

# Final Sound Solutions

A car allows us to travel from A to B. Clothing allows us to keep warm and protect our skin. Without challenging the accuracy of these statements, anybody who reads this is likely to frown. After all, modern consumers are interested in more than just quality and functionality. Aesthetics are at least as important. In that sense, it is surprising that that same consumer still has to content himself with audiovisual products which he can barely integrate into his own living environment.

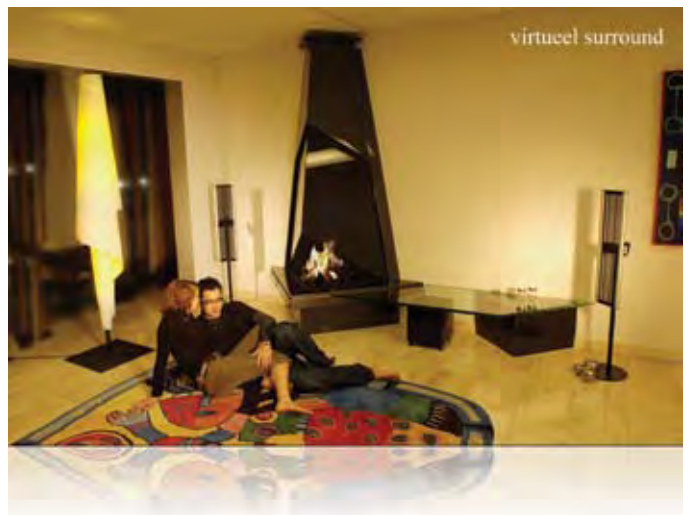
**F**ortunately, there is an audio manufacturer who understands that the whole is more than the sum of its parts. That the looks are as important as the value, so to speak. In this HiVisit, and in this context, I'm therefore pleased to take you along to Veghel in Brabant.

Get acquainted with a Dutch manufacturer of quality speakers who knows very well that building speakers is about much more than placing high-quality speaker units between a pair of sturdy panels.

## ■ Enjoyable living

Made in Holland. Quality from Dutch soil. That, in short, is the firm whose acquaintance I'm about to make. During the first few years, in the early nineties, the stress was mainly on designing electrostatic speakers for audiophiles. The rapid growth of the market for plasmas, projectors, LCDs, and home cinema systems at the beginning of the new millennium challenged Final to develop a range of products which fitted in seamlessly with these new market developments. A milestone in Final's existence was the development of Inverter technology in 2002, which gave the company the opportunity to successfully cross over into the world of home cinema and multi-channel. The principle may be simple, but its technical realisation is not. However, it was so important to Final that collaboration was sought with various partners, including the Technical University of Eindhoven.

Joop Haarman, who is a musician himself (bass guitar), and who works as a music reviewer for a professional music magazine in addition to his work as Final's Training Officer, explains: 'If a manufacturer manages to give his product clear added value, it means the product is successful. And this holds true for our company as well. Yes, our team consists of excellent team players, most of whom have already made their mark in the world of home entertainment. For instance, we count ourselves lucky to have key persons in our midst who played a major role in the development of the CD player at Philips, and are now closely involved with our product development. A small team that works with an open structure and has a clear vision, clear principles and targets has ensured that we, as a small organisation of 18 members of staff, have conquered an important position in the competitive market for high-quality home entertainment.'



Ellen Minkels, responsible for Marketing & Communication, adds: “The success of high-quality speakers is not JUST determined by a good choice of materials, and their acoustic and electric qualities. The modern consumer makes ever higher demands of his own living environment. Speed, production, and performance are increasingly regarded as the standard in our society. It is therefore not surprising that our own domain, our home, becomes an ever more important part of our lives.

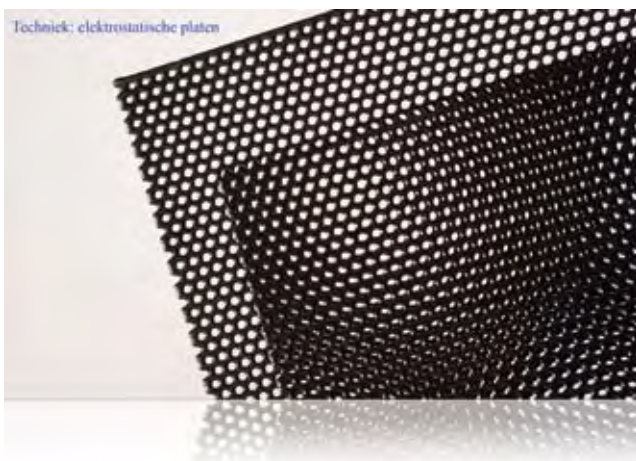
Of course we expect our living environment to be furnished functionally, and equipped with all possible comforts. In addition, but really above all, our living environment should have the right atmosphere, which enables us to find peace and restore our equilibrium in a world of haste, production, and achievement. To leave things be for a while, snuggle up to each other, and sit down in the best seats at the front of our home cinema or concert hall. Phone off the hook, a bottle of Cuvée Prestige on the table, accompanied by a delicious Camembert. Enjoy each other, and the moment. Our DESIGN speakers clearly add an extra dimension to your life.”

According to Final CEO Gijsbert van de Brink, the company is well aware that quality and design can be integrated effectively into the design. The whole becomes more than the sum of its parts. Ellen puts extra emphasis on Gijsbert’s words: ”Of course you can expect our products to produce the best possible sound. But at those moments when you don’t have the opportunity to listen to music, you will notice our speakers in the living room every time. Every time you come in you will see these elegant ultra-flat pillars standing there, a very pleasant presence. Every consumer has different opinions about what constitutes pleasurable living. And that is why we are well aware that our speakers should fit in seamlessly with any interior. Because of that, Final has an extensive range of products, tailored to any desired living circumstances. The consumer can choose from a wide range of colours, and because the base of speakers must not be forgotten either, a wide range of elegant silver, black, marble, or glass bases are available.”

## ■ Challenge

Especially if the consumer opts for a multi-channel audiovisual system in the living room, the demands on quality and design become even higher. Placing multiple traditional electrostatic speakers in a multichannel environment could become rather expensive, and unaffordable for the average consumer. Add to this that high-quality electronics are required to operate high-quality electrostatic speakers. After all, these have to be able to keep track of the difficult impedance behaviour of the vast majority of electrostatic speakers. And naturally, this would become very expensive in a multichannel environment.

Final perceived this fact as a challenge: after all, it had to be possible to develop high-quality speakers which 1) had to comply with the highest standards in terms of sound quality, 2) have an appealing design 3.) last but not least, had to be affordable. The year 2002 was therefore an important one for Final. With the development of Inverter technology, it suddenly became possible to achieve excellent sound quality with speaker systems that until recently cost many times more than they did now.



Ronald Buining from Development Management explains: “Electrostatic speaker systems represent the best in high-quality sound reproduction. Thanks to the very light, almost weightless membranes, the electrostatic system is capable of tracking the speed of the sound signal like no other. Because the membranes are not installed in a box, like traditional dynamic systems, you don’t get reverberations and disturbances. This results in a completely homogenous, transparent, and natural representation. Add to this that the electrostatic system can follow dynamic jumps easily, and is capable of reproducing even the tiniest details, thanks to the almost weightless membrane. So much for the advantages: the primary disadvantage is that production costs are very high, which means that traditional electrostatic reproducers are very expensive, and therefore unaffordable to the majority of music lovers. In addition to that, traditional electrostatic reproducers are very sensitive to dust and cigarette smoke, which limits their lifespan. And finally: traditional electrostatic reproducers convert the music signal into a high-voltage signal on the plates, which makes the membrane in between them vibrate and produce sound. This means there is a high risk of electric shock if you touch the plates.”

In 2002, Final managed to develop a technology (Inverter technology) which in one fell swoop cancelled out a number of the most important disadvantages of the electrostatic speaker system. Briefly, the main principle is that the music signal is no longer converted into a high voltage current and put onto the front and back plates. The music signal is now put on to the membrane after it has been transformed to a high voltage current. In that case the plates serve as a kind of earth through which the signal is being diverted. The direct consequence of this is that the plates can now be touched and are therefore completely safe. The panels switch themselves off when touched. Self-evidently, this is very important in a modern family, with children playing in the living room.

Therefore it is worth mentioning that the latest Final speakers do not only meet the European CE Standard. Thanks to the new Inverter technology, Final also meets the strict American UL standard, a milestone as far as electrostatic speaker systems go.

### *Inverter technology also has a number of other important advantages:*

- Because the technique that has been used is very efficient, it is possible to work with a much lower input voltage. The input transformer does not have to be as big (the size of a PDA) and it is possible to operate it with simpler and therefore cheaper amplifiers.
- The speaker elements are not bent. Gluing it together is easy to do and ensures a sturdy design which significantly lowers the production costs.
- The membrane has been divided asymmetrically into a narrow and a wider part. The narrow part is responsible for reproducing the higher frequencies, the wider part for reproducing medium and low frequencies. This makes it possible to achieve a greater horizontal dispersion: it is not absolutely necessary to be exactly in the middle to be able to hear a perfect stereo sound. The stereo sound is maintained perfectly, even if you are not exactly between the boxes, or are perhaps even wandering through the listening space.
- Due to the emission behaviour of the dipoles (which are line sources, after all) the speakers do not experience any significant obstruction from walls, ceilings, or partitions. Unlike regular dynamic speakers, which can be thought of as point sources, hardly any energy gets lost in the horizontal field because of their favourable emission behaviour. Because of this the music retains its natural power and effectiveness, even at a greater distance from the listening chair. In combination with a good quality sub and an amplifier with an SRS chip, two speakers would be capable of producing high-level VIRTUAL SOUND.



*90i HT set: Flat – flatter*

The conclusion should be clear: a high-quality product from the Netherlands that is not out of the reach of a wider audience as far as price is concerned.

Ronald: “Because our new speakers are now affordable, they are within reach of music lovers who do not have an astronomically high budget. Until recently, that would have been necessary in order to afford an electrostatic reproducer. Being a technical man, it’s great to see the ideas that you’ve worked on for years in the shops, where they’re enthusiastically received by a wider audience. It’s good to see your ‘baby’ grow.”

Gijsbert: “In any event, Inverter technology has given our company an important new impulse, so that it has been able to develop more effectively than before. Up until a few years ago all activities, from design to manufacturing, took place in Veghel. Thanks to a close collaboration with Jabil Circuit Inc. the manufacturing of Models 90, 150 and 400 has been moved to Hasselt. Models 600 and 1000 are still manufactured in Veghel.

Firm links have also been established abroad. We see clear growth: only a short while ago a sales office was opened in the United States. Final’s presence in other parts of the world is continuing to increase. The Far East in particular is an emerging market.’

## ■ Hear and see...

After this enlightening story from the members of the Final team, it's time to find out more about some important Final branches.

So we sit down in the sizeable listening space where a number of up-to-date speaker systems are waiting to be listened to.

First I listen to a set of Model 90i speakers consisting of two front, two rear, and one centre speaker, combined with the S100 Subwoofer in a Virtual Surround configuration. The heart of this system, which is built around an LCD screen, is a Marantz Receiver. Norah Jones live ... I get goose bumps as she's being projected into the listening space as if she's actually there. The first thing I notice during my first experience with the Final sound is the complete absence of any disturbance whatsoever. I can tell by the timbre of her voice. Every sound she makes, and even her breathing, correspond seamlessly to the LCD screen's sharp image. Annoying factors such as nasality, or disturbance that cause the voice to sound too high or too low, are completely absent because there is no disturbance from the box.

Aside from the complete homogeneity, I can also perceive an immense measure of (micro-)elaboration. The immense speed with which the system is able to follow and project even the tiniest music signals causes a perceptible virtual podium to be built up. The listener gets the feeling he is actually present in the concert hall. Her crystal-clear voice is projected into space as if it's entirely natural, and the instruments have a clearly demarcated place in space, behind Norah Jones' voice.

The Inverter technique does a good job of bringing this about. This shows from the fact that I do not, so to speak, need to sit in the front row, right in the middle, to be able to see and also hear her best.

As I listen I decide to stand up and walk around in the listening space. Nevertheless, Norah's voice stays exactly in the middle, regardless of the position from which I listen to it. This is also true for the other instruments within the sound picture, even though they remain solidly in place. I conclude from this that the space picture is very stable. Other, particularly older, electrostatic reproducers often have a much harder time building up a stable system; I have often had the experience that I had to be right in the middle to get a good stereo reproduction: moving beyond the middle, the picture would become diffuse very quickly.

The combination with the S100 Subwoofer is very successful. If I listen critically, I can only perceive the transition to the Subwoofer with the greatest difficulty. It is impressive how a dynamic system for the lower ranges can combine this seamlessly with the rapid reproduction of the Model 90i speakers.





Let's jump to Model 150i. It's decided I should listen to this in a stereo configuration. A Primare CD player and amplifier combination of worth around 6000 euro are at the heart of the system. There is a more modest role for the S1000 Subwoofer. This now takes over the lower ranges at a lower frequency than was the case with Model 90i. Eva Cassidy sings the beautiful song 'Fields of Gold'. It's immediately obvious that the tonality of Model 150i is EXACTLY the same as that of the 90i. The complete absence of any (box) disturbance whatsoever is the cause of the exact similarity in tone and timbre. And yet you can hear at once that the picture is now projected into the space a bit more naturally. The Model 150i produces the picture with more ease and authority. This has to be down to the larger panel size. We can once again hear the same stable picture that Model 90i produced too: impressive.



Model 400i is to be listened to in the same stereo configuration as the 150i. The SUB100 is still part of the system, although this role is more modest than with the Model 90i and 150i. We now play harder stuff: Alan Taylor rocks vigorously with his song 'Beat Hotel'. This performance puts paid to the misconception that electrostatic reproducers would mainly be suitable for reproducing more subtle work, such as small acoustic ensembles and solo instruments. No, this time we're rocking hard, and the Model 400i speakers swing along merrily without breaking a sweat! And this time, distinct similarities can once more be detected between Model 90i and Model 150i, the main differences being that the authority and image have increased dramatically. Without doing an injustice to the qualities of Models 90i and 150i, it can only now be fully recognised what incredible dynamic reach this system is capable of.

And at the end of this listening session, the flagship from the Final stable, the Model 1000i, gets the opportunity to demonstrate its singing ability. Without detracting from the qualities of its younger brothers and sisters, the full capabilities of a set of full-range Final electrostatic loudspeakers are now clearly audible. Beethoven, Sonata no. 30 in E major.

I close my eyes and can almost hear the listening space vibrate as Freddy Kempf gently touches the keys of his piano. As I become entranced by his beautiful playing, I think: thank God there are still talented recording technicians. What a beautiful recording! I can clearly hear that much attention has been paid to the correct placement of the microphones in the space surrounding the instrument. Anyone who is familiar with the sound of a piano or grand piano knows that speakers often find it difficult to convey the right mixture of warm undertones (the wood and the tone of the low octaves) and the clear sounds of the high tones (the chords, the higher octaves). The pianissimo, the crescendo, the fortissimo and the decrescendo. It doesn't matter which dynamic jumps Freddy Kempf makes, the Model 1000i follows them with the greatest ease: compression is a word which does not appear in this model's dictionary. It's almost incredible how life-like the majestic instrument sounds as it's projected into the listening space, keeping the tone exactly right.

It's Joop's conscious decision to play this beautiful piece of music on the Model 1000i. I suspect that there aren't many reproducers in the world which would be able to convey this music so well, so life-like, in terms of tone and image size. I strongly suspect that Joop knows this too, hence the brave decision to let me listen to this piano piece. Roger Waters, 'Amused to death'; this exceptionally beautiful Q-sound recording allows us to hear what kind of image the Model 1000i can build up. It's an utterly absurd experience when you suddenly hear the sound of a TV behind you on your left, while other sounds can be perceived behind you on your right. And this while two reproducers are playing. It becomes clear that, whatever music the Model 1000i has to play, with the 1000i Final has created statement in terms of fine details, (micro)dynamics, dynamic reach and the representation of the space. I can only compliment the Final designers.

## ■ News from Final

The combination of affordable first-rate reproducers which can be operated with good, and also affordable electronics, has made it possible to reach the market for home cinema, where first-rate quality is expected for an affordable price. With electrostatic speakers, this used to be out of reach. We discuss the performance of the Model 90i, which we listened to in a multi-channel configuration.

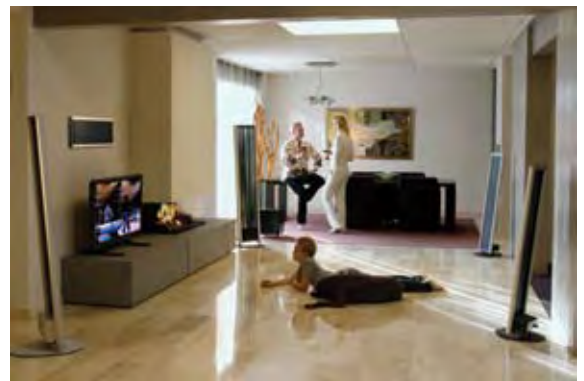
Joop: “In the course of intensive listening tests, we experienced that on the basis of Model 90i, 150i and 400i speakers, in combination with an S90, S100 or S200 Subwoofer, excellent configurations can be compiled which can easily bring high-quality home cinema configurations to a higher level. That is why Final will very shortly launch a complete Virtual Surround package on the basis of the models described above. The consumer can put together his own system, which we can provide, as he wishes and within the desired budget, which we can provide as a complete package. They could not yet reveal any further information on their own AV receiver. But they’ll come out with something new very shortly!

Other important news: In the short term, the range of Subwoofers, now still consisting of the S90, S100 and S200, will be supplemented with two ENTIRELY NEW models, the S110 and the S220. These two brand new models have been introduced very recently at the CEDIA in Denver, Colorado. A number of new features sets these models apart:

- A seamless interaction with the Final electrostats is achieved by programming electro-features into these new models. Additionally, the phase and time behaviour has been programmed into the new subwoofers.
- The S110 and S220 Subwoofers have also been fitted with a high frequency filter which is used to operate the Final electrostats. This filter suppresses the lower frequencies from the Final electrostats. The whole speaker system is in a sense transformed into a two-way system. This makes for an even better integration between the Subwoofer and the Final electrostats.

These excellent adaptations mean that transitions between the low frequencies and the other frequencies in the sound spectrum will no longer be heard.

And last but not least: there will shortly be a model in the market to fill the gap between the Model 150i and 400i. This will be named Model 300i and will have the width of Models 90i and 150i, and the height of the 400i. More information will follow shortly.



## ■ Conclusion

The thing that already came out clearly in the conversation with Joop, Ellen, and Ronald has proven to be true during the listening test. The Inverter technology has made it possible to design electrostatic reproducers which produce a performance for which, up until a few years ago, you had to pay a lot more money. Also, be aware of the fact that the high level at which the reproducers performed has been attained using qualitatively excellent, but nevertheless affordable electronics. It has at any rate become clear to me that sensible and successful innovations in the field of speaker design are still possible. Add to that the splendidly trim appearance of the beautiful panels, and we can come to the conclusion that the Final designers have succeeded excellently at designing high-quality electrostatic speakers. “Where Art and Science meet,” according to Final, and I couldn’t put it any better myself.

I would like to thank Ellen, Joop and Ronald for their openness during my conversation with them, and wish them a great deal of success with the further development of what is, to my mind, a