

LYNGDORF



A word from the founder Peter Lyngdorf

I am proud to introduce the latest catalogue from the company that carries my name. Herein you will find the most revolutionary music systems that the World has ever seen or heard.

Ordinary audio systems re-produce music – but only Lyngdorf can actually re-play the artistic performance exactly as it was recorded. Like no other we can bring the true musical event into your own home.

That is the Lyngdorf revolution. We have pushed the parameters for music re-play far beyond the performance of traditional audio.

This has been achieved by innovative scientific engineering. There is no 'voodoo' in Lyngdorf. The magic inside is the combined experience and intelligence of the largest high end audio development team in Europe.

But don't just take my word for it. Listen to a Lyngdorf system and you will see how much further true digital audio can take you into the music.

Peter Lyngdorf

Founder, Lyngdorf Audio

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A no-compromise Lyngdorf audio system: Millennium Mk IV amplifier, Millennium ADC and the MH-1 MKII reference speakers.

Millennium Mk IV

True Digital Amplifier



Millennium Mk IV is the best sounding amplifier in the World. The speed, precision and incredible dynamic range of this legend has set new standards for music re-play ever since the first version was introduced in 1998. Still it is the most advanced amplifier available today and employs 4th generation true digital technology.

In fact the Millennium is much more than an amplifier. It is a complete digital control centre replacing a D/A converter, equalizer, pre-amplifier and power amplifier. And the impressive volume control has become a world wide symbol of audio excellence.

No other amplifier can re-create the original musical event exactly as it was recorded as the Millennium. The extremely transparent sound and ultimate sense of freedom are combined with a second-to-none ability of presenting musical micro details in a crystal clear real-life audio scenario.

Powerful masterpiece

The Mk IV version is a new mechanical and electrical design increasing the maximum output current to a staggering +/- 60A so that even the most difficult speaker loads will be controlled effortlessly.

Millennium is a true masterpiece created for the most demanding music lovers that want no compromise in audio performance. Not only will you hear the music perfectly – you will feel the very soul of the performer. No other amplifier at any price can bring you that close to the art of music.

Millennium ADC

Analog/Digital Converter



The Millennium ADC is the finest 2-channel analog-to-digital converter on the market offering unsurpassed performance and an optional RIAA section of equally high potential.

The designers were given no cost constraints in their quest for the highest possible performance. We began by optimizing and filtering our preferred Holmgren-based toroidal power supply, engineering local low noise supplies for all active components. This paved the way for the finest dual mono converter technology ever seen.

Optional Phono Stage

Using a combination of state-of-the-art analog circuitry and Digital Signal Processing to support the two balanced 24 bit converters per channel, the Millennium ADC sets new performance standards for analog to digital conversion.

The Millennium ADC features 4 analog line inputs and an optional Phono Stage plug-in module allows for a turntable to be connected.

The RIAA equalization in the Lyngdorf Phono Stage has tight-tolerance polypropylene capacitors. To further improve de-emphasis possibilities seven additional de-emphasis curves are available in the DSP for optimal playback of records made before implementation of the RIAA standard.

Overall, the Millennium ADC is an advanced and extremely versatile product that can be employed in many different setups.



A Lyngdorf 2+2 system consisting of TDAI-2200 integrated amplifier, SDA-2175 power amplifier, CD-1 compact disc player, DP-1 main speakers and BW-1 BassDirect speakers.



TDAI-2200

Integrated True Digital Amplifier



The TDAI-2200 is the most versatile amplifier in our range with a long list of facilities you will not find elsewhere. Actually it is so much more than an amplifier, it is a complete digital signal processing control centre for designing advanced audio systems. The TDAI-2200 replaces both D/A converter, pre-amplifier and power amplifier, requiring only a CD transport as a source.

This is a true digital integrated amplifier based on the exact same principles as the legendary Millennium and that offers a divine sound quality. It is simply one of the best and most neutral sounding amplifiers.

TDAI-2200 can re-play music exactly as it was made. It has no coloration, no sound of its own and is a true audiophile reference easily outperforming amplifiers many times more expensive.

Efficient power

In spite of the slim and discrete appearance TDAI-2200 is an extremely powerful device capable of delivering 2 x 200 W RMS in 8 ohm and an impressive 2 x 375 W RMS in 4 ohm loads, making it possible driving even the most difficult loudspeaker loads effortlessly. And as this is a true digital amplifier it will never run hot due to the extremely high efficiency. More than 90% of the power will be converted into music, whereas typical analog amplifiers suffer from a massive heat loss of 60-70% or even more due to the extreme inefficiency of analog technology.

As the TDAI-2200 always stays cool and do not need any space for heat ventilation you can place it wherever you want.

Furthermore you can tailor make your own version of the TDAI-2200 according to your needs by adding more features as you wish. The optional state-of-the-art A/D conversion module has three unbalanced inputs and one balanced input which allows you to interface with all kinds of analog sources. The module contains the finest A/D converter available and has extremely low noise and distortion, by far superseding analog devices.

Control your acoustics

The optional RoomPerfect module will give you full control over your whole listening environment, removing all the negative acoustical effects in your room. Lyngdorf has created the most intelligent music system ever heard of. RoomPerfect adjusts the music signal to your room acoustics, removes the negative effects and presents only the original sound for you to hear. And it works perfectly in any kind of room - and with any kind of speaker..

The TDAI-2200 is full of other remarkable features like the adjustable power supply voltage which actually works as the volume control. This ensures you full dynamic range even when playing at very low volume levels. Also integrated within is a DSP section with equalization and correction possibilities for speaker position and delay, combined with extreme versatility with regard to processing, making this amplifier an obvious choice for the critical audiophile.

The TDAI-2200 is the ultimate combination of tools, toys and audiophile amplification. And do not just take our word for it. Try it out yourself and you will see what we mean by true audio revolution.



Lyngdorf SDAI-2175 integrated amplifier and CD-1 compact disc player.

SDA-2175

Digital Amplifier



The SDA-2175 is a high-performance digital power amplifier for use in any Lyngdorf system or with any kind of preamplifier. And powerful it is, being capable of delivering 2 x 200 W RMS in 8 ohm and a whopping 2 x 375 W in 4 ohm!

The output stage uses Pulse Width Modulation with a patented switch speed optimization technology. This ensures a low and linear natural distortion, and an unmatched performance is achieved by using less feedback compared to typical Class D amplifiers. And the fully balanced signal path all the way through the amplifier guarantees a remarkable performance with a signal-to-noise ratio superior to any other Class D amplifier in the market!

Millennium technology

SDA-2175 has been designed with utmost care: it starts at the mains input with a massive low-noise Holmgren toroidal transformer with power supply feed-forward compensation, suppressing the variations in the output rather than relying on feedback-based error correction normally used. This feed-forward technique originates from the legendary Millennium digital amplifier.

The critical output stage has only the highest quality components such as polypropylene capacitors and linear ferrite material in the output filter. This results in extremely low and frequency-independent distortion. Consequently wideband musical instruments can be re-played without any added harmonics and exactly the way they were recorded.

SDAI-2175

Digital Integrated Amplifier



The SDAI-2175 integrated amplifier offers very high performance and amazing value for money. The open natural music re-play and massive 2 x 200 W power output simply makes this the best integrated amplifier in its price class!

The power section is identical to the SDA-2175 power amplifier and the two can be used as building blocks in a multi-amplified system as they provide the exact same music quality. You simply connect the SDA power amp to the balanced or unbalanced pre-out terminal on the integrated SDAI and you have staggering 4 x 200 W at your service!

Loss-less selection

SDAI-2175 is extremely versatile. You get seven line inputs and each one of them can be named according to the signal source connected to it. Input sensitivity can be adjusted to match different sources avoiding differences in volume level when you switch between them.

The inputs are selected through the highest quality low-loss relays with double gold plated contacts. This ensures complete separation between inputs and a loss-less source selection.

The volume control is a high-precision digitally controlled analog attenuator allowing 0.1 dB steps over a 100 dB range. Signal paths are kept as short as possible and there are no relays or fuses in the power section. Instead, all handling is controlled by a patented current monitoring technique.



LYNGDORF

MUTE

DIGITAL

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Music 1 TUNER Global

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MENU

DPA-1 Digital Pre-Amplifier



RP-1 RoomPerfect Processor



Lyngdorf RP-1 is a true sensation: The World's first RoomPerfect™ digital room control processor for analog audio systems. You will not find a more cost-effective way of up-grading your audiophile system to the highest standards.

RoomPerfect™ will adjust your audio system to the acoustics of your listening room so that any kind of unwanted coloration and distortion will completely disappear. You can then hear just how good your audio system actually sounds without the devastating effects of uncontrolled room acoustics. And set-up is very easy due to the automated calibration process.

RP-1 has analog input and output whereas the processing inside is fully digital. You connect it in between your pre and power amplifiers or via the tape loop on your integrated amplifier. Analog to digital signal conversion is handled by the same high performance converter as also employed in the flagship Millennium ADC. The D/A converter section which is also taken from the Millennium drives both a high quality single ended and balanced output stage.

Digital crossover option

On top of correcting your room acoustics RP-1 can also operate as a digital two-way crossover allowing you to tailor-make filters for any kind of speaker system that can be bi-amplified. You can also get the full benefit of the revolutionary Lyngdorf BassDirect speakers or optimise the use of ordinary subwoofers.

In short this is an amazing opportunity to dramatically improve the performance of your audio system.

DPA-1 True Digital Pre-Amplifier



If you want to update your audio system with the very best of digital processing this is the obvious choice for audiophile music lovers. Lyngdorf DPA-1 is the sonically most transparent pre-amplifier on the market and brings you a full package of the most intelligent features.

Actually DPA-1 is a complete digital signal processing control centre for advanced loudspeaker set-ups. The most prominent feature is RoomPerfect™ that allows you to adjust your audio system to your room acoustics and make a giant leap forward in audio performance. Even though RoomPerfect™ is the most advanced system of its kind it is very easy to set-up and to operate.

Digital cross-over for bi-amping

You can also design your own digital crossovers with a choice of frequencies from 40-9999 Hz and 1-8th order filtering. This can be used for optimising the sound of any bi-ampable full-scale speakers or for 2+2 systems with subwoofers. The list of facilities is very long indeed.

To ensure maximum compatibility the DPA-1 offers both single ended and balanced inputs and outputs. It has four analog line inputs, two analog line outputs and connection for two power amplifiers. There are five digital inputs and one digital output for either line or main signal.

In fact this is the most versatile pre-amplifier in the World! Try out the Lyngdorf Audio DPA-1 for yourself and you will be impressed!



Lyngdorf CD-1 compact disc player on top of TDAI-2200 integrated amplifier. To the right the MH-1 MKII reference speaker.

CD-1

Compact Disc Player



Lyngdorf CD-1 is a true audiophile compact disc player using the most advanced technology available for music re-play. And we do mean music. There are no noise-radiating video related components inside at all. This is a pure-audio CD-only player completely focused on maximum sound quality.

As all Lyngdorf products the CD-1 is an extremely versatile product giving you many options that you will not find elsewhere. One of them is a sample rate converter that upsamples the original CD-signal to improve sound quality. You can even select at which sample output rate: 44.1, 48, 96 or 192 kHz.

Variable sample rate

Removing the output frequency away from the standard 44.1 kHz input improves the sound quality dramatically. The digital output can be delivered in a 24-bit resolution at a sample rate up to 192 kHz with extremely low jitter. The digital output is available in SPDIF, Toslink or AES format.

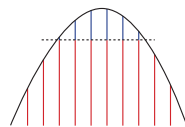
The analog section is also upsampling in a parallel process to 96 kHz. The D/A converter section (also used in the famous Millennium amplifier) drives a high quality, single-ended and balanced output stage. The converter has the fine Wolfson WM8740 processor and outstanding sonic qualities.

Another advantage of sample rate conversion is that it eliminates a basic drawback of modern digital-to-analog converters or DACs. When recording contemporary CDs the level is often very high, and by analysis you will often find several consecutive maximum samples indicating something

has been clipped away from the original signal. With this kind of input most DACs sound very bad and the fine theoretical specifications are in reality not achievable.

ICC - Intersample Clipping Correction

But in CD-1 we solve this problem by reducing gain by 2 dB when resampling for the DAC. Then we use the resampling low pass filters to reshape the clipped samples back to the original shape which gives the modulator in the DAC optimum working conditions. The result is no clipping and brilliant sound.



For a CD player solid mechanical construction is essential to avoid vibration. The CD-1 is built like a heavy amplifier with a thick aluminium chassis frame, a heavy machined front panel and vibration damped lid.

A highly advanced mains filter will kill any disturbance from the power grid and the utmost care has been taken on grounding. The power supply has a Holmgren toroidal transformer followed by extremely well regulated and linear power supplies. These are filtered and decoupled with different supplies from three independent secondary windings on the transformer.

Furthermore you can shut down all analog sections to turn the CD-1 into a transport only to obtain the best possible performance.

Some reproduce what is on the disc – we re-play the music on the disc exactly as it was recorded, no more, no less.

MH-1 MkII

Reference Mainspeaker



This is a true reference speaker with an amazingly open and transparent musical performance. Details, precision and real life dynamics are the keywords for the Lyngdorf MH-1 MkII.

This remarkable system employs selected quality drivers with the best technologies available, making it one of the best sounding speakers on the market. A truly noble piece of audio art forming a perfect partnership with the open sound from any Lyngdorf amplifier.

The woofers are 6½” drivers with highly advanced Sliced Cone diaphragms to eliminate any audible coloration from break-ups in the cone. They also have the patented SD-2 Dynamic Linear magnet structure for high efficiency and low distortion.

The famous Dual Ring Radiator tweeters ensure extremely fast response time and ultra-low distortion.

The MH-1 MkII is a brilliant example of the highest-grade cabinet design. It has no parallel sidewalls which eliminates standing waves. Internal bracings reinforce the structural rigidity. The front baffle for the drivers has been machined out of a solid 30 mm block of aluminium making it extremely strong and inert.

So overall the cabinet is extremely resonance-free and practically inaudible. It has been craftsman-manufactured in a beautiful piano-gloss finish comprising of no less than 10 layers of lacquer, each polished to a deep, black, glossy shine.

The MH-1 MkII can be used as a full range stand-alone system or as main speaker in a 2+2 set-up with Lyngdorf BassDirect speakers.



Lyngdorf DP-1 main speaker (left) and BW-1 BassDirect speaker (right).

DP-1

Dipole Main Speaker



Revolution is the state of mind at Lyngdorf. We are proud to introduce yet another liberator of music: the cabinet-free DP-1 loudspeaker which breaks one more barrier on the road to perfect music re-play.

DP-1 is a dipolar design without any cabinet, just a prolonged and very stylish front baffle in which the drivers are mounted. The result is an extremely open, detailed and dynamic musicality completely free of traditional cabinet-induced smear and coloration. We use only the very best drivers and the innovative, sculptured design is a statement of its own.

The DP-1 is intended for use in a Lyngdorf 2+2 set-up where you combine it with a BassDirect speaker to deliver the bass below 300 Hz.

Out of the box

The cabinet is one of the worst problems for loudspeakers and therefore we simply removed it. The speaker box was originally invented as an easy way of obtaining deep bass from a small speaker system. But any kind of box is resonant and vibrant and thus makes a lot of unwanted contribution to the sound.

Therefore, the cabinet advantage of extended bass has severe costs in degradation of all the octaves above, especially the upper bass and midrange. And since we did not need bass from the DP-1 the choice was easy: Exit box.

Furthermore, the air inside a cabinet acts like a spring attached to the cone and works as a brake, holding back the driver when it starts to move in and out. This actually drains energy from the drive units which obviously compromises dynamics, attack and precision.

Free from the cabinet imprisonment, the drive units in this elegant and slim dipole loudspeaker will deliver midrange and treble with unbelievable freedom and musicality.

Exclusive driver selection

The extraordinary drivers are specially customized for the DP-1. The ScanSpeak tweeter has a 1" textile dome which has been coated several times to achieve the exact desired combination of dynamic linearity and resonance damping. The ingenious magnet structure practically eliminates electrical phase shifts and distortion. The result is an incredibly smooth, linear, dynamic and amazingly transparent sound.

The 6.5" Seas woofer is extremely advanced: Both the diaphragm and the chassis are made of magnesium. This ensures a minimum of break-up in the cone and a completely non-magnetic chassis that concentrates the force of the magnet around the voice coil. The unit has a solid metal center plug instead of a traditional dust cap. That makes the cone lighter and faster and eliminates unwanted air pressure behind the cap. Furthermore it provides extra cooling for the voice coil which increases power handling and sonic stability at high volume levels.

The front baffle of the DP-1 is made of seven layers of MDF board glued together to shape the solid 50 mm thick profile that provides optimum acoustic properties for the drivers. It has a beautiful piano finish comprising of no less than 10 layers of lacquer, each hand polished to a deep, black, glossy shine.

DP-1 is the very pinnacle of high-end loudspeaker technology and aesthetics – a beautiful music sculpture for the homes of true music lovers.

BW-1

BassDirect Speaker



Lyngdorf BW-1 is a small BassDirect speaker that packs a monumental punch. It does so by turning the worst problem facing loudspeakers - the room acoustics - into an enormous advantage for music replay. This is no ordinary subwoofer – it is a stroke of genius!

This stylish little speaker is by far superseding any traditional subwoofer in phase linearity, efficiency, dynamics and frequency range. Not only does the BW-1 manage really deep bass down to 25 Hz but it can go as high as 500 Hz! A crossover frequency of 300 Hz or higher will free up the power handling of your main speakers and improve their performance.

Acoustic amplification

BW-1 is a floorstander designed specifically for front wall location facing your listening position. The direct sound from the 10" woofer as well as wall and floor reflections will arrive simultaneously at the listening position resulting in unsurpassed bass attack and precision.

Furthermore, the acoustic reinforcement from floor and walls will add extra efficiency. BW-1 plays loud even at modest power levels.

The BW-1 has been developed for a 2+2 Lyngdorf system and is the perfect match for the DP-1 main speaker. But any kind of speaker setup will greatly benefit from adding a pair of powerful BW-1s.

The stylish curved design in high gloss piano lacquer makes the BW-1 a pleasure not only for audiophile ears but also for discerning eyes.



W-210

BassDirect Speaker



Lyngdorf W-210 is an ingenious solution to the fundamental acoustical problems that arise when loudspeakers are playing inside a room. It is a dedicated BassDirect speaker designed for corner placement in a 2+2 system.

The W-210 is much more than a subwoofer. The two 10" woofers are designed more like midrange drivers with very low moving mass. This results in a very high upper roll-off frequency (around 4500Hz!), extremely low reaction time and very high sensitivity.

Corner placement

Placing the W-210 in a corner ensures that the direct sound from the woofers and reflections from floor and walls all arrive simultaneously at your listening position. This will give you maximum precision and power as we actually use the room reflections to improve the efficiency of the BassDirect speaker. In reality W-210 will rarely be fed with more than 5 watts even when playing really loud. And in this case, really loud also means very clean.

For maximum performance the W-210 must be operated by means of the crossover and equalization controls in Lyngdorf digital amplifiers. You can then use crossover frequencies up to 4-600 Hz and reduce the power handling of your main speakers, thereby improving their sound quality considerably.

The cabinet is craftsman-manufactured in a beautiful piano finish comprising of no less than 10 layers of lacquer each polished to a deep, black, glossy shine.

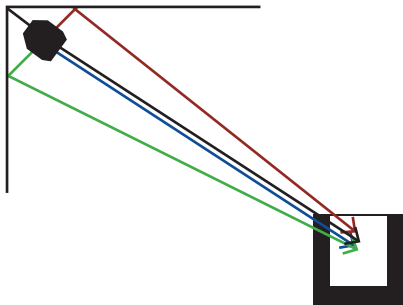


Fig. 1. Directional pattern of a W-210 BassDirect speaker: The direct sound and the reflections from walls and floor reach the listening position in seamless synchronization.

The listening room has a huge impact on the final quality of music re-play. Once your precious audio system has transformed the electrical signal into audible sound waves you will have to obey the strict physical laws of acoustics. The music will undergo dramatic sound coloration – frequency changes – enforced by the room acoustics. What you will finally hear is a far cry from the perfect outset.

The room size, shape, walls and furnishings all play their part. Room resonances interfere with the bass so that deep notes will be strongly emphasised in some places and disappear in other parts of the room. Room acoustics are based on inevitable physical laws just like gravity (and try to avoid that!).

Some try to minimize coloration by placing the speakers well away from walls to clear up the upper tone registers. But that will severely affect the precision of the bass performance. Damping one room problem will just magnify another one. You can move the problems around but not remove them unless you remove your walls.

Lyngdorf has created an ingenious solution to this generic problem and turned it into a major advantage. Instead of trying to avoid room coloration we use it to improve the sound quality of bass speakers. And by doing that we actually created a new invention – the BassDirect speaker.

The Solution for the Bass Frequencies

An average size living room will add 6-9 dB extra bass to the original sound of the speaker. This is the equivalent of increasing the power of your amplifier tenfold! So by using this acoustical amplification in a positive way we can actually improve the overall efficiency of a speaker dramatically.

Where lower frequencies are concerned a possible solution is to place the loudspeakers in the corners of the room since

the path lengths of the direct and the reflected signals are then practically identical. Three advantages can be listed immediately:

1. The problem of varying sound pressure areas in the listening room is cancelled or at least seriously reduced.
2. Impulse response at low frequencies is improved because the direct signal and reflections reach the listener at the same time.
3. Much less energy is required for bass reproduction because the walls and the floor guide the moving air in the same direction – towards the listening position. This is also the reason why placing speakers in this position normally gives too much bass; most loudspeakers are designed for placement away from the walls.

Controlling the sound

By clever design and by applying the most modern digital room control we can shape the frequency response of the BassDirect speaker into perfection. You will get extremely high efficiency, very clean and dynamic sound plus really deep bass below 25 Hz all at the same time.

Another major advantage of BassDirect is that the speakers can go much higher in frequency than ordinary subwoofers. A conventional subwoofer is only capable of reproducing the deepest bass - below say 120Hz - hence the name subwoofer. But when using BassDirect speakers you typically cross over to the main speakers around 400Hz - or even higher! They can actually operate into the lower midrange.

The Solution for Mid and High Frequencies

However, placing a full-range loudspeaker system in the corners of a living room can make it difficult to find a good listen-

ing position, i.e. being able to sit at the corner of an imaginary equilateral triangle. It therefore makes sense to separate the woofers from the mid/high frequency drivers.

Traditionally, separating the woofer from the rest of the loudspeaker creates some challenges when it comes to achieving the desired seamless integration of the two frequency ranges. Due to the greater distance between the woofer and the listener there is a delay in the bass compared to the mid/highs.

Also, you would experience a considerable higher sound pressure level in the bass compared to the mid/highs. This would cause audible impulse, phase and balance problems.

The Lyngdorf Solution for the Entire Frequency Range

Thanks to the advanced signal processing capabilities of the DSP in the Lyngdorf products it is perfectly possible to physically separate the bass and the mid/high driver sections, creating what we refer to as a 2+2 system. The advantages are:

1. The bass level from the corner-placed woofer can be reduced and equalized exactly to match the mid and high frequencies.
2. The electrical signal to the mid/high unit can be delayed to achieve a simultaneous arrival of the sound from woofer and mid/high at the listening position.

The overall effect is a dramatic improvement in both frequency and impulse response.

We have two models of BassDirect speakers: The W-210 for the no-compromise audiophile music lover who can place the BassDirect speakers in the front corners of his room. The very compact BW-1 is specially designed for wall placement and thus will easily blend in discretely with any kind of interior.



Setting up a Lyngdorf RoomPerfect™ system is easy by using the included microphone with stand and cable. The microphone is only to be used for measuring room acoustics for a few minutes - afterwards you can remove it.

You may be the master of your home but you are a slave to room acoustics. The listening room has a huge impact on the final quality of music replay. Once your precious audio system has transformed the electrical signal into audible sound waves you are no longer in control and will have to obey the strict physical laws of acoustics.

The room size, shape, walls and furnishings all play their part. The distance between the loudspeakers and your ears is an acoustic minefield and you are in the losing end. The music will undergo dramatic sound coloration – frequency changes - enforced by the room acoustics. What you will finally hear is a far cry from the perfect outset.

Hard surfaces like walls and windows will reflect and reinforce sound, whereas soft furniture and carpets will absorb and dampen sound – all at different frequencies. Room resonances interfere with the bass so that deep notes will be strongly emphasised in some places and disappear in other parts of the room. If you imagine the original music as the flat topography of Denmark it actually will look like a profile of the Himalayas in your listening position.

Room acoustics are based on inevitable physical laws just like gravity (and try to avoid that!). Some try to minimize coloration by placing the speakers well away from walls to clear up the upper tone registers. But that will severely affect the bass performance. Dampening one room problem will just magnify another one. You can move the problems around but not remove them unless you remove your walls.

But today you have one more choice. Lyngdorf has created the most intelligent music system ever heard. RoomPerfect adjusts the music signal to your room acoustics, removes the negative effects and presents only the original sound for you to hear. And it works perfectly in any kind of room.

How is that possible? First we measure the coloration – the frequency changes your listening room imposes on the music. Next, RoomPerfect analyzes the intelligence gathered and

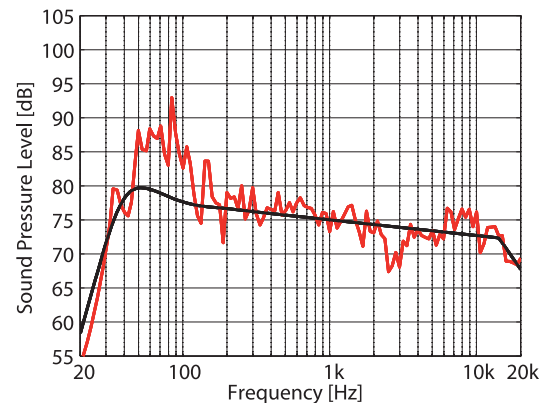
adds counter measures to the music signal that will completely neutralize the room coloration. Finally you hear only music.

So, today it is up to you: Either to continue letting your room acoustics dictate how you hear music. Or to take perfect control of your own listening room with RoomPerfect and finally listen to 100% music. That is what we call an audible breakthrough for art – a true re-play revolution.

Set your music free with RoomPerfect.

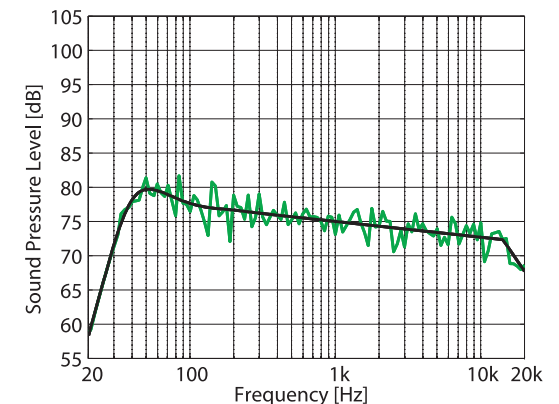
Frequency response

Without RoomPerfect™ (red), target (black)



Frequency response

With RoomPerfect™ (green), target (black)





Lyngdorf True Digital Amplification

Technical Description

The World's first true digital amplifier was the legendary Millennium which was introduced already in 1998. This groundbreaking design still exists as the Lyngdorf Millennium Mk IV and is without any feedback. All signal processing is 100% in the digital domain.

Even today only very few digital amplifiers are actually 100% digital. Almost all rely on analog control of the digital power conversion process – so called analog feedback. True digital amplification is very complex to develop and expensive to build as only the very best components can be used. This is why almost every other manufacturer of digital amplifiers prefer the relatively cheap and simple principle of analog feedback.

This concept can function very well as our own SDA-2175 and SDAI-2175 amplifiers proves so brilliantly. But only 100% digital processing can release the full potential of digital amplification and Lyngdorf is the world leader in true digital power conversion.

PWM – pulsating in time

The output stage of most switching amplifiers is based on the same principle named Pulse Width Modulation – in short PWM. Modulation is simply a matter of variable open/close time of the transistors.

Simplified, you can compare the transistors in the PWM output stage to a pair of switches. Please see fig 1.

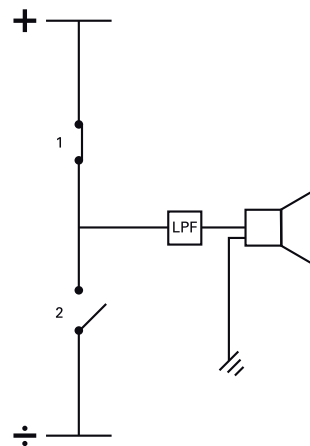
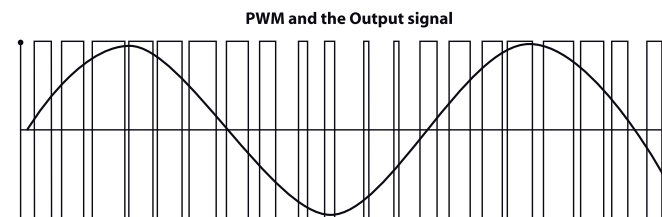


Fig. 1: Switching amplifier

The longer switch 1 is ON and switch 2 is OFF the longer the positive excursion of the loudspeaker will be. Oppositely, the longer switch 2 is ON and switch 1 is OFF the longer the negative excursion will be.

And if the two switches are ON for the same period of time within one switching cycle there will be no excursion of the driver - no sound. Please see fig 2.

Fig. 2: Pulse width modulation in time



Analog feedback in digital amplifiers

Most PWM amplifiers today are self-oscillating which means that the amplitude or level of the ANALOG input signal decides the switch frequency. This means that the switch frequency is high (>300k Hz) when the audio input signal level is low. And that the switch frequency is low - moving towards the audible frequency range - when the audio input level is high. This is also when the output from the amplifier is high.

The advantage of this topology is that it is relatively cheap and simple to design since it uses well proven feedback from the analog output to the analog input partly to create the oscillation and partly to create a low THD amplifier.

The disadvantages are several - mainly that it requires an analog input signal (= it is really an analog amplifier!). So, the PCM (Pulse Code Modulated) signal from your CD player is converted to analog and then the analog signal is converted to the PWM signal.

Also, the feedback loop typically is not linear which is why distortion often increases towards higher frequencies.

Finally, the fact that when you play loud the switch frequency will move closer to the audible frequency range, can risk creating an offset working point for the tweeter. Even though you cannot hear it directly, harmonics of an 80 or 100 kHz switch frequency can bias the tweeter.

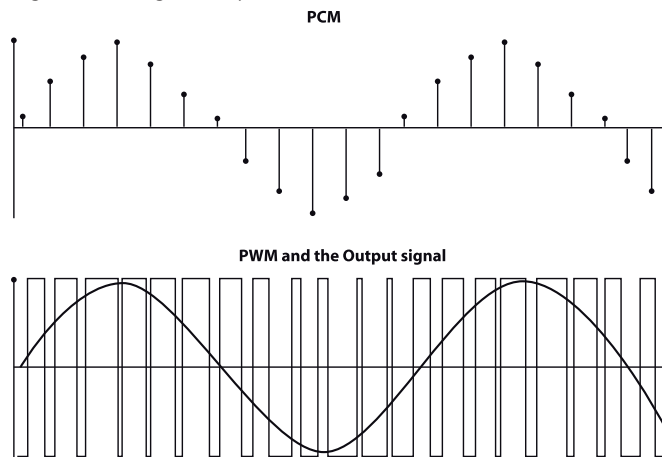
The Lyngdorf true digital amplifiers use a fixed switch frequency at 400 kHz. Furthermore, we convert the PCM signal from the CD directly to the PWM signal for the output stage in a PCM-to-PWM modulator.

True digital amplification with no feedback

Below in fig. 3 is a sine wave, in terms of a PCM signal, in the upper panel of the figure. In a PCM signal, each discrete sample represents a specific amplitude. The corresponding pulse-width-modulated signal at the same sampling rate (frequency) is shown in the lower panel.

The magnitude of each PWM sample is described in terms of the pulse width, as opposed to the pulse height in a PCM signal. So, the 24-bit PCM digital audio signal is fed to the modulator where the audio data is up-sampled 4 times. The Equibit™ modulator then translates the up-sampled signal to a PWM signal having the same switching frequency.

Fig. 3: True digital amplification



This means that Lyngdorf true digital amplifiers have a direct signal path without sound deteriorating conversions.

The very unique feature of the Equibit technology is that the PCM to PWM conversion is made without using feedback.

Which actually is a necessity since you cannot make a feedback loop taking the analog signal at the speaker terminals and feed it back to the digital PCM signal! That is just not possible!

So, the Lyngdorf true digital amplifiers are open loop amplifiers - no feedback is being used at all.

Linear conversion makes better music!

It is quite obvious that developing such an amplifier is an extremely complex process. It is simply more expensive since it requires very stable and ripple free power supplies and other special solutions such as the Equibit for the PCM to PWM conversion and extremely linear design of both power supply, output stage and reconstruction filter.

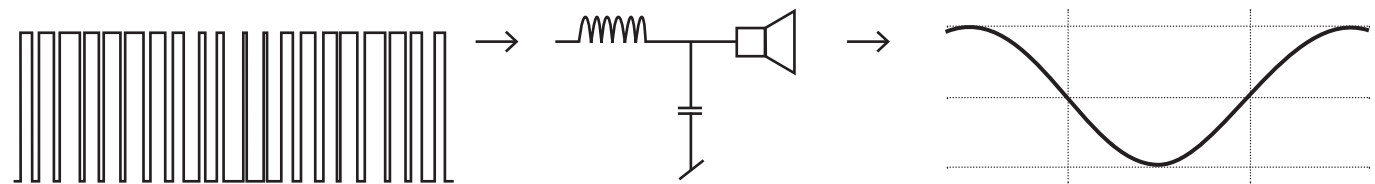


Fig. 4: Output filter

The advantage of this meticulous design is for instance that the very linear and low distortion simply results in a more musical sounding amplifier. If you imagine an acoustic instrument it creates a fundamental tone and a lot of harmonic overtones. Pianos and violins have considerable energy in the overtones compared to the fundamental tone.

If the distortion versus frequency of the amplifier is not flat - which is rarely the case for a typical switching amplifier - you will add more or less distortion from the fundamental to the natural harmonics and actually destroy the balance of the natural harmonics. However, when the distortion (which, as already mentioned, is very low) is the same at all frequencies you can preserve the natural balance of the music you listen to.

We have conducted experiments with this, and actually test persons would prefer higher but linear distortion compared

to lower but nonlinear distortion over frequency. So, low and linear distortion is the key to musicality.

No-compromise output filter

The advantage of the fixed switch frequency is first and foremost that it is so far away from the audible frequencies. This gives the possibility of constructing a more efficient reconstruction filter. It is almost self explanatory that a passive filter (in principle it actually only consists of a coil and a capacitor, see fig 4) only supposed to filter away a very narrow frequency band can be made more efficiently than a filter that is constructed to filter away a broad frequency range.

The reconstruction filter of a switched amplifier is often a point that is overlooked - partly because the ideal components are expensive and take up board space and partly because the filter is regarded to be way out of the audible frequency range. But even filters placed octaves above audible frequencies affect the linearity within the audible frequencies: In the Millennium amplifier we have used no-compromise Jensen capacitors and coils resulting in an unsurpassed low distortion and linearity in the filter.

Lyngdorf makes the very best digital amplifiers in the World. But do not just take our word for it - try out true digital amplification for yourself and join the Lyngdorf audio revolution. The future is digital.

You can find much more information on digital processing at www.lyngdorf.com.

AUDIO PERFORMANCE

AMPLIFIERS	Output power, 0.1% THD-N		Nominal load impedance	Frequency response		Output impedance		Total Harmonic Distortion (THD) + Noise, A-weighted				S/N ratio	Dynamic range	Channel separation	Peak output current
	8 ohm	4 ohm		-3 dB, 8 ohm	20 Hz-20 KHz, 8 ohm	20 Hz-1 kHz	20 KHz	8 ohm @ 1 W output	4 ohm @ 1 W output	8 ohm @ 100 W output	4 ohm @ full output				
Millennium MkIV	2 x 150 W	2 x 300 W	4 - 8 ohm	0.3 Hz-33 KHz	-0 dB/+0.2 dB	0.020 ohm	0.2	0.03%	0.04%	0.03%	0.02%	113dB	140dB	100 dB	±60A
TDAI-2200 Integrated Amplifier	2 x 200 W	2 x 375 W	4 - 8 ohm	0.3 Hz-33 KHz*	-0 dB/+0.2 dB	0.035 ohm	0.4 ohm	0.04%	0.04%	0.02%	0.07%	107dB	133 dB	90dB	±40A
SDA-2175 Power Amplifier	2 x 200 W	2 x 375W	4 - 8 ohm	0.3 Hz-33 KHz	-0 dB/+0.2 dB	0.035 ohm	0.4 ohm	0.009%	0.01%	0.01%	0.07%	117 dB	117	84 dB	±40A
SDAI-2175 Integrated Amplifier	2 x 200 W	2 x 375W	4 - 8 ohm	0.3 Hz-33 KHz	-0 dB/+0.2 dB	0.035 ohm	0.4 ohm	0.008%	0.01%	0.01%	0.07%	113dB	113	84dB	±40A

*With RoomPerfect: -3 dB at 18 Hz

COMPONENTS	Analog output level		Selectable sample rates	Input impedance		Input sensitivity for full scale output		Frequency response		Frequency linearity L/R (20-20,000 Hz)		THD + N, A-Weighted (dBFS)		Signal-to-noise ratio: THD + N	
	Unbalanced	Balanced		Analog input	Phono input	Analog input	Phono input	Analog input	Phono input	Analog input	Phono input	Analog input	Phono input	Analog input	Phono input
Millennium ADC	N/A	N/A	48, 96, 192 kHz	10 kOhm	20, 100, 200, 47k ohm	100 mV - 4.4 V	390 µV - 180 mV	<10-45,000 Hz -3 dB	<10-39,000 Hz -3 dB	-0/+0.07 dB	-0/+0.02 dB	0.0002%	0.0003%	124 dB A/D	72-122 dB
DPA-1 Pre-Amplifier	4.4 Vrms	8.8 Vrms	48, 96, 192 kHz	10 kOhm	N/A	100 mV - 4.4 V	N/A	20-20,000 Hz ±0.1 dB*	N/A	±0.1 dB	N/A	0.0003%	N/A	119 dB A/D	N/A
RP-1 Room Processor	Unity Gain*	Unity Gain*	48, 96, 192 kHz	10 kOhm	N/A	100 mV - 4.4 V	N/A	20-20,000 Hz ±0.1 dB*	N/A	±0.1 dB	N/A	0.0007%	N/A	113 dB A/A	N/A

*With RoomPerfect: -3 dB at 18 Hz

DISC PLAYER	Analog output level		Selectable sample rates on digital outputs		Frequency response L/R	Balanced analog output impedance	Total harmonic distortion (THD) + noise, A-weighted	Signal-to-noise ratio THD + N, A-weighted ("infinity zero" track)	Crosstalk	Digital outputs
	Ref. 0 dB	16 bit	24 bit	20-20,000 Hz						
CD-1 Compact Disc Player	3.8 Vrms	44.1 kHz	48, 96, 192 kHz	± 0.02 dB	50 ohms	0.0003 %	-115 dBA	-100 dBA	-114 dB	AES, SPDIF, Toslink

LOUDSPEAKERS	High frequency driver		Crossover frequency	Cabinet type (port tuning frequency)	Frequency Response	Sensitivity (2.83V/1m)	Nominal Impedance	Maximum SPL	Placement
	1" dome tweeter	Woofer/midrange driver							
DP-1 Main Speaker	1" dome tweeter	6.5"	2.2kHz	Dipolar, no cabinet	300-22,000 Hz	89 dB	4 ohm	112 dB	Floor
MH-1 MkII Main Speaker	1 1/4" ring radiator	2 x 6.5"	1.3kHz	Bass reflex (35 Hz)	35 - 60,000 Hz	92 dB	4 ohm	118 dB	Floor
BW-1 BassDirect Speaker		10"	N/A	Closed box	25 - 800 Hz	90 dB	4 ohm	112 dB	Floor, against wall
W-210 BassDirect Speaker		2 x 10"	N/A	Bass reflex (28 Hz)	16 - 3,500 Hz	96 dB	8 ohm	118 dB	Floor, in corner

AMPLIFIERS	Finish	Mains voltage range		Power consumption			Dimensions			Weight		
		115 V version	230 V version	Standby mode	On mode, no output	2 x 37.5 W 4 ohm	2 x 300 W/4 ohm	Width	Depth	Height	Net weight	Shipping weight
Millennium MkIV	Silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	3 W	30 W	110 W	800 W	450 mm	435 mm	145 mm	28.0 kg	30.0 kg
TDAI-2200 Integrated Amplifier	Black or silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	4 W	36 W	116 W	820 W	450 mm	455 mm	100.6mm	18.0Kg	20.0Kg
SDA-2175 Power Amplifier	Black or silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	N/A	36 W	116 W	820 W	450 mm	361 mm	100.6 mm	13 kg	15.7 kg
SDAI-2175 Integrated Amplifier	Black or silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	1.5 W	36 W	116 W	820 W	450 mm	361 mm	100.6 mm	13 kg	16 kg

COMPONENTS	Finish	Mains voltage range		Power consumption			Dimensions			Weight		
		115 V version	230 V version	Standby mode	On mode	2 x 37.5 W 4 ohm	Width	Depth	Height incl. feet	Net weight	Shipping weight	
Millennium ADC	Silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	4 W	45 W	110 W	800 W	450 mm	430 mm	145 mm	12.9 kg	17.2 kg
DPA-1 Pre-amplifier	Black or silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	7 W	26 W	110 W	800 W	450 mm	355 mm	100 mm	7.4 kg	10.8 kg
RP-1 Room Processor	Black	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	7 W	23 W	110 W	800 W	450 mm	345 mm	100 mm	6.6 kg	9.9 kg

DISC PLAYER	Finish	Mains voltage range		Power consumption			Dimensions			Weight		
		115 V version	230 V version	Standby mode	On mode	2 x 37.5 W 4 ohm	Width	Depth	Height incl. feet	Net weight	Shipping weight	
CD-1 Compact Disc Player	Black or silver	100-120V AC, 50-60Hz	200-240V AC, 50-60Hz	7 W	16 W	110 W	800 W	450 mm	355 mm	100 mm	6.9 kg	9.9 kg

LOUDSPEAKERS	Finish	Width	Depth	Height	Net weight	
					Net weight	Shipping weight
DP-1 Main Speaker	Black piano lacquer	282 mm	371 mm (91 w/o foot)	1069 mm	20.9 kg	50.5 kg (pair)
MH-1 MkII Main Speaker	Black piano lacquer	206 mm	385 mm	1205 mm	45.0 kg	55.0 kg
BW-1 BassDirect Speaker	Black piano lacquer	511 mm	180 mm	424 mm	17.7 kg	21 kg
W-210 BassDirect Speaker	Black piano lacquer	420 mm	560 mm	550 mm	34.0 kg	45.0 kg



Millennium Mk IV



Millennium ADC



TDAI-2200



CD-1



SDA-2175



SDAI-2175



RP-1



DPA-1

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