perfect fit. It has the lowest noise floor on the market (24 dB) while still maintaining a small form factor.



BENEFITS:

In addition to its low noise floor, the 46BL-1 also provides HARMAN with backwards compatibility to their existing test setup with standard ¼" microphones in six-microphone arrays.



Driving the evolution of automotive acoustic standards

As automotive acoustic standards evolve, and as consumer expectations for in-vehicle sound and infotainment systems become more and more advanced, the demands placed on acoustic testing become higher and higher.

HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide,

GRAS

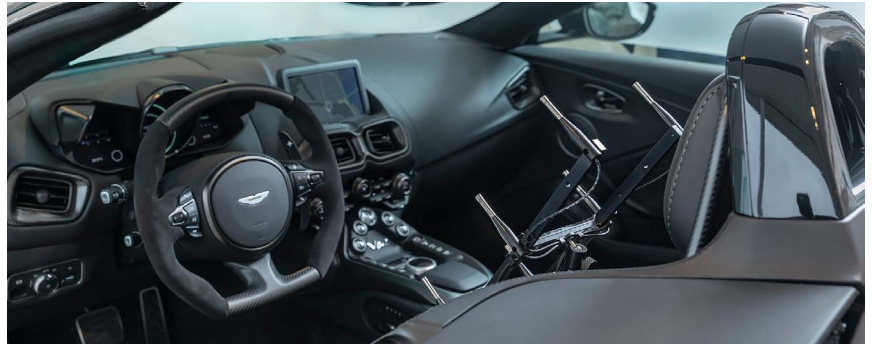
An Axiometrix Solutions Brand

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For us it is important to use microphones that meet our strict requirements. After all, this will be the equipment that lays the foundation for our work. The only limitation should be the environmental noise floor, not the microphone noise floor.

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Greg Sikora, Acoustic Systems Engineering Sr. Director, and head of HARMAN's Automotive Acoustic Systems Engineering department.



including connected car systems. HARMAN's Automotive Acoustic Systems Engineering department tests around 400-500 systems a year. A HARMAN automotive sound system has anywhere between 10 - 30 speakers. Each of them needs to be tuned separately by listening and measuring over and over to make sure the sound in the car is optimized and achieves targets for respective brands.

As the number of in-vehicle speakers grows, so does the need for measurement microphones with tighter tolerances and higher sensitivity. A low noise floor is necessary to be able to accurately test e.g., a tweeter in a large SUV.

Finding the perfect fit

The acoustic engineers at HARMAN's Automotive Acoustic Systems Engineering department began looking for a 1/4" microphone with a lower noise floor to replace their standard 1/4" microphones. Eventually they chose the GRAS 46BL-1. With its noise floor as low as 24dB(A), it was the only 1/4" microphone that met their strict requirements as well as the AES guidelines for infotainment system testing. Coincidentally, it is also the lowest noise floor for 1/4" microphones available on the market.

GRAS 46BL-1 
1/4" CCP Pressure Standard
Microphone Set, High
Sensitivity



"The GRAS 46BL-1 1/4" microphone is basically plug and play, and it lets us retain backwards compatibility with our current system while lowering the noise floor. It's a perfect fit," explains Greg Sikora.

Apart from the noise floor, it was also important to HARMAN that the 46BL-1 would let them retain backwards compatibility with their current system and their test setup. HARMAN uses six-microphone arrays to cover the sound field around listener positions in various seats of the vehicle, as recommended by the Audio Engineering Society (AES).

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We see ourselves as a development partner to our customers. And as they face a constant trend towards tighter production tolerances and the need to include lower levels in testing, we of course have to develop microphones that help them deliver.

Niels Kjærgaard, VP Business Development, GRAS Sound & Vibration.

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GRAS are well known for making good products, and working with GRAS has been great. GRAS gave us a personal approach, they were interested in the application and how we wanted it to work.

Greg Sikora, Acoustic Systems Engineering Sr. Director, and head of HARMAN's Automotive Acoustic Systems Engineering department.

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GRAS 46BL-1: Lowest noise floor on the market

GRAS has been a global market leader in high precision measurement microphones since the 1990s. Through close collaboration with our customers, we are well aware of the constant increase in acoustic quality requirements for telecom, audio, PCs, tablets – and in-vehicle infotainment systems. Therefore, we set out to create a microphone as robust and reliable as standard ¼" microphones, but with laboratory microphone performance specs.

GRAS decided to improve upon the standard ¼" microphone, as the actual physical size of a ¼" microphone provides many benefits. Not least when measuring where there are many reflections and disturbances, such as in-cabin. Here, the physical advantages of a ¼" microphone can greatly increase accuracy and simplify post-processing data.

"Through close cooperation with our customers, we know that data-safety is highly important because the costs related to unsuited and unreliable sensors may determine whether your project turns into a success or not," explains Niels Kjærgaard.

Data safety translates directly into the need for easier microphone selection, simple system configuration, and reduction of measurement errors. To meet the need for a lower noise floor in a robust standard 1/4" microphone, we developed two unique high sensitive measurement microphone sets: The GRAS 46BL-1 high sensitivity, pressure microphone set, and its multifield counterpart, the GRAS 46BC. Thanks to our unique and proven design they are simple, reliable, and robust and allow users to take laboratory level measurement capabilities into the field.

AES Whitepaper Compliant

The AES Technical Committee on Automotive Audio [TC-AA] has developed some very useful guidelines for In-car Acoustic measurements in a whitepaper from 2023. This paper is focused on measurements with microphones in the driver and passenger seat, both on methods and instrumentation.

Having the Audio Engineering Society's (AES) recommendations for In-Car Acoustics Measurements as a yardstick was also helpful, as it gave GRAS engineers something to aim for.

Niels Kjærgaard: *"Arranging our 46BL-1 or 46BC microphones in a six-microphone array like our own [RA0399 holder](#), perfectly meets the recommendations in the AES whitepaper on in-vehicle measurements."*

For more information, please contact marketing@grasacoustics.com.

ABOUT GRAS SOUND & VIBRATION

GRAS is a worldwide leader in the sound and vibration industry. We develop and manufacture state-of-the-art measurement microphones to industries where acoustic measuring accuracy and repeatability is of the utmost importance in R&D, QA and production. This includes applications and solutions for customers within the fields of aerospace, automotive, audiology, and consumer electronics. GRAS microphones are designed to live up to the high quality, durability and accuracy that our customers have come to expect and trust.

GRAS Sound & Vibration is represented through subsidiaries and distributors in more than 40 countries and is part of Axiometrix Solutions, a leading test solutions provider comprised of globally recognized measurement brands.