



VIVID *audio*  
*auditory acuity*

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## GIYA OWNERS GUIDE



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# *CHAPTER 1 introduction*

We're very happy that you chose our Vivid Audio GIYA Loudspeaker system, so please spend a little time reading this manual to help ensure that you are equally happy with your purchase.

These loudspeakers are the culmination of many years of research by our design engineer Laurence Dickie and his R&D team. These speakers feature a range of unique drive units and enclosures which deliver an unprecedented purity of reproduced sound. All our drivers include novel features, many of which have been patented. A fundamental design philosophy has always been to keep resonances and the effects of reflection well out of band and this applies just as much to our mid-range units as to our tweeters. We don't take a basically floppy cone and treat it until the resonances are acceptable, we make jolly sure they are not there in the first place!

Similarly you may have noticed that the GIYA enclosure is a unique rounded form. This is not done for pure aesthetics but is there to completely remove the effects of reflection from the edges of the cabinet. It houses four separate exponentially tapering horns each tuned exactly to the task at hand. Even the LF section is novel in its use of an exponentially tapered absorber with a vented system, creating the world's first enclosure of this type.

Having perfected a driver and enclosure combination that deliver totally smooth responses, the filter designs are quite straightforward with no extra elements required to make up for deficiencies of the basic acoustic designs.

We follow the conventional rules for system design quite closely and find there is no need to deviate from the path because we do not have to compensate for any driver idiosyncrasies.

So, having taken all this trouble to develop these loudspeakers we feel it would be only fair that you take the time to read these notes to help squeeze out as much of that performance as possible into your listening space.

## *CHAPTER 2 getting started*



### *IMPORTANT NOTES*

The silver aluminium domed/coned drive units are extremely sensitive. They must never be subjected to probing fingers or other sharp objects! If so, certain damage will result and a replacement driver will have to be fitted. This replacement will not be performed under guarantee conditions.



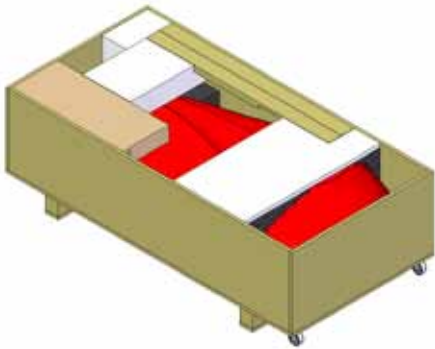
### *UNPACKING INSTRUCTIONS*

Read these instructions that contain important information about the safe use, installation and maintenance of this loudspeaker.

- Unpack the loudspeaker following the instruction sheet attached to the shipping crate. The method is also described overleaf.
- Keep potentially hazardous packaging (plastic bags, polystyrene etc.) out of reach of children.
- Dispose of packaging in compliance with current waste disposal requirements.

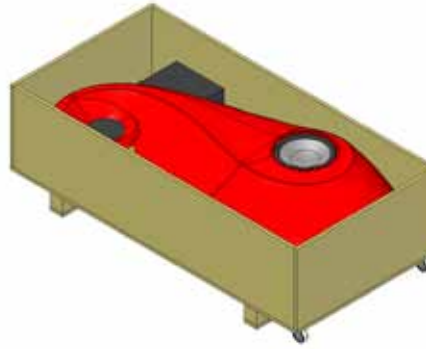
## UNPACKING sequence

# GIYAG1



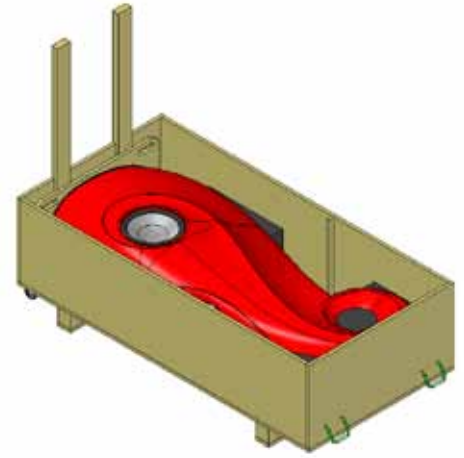
### STEP 1

Should read "The crate should be positioned on the floor resting on its pallet feet as shown. Remove the ten 10mm lid securing bolts. Set aside for use when replacing the lid. Remove the (HEAVY) lid CAREFULLY, setting aside for use later.



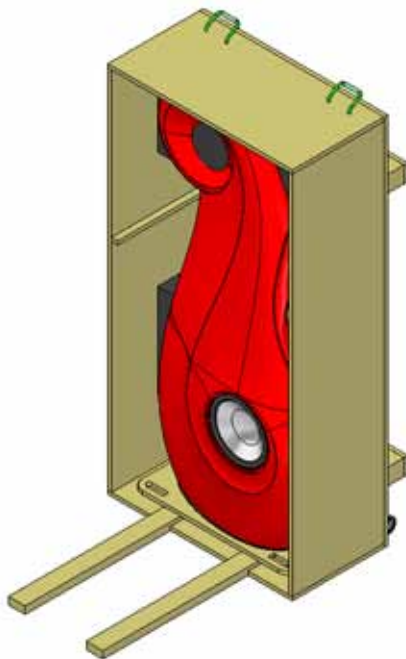
### STEP 2

Remove the skids, the accessory kit and the two grille boxes. Then remove the two upper packaging inserts (Foam rubber and polystyrene). There is also a separate foam rubber protector for the bass driver. This must be removed carefully.



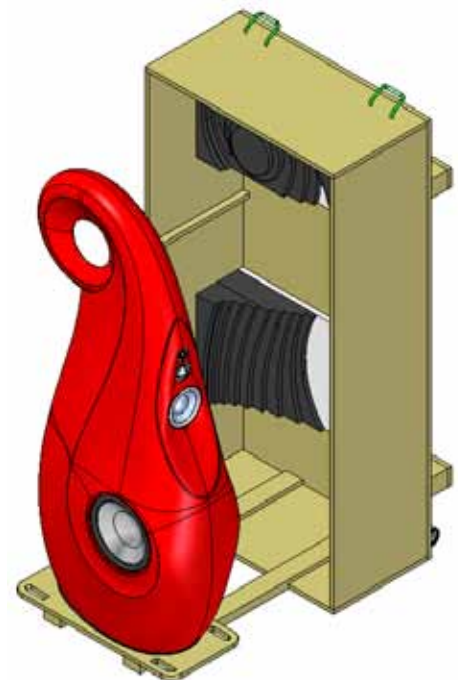
### STEP 3

Position the skids as shown below. There are slots machined above the base board bolted onto the bottom of the loudspeaker - the skids are fitted into these.



### STEP 3

Carefully tilt the entire crate, (skids and cabinet inside) onto its end so that the skids are flat against the ground. Be sure that the speaker does not fall out as the crate approaches the vertical. Grab hold of the two handles in the base board and slowly pull the loudspeaker out of the crate. Pull it to the edge of the skids but not off them. Only pull on the base board, not on the cabinet. This will keep the speaker stable as you pull it out.

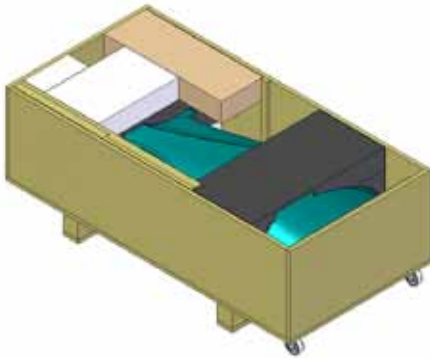


### STEP 4

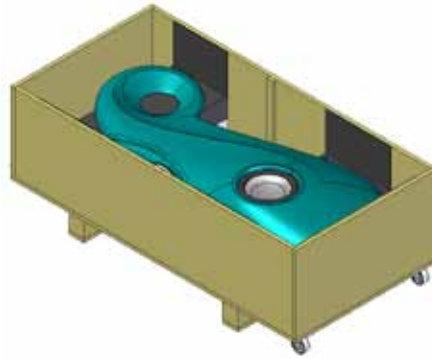
Tilt the speaker, and lift it off the skids, laying it down on a soft, clean surface. There are six M8 bolts holding the base board to the cabinet. You should be able to loosen them using fingers only. If you cannot, a size 13 spanner (metric) or a shifting spanner will loosen the bolts. Remove them and then lift the speaker off of the base board. You can use the port apertures or the spiral to lift the cabinet. With care, the speaker can also be lifted using fingers in the groove near the bass drivers. There is a handle moulded into the base of the speaker as well.

# UNPACKING sequence

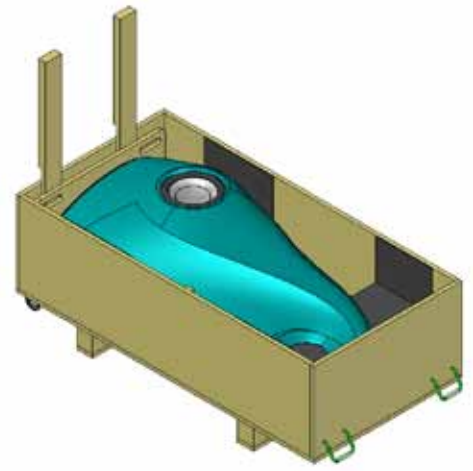
## GIYAG2



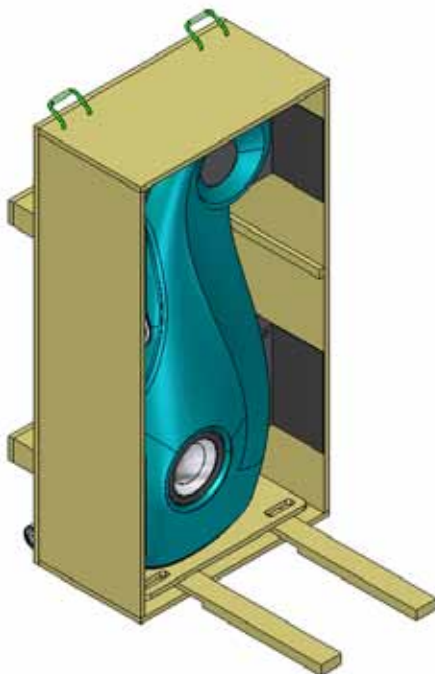
**STEP 1** Should read "The crate should be positioned on the floor resting on its pallet feet as shown. Remove the ten 10mm lid securing bolts. Set aside for use when replacing the lid. Remove the (HEAVY) lid CAREFULLY, setting aside for use later.



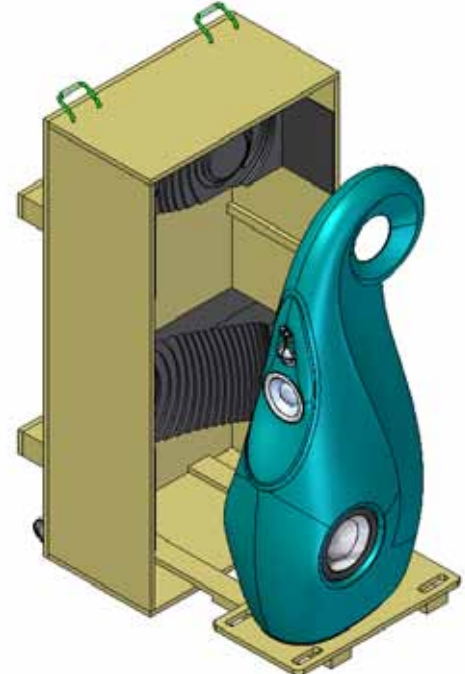
**STEP 2** Remove the skids, the accessory kit and the two grille boxes. Then remove the two upper packaging inserts (Foam rubber and polystyrene). There is also a separate foam rubber protector for the bass driver. This must be removed carefully.



**STEP 3** Position the skids as shown below. There are slots machined above the base board bolted onto the bottom of the loudspeaker - the skids are fitted into these.



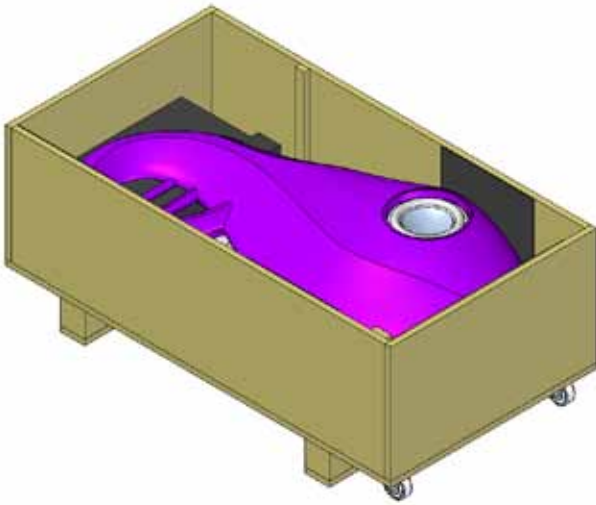
**STEP 3** Carefully tilt the entire crate, (skids and cabinet inside) onto its end so that the skids are flat against the ground. Be sure that the speaker does not fall out as the crate approaches the vertical. Grab hold of the two handles in the base board and slowly pull the loudspeaker out of the crate. Pull it to the edge of the skids but not off them. Only pull on the base board, not on the cabinet. This will keep the speaker stable as you pull it out.



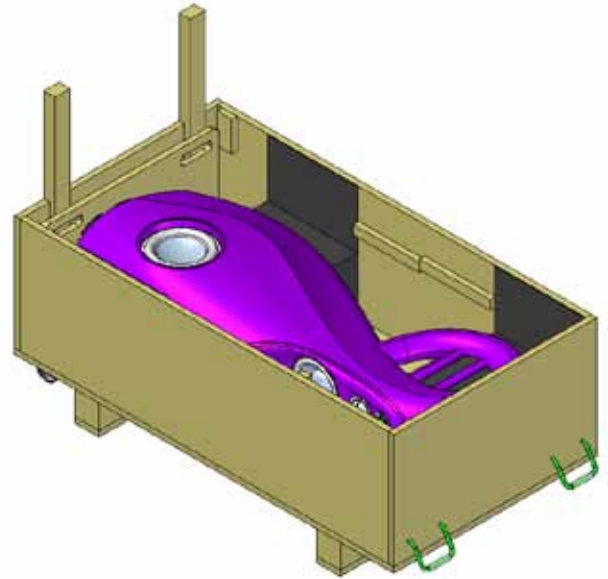
**STEP 4** Tilt the speaker, and lift it off the skids, laying it down on a soft, clean surface. There are six M8 bolts holding the base board to the cabinet. You should be able to loosen them using fingers only. If you cannot, a size 13 spanner (metric) or a shifting spanner will loosen the bolts. Remove them and then lift the speaker off of the base board. You can use the port apertures or the spiral to lift the cabinet. With care, the speaker can also be lifted using fingers in the groove near the bass drivers. There is a handle moulded into the base of the speaker as well.

# UNPACKING sequence

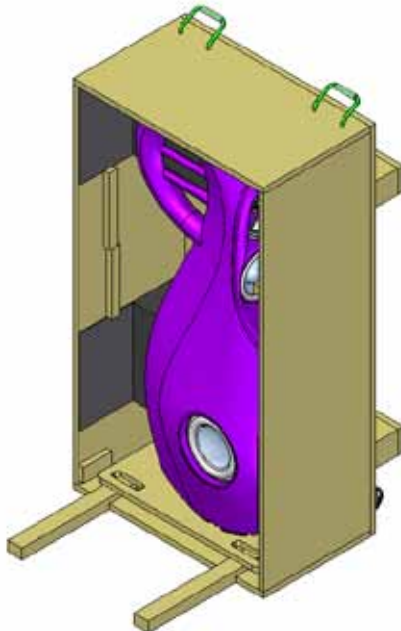
## GIYAG3



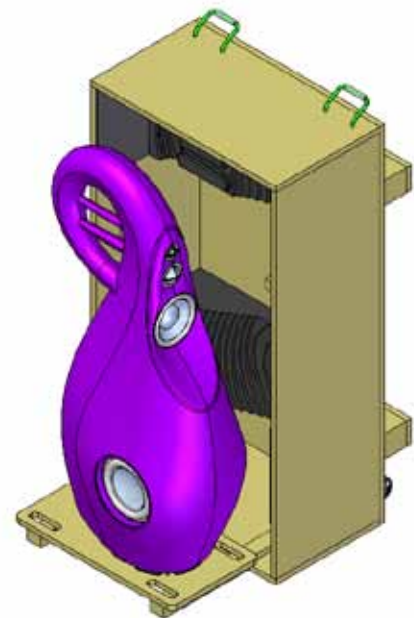
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## POSITIONING

Vivid Audio loudspeakers are designed with both home theatre and two channel stereo application in mind and, because of the intrinsically shielded magnet structure, all our products can be placed near to conventional open style tube televisions or computer monitors if necessary.

For two-channel installations we recommend as a starting point that you position the loudspeakers at least 0.5m from the rear wall and, if anything, a little further from the side walls if possible. Having two different distances here will help to smooth out the effects of the boundaries on the low frequencies and improve the sense of space and scale of the performance.

As a general rule, the closer the speakers are to a wall the more the upper bass will be accentuated. Conversely, if you move them away from the walls only the lower bass will be reinforced. If the walls are of a light construction these reinforcement effects will be reduced accordingly.

Furthermore, all rooms have resonances at a number of single frequencies that will tend to be emphasised when the speakers are placed nearer the corners which can cause 'boominess'. So again, if these are problematic, try moving the speakers away from the corners.

Remember that all the rules which apply to the loudspeaker position also apply to the listening position so if you find that the low frequencies are a little light because you have placed your sofa in the middle of the room to be equidistant from the surround speakers then you may recover some of this low end by moving the speakers back towards the walls. Similarly, if you are in two channel mode with the listening position close to the back wall and you have excessive bass, try moving away from the wall.

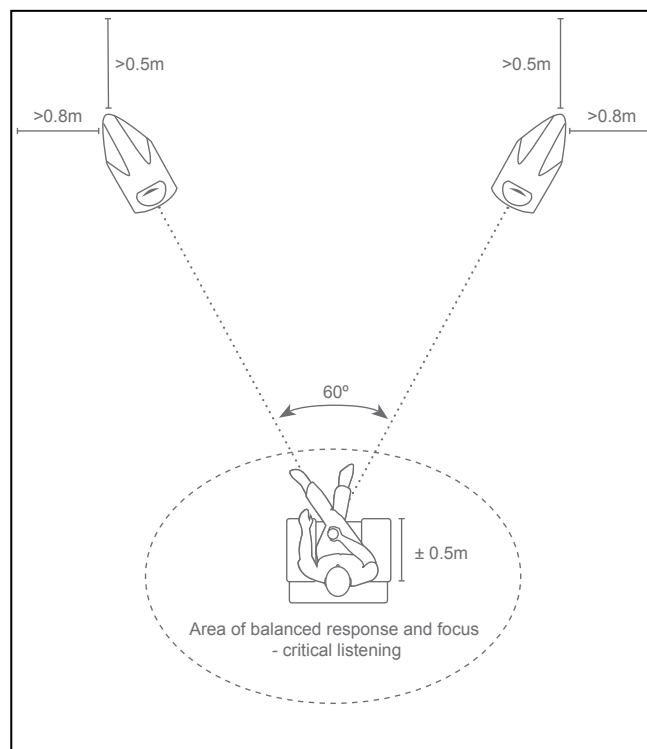


Fig 1



One technique for finding the best speaker position which exploits this reciprocity is to place a speaker at the listening position and to move around the room to find places with an even bottom end. Then you can swap the speaker and listener and find the same result. This only works for one speaker at a time and the results with both speakers in position may not be quite as you expect so be prepared to try again. A good listening position will often be found at the point where the loudspeakers are about 60° apart, fig.1. Much closer together than this and the apparent image width will suffer, much wider and you may find a 'hole' in the centre of the image, particularly when seated off to one side.

There is no appreciable beam from any of the Vivid Audio loudspeaker drivers, that is to say; the tonal balance is consistent across a wide angle as opposed to some designs where the high frequencies in particular quickly fall in level as you move away from a point directly in front of the speaker as if they were shining out from a flashlight. It is our experience that, because of the very smooth wide sound field produced by our designs, angling the loudspeakers so that they both face a position just ahead of the listeners can help to widen the useful area where stereo sound may be enjoyed.

An absence of beaming is also a feature in the vertical plane, so being absolutely at the same level as the loudspeakers is not important. In fact a perfectly enjoyable sound balance may be found when lying on the floor more or less anywhere between the loudspeakers!

Because of the infinite number of combinations of wall materials dimensions and furnishings in the room it is impossible to give more precise positioning advice than that above. In the end we strongly recommend that you experiment, so if you are going to fit the spikes to the bases then we suggest that you leave this until the positions have been determined.

## CABLING AND CONNECTIONS

We recommend that you make and secure all connections before turning on any power to avoid short-circuiting the amplifiers.

We don't try to recommend any particular cable because it is an ever-changing field but we would advise that you get something reasonably thick, say 2.5 mm<sup>2</sup> for less than 5m lengths and 4 mm<sup>2</sup> for longer lengths.

GIYA is provided with four terminals to permit the use of bi-wiring or bi-amping shown in fig.2. The mid and high frequency crossover is connected to the right hand pair of terminals (as viewed from the back) and the low frequency to the other allowing the user to have separate wires feeding each section connected to a single amplifier output, in the case of bi-wiring, or two independent amplifiers in the case of bi-amping. This latter case even gives rise to the possibility of mixing different types of amplifier for the two ranges but be careful to match the gain and polarity of the two if you are to avoid messing up the basic frequency response of the loudspeaker. If you are in any doubt about this you really should talk to your dealer.

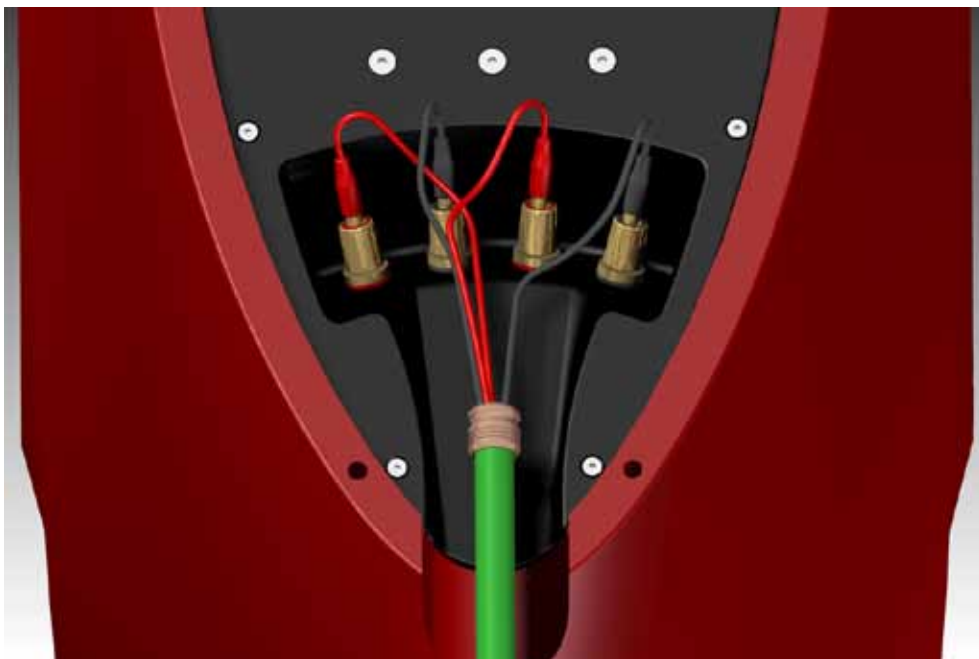


Fig 2

For many folks the use of extra wires will seem quite pointless in which case a single pair of good quality conductors will be all you require and the two pairs of terminals must be linked at the speaker using the links provided. In the accessories pack you will find two 10cm lengths each of red and black wire each terminated with a 4mm plug and spade. Link the hi-mid section to the low section as shown in Fig.3. Supplied non bi-wired links.

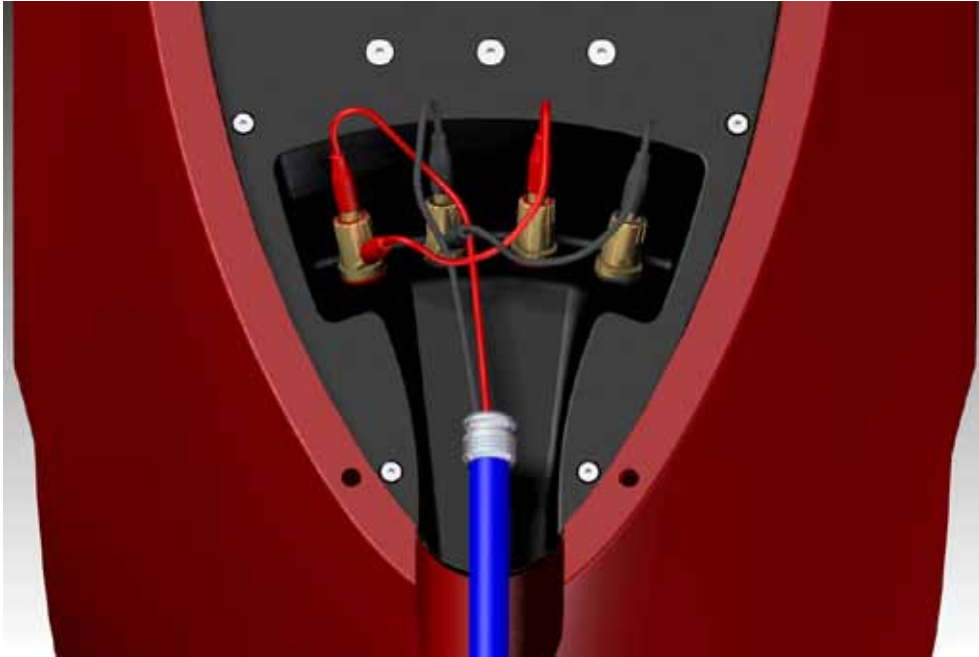


Fig 3

Fig 4. This arrangement will allow you to use amplifier leads terminated with either spade connectors (as shown) or 4mm plugs.

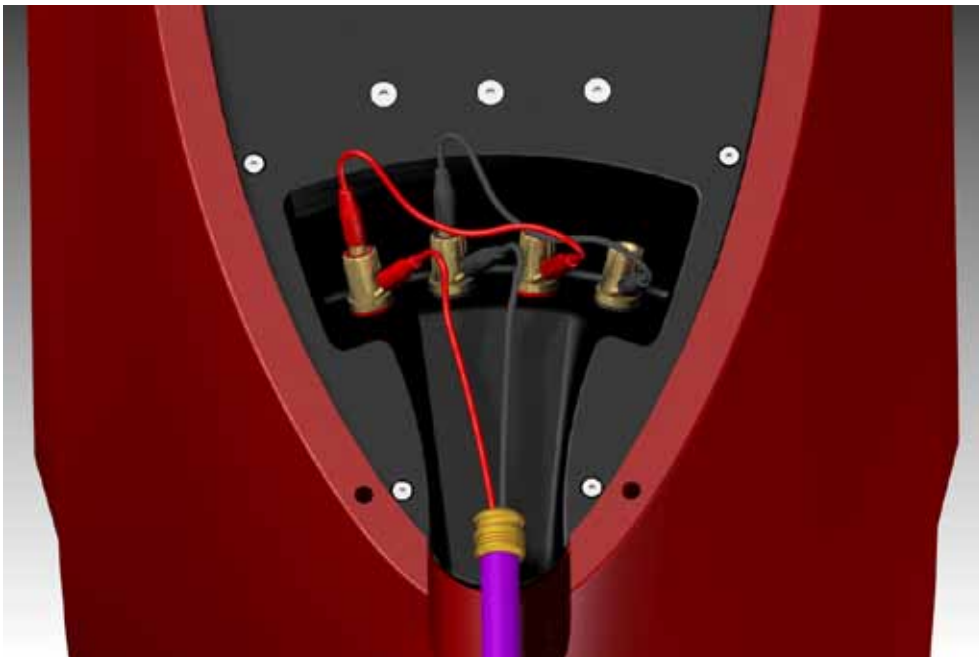



Fig 4

 **IMPORTANT NOTE:** Figures 2, 3 and 4 are views of the Giya terminal tray as seen from below! Therefore the hf/mf terminals are shown on the left in these images.

## ***SPIKES***

One of the innovative design features of the Vivid Audio GIYA design is the use of reaction cancelling drivers and ports, the purpose of which is to cancel out any reaction forces on the enclosure and hence removes the dependency of the overall acoustic delivery on the way in which the loudspeaker is supported on the ground. Nevertheless we do provide six M8 threaded holes in the bottom surface of the base and six corresponding spikes to fit into these points if required for stability on soft carpets. Some have also reported sonic benefits as a result.

We recommend that you have two fairly strong people available for this operation. First tilt the speaker forward onto a soft non abrasive surface, while inserting the two rear spikes and the two in the middle of the speaker. Now tilt the speaker back onto these spikes and tilt backwards to allow the insertion of the front two spikes. Ensure that the speaker is vertical as seen from the front. Adjust the two rear spikes accordingly if not.

From the side you will have to verify that the base is horizontal. Don't worry too much about this since it is purely a visual issue so if it looks OK leave it there. If it needs a tweak then use the front spikes to make that adjustment. Once aligned tighten the lock nuts on these four spikes. Then unscrew the two side spikes by hand until they touch the ground, at which point it will become difficult to turn them further. Tighten the two corresponding lock nuts and the operation is complete. Only hand tighten all these spikes - DO NOT USE A WRENCH.

## ***RUNNING IN***

It is now fairly well accepted that, despite the protestations of the engineering teams who design loudspeakers and who have difficulty accounting for it, there is a definite period of time during which the sound of the equipment improves subtly. There are definite and measurable changes which occur, particularly for the compliant suspensions, as the various materials used soften up and gradually approach their design values but it really does seem that some other improvements occur. Some well respected authorities have even referred to it as a 'learning' phase. There is also the far more earthly explanation that what is happening is that our brain/ear combination is becoming accustomed to the new sound balance from the loudspeakers. Certainly, the great clarity delivered by the Vivid Audio approach can be a little disconcerting at first if you have been used to the sound of mid-range cone break-up and the first reaction is that something is missing. Bit by bit you realise that something is missing and you are really hearing through to the original recording in a way that you never experienced before. This can in itself be rather revealing of poorly edited work but then the original recording engineers may not have had the benefit of monitoring on Vivid Audio loudspeakers so give them a break!

It is not really for us to get involved here with the philosophy or metaphysics of what might be happening but suffice to say that you shouldn't be too surprised if, after owning your speakers for a few weeks, you really get very excited about what you're hearing.

## *CHAPTER 3 warranty*

### *IMPORTANT*

- The manufacturer warrants that these loudspeakers supplied will at the time of delivery correspond to the description given by the manufacturer.
- The manufacturer declines all responsibility for damage resulting from improper, incorrect or negligent use.
- Repairs must only be carried out by a service centre authorised by the manufacturer.
- All other warranties, conditions or terms relating to fitness for purpose, quality or condition of the Goods, whether express or implied by statute or common law or otherwise are excluded to the fullest extent.



# CHAPTER 5 specifications

www.vividaudio.com **GIYAG1**



- Configuration :** 4-way 5-driver system
- Cabinet :** Reinforced advanced composite
- Finish :** Multi-component high-gloss automotive
- High frequency driver :** Vivid Audio D26 (patented)
  - Catenary dome profile
  - Radially polarized super flux magnet structure
  - Isolating compliant mount, Tapered tube loading
- Mid frequency driver :** Vivid Audio D50 (patented)
  - Catenary dome profile
  - Radially polarized magnet structure
  - Isolating compliant mount, Tapered tube loading
- Mid-bass driver :** Vivid Audio C125S (patented)
  - Short-coil long-gap motor design
  - 50mm copper ribbon coil on highly vented former
  - Highly aligned chassis, Radial magnet structure
  - Isolating compliant mount, Tapered tube loading
- Bass drivers :** Two Vivid Audio C225 (patented)
  - Short-coil long-gap motor design
  - 75mm copper clad aluminium coils on highly vented formers
  - Highly aligned chassis, Radial magnet structures
  - Reaction canceling compliant mount
- Bass loading :** Exponentially tapered tube absorber combined with critically tuned reaction canceling vents (patent pending)
- Sensitivity :** 91 dB @ 2.83Vrms and 1.0 meter on axis
- Impedance (Ω) :** 6 nominal, 4 minimum, low reactance
- Frequency range (Hz) :** - 6 dB points 23 - 44,000
- Frequency response (Hz) :** 30 – 41,000 +/- 2 dB on reference axis
- Harmonic distortion :** < 0.5% over frequency range
- Crossover frequencies (Hz) :** 220, 880, 3500
- Power handling (music program) watts rms :** 800
- Loudspeaker Dimensions (H, W, D) mm :** 1700, 440, 800
- Net mass (kg) :** 70
- Shipping Dimensions (H,W,D) mm :** 581, 893, 1807
- Shipping mass (kg) :** 90

# CHAPTER 5 specifications

www.vividaudio.com  
GIYAG2



- Configuration :** 4-way, 5-driver system
- Cabinet material :** Reinforced advanced composite
- Finish :** Multi component high gloss automotive
- High frequency driver :** Vivid Audio D26 (patented)  
Catenary dome profile  
Radially polarized super flux magnet structure Isolating compliant mount, Tapered tube loading
- Mid frequency driver :** Vivid Audio D50 (patented)  
Catenary dome profile  
Radially polarized magnet structure isolating compliant mount, Tapered tube loading
- Mid-bass driver :** Vivid Audio C125S (patented)  
Short-coil long-gap motor design 50mm copper ribbon coil on highly vented former  
Highly aligned chassis, Radial magnet structure isolating compliant mount, Tapered tube loading
- Bass drivers :** Two Vivid Audio C175 (patented)  
Short-coil long-gap motor design 75mm copper clad aluminium coil on highly vented former  
Highly aligned chassis, Radial magnet structure  
Reaction cancelling compliant mount
- Bass loading :** Exponentially tapered tube absorber combined with critically tuned reaction canceling compliant mount
- Sensitivity :** 91dB @ 2.83Vrms and 1.0 m on axis
- Impedance ( $\Omega$ ) :** 6 nominal, 4 minimum, low reactance
- Frequency range (Hz) :** -6dB points 29 - 36,000
- First D26 Break Up mode (Hz) :** 44,000
- Frequency response (Hz) :** 29 to 33,000 +/- 2dB on reference axis
- Harmonic distortion (2nd and 3rd harmonics) :** < 0.5% over frequency range
- Cross over frequency (Hz) :** 220, 880, 3500
- Power handling (music program) watts rms :** 800
- Loudspeaker dimensions (H, W, D) mm :** 1383, 360, 638
- Net mass (kg) :** 55
- Shipping dimensions (H, W, D) mm :** 536, 736, 1480
- Shipping mass (kg) :** 80



# CHAPTER 5 specifications

www.vividaudio.com  
**GIYAG3**



- Configuration :** 4-way, 5-driver system
- Cabinet material :** Glass reinforced balsa cored sandwich composite
- Finish :** Multi component high gloss automotive
- High frequency driver :** Vivid Audio D26 (patented)  
Catenary dome profile  
Radially polarized super flux magnet structure Isolating compliant mount, Tapered tube loading
- Mid frequency driver :** Vivid Audio D50 (patented)  
Catenary dome profile  
Radially polarized magnet structure Isolating compliant mount, Tapered tube loading
- Mid-bass driver :** Vivid Audio C125S  
Short-coil long-gap motor design 50mm copper ribbon coil on highly vented former  
Highly aligned chassis, Radial magnet structure Isolating compliant mount, Tapered tube loading
- Bass drivers :** Two Vivid Audio C135  
Short-coil long-gap motor design 75mm copper clad aluminium coil on highly ventilated former  
Highly aligned chassis, Radial magnet structure  
Reaction cancelling compliant mount
- Bass loading :** Exponentially tapered tube enhanced bass reflex (patented)
- Sensitivity :** 87dB @ 2.83Vrms and 1.0m on axis
- Impedance ( $\Omega$ ) :** 6 nominal, 4 minimum, low reactance
- Frequency range (Hz) :** -6dB points 33 - 36,000
- First D26 Break Up mode (Hz) :** 44,000
- Frequency response (Hz) :** 36 to 33,000 +/- 2dB on reference axis
- Harmonic distortion (2nd and 3rd harmonics) :** < 0.5% over frequency range
- Cross over frequency (Hz) :** 220, 880, 3500
- Power handling (music program) watts rms :** 800
- Loudspeaker dimensions (H, W, D) mm :** 1161, 341, 578
- Net mass (kg) :** 41
- Shipping dimensions (H, W, D) mm :** 516, 674, 1260
- Shipping mass (kg) :** 65

# CHAPTER 6 *loudspeaker history*

## SOME LOUDSPEAKER HISTORY

**1874** - Ernst W. Siemens was the first to describe the “dynamic” or moving-coil transducer, with a circular coil of wire in a magnetic field and supported so that it could move axially. He filed his U. S. patent application for a “magneto-electric apparatus” for “obtaining the mechanical movement of an electrical coil from electrical currents transmitted through it” on Jan. 20, 1874, and was granted patent No. 149,797 Apr. 14, 1874. However, he did not use his device for audible transmission, as did Alexander G. Bell who patented the telephone in 1876. After Bell’s patent was granted, Siemens applied for German patent No. 2355, filed Dec. 14, 1877, for a nonmagnetic parchment diaphragm as the sound radiator of a moving-coil transducer. The diaphragm could take the form of a cone, with an exponentially flaring “morning glory” trumpet form. This is the first patent for the loudspeaker horn that would be used on most phonographs players in the acoustic era. His German patent was granted July 30, 1878 and his British patent No. 4685 was granted Feb. 1, 1878.



**OLIVER LODGE**  
from Das Fotoarchiv

- 1898** - Oliver Lodge filed for British patent No. 9712 on Apr. 27, 1898, for an improved loudspeaker with nonmagnetic spacers to keep the air gap between the inner and outer poles of a moving coil transducer. This was the same year he applied for a patent on his famous radio tuner. A model of his loudspeaker is in the British Science Museum in South Kensington, and a photo was published in *Wireless World* Dec. 21, 1927. This improvement was later claimed by Pridham and Jensen in the Magnavox application for patent No. 1,448,279 filed Apr. 28, 1920, and granted Mar. 13, 1923.
- 1901** - John Stroh first described the conical paper diaphragm that terminated at the rim of the speaker in a section that was flat except for corrugations, filed for the British patent No. 3393 on Feb. 16, 1901, granted Dec. 14, 1901.
- 1908** - Anton Pollak improved the moving-coil loudspeaker with a voice-coil centering spider, filed for U.S. patent No. 939,625 on Aug. 7, 1908, granted Nov. 9, 1909.
- 1911** - Edwin S. Pridham and Peter L. Jensen in Napa, California, invented a moving-coil loudspeaker they called the “Magnavox” that was used by Woodrow Wilson in San Diego in 1919.

## EARLY BELL LOUDSPEAKERS

**1915** - Harold Arnold began program at Bell Labs to improve phonographic sound recording. The first priority was the electronic amplifier using the new vacuum tube, second was the microphone, and third was the loudspeaker that would improve the “balanced armature” units developed for public address. After WWI, J. P. Maxfield led this project that produced E. C. Wentz’s moving coil speaker by 1925, the Orthophonic phonographic player by 1925, and Vitaphone talking motion pictures by 1926.

**1918** - Henry Egerton on 1918/01/08 filed patent for balanced-armature loudspeaker, used in the Bell Labs No. 540AW speakers developed by N. H. Ricker Oct. 6, 1922, that became the 540 commercial speaker by 1924; was based on the balanced armature telephone patent of Thomas Watson granted Oct. 24, 1882, similar to devices also developed by Siemens and Frank Capps.



**1925** - Grebe radio receiver and 1924 Western Electric 540 speaker (NMAH)

**1921** - The Phonetron based on patent No. 1,847,935 filed Apr. 23, 1921, by C. L. Farrand, was the first coil-driven direct-radiator loudspeaker to be sold in the U.S. and was well-received, competing with the horns used by table radios

**1923** - The Thorophone was a gooseneck loudspeaker with a voice-coil driver

**1925** - The research paper of Chester W. Rice and Edward W. Kellogg at General Electric was important in establishing the basic principle of the direct-radiator loudspeaker with a small coil-driven mass-controlled diaphragm in a baffle with a broad midfrequency range of uniform response. Edward Wentz at Bell Labs had independently discovered this same principle, filed patent No. 1,812,389 Apr. 1, 1925, granted June 30, 1931. The Rice-Kellogg paper also published an amplifier design that was important in boosting the power transmitted to loudspeakers. In 1926, RCA used this design in the Radiola line of a.c. powered radios.

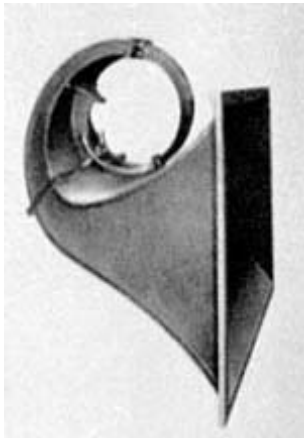
**1925** - Victor Orthophonic acoustic phonograph player had a folded exponential horn that was later used as model for the Klipsch speaker of the hi-fi era. Within a year, the Orthophonic faced competition from all-electric phonographs with an electromechanical pickup, vacuum-tube amplifier, and moving-coil loudspeaker, such as the Brunswick Panatropé sold by the Brunswick-Balke-Collender Company.

*VITAPHONE 555-W, FROM AT&T ARCHIVES*

**1926** - Vitaphone sound system for motion pictures used a new speaker developed at Bell Labs. Wentz and Thuras designed the Western Electric 555-W speaker driver that was coupled with a horn having a 1-in. throat and a 40-sq. ft. mouth; it was capable of 100-5000 hz freq. range with an efficiency of 25% (compared to 1% today) needed due to low amp power of 10 watts. The power amps were 205-D. Older loudspeakers were balanced armature type, but the newer 555-W speakers of the Vitaphone were moving coil type.



**1928** - Herman J. Fanger filed patent No. 1,895,071 on Sep. 25, 1928, granted Jan. 24, 1933, that described what came to be known as the coaxial speaker, composed of a small high frequency horn with its own diaphragm nested inside or in front of a large cone loudspeaker, based on the variable-area principle that made the center cone light and stiff for high frequencies and the outer cone flexible and highly damped for lower frequencies.

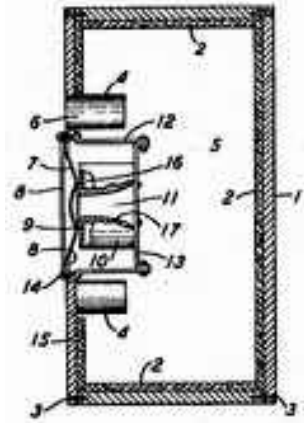


**1929** - E. W. Kellogg filed patent No. 1,983,377 on September 17, 1929, granted December 4, 1934, that described an electrostatic speaker composed of many small sections able to radiate sound without magnets or cones or baffles. This patent, as well as the 1932 British patents of Hans Vogt, influenced Peter Walker to build the Quad ESL flat panel speaker in 1957.

**1929** - J. D. Seabert of Westinghouse developed a horn-type loudspeaker that directed the sounds of human speech toward the audience better than cone speakers that were intended for the over-all sound including music to fill the entire room. These "directional baffle" horns had an opening 3 ft. by 4 ft. and were different from small-throat horns.

## THURAS BASS-REFLEX PATENT

**1930** - Albert L. Thuras filed patent No. 1,869,178 on Aug. 15, 1930, granted July 26, 1932, for the bass-reflex principle while working at Bell Labs. Early cabinets used a passive baffle to direct sound to the front, allowing the back of the cabinet to be open for the low sounds. The bass-reflex enclosure kept the low-frequency sounds from being lost from the rear of the diaphragm.



**1931** - Bell Labs developed the two-way loudspeaker, called "divided range" for the demonstration by H. A. Frederick in December of vertically cut records. The high frequencies were reproduced by a small horn with a frequency response of 3000-13,000 hz, and the low frequencies by a 12-inch dynamic cone direct-radiator unit with a frequency response within 5db from 50-10,000 hz. By 1933, a triple-range speaker had been developed for the Constitution Hall demo in April, adding Western Electric No. 555 driver units as the mid-range speaker. For the low frequency range 40-300 hz, a large moving coil-driven cone diaphragm in a large baffle expanding from a 12-in throat to a 60-inch mouth over a total length of 10 ft. This 3-way system was introduced in motion pictures as "Wide Range" reproduction.

**1932** - RCA demonstrated a dual-range speaker of its own design for s, using three 6-inch cone diaphragms with aluminium voice coils in divergent directions, with a response of 125-8000 hz, and 10-ft. horns 40-125 hz.

**1933** - "Progress was such that a demonstration of the new system - called "stereophonic" because of its ability to give a spatial sense corresponding to stereoscopic vision - was given before the National Academy of Sciences and many invited guests at Constitution Hall, Washington in the spring of 1933. Transmission was

### THURAS THEATRE SPEAKER 1933, FROM AT&T ARCHIVES

over wire lines from the Academy of Music in Philadelphia and three channels were used with microphones respectively at left, centre and right of the orchestra stage and loud speakers in similar positions in Constitution Hall.” This transmission of music “was carried out with special loud speakers developed for the purpose by Dr. Wenthe and the late A. L. Thuras. The objectives in the design of these loudspeakers were uniform response over the whole tonal range of the orchestra, an enhanced sound power output capacity without noticeable non-linear distortion and uniform distribution of the emitted sound at all frequencies throughout a wide solid angle.



For the receiving unit and the multicellular horn which were developed for this demonstration, Dr. Wenthe, jointly with the Bell Telephone Laboratories, was awarded a gold plaque by the Academy of Motion Picture Arts and Sciences in 1936.” (Bell Labs, 1953)

- 1935** - Douglas Shearer and John Hilliard at MGM developed a standard speaker system, starting with the Loews 5000-seat Capitol on Broadway. James Lansing and Dr. John F. Blackburn of Cal Tech designed a 2-way speaker system; the high frequency driver had a 3-inch aluminium diaphragm and throat size of 1.4 inches; the low frequency baffled cone unit was 15 inches. ERPI provided speakers from Fletcher’s hi-fi experimental equipment to help design the speakers. The low frequency horn used four 15-in. Lansing cone drivers and Lansing 284 drivers for multicell horns of different sizes. The system was installed in 12 s for the opening of “Romeo and Juliet” with Norma Shearer, sister of Douglas, Aztec A-7 Voice of the , from Audio, Dec. 1961 then installed in all Loews s, then became the standard established by the Academy.
- 1940** - Paul W. Klipsch filed patent No. 2,310,243 on Feb. 5, 1940, granted Feb. 9, 1943, for the corner horn speaker.
- 1941** - Altec Lansing Corp. was formed when Altec bought Lansing; Altec Service Corp. (from “all technical”) had been formed in 1938 by M. Conroe and George Carrington to manage ERPI installations after ERPI was dissolved. John Hilliard worked at Altec Lansing in 1943 on magnetic airborne sub detection and in 1945 put on the market the 2-way “Voice of the Theater” speaker system with improved horns and magnet drivers. See Lansing Heritage for images and a detailed history.

*AVERY FISHER WITH 9-TUBE AMP AND COAXIAL SPEAKER, FROM FORTUNE, OCT. 1946*

**1949** - W. E. Kock and F. K. Harvey at Bell Labs developed the acoustical lens, and reported findings in 1949 JAES. These lenses are used in James B. Lansing theater speakers and home hi-fi speakers

**1953** - Arthur Janszen was granted patent No. 2,631,196 on March 10, 1953, for an electrostatic high-frequency speaker



**1954** - Acoustic Research introduced the small AR-1 bookshelf loudspeaker that used the acoustic suspension principle developed by company co-founder Edgar Villchur. This was soon followed by the \$89 AR-2 and by the AR-3 with improved domed tweeters in 1958.

*WALKER'S ESL, FROM QUAD*

**1957** - Quad ESL marketed as the first full-range electrostatic loudspeaker, designed by Peter Walker and David Williamson, based on Edward W. Kellogg's patent No. 1,983,377 filed September 17, 1929 and granted December 4, 1934.

**1974** - Earthquake premiered Nov. 15 in the Chinese in Hollywood with Universal Picture's Sensurround process developed by W. O. Watson and Richard Stumpf at Universal. Four large low-frequency horns were located behind the screen, two in each corner. The Model W horn in each corner was 8 ft. long, 4 ft. wide, 4 ft. high. The Model C horn in each corner was a modular unit 1 ft. wide and 5 ft. high. Two additional horns were located on a platform in the rear of the . Each horn was driven by a 1000-watt amplifier controlled by inaudible tones on a special optical control track along with the normal 4-track magnetic soundtrack of the 35mm Panavision filmstrip.



**1994** - Sees the introduction of what was quite possibly the world's least coloured loudspeaker system – the Nautilus. Conceived and designed by Laurence Dickie the loudspeaker has been highly acclaimed for over a decade and has a pride of place in the Millennium Dome in London. Ten years later Laurence had honed these technologies from Nautilus to new heights for a range of products from Vivid Audio, to similar levels of acclaim and excitement from the world's specialist press.





# CHAPTER 7 *vivid audio*

To quote from Laurence's Vivid Audio Ethos *"Through aeons of evolution, the hearing of animals like ourselves has developed an incredibly high sensitivity to resonance and reflection as a matter of survival. Much crucial information can be deduced about the surrounding environment and the presence of imminent danger by listening for subtle changes in these effects."*

At Vivid Audio, we believe that the subjective transparency of a loudspeaker system is closely related to the reduction of these two aberrations and have made every effort to keep them to a minimum.

Each driver is designed to be pistonic within their working bandwidth with resonant break-up occurring well above the range of audibility or at a frequency at least five times that of the upper band limit. At the rear of the diaphragm, any cavities which might lead to in-band resonances have been comprehensively vented or coupled to matched absorbers, both actions completely remove them.

Reflected energy from the rearward wave-front is also controlled by minimising the area of any obstruction, such as the struts of the low frequency driver chassis or the dome driver pole pieces, and ensuring that the wave then passes through an adequate volume of absorbent material before meeting any boundaries.

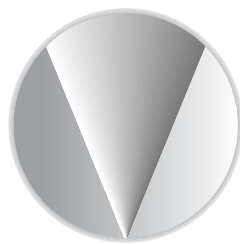
A similar attention to detail is applied to the external surface which dictates that it be free of any sharp features which might give rise to distinct reflections. The gently swept spline curve, which defines the cabinet shape, ensures that the emerging wave-front encounters no perturbation. All aspects of the enclosure design were created using solid modelling to produce the seamless curves and precision features. Such a smooth form and compact enclosure results in an extremely wide mid-band dispersion which gradually narrows with ascending frequency. This natural sounding polar performance integrates with a wide variety of listening environments to give a gently falling power response which quality is widely acclaimed as being highly desirable. Having a well-controlled off-axis response also widens the usable listening area to include much of the room.

Radial magnet technology permits the mounting of drivers with a minimal separation ensuring the widest vertical beam at crossover while also having an intrinsically low stray magnetic field which allows placement close to CRT monitors.

Having such a flowing line, the natural choice of enclosure material is the fibre reinforced composite. We selected a synthetic resin which is infused into quadraxial E-glass reinforcement under vacuum. The moulds were cast from patterns cut from solid using multi-axis CNC mills driven directly from the 3D models created in the design process.

The doubly curved form of the cabinet walls possesses a high degree of intrinsic rigidity further enhanced by GRP lateral bracing. These two factors ensure that the resonant modes are sufficiently high in frequency. Direct mechanical excitation of the enclosure is, in any case, avoided by rigorous use of compliant mounts for every driver and reaction cancelling between the two low frequency drivers which ensures that there is no net movement of the chassis. Reaction cancelling is further applied to the design of the low frequency venting where a pair of ports, with streamlined profile to minimise air turbulence, are positioned on either side of the cabinet. The result is an extremely stable low frequency performance with a rather novel appearance.

\* Many of the above technologies are patented and are protected by international law. Perceived infringements will be actively pursued.



**VIVID** *audio*  
*auditory acuity*

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VIVID AUDIO and the VIVID AUDIO logo are registered trade marks.

Patents Pending on Exponentially tapered tube absorber combined with critically tuned reaction canceling vents.

Patents exist on D26,D50, C125, C125s, C135, C175 and C225 drivers.

All COHERENT ACOUSTIC SYSTEMS products are in conformity with the EMC directive and the low voltage directive.

Availability of models may vary from country to country.

Please visit our web site for the details of your nearest authorised dealer and to learn more about us and our technology.

*[www.vividaudio.com](http://www.vividaudio.com)*

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