sonion

> We are the World's #1 supplier of balanced armature drivers to high-end in-ear earphones and professional in-ear monitors

Passion for Sound

Sonion Pro Audio

Sonion at a Glance

We are the World's leading supplier of balanced armature drivers to high-end in-ear earphones and professional in-ear monitors

Founded in 1974 Sonion is a global B2B supplier of micro acoustic and micro mechanical technologies for hearing instruments, in-ear earphones and communication headsets.

With four decades of experience as a leading supplier to the hearing health and Pro Audio industries we have gathered vast experience in developing high quality products, which we ship with high and consistent delivery performance.

Our more than 3,000 employees are dedicated in providing our customers with unique solutions through innovation and close collaboration.

Sonion has the broadest range of balanced armature drivers in the market and we also offer our proprietary AcuPass™ technology for plug'n play multi driver applications.

Sonion HQ is located in Denmark. Transducer development takes place in our new facility in Hoofddorp, The Netherlands, and we offer local sales support in all regions.

State-of-the art production facilities in Vietnam and Philippines

Innovation leader in balanced armature driver technology

What is your passion?

Working with Sonion means working with your customers, because that's who we are.

The Pro Audio Team share a passion for great sound, whether it's through development of transducers at work, playing music in a band or building custom in-ear earphones - we speak "audio" and understand it from a musician's point of view.

Sonion's Pro Audio team has a combined 205 years professional experience, 235 years of musicianship from >40 bands and no less than 404 years of audio enthusiasm.

Our CTO has his own personal speakers in his office and a colleague from R&D practices his trombone at work during breaks. Play lists & concert experiences are shared amidst emails and conference calls while music memories get associated with a discussion about sonic signatures or performance data.

There are too many to mention them all here but let's introduce two of our Pro Audio enthusiasts.

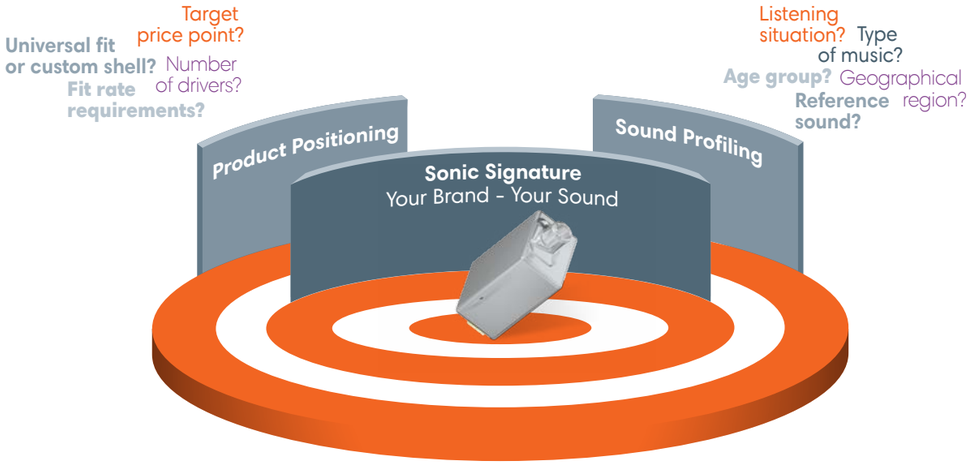
Meet two of our Pro Audio enthusiasts

Eric Hruza, Director Pro Audio
Eric started his career 33 years ago working his way through college by providing sound for bands like Ramones, The B-52's, Willie Nelson, Bo Diddley and the Blues Brothers (just to mention a few). After graduating with a BSEE he started working for Audio Technica, Shure, Crown & Harman. Eric is an expert IEM designer and plays several instruments: guitar, piano, bass, drums, and banjo.

Onno Geschiere, Application Engineer
Onno has been an audiophile since early childhood and he has 25 years of professional audio experience. He is already well known for his golden ears in the industry. Onno is very passionate about developing transducers and the science & art of creating the right architecture of excellent sounding earphones.

Working with Sonion

Appreciation of sound quality is universal – success in designing in-ear earphones is not



A typical teenager does not have the same listening requirements or financial resources as a mid-aged jazz enthusiast. For the same reason it is important to be very clear on which sonic signature the target audience wants. Teaming up with the Pro Audio team means engaging in the Sonion approach; this will help define the right product for your application.

Shaping the sonic signature

From a business perspective we first seek to understand your desired product positioning: What is the target retail price point? Are you looking for a custom shell or a universal fit? How many drivers are needed given the fit rate requirements and the target price point? These are some of the details that help Sonion set the boundary conditions for your transducer configuration.

Next we seek to do a sound profiling based on your requirements. This is a competence which we have built and refined over decades: Today, we believe that we are unique in our ability to help define your sound profile and to translate this into driver specifications and designs. The preferred type of music, the age group and even the nationality are all factors which will affect the sound profile.

Combining your desired product positioning with your sound profile, we shape your brand's sonic signature. This will help differentiate your earphones in the market place.

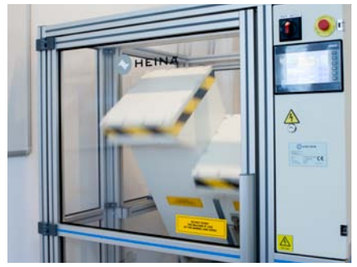
We lend you our expertise

By listening to our customers we translate ideas into specifications. Some of our Pro Audio Team members are known for the incredible ability to distinguish the smallest acoustic subtleties in sound (commonly referred to as "Golden Ears"). They offer their acoustic expertise in the art of designing an excellent sounding earphone. We don't just offer products, we offer a team of passionate experts. Golden ears and market insight is key in getting the sound details right.

Equally important are the precise measurements we conduct during the development process in our advanced laboratories. We use a combination of state-of-the-art equipment and our own internally developed technologies to ensure we can produce the desired sonic signature repeatedly in mass production.

Quality

As a main supplier for the MedTech (hearing aids) and Pro Audio industries for four decades we have gathered vast experience in developing our quality tests and we are continuously improving in order to comply with the increasing quality demands. Currently we conduct nearly 100 different quality tests on our transducers such as:



Robustness

We conduct a robustness test, where a drop and a tumble test expose transducers to high G-forces. A large selection of our receivers can withstand mechanical shock of up to 14,000 g without suspension.

Reliability

Reliability is tested both over time and through extreme conditions. The Accelerated Life Test (Tropical Heat Test), tests for reliability after a simulated aging during a 21 day running cycle at high temperatures and 99% humidity level. Corrosion and electrical failures are tested in Sonion's Artificial Sweat test, where transducers are exposed to fumes of artificial sweat that creates a highly acidic atmosphere.

Final Quality Control

100% Acoustical, Electrical and Visual inspection: At the end of the manufacturing process all products are checked on a calibrated and verified Final Quality Control measurement setup and subjected to a final visual control. FQC data are analyzed based on their distributions/trends and are closely monitored by QA Engineers.

A high level of product and process quality is important to our customers. Consequently, quality is a critical factor in all aspects of our business.

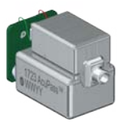
> For same size earphones, balanced armature technology provides broader bandwidth compared to moving coils.

Balanced Armature Drivers

> Balanced armature receivers offer substantially more output per mm^3. This is an advantage in miniaturized applications where you want to fit several receivers in a small area to produce hi-fi earphones with tweeter, mid and bass tones.

> Balanced armature receivers are much more power efficient than moving coils. In wireless applications this could offer substantially longer battery life.

Pro Audio driver families

Driver Family		Dimensions mm [in] typical L	W	H	Volume mm^3	Typical Application	Description
Single Driver							
	**2600**	5.20 [0.205]	3.05 [0.120]	2.60 [0.101]	41	Full or mid range	People who are looking for the tube amplifier sound will find it in the 2600 drivers.
	**2300**	6.30 [0.248]	4.29 [0.169]	2.96 [0.117]	80	Full or mid range, tweeter	Most versatile driver with a nice and silky smooth buttery finish. Very forgiving and easy to work with.
	**3100**	7.87 [0.310]	4.09 [0.161]	2.80 [0.110]	90	Woofer	Very fast, very powerful, highly accurate, good clarity. Needs to be used right.
	**3500**	7.87 [0.310]	4.09 [0.161]	2.80 [0.110]	90	Woofer	Precise, accurate & fast, with a smooth sound.
	**1700**	7.95 [0.313]	5.60 [0.220]	4.07 [0.160]	181	Full range Woofer	Nice medium sized versatile driver that comes in several flavors so you can do a lot of different things with it.
	**2000**	9.45 [0.372]	7.13 [0.281]	4.10 [0.161]	276	Woofer	Sounds like a large cone woofer, it's a big brute force monster that gets the job done.
Dual Driver							
	**3300**	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180	Woofer	Dual version of 3100. Very fast, very powerful, highly accurate, more clarity. Needs to be used right, big penalty if used wrong.
	**3700**	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180	Woofer	Dual version of 3500. Precise, accurate & fast with a smooth sound.
	**3800**	7.87 [0.310]	5.60 [0.220]	4.09 [0.161]	180	Woofer	The most powerful and big sounding woofer, it's a monster! More low end punch, less accurate if used wrong.
AcuPass™							
	**1723**	9.40 [0.370]	5.60 [0.221]	7.33 [0.289]	386	Full range Tweeter-Woofer	A high performing, excellent sounding full bandwidth plug'n play module

Single Drivers

26A005

Headroom	Sound					
	Bass		Mids		Treble	

Mike Geskus

My opinion

“ Analytic full range with pleasant smooth HF, missing LF output like a small un-ported bookshelf speaker. It's warm and lush with a colored frequency response in a way that almost everyone likes. It can be used as a mid range.

2323

Headroom	Sound					
	Bass		Mids		Treble	

Onno Geschiere

My opinion

“ Very accurate with extended HF, analytic full range or very good standard tweeter - It just sounds good! When used as a tweeter, I have never heard one better: Wonderful tweeter with silky smooth HF extension, never harsh, never brittle.

2356

Headroom	Sound					
	Bass		Mids		Treble	

Onno Geschiere

My opinion

“ Full range with pleasant balance, similar to a small high quality bookshelf speaker: bass is available but never gets physical. Perfect for the good all round sound signature. If you are going to build a single driver ear phone, this is the one you would use.

26A005/8

Headroom	Sound					
	Bass		Mids		Treble	

Eric Hruza

My opinion

“ Full range with emphasis on bass and lower midrange, similar to a ported bookshelf, LF is present but not very dynamic. It's got a bigger warm low end and usually startles and shocks people that so much HF information comes out of a receiver that small – they just can't believe it.

26A007/9

Headroom	Sound					
	Bass		Mids		Treble	

Onno Geschiere

My opinion

“ Warm, rich sound, pleasant, sounds like a bigger receiver than it actually is. It has the sound of a big Cervin Vega night club speaker, big aggressive US night club style bass.

2389

Headroom	Sound					
	Bass		Mids		Treble	

Eric Hruza

My opinion

“ An even hotter version of the 2323: you have access to one more tap so you can run at lower impedance and get a little more HF output.

23x47/8

Headroom	Sound					
	Bass		Mids		Treble	

Onno Geschiere

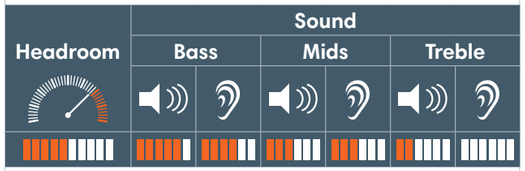
My opinion

“ An atypical BA full range with emphasis on bass and lower midrange. Warm sound, similar to a ported bookshelf. A choice for those who like presence and dynamics a bit reduced.

Symbols

Output	Quality

31D005/8

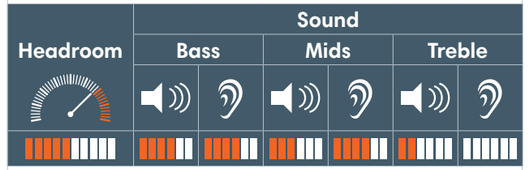


Onno Geschiere

My opinion

"A small woofer which sounds bigger than it is. You could compare it with a small Public Address woofer in a ported enclosure. The port adds low end output, but the downside is a loss in accuracy. Fast transients come out a little slower. It is the preferred effect when the goal is to have slightly more bass than is really in the recording.

31A007

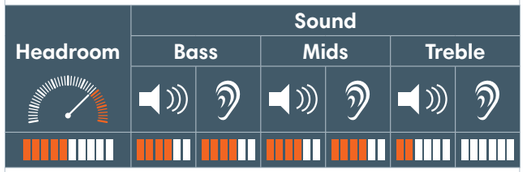


Haico van Oosten

My opinion

"The smallest no compromise woofer: Accurate and fast but no bass wonder, sounds like an 8" in a closed enclosure. You need to use it together with a tweeter, since it doesn't work well as a full range.

35A007

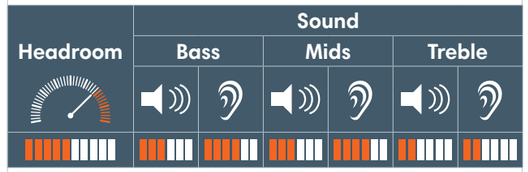


Onno Geschiere

My opinion

"Sealed small true woofer. Very precise and fast but not loud. Has a little more emphasis than 3100. It also works well as a very fine midrange.

17A003

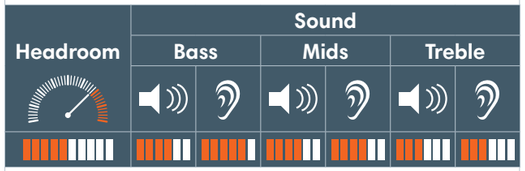


Onno Geschiere

My opinion

"Old style broadband receiver, recommended for communication, friendly sound: It has smooth, powerful mid's and works really well as a midrange in a HI-FI IEM. It is very intelligible and clear sounding

17A006b/9

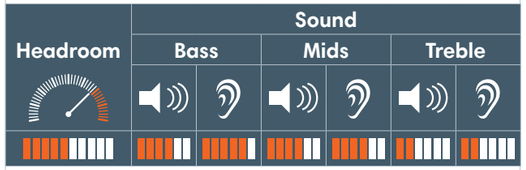


Eric Hruza

My opinion

"Broadband suited for entry level earphone or headroom demanding applications. Friendly sound. Bass has some nice impact and details common for a large diaphragm receiver. Warm lows and it has an aggressive in-your-face sound.

17A007/9



Mike Geskus

My opinion

"The inductive coil combined with tuned venting results in a woofer version of 1700, popular bass enhanced sound but sweet, not overly dynamic or aggressive. It's got a lot of punch, definition, clarity and sounds fast. Used properly it's a formidable woofer.

2015

Onno Geschiere

My opinion

"It can produce so much sound and has unbelievable head room. This is the mid range or the woofer in some of the best in ear monitors that have ever been made. Period.

2091i

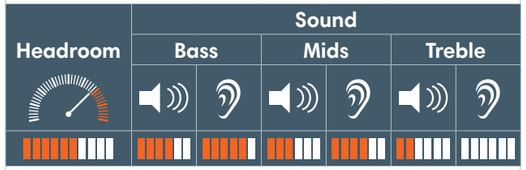
Onno Geschiere

My opinion

"A vented version of the 2015: Sounds like a large cone woofer in a vented speaker cabinet, big, woody and powerful sounding

Dual Drivers

33AJ007i

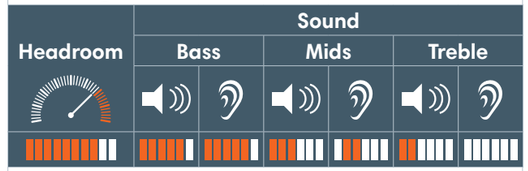


Onno Geschiere

My opinion

"Sealed woofer, very precise
and fast but not loud.
It is a nice accurate woofer
that sounds "flat".
If accuracy is the goal,
this is a good choice.

37A007

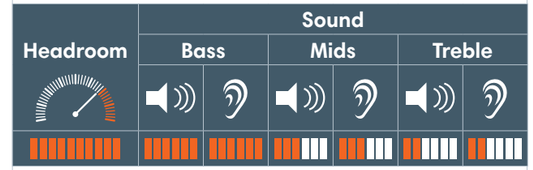


Onno Geschiere

My opinion

"Sealed woofer. Very precise
and fast but not loud.
A little more powerful woofer
than a 3300 with
a bit more body

38AM007mi/8a

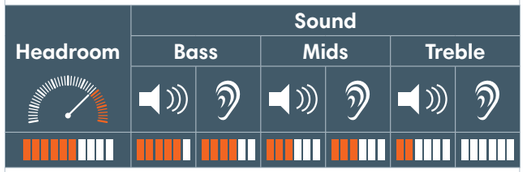


Haico van Oosten

My opinion

"This is our most powerful
and big sounding woofer
It's a monster!
Extremely powerful and
impressive sounding, bigger than life.
It plays at unbelievable
high sound pressure levels, a full octave
below what you can hear.

33AJ007i/8

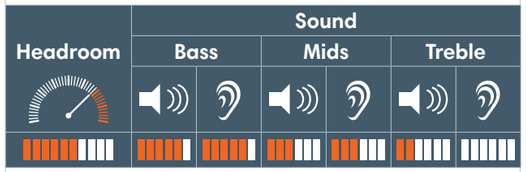


Eric Hruza

My opinion

"Large vent, sounds like
speaker with a ported cabinet.
Loud bass up to lower midrange but
bit undefined. You get more LF output
at the expense of nice clear tight lows
and mids. If a fat warm low end
is the goal, this is a good receiver to use.

33AJ007i/9

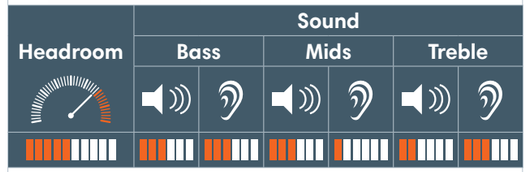


Eric Hruza

My opinion

"Tuned vent driver with emphasis
on low bass and still precise, dynamic,
sounds like a midsize cone dual woofer
Public Address. This 3300 sounds great, it's
robust and has a nice size - and it's
powerful enough for almost any application.
This is a good building block for almost any
multi driver earphone.

1723WT03

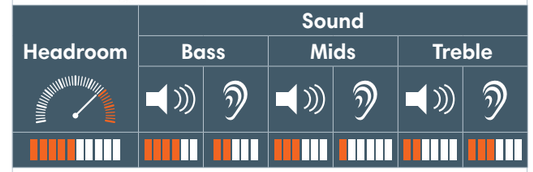


Onno Geschiere

My opinion

"Good off the shelf turnkey design,
with little or no Engineering resources
needed. 1723 AcuPass™ is
a plug and rock solution.
It has a typical European
sound signature.

1723WT03/9



Onno Geschiere

My opinion

"Vented version of our 1723 AcuPass™.
It has a bigger bass response
than the standard version.
More and heavier bass, less accurate.
It has a typical American
sound signature.

< 1970
Musicians give concerts without assistance from stage monitors. They do the best they can with nothing to help them hear what is being played.

1970-1980
As stages and audiences grow, it is increasingly difficult for musicians to hear themselves. They start pointing speakers in the direction of the stage, which introduce feedback as a problem.

To reduce feedback, speakers migrate into floor wedges and side fill monitors. Noise exposure is at deafening levels.

1980-1990
Work to develop basic In-Ear-Monitors (IEMs) from hearing aid receivers and ear plugs begin. These sealed ear-phones reduce external noise by 20dB and help preserve musicians' hearing. At the same time, they enable move-ment around stage and they are easy to transport.

IEM's become increasingly popular and a need to further develop sound quality and industrialization emerge.
A close collaboration between the IEM inventors and estab-lished earphone manufactur-ers is initiated.

People with hearing aid transducer competence are brought in to support the development. Among these, you find staff which to this date is employed in the Sonion Pro Audio team.

Pro Audio History

The industry has evolved over the past 30-years and Sonion is proud to employ people who were a part of the industry from the very beginning. It is through these roots that our expertise and passion nourish.

2000-2010
Following the introduction of iPod's in 2001, MP3 player demand surges and a consumer market for IEMs emerge. The first consumer products are launched under different category names: Personal Monitors (PM), Sound Isolating Earphones and In-ear Earphones to mention some.

Distribution expands to include mainstream consumer electronic outlets.

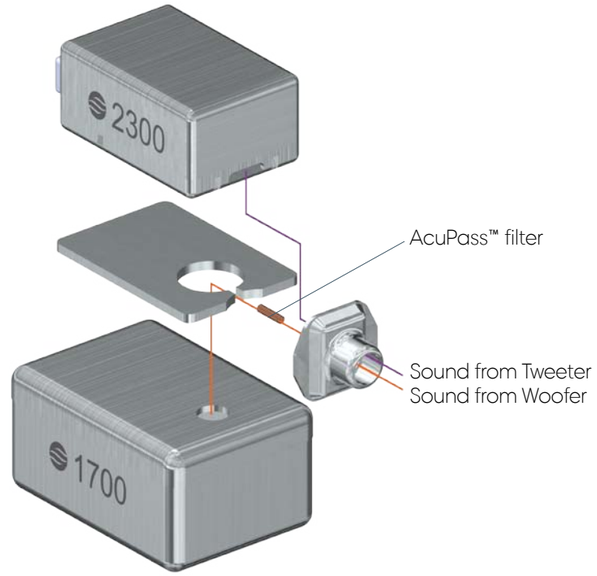
New players emerge, including some of the World's biggest consumer brands.

2010-
With the growing popularity of smartphones, a new market for IEMs with microphones is born (IEM headsets).

AcuPass™ Technology

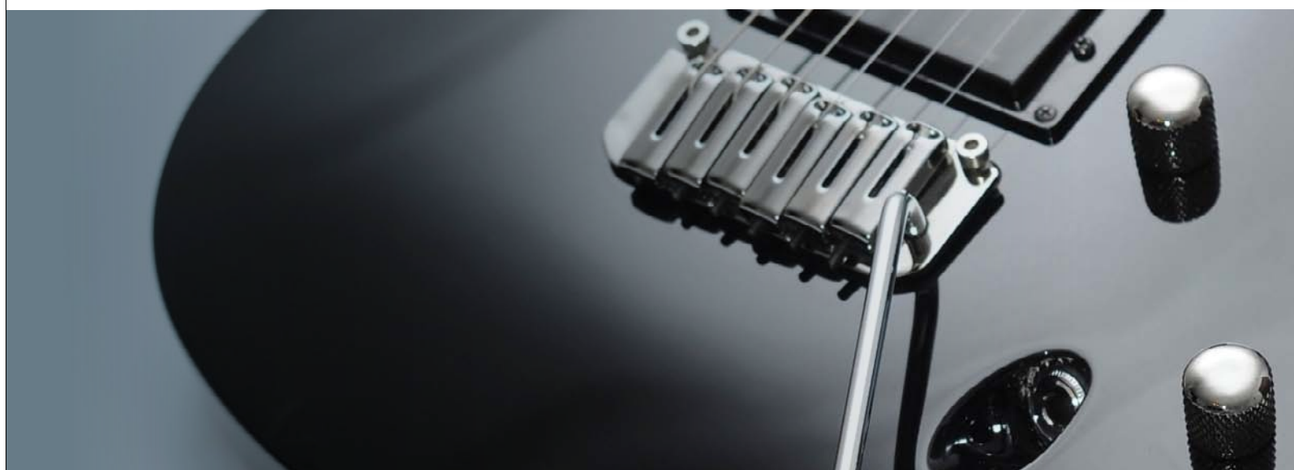
The Accurate Acoustic Low Pass filter offers a dual spout performance in a single spout design.

The 1723 AcuPass™



AcuPass™ technology ensures minimal interference between the tweeter and woofer, optimizing the full bandwidth potential of earphone designs. All of this combined with more headroom assures you get a high performance receiver module with excellent sound quality. The patent pending AcuPass™ technology has a built-in acoustic crossover with precision low tolerance filtering, making complex acoustic manifolds redundant.

Scan and watch how AcuPass™ technology works



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