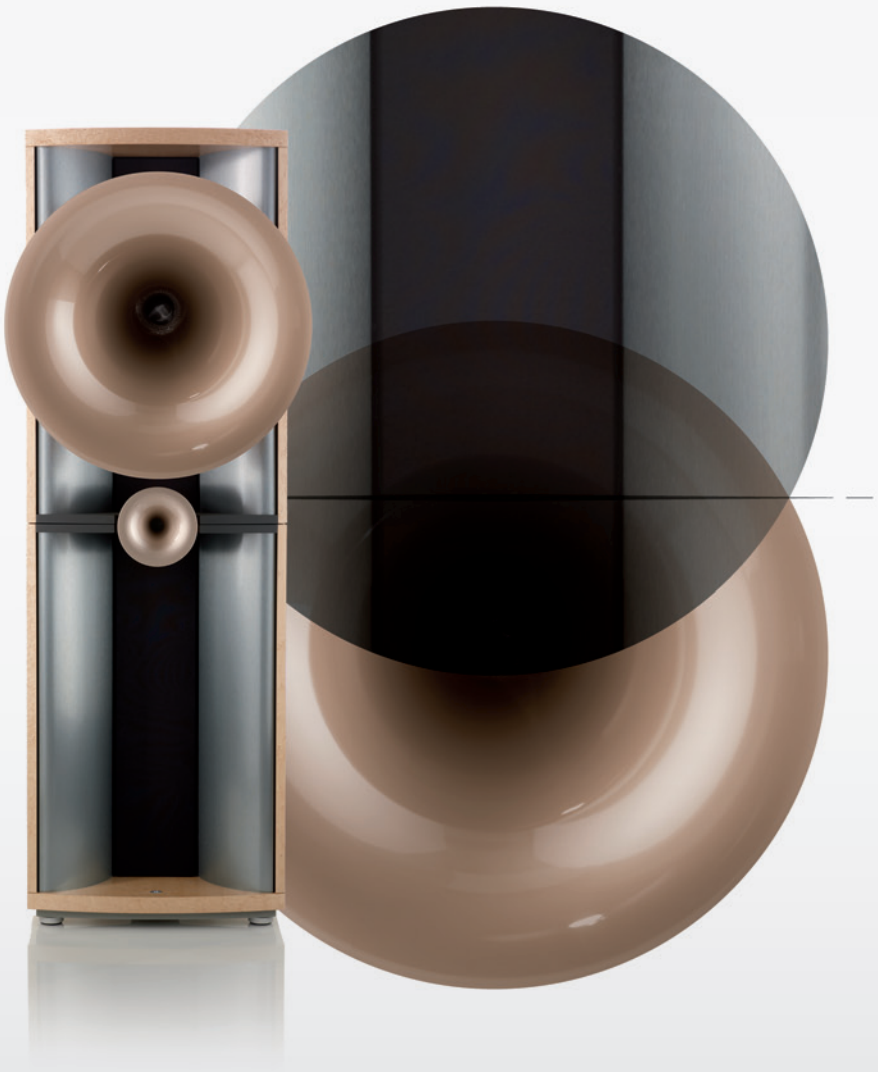
DUO PRIMO FACT SHEET

The full horn loaded speaker within the Duo line



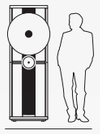
avantgarde
ACOUSTIC

DUO PRIMO | FACT SHEET

The full horn loaded speaker within the Duo line

DUO PRIMO

107 dB sensitivity
18 ohm omega drivers with neodymium magnet
27 inch spherical midrange horn
CDC system with no crossover
100V CPC crossover (patent pend.)
Horn subwoofer with active ADRIC feedback control
4 x 12 inch neodymium bass drivers
2 x 500 watt subwoofer amplifier with 120.000 µF

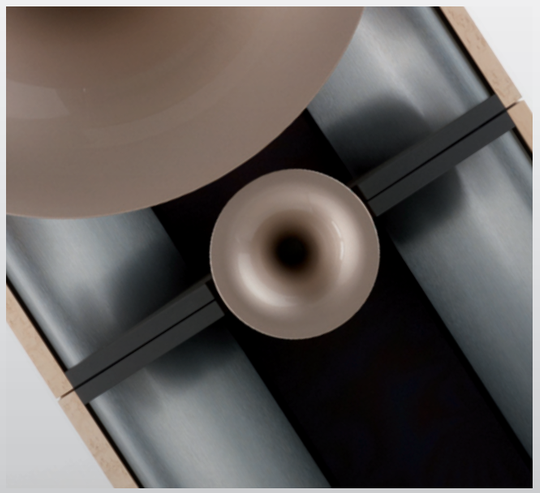


THE SYSTEM

Taking advantage of the unrivalled performance of the horn principle by consequentially extending it to the lower octaves, the Duo Primo is the biggest spherical full range horn systems in the Duo product line. An utterly thrilling way to experience the magic of the ultimate spherical full–range horn principle.

The Duo Primo is a 2–way spherical horn system complemented in the low frequencies with two active Short Basshorn subwoofers. It is very similar to the Duo Mezzo system, differing only in having an additional ADRIC horn subwoofer module, to provide even more power in larger rooms.

By utilizing four powerful 12 inch drivers loaded to the short hornflare of the lower and upper basshorn, the dynamic headroom of the bass has been practically doubled, compared to the even very powerful Duo Mezzo.



DUO PRIMO TECHNOLOGY

The full horn loaded speaker within the Duo line

OMEGA TECHNOLOGY

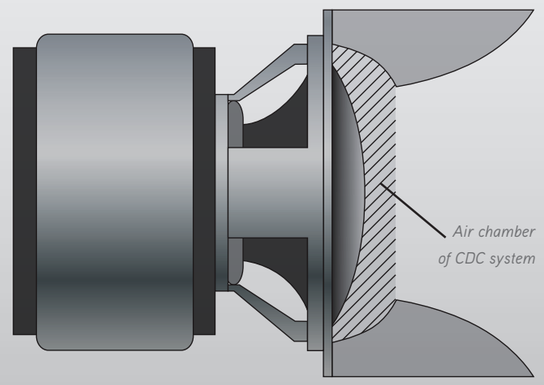
To significantly improve the sound quality Avantgarde Acoustic™´s *Omega* approach is based on two major concepts: simplification of the passive crossover design and high impedance voice coils.

Different to 2nd order conventional passive crossover with six components for a 2-way speaker, the Duo Primo omega crossover has only two components for the tweeter and no component for the midrange. Using no crossover in the midrange is usually not easy due to the large overlapping of the frequency response. Using their "Controlled Dispersion Characteristic" of the driver/horn configuration, Avantgarde Acoustic™ effectively controls the output.

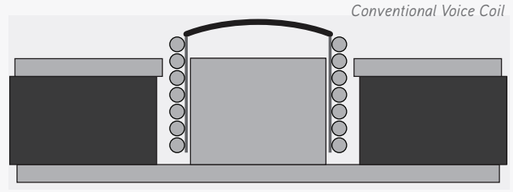
This is how CDC works: The lower cut-off frequency of a horn loudspeaker is determined by the size of the horn. The larger the horn, the lower the response. Below the cut-off frequency of the horn, the response falls off steeply at 18 dB/octave. Avantgarde Acoustic™ speakers thus operate only down to their cut-off frequency limit and require no high pass filters. The upper frequency response is determined by the driver. However, it can as well be influenced acoustically by the horn. For this purpose, Avantgarde Acoustic™ places a small chamber between the driver's membrane and the horn throat. The driver does not emit directly but via a small air chamber into the horn throat opening. This air volume operates as a kind of band-pass filter and automatically filters frequencies above the resonance volume of the chamber (at 6 dB/oct.). By choosing an adequate driver with a natural roll-off at 6 dB in this frequency range, Avantgarde Acoustic™ obtains an acoustic attenuation of the frequency response of 12 dB without any passive frequency crossover. No further low pass filters are necessary! The CDC system thus causes the midrange to only operate within their operational band and steeply fall off at the transition points.

The attached graphics show the difference of conventional and the new Omega voice coils. To achieve very high resistance the voice coils of the Omega drivers are made with very long but very thin wires. Up to four windings are placed on the voice coil former. Elaborate production technology is required as the wire is so thin and easily breaks and the voice coil gap is so narrow. Now, why is the horn manufacturer taking so much energy and effort to simplify the passive crossovers and enhancing the impedance of their voice coils?.

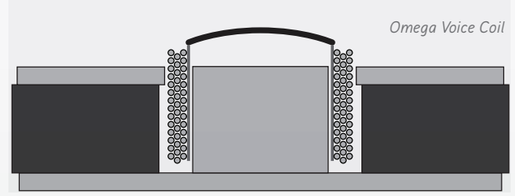
The key point is the damping factor. Damping factor is the technical term for the ability of an amplifier to control the movement of the membrane. E.g. simply speaking the force the amplifier applies to the voice coil to follow exactly the musical signal. According to common knowledge the damping factor is determined by the quotient of load impedance (driver) and output impedance of the amplifier. An amplifier with an output impedance of 0,04 ohm will thus theoretically have a damping factor of 100 when connected to an 4 ohm speaker. But this is a purely theoretical figure! In real life the signal has to pass a speaker cable and the passive crossover components till it reaches the voice coil. Using a typical 5m long speaker cable with an W-resistance of 0,36 ohm and a resistance of the crossover coil of 0,6 ohm, the effective real damping factor will decrease to a value of only 4! Connecting the same amplifier/ cable configuration to the Duo omega will result in a real damping factor of 18, which gives 4,5 times more control and presicion! E.g. the control of the amp will increase by 450% and at the same time will reduce the negative effects of long speaker cables by 80%.



Conventional Voice Coil



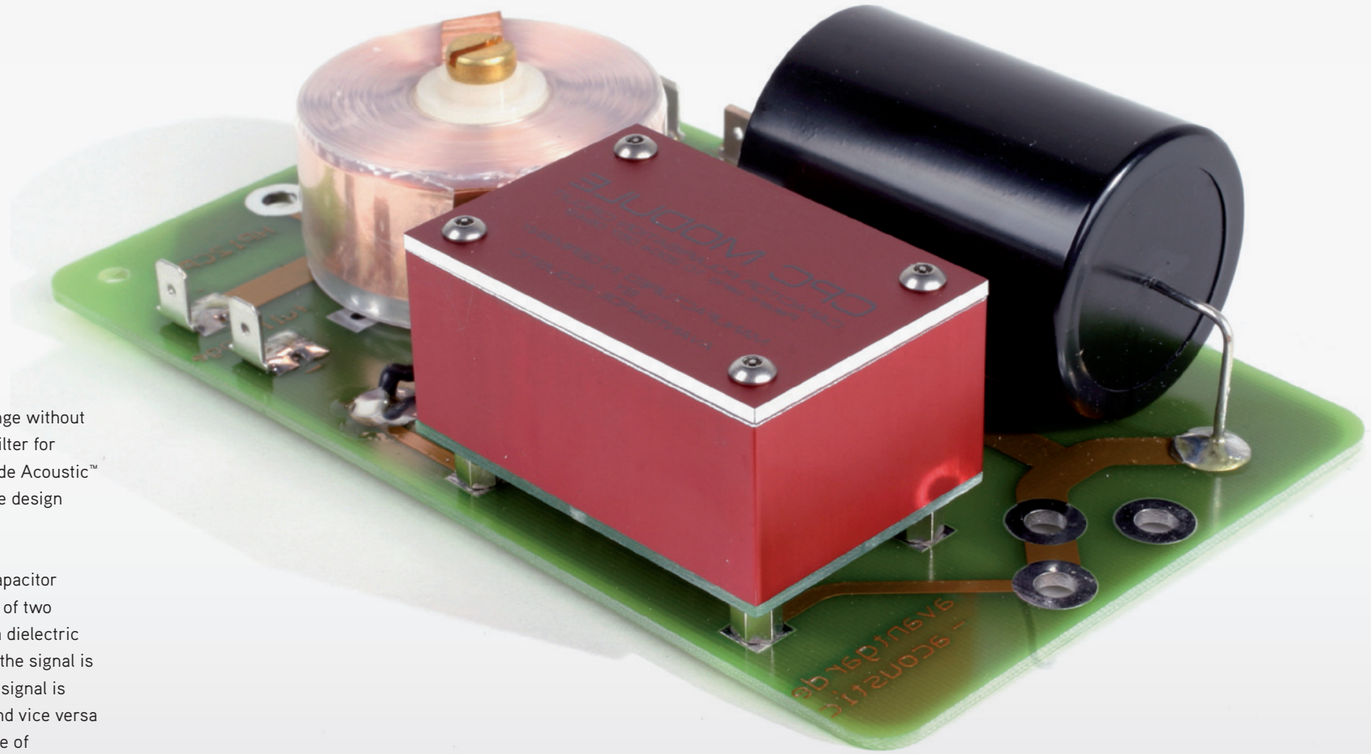
Omega Voice Coil



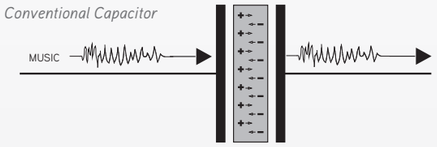
As a result the Omega drivers have more authority, less distortions and an excellent detailled response characteristics.

DUO PRIMO TECHNOLOGY

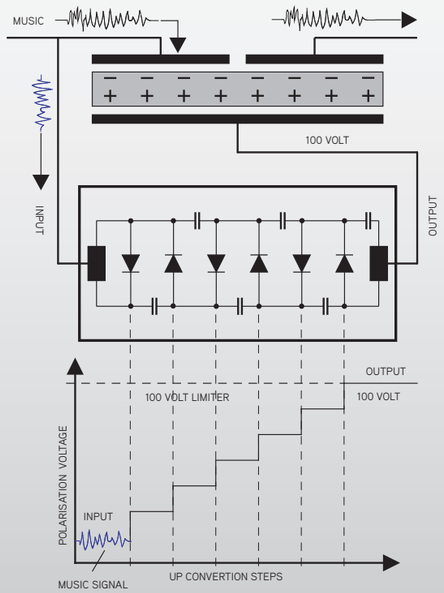
The full horn loaded speaker within the Duo line



Conventional Capacitor



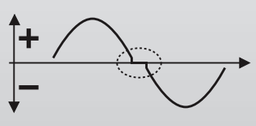
CPC Capacitor



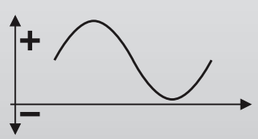
THE CPC CROSSOVER

Although the Omega midrange driver is running full range without any crossover, the Omega tweeter requires a passive filter for thermal protection. As with all their products Avantgarde Acoustic™ was taking a very puristic approach. Less is more is the design philosophy.

A potential limitation of any passive crossover is the capacitor required to filter low frequencies. A capacitor consists of two plates or conductors. As both plates are separated by a dielectric or insulator, the conductors have no direct contact but the signal is passed through a dielectric field. Every time the music signal is changing from the positive to the negative half-wave and vice versa the dielectric field gets inverted. The permanent change of direction of the field in a capacitor - a phenomen called “dielectric memory effect”- causes distortions which get worse the closer the signal passes through the zero point and are at a max just when the electric field changes its direction.



Dielectric Memory Effect of Capacitor



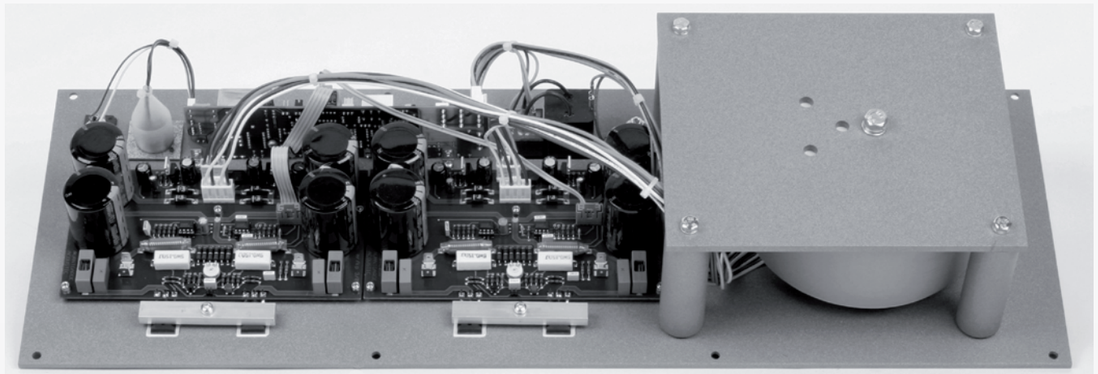
CPC biased Capacitor

To avoid these distortions Avantgarde Acoustic™ uses with the “Capacitor Polarisation Circuit” an elaborate approach. Different to conventional capacitors the CPC–capacitor has multiple conductor–foils connected with a special electric layout shown in the attached graphics. The CPC module up-converts the income music signal to the required voltage to bias the conductors. Only the inner conductor is biased with DC. In the CPC module a voltage cascade through a network of diodes increases the voltage of the music signal to a multiple. This high direct current is than fed into the inner conductor. Furthermore is the diode circuit electrically decoupled through a very high impedance transformer to avoid any backlash to the music signal. Already a view moments after turning on the music the CPC module has generated the required direct current to bias the capacitor. As the CPC diode cascade can build-up voltages by far beyond allowable levels, Avantgarde Acoustic™ has included a protective circuit to avoid overloading the capacitor.

The CPC biased capacitor has less distortions and can more precisely handle incremental signal variations.

DUO PRIMO TECHNOLOGY

The full horn loaded speaker within the Duo line



THE ADRIC HORNSUBWOOFER

Basshorn systems are a myth and enjoy a legendary but at the same time – when they are constructed too small – an ambivalent reputation. Too small dimension will inevitably cause bouncy impedance curves and a boomy frequency response.

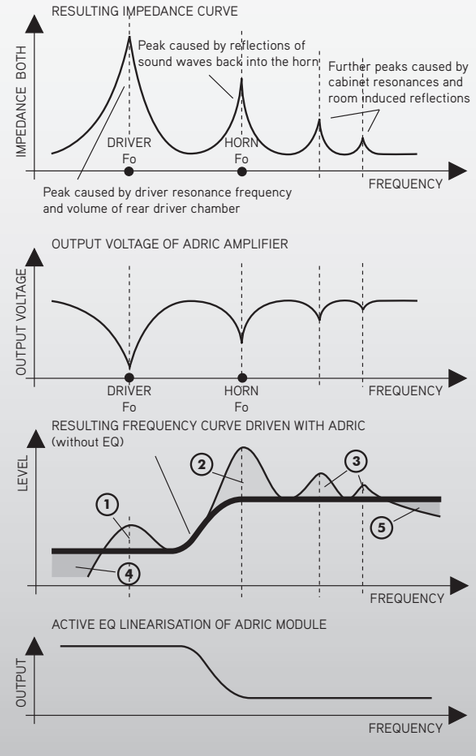
To cope with this problem, the technical literature recommends using drivers with very stiff suspension, light moving mass and small rear chamber volumes. This way the resonance frequency of the driver F_0 is set at or above the cut-off frequency of the horn F_0.

As the driver does radiate significantly less energy below his resonance frequency reflections back into the horn are minimized. In other words the driver parameters are matched to the horn in a way, that the response for the given horn is optimized. This shows the major drawback of reactance annulling. The lowest frequency is only determined by the size of the horn. So reactance annulling improves the response but cannot make horns go lower in frequency!

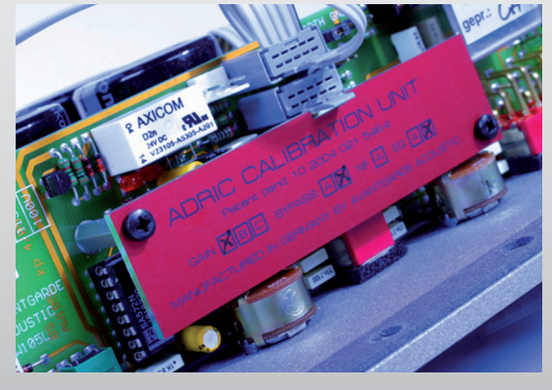
Contrary to all common knowledge, Avantgarde Acoustic™'s approach purposely works without reactance annulling. Unlike the drivers used in their ADRIC basshorn systems have a low resonance frequency with relatively soft suspension. These are applied in a front loaded horn with a big rear volume behind the driver to allow for high acoustical output at low frequencies. To compensate for the inescapable impedance irregularities - caused by the resonance frequency of the driver being lower than the cut-off frequency of the horn - the Avantgarde Acoustic™ uses its patented "Active Dynamic Radiation Impedance Compensation". The way ADRIC works is shown in the graphic. The upper chart shows the typical bumpy impedance curve caused by a driver with low resonance frequency connected to a relatively small horn. The output voltage of the ADRIC amp is shown in the chart below. At rising impedance of its load the ADRIC amplifier with negative output impedance generates an inversely proportional output voltage. It is practically the inverse of the frequency curve.

The thick black line in the next chart shows the resulting frequency curve driven with an ADRIC amplifier. The circuit linearizes the peak at the resonance frequency of the driver 1, the peak caused by back reflections at the cut-off frequency of the horn 2, the spikes caused by cabinet resonances and further room induced reflections 3. Furthermore ADRIC flattens the upper frequency response of the horn, caused by the higher inductivity of the driver at higher frequencies 5. As the motional feedback circuit of ADRIC compensates as well for all cabinet induced influences, even the frequency response below the resonance frequency of the driver is beeing linearized 4. ADRIC thus automatically compensates all waviness and ripples induced by cabinet, horn, driver and room.

The drop below the cut-off frequency of the horn is caused by the difference in sensitivity between horn and sealed enclosure. Using an active equalization with the respective filter characteristics (see lower chart) will flatten this drop. As a result all Avantgarde Acoustic™ ADRIC horn bass system will have a perfectly flat frequency response.



The proprietary ADRIC technology of Avantgarde Acoustic™ thus ensures that relative small hornsize and overwhelming low frequency extension does not necessarily exclude. It is based on our fundamental research of the electro-acoustical interdependencies of wavefronts being induced in horn funnels. The complex ADRIC circuits detect the characteristic impedance peaks and precisely compensate through ultrafast analogue feedback loops.



DUO PRIMO | DRIVERS

The full horn loaded speaker within the Duo line

THE MIDRANGE HORN DRIVER

The outmost care at choosing the drivers is the key to successfully transforming the theoretical advantages of the horn technology into an outstanding High End speaker. As mostly people focus on treble and bass response, Avantgarde Acoustic™ considers the midrange as the “heart” of each speaker system.

The Duo Primo offers the same technology as Avantgarde´s flagship model Trio. It features a sophisticated M2 omega driver with high impedance technology loading a 670 mm spherical midrange.

The M2 omega is a 170 mm (7 inch) midrange driver with a 100 mm (4 inch) dome especially developed for the Duo and optimized for a large, linear excursion.

Avantgarde Acoustic™ managed to increase the effective magnetic flow in the air-gap of the driver by eliminating the usual copper inlay of the pole-piece. The roll-off at higher frequencies caused by the higher inductivity of the voice coil and a specially designed dome was set to the exact crossover point of the tweeter.

Furthermore Avantgarde Acoustic™ added a powerful Alnico magnet to this new M2 omega development. This precious magnet material generates a powerful magnetic field which homogeneously controls the movement of the voice coil.

The M2 omega has a very low cut–off frequency with seamingless and crossover–less integration to the subwoofer. The design of the dome ensures a phase–neutral radiation of the sound waves into the midrange horn SH6704 and wide bandwidth of the extended midrange down to 170 Hz.

The kevlar midrange cone of the M2 omega is coated with trillions of tiny microfibres generating a “*Velours Damping Effect*”. This incrementally small fur of the VDE technology cone effectively reduces partial resonances of the cone itself. Furthermore the microscopc fibres of the VDE technology help to effectively absorb high frequency distortions.

The Avantgarde Acoustic™ proprietary CDC system features a controlled roll–off at 2,000 Hz, and allows us to completely eliminate all passive crossover components in the signal path. This way the M2 omega gets the pure and non–distorted full–range signal directly from the amplifier! The nominal impedance of the M2 omega is a staggering 18 ohm and the sensitivity is 107 dB (Watt/m).

DUO PRIMO | DRIVERS

The full horn loaded speaker within the Duo line

THE TWEETER HORN DRIVER

As the performance of the M2 omega midrange driver achieved Trio levels, Avantgarde Acoustic™ was able to use their flagship tweeter H3 omega for the new Duo Primo system.

This exceptional driver combines the smoothness of an electrostatic driver and the power of a strong 1 inch horn driver. The H3 omega features a voice coil former made of Kapton with a minimised air gap, a special geometrical shape of the 17 ohm voice coil and an ultra light diaphragm.

The mere force of the 3 kg (6.5 lb) magnet on the voice coil guarantees 100% detail and precision even at low volume levels, and provides the Duo Primo with compression-free sound reproduction at extreme sound pressure levels.

With the spherical horn SH1801 the H3 omega offers an ultra wide bandwidth down to 900 Hz. Due to the passive crossover point being at 2,000 Hz Avantgarde Acoustic™ achieves a seamingless smooth sound with incredible dynamic headroom.

DUO PRIMO | DRIVERS

The full horn loaded speaker within the Duo line

THE SUBWOOFER DRIVER

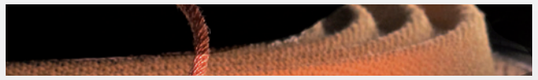
The Duo Primo is supplied with two active Short Basshorn subwoofers, which each are driven by two powerful 30 cm (12 inch) 600 watts (RMS) long-excursion drivers.

The 12–ND600 is the result of an extensive and intense research of every single constituent part of an electro-dynamic loudspeaker, rethinking the basics and taking care of every detail, to withstand the extreme power conditions it has been designed to work in. All this investigation is reflected in the new and innovative technologies developed by Avantgarde Acoustic™ and applied in this new transducer.

The 12–ND600 features a 4 inch voice coil with laminated former combining two different advanced technology materials to enhance the voice coil life and to ensure an optimum force transmission. A forced convection mechanism results in low power compression. This design has been optimized with the extensive use of miniature high temperature probes and real-time temperature acquisition systems, together with a thermographic camera to obtain real images of the heat distribution in the voice coil and forced convection effects.

The Double Conex Spider with its diaphragm surround and the double spider have been carefully designed with the assistance of Finite Element calculations in order to match coherently, enabling long and controlled cone displacements.

The 12–ND600 long excursion drive unit is characterized by its extremely high efficiency and utmost power handling capabilities. The extended controlled excursion is +/– 8 mm. Exclusive neodym magnets with a special under–pole magnet topology are used to maximize the flux density in the air gap and to eliminate energy leakage of the magnetic field. The powerful neodym magnet with a very strong BL power factor and the very stiff but light membrane will ensure highest resolution and authority even with complex signals at extreme sound pressure levels.



DUO PRIMO AMPLIFIER

The full horn loaded speaker within the Duo line

THE SUBWOOFER AMPLIFIER

The two integrated active HPA 106 electronics consist of four powerful 250 watt amplifiers and an active frequency crossover per channel. In total four forceful 540VA toroidal transformers and an energy reservoir of 480.000 µF providing ample energy reserves and dynamic headroom. Up to 2.000 Watts of class A/B system power provide for sufficient reserves under any condition. The toroidal mains transformers are mechanically decoupled to prevent resonances.

In order to achieve full control to overcome the inertia of the driver mass, the HPA 106 are equipped with Avantgarde´s genuine ADRIC circuitry. These ultrafast analogue electronics compensate detect and compensate for characteristic impedance fluctuations of the bass driver voice coil - effected by small horn mouth dimensions - by a fast analogue feedback loop. As a result the Short Basshorns of the Duo Primo achieve an astonishingly flat frequency response down to 18 Hz! Furthermore, even at very low listening levels – when the music signal is too weak to overcome the inertia of the bass driver mass – the adaptive motional feedback circuitry will seamlessly increase its power output for a full and rich bass response.

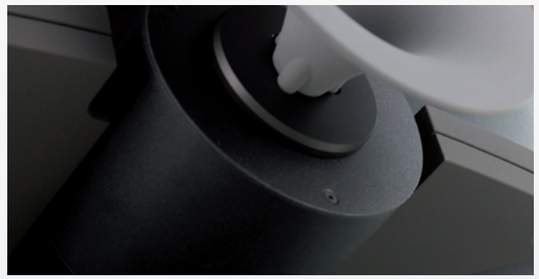
The active crossover allows the adjustment of a number of parameters thus ensuring a very easy and fast installation of the system even in acoustically critical situations. A 3–position subsonic switch, variable settings for the input sensitivity and crossover frequencies make the HPA 106 extremely versatile. The HPA 106 can be remotely switched on/off using the 12V trigger signal.

The HPA 106 is driven via high power speaker terminals for direct connection to integrated amps, power amplifiers or receivers or alternatively via XLR terminals. The signal take–off is not only at high impedance, but is also balanced and transformer coupled. This floats the subwoofer ground, avoiding hum loops and eases connection to balanced and bridged amplifier designs.

DUO PRIMO CONSTRUCTION

The full horn loaded speaker within the Duo line

avantgarde ACOUSTIC



MECHANICAL CONSTRUCTION

The midrange horn is mounted inbetween the bass drivers of the upper horn subwoofer. The tweeter is located in a circular housing cylinder inbetween both horn subwoofer enclosures.

The recessed profile of the cabinet in exclusive wood finish with its slender rear section gives reminiscence to classical instruments but at the same time continues the heritage of the characteristic tripod concept of the Duo line. The hornflare in brushed stainless steel finish is visually detached from the wooden cabinet by a subtle 6 mm shadow gap. With this small gap the hornflare seems to float in a frame build by the cabinet. It underlines the importance of the basshorn flare and puts it elegantly in scene.

The Duo Primo has been designed by the Swiss designers Tobias Adami and Hannes Wettstein from zed. of Zurich. The almost minimalistic style of the Swiss designers gives the Duo Primo a straight and timeless appearance.

DUO PRIMO | COLORS

The full horn loaded speaker within the Duo line

EXAMPLES

COLORS FOR THE HORNS

- Stealth Nocturne Black (panel only)
- Turmaline Vivid Black
- Stealth Nocturne Grey
- Shiny Citrine Orange [1]
- Diamond Crystal Silver
- Ruby Brilliant Red
- Akoya Pearl White
- Sapphire Burma Blue
- Light Amber Bronze
- Light Topas Blue
- Saona Beach Cream
- Smaragd Pearl Green

A selection of ten standard colors is available for the horns. This includes eight metallic lacquer finishes, the uni-color *„Saona Beach Cream“* finish and the moderne *„Stealth Nocturne Grey“* finish. The special *„Shiny Citrine Orange“* multi-layer coating is available as an option.

On this page you will only find a small selection of thumbnails of the color combinations possible. For a better overview you should visit our website *www.avantgarde-acoustic.com*.

Here you can download a special *Color & Finishes.pdf* for each product. In this document you can find a nice overview of all combinations available. This will quickly guide you to your favorite horn-wooden veneer combinations.

COLOR CONFIGURATOR

On our website *www.avantgarde-acoustic.com* you will find as well a comprehensive color selection tool. Just go to the respective product within the *HORN*-section. Under *DESIGN* you can select the color of the horn and veneer of the enclosure. If you have found your favorite color combination, simply click on the download-button for a high resolution picture (6 mb).

WOODEN VENEERS FOR THE SPEAKER BODY

- Flower Birdseye Maple
- Tianshan Mystic Walnut
- Hanami Lucent Cherrywood
- Jacaranda Aura Rosewood

1) optional customized color

2) other wooden veneers for the speaker body are available upon request

DUO PRIMO | REVIEWS

The full horn loaded speaker within the Duo line

avantgarde ACOUSTIC

TEST REVIEWS*

"The all-horn DUO PRIMO speaker system has an infinite of possibilities. Stereo Sound magazine would like to applaud Avantgarde's achievement of leading the traditional horn speaker to the next level by implementing their cutting-edge technologies." (STEREO SOUND, Issue #156, editoral staff, JAPAN)

Stereo Sound

"The DUO PRIMOs balance of power between strings and piano in Schubert's 'Trout' was near to the utmost. Multiply revolving around the brilliant piano sound, the strings played no less allurig. The balance of piano and strings were amazing. The sudden and sometimes rough outbursts of the music easily calmed down to easy floating motions and melodies - realistically as a visual painting of art." (AUDIO, Cho Young Chul, KOREA)

Audio 월간오디오 THE MONTHLY JOURNAL OF AUDIO

"Only few highly analytical speakers are capable of revealing the quality of a recording in such a merciless manner. High hats and cymbals of the drums of the Treya quartett on the track "Fauré Pavane" were impressive in size. Enthralling as well Keith Jarretts piano of his "Cologne Concert" live recording: the DUO GROSSO managed to reproduce the strain of the artist and the stroke of the keys – sometimes silky smooth, sometimes forced – so authentic and realistic like no others." (AUDIO VISION, U. Rattai, GERMANY)

KINO ZU HAUSE audio vision HDTV SURROUND GROSSBILD DVD BLU-RAY

"The DUO GROSSO showed its awesome musical authority. This said, I feel that the Avantgarde system has a sonic signature, not intrinsically organic, but delightfully musical, the sonic signature signed by an artist who understands tonal harmony. The Avantgarde system can be considered art — audio art, which transcends technological wonders and offers some of the best entertainment I've run across in years." (INNER EAR, E. Fisher, CANADA)

THE inner ear DISCOVER HIGH END

"So much goes on in the mid-range, and the DUO rewards its owner with excellent linearity, clarity, detail, separation of instrumetal lines, immediacy, and natural attack. There´s true sonic value in that majestically broad, dynamic midrange, in the obvious microdynamic delicacy and accuracy, the near-zero distortion, the potemtial for very high sound levels, the easy amplifier loading. You´ll need to listen to appreciate the quality of the entire creation." (STEREOPHILE, M. Colloms, USA)

stereophile

"For the amplifier on duty, the 18-ohm impedance of the DUO OMEGA appears to remove the load altogether. Combine that with its extreme high sensitivity and the amplifier might think it's just idling while creating the most beautiful music for us. We now have more real music in the house which is effortless transmitted and completely free of constraints from the loudspeakers. The difference between the DUO and the DUO OMEGA is more then a small improvement. It is a major step towards TRIO Omega level." (6MOONS, Dr. Henk & Dr. Maja, HOLLAND)

6 sixmoons.com

TEST REVIEWS*

"I cannot say that I listen to the DUO PRIMO ... They are so transparent that instead I should say: I listen to a certain amplifier through the Avantgarde. The reality of reproduction was so close to a live music experience that I simply closed my eyes. The performer was standing in front of me." (SUONO, Paolo Corciulo, ITALY)

SUONO HIFI STEREO

"Without any doubt, the DUO MEZZO sounds effortless, extremely open and emotional touching. You must experience this by yourself, to understand. The totally unleashed dynamics are unbelievable fascinating. This turns on and gets you addicted. This explosiveness ca not be reached with any other system. The original dynamics of a symphony orchestra played through the DUO MEZZO formally outclasses other boxes. With the right music and attitude this is the topmost ever!" (STEREO, T. Frantzen, GERMANY)

STEREO

"DUO MEZZO - the best performance of 2007. You can't believe what the basshorn module does. It changes everything! Listens respectfully to this system. The regeneration of wind and stringed musical instruments of an orchestra is that astonishing! Each musical instrument within the orchestra is outlined so clear. In the chorus each solo singer's ray of sound is so defined. I am afraid to faint by thinking that a simple CD already can sound so good." (AUDIO ART, Ming-Zhen Liu, TAIWAN)

Audio Art 音響論壇

"Sonic dynamite. These are not normal speaker systems. Not even High End speakers. These are speakers in the Formula 1 class. They are incredible fast, dynamic, analytic, resolving, dimensional. I could easily continue listening more extraordinary accomplishments. But they all would anyway culminate in the one and only point which really matters - the fun listening to music. For me the DUO GROSSO is an absolutely dream system. Period." (AUDIO VIDEO, F. Kulpa, POLEN)

AUDIO Video

"The DUO OMEGA gives a whole new life to spherical horn architecture. Ning Kam's violin is precise and at the same time beautifully condensed. Just on the spot. Yet the energy of the treble penetrates with power like in reality. The proper tuning of these special tonal characteristics is what makes the DUO OMEGA so very special. The listening is more relaxed and at the same time envolving, like having the centre front row seat in a concert hall." (AUDIO CITE, Zhong-Hao Tao, TAIWAN)

Audio Cité

"My feet tap all the time. Tonal quality is unbelievably better. The tone of string and brass instruments is just so rich, pure and believable. Drums have real decay and timbre. Electronic instruments, though clearly electronic, now sound extended without being terribly harsh. In a nutshell: the overall presentation is smoother, richer and fuller with more palpability, detail and dynamism thrown in to boot. I cannot find a downside. The DUO OMEGA is thoroughly recommended." AUDIO ASYLUM, P. Earnshaw, USA)

a² AudioAsylum

**) This is just a small selection of reviews. More quotes from international reviews for each product, can be downloaded on our website.*

AWARDS

avantgarde ACOUSTIC

communication
design
award

2010

REVIEWERS CHOICE AWARD OF THE YEAR SoundStage!

GOLDEN EAR AWARD
the absolute sound

hi-fi+ Product of the Year AWARD 2009 Highly Commended

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Hi-Fi News AWARDS PRODUCT OF THE YEAR

stereophile RECOMMENDED COMPONENT CLASS A

PRODUCT OF THE YEAR Sound & Vision GUIDE HOME THEATER

Best of the Best by STATUS 2010

HIGH END AUDIO Video READERS CONTEST

Audio ACADEMIA DELL AUDIO AWARD

Audio Art BEST PERFORMANCE OF THE YEAR 音響論壇 AWARD

Audio Accessory AUDIO EXCELLENCE AWARD

Stereo Sound Grand Prix Award

DESIGN IN EXCELLENCE AUDIO VIDEO INTERIORS

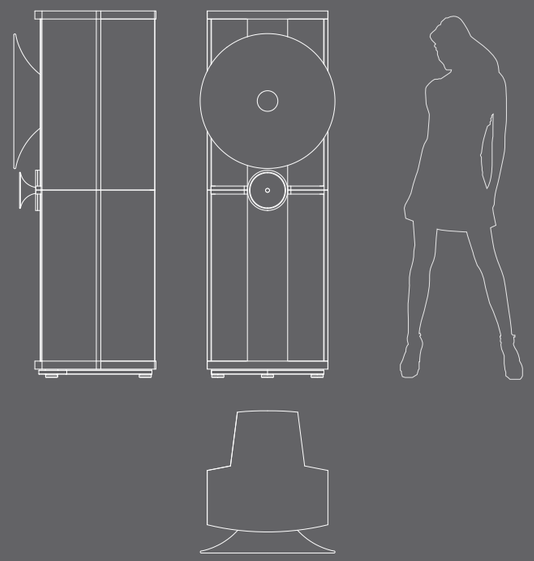
stereophile PRODUCT OF THE YEAR

Enjoy the Music.com BEST OF AWARD Enjoy the Music.com
Best of the Year Award

PRODUCT OF THE YEAR AWARD High Fidelity

TECHNICAL SPECIFICATIONS

avantgarde ACOUSTIC



SYSTEM DATA		
Frequency response	satellite	*170 – 20.000 Hz*
	subwoofer	*18 – 350 Hz*
Power capacity		*100 Watts*
Sensitivity (1 Watt / 1 m)		*> 107 dB*
Crossover frequencies		*170 / 2.000 Hz*
Nominale Impedance		*18 Ohm*
Recommended amplification		*> 10 Watts*
Recommended room size		*> 20 m^2 / 200 ft^2*
CDC (Controlled Dispersion Characteristic)		*Yes*
CPC crossover (patent pend.)		*Yes*

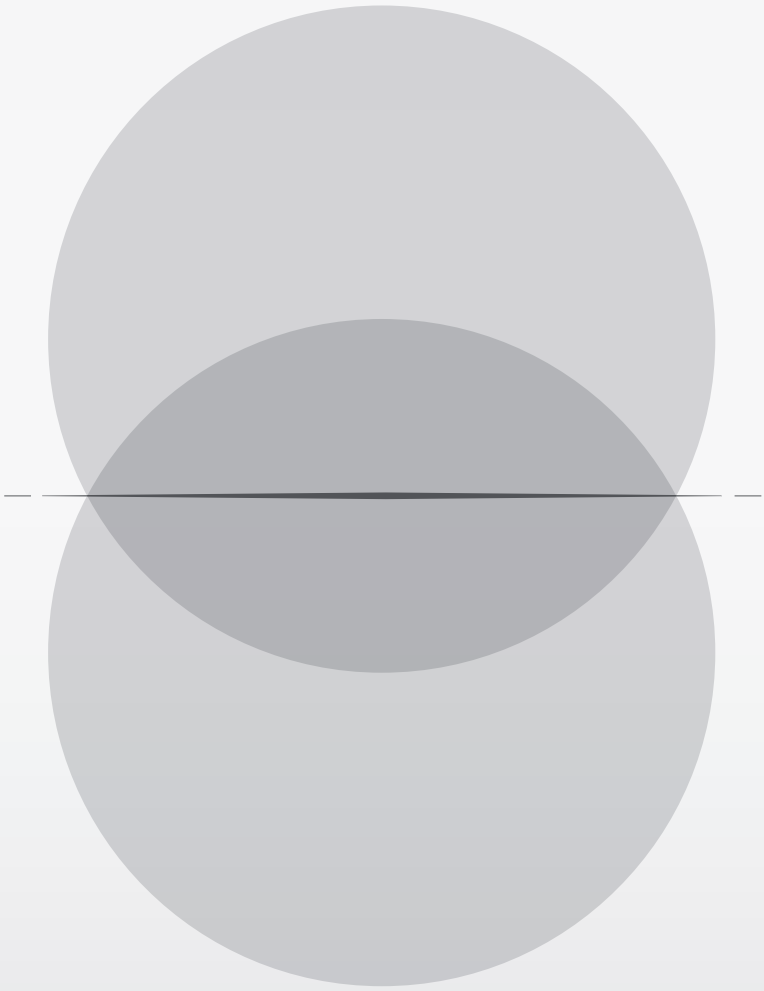
HORN		
Horn type		*Spherical horn*
Horn material		*ABS injection mold*
Horn finish		*polished*
Dispersion type		*180 degree*
Horn mouth area	low mid range	*0,940 m^2 / 1458 in^2*
	mid range	*0,353 m^2 / 547 in^2*
	high range	*0,025 m^2 / 39 in^2*
Horn mouth diameter	low mid range	*n/a*
	mid range	*670 mm / 26 in*
	high range	*180 mm / 7 in*
Horn length	low mid range	*210 mm / 8.3 in*
	mid range	*370 mm / 15 in*
	high range	*85 mm / 3.3 in*

HORN DRIVERS		
Diameter	low mid range	*4 x 300 mm / 12 in*
	mid range	*170 mm / 7 in*
	high range	*25 mm / 1 in*
Magnet material	low mid range	*n/a*
	mid range	*Alnico*
	high range	*Ferrite*

SUBWOOFER	
Power Output (RMS)	*4 x 250 Watts*
Power capacitance	*2 x 120.000 µF*
Toroidal transformer	*2 x 540 VA*
REAL TIME feedback control	*Yes*
ADRIC circuit (patent pend.)	*Yes*
Aktive frequency crossover	*variable 60 – 350 Hz*
Subsonic filter, 3-positions	*20 / 30 / 40 Hz*
Automatic 12V remote On/Off	*Yes*
Smart Limiter	*Yes*
SoftStart circuit	*Yes*
Driver diameter	*300 mm / 12 in*
Number of drivers per module	*4*
Magnet material	*Neodym*

DIMENSIONS/WEIGHT		
Dimensions	width	*670 mm / 26 in*
	depth	*650 mm / 26 in*
	height (+/– 15 mm)	*1.800 mm / 71 in*
Weight		*177 kg / 390 lbs*

purity



performance

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ACOUSTIC

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