

# IT ALL REVOLVES AROUND TIME

## REVIEW: TEMPORAL COHERENCE

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Theo Wubbolts reported his visit to the gentlemen behind Temporal Coherence in the July 2014 issue. The focus then was mainly on the loudspeakers of the brand. Half January, I visited TC to listen to the amplifiers.

Who wants to know more about the gentlemen behind the brand Temporal Coherence is referred to the July 2014 issue of HVT in which Theo Wubbolts reports extensively about the background and the ideas of these people. Also, the papers that Hans van Maanen has published through the years about phenomena in audio are very educating and illustrative for the ideas of Temporal Coherence. Together with Ron Eijling and Ton Nahuijsen, Hans forms the design team which has very clear ideas about how a piece of audio equipment should sound and how to achieve that sonic picture.

### **Amplifiers**

During his visit, Theo Wubbolts listened to the ‘Diamant’ loudspeaker system. Naturally, shortly after my arrival at TC I was given the opportunity to listen to this circular radiating active 3- way system. A very special experience, but that was not the reason for me being there. The Diamant is an active system and therefore equipped with three power amplifiers, which have completely been developed and also produced “in house”. In the meantime, TC has decided to focus also on separate electronic components, besides the two active loudspeaker systems (the Diamant and the Pyramide). In simple terms, the power amplifier which is introduced now is directly derived from the power amplifiers of the Diamant and the Pyramide. To control the power amplifier you need a control amplifier, which is now included in the suite of products. Because people sometimes like to listen to headphones very much, a headphone amplifier is now also an option.

### **Control amplifier**

The way a control amplifier, or, if you want, a preamplifier, operates is, of course, basically quite simple. The device should provide a choice for the sound source, it should provide a volume control and when next to line sources a turntable is used as well, a phono stage with RIAA correction is required. If only line sources are used than, strictly speaking, even amplification is not necessary (provided the power amplifier has a good sensitivity). Experience tells us that this, in itself very simple, description of a control amplifier is in practice not always that simple. The addition of (active) electronics can spoil the party and can have an influence on the reproduction. This explains the popularity of passive controls which do not include active components and which usually are build very minimalistic. But passive controls are far from ideal and not suited for the use of long cables (like those applied with an active loudspeaker system). The Temporal Coherence control amplifier, however, applies an approach which comes very close to the ideal control amplifier (a switched volume control). Internally you can see the simplicity of this digitally controlled analog pre-stage. The digital part of the apparatus is purely to control the input selection and the volume control. In this apparatus everything is switched using relays. Not only the choice of the source, but also the different volume levels (all in steps of 1 dB) are switched using relays. The channel equality is therefore potentially ideal. The use of accurate resistors guarantees

this. Of course, the amplifier stages are build up using discrete components (the most beautiful way) and have specifications of the utmost high level. The high internal power supply voltage (over 40 V) for the analog circuitry is remarkable. That is rather different from the standard  $\pm 15V$ . This offers in potential a gigantic analog headroom.

### **Time and phase**

What is remarkable in the specification lists of Temporal Coherence is the large bandwidth. It is 200 kHz for the control amplifier and the power amplifier and the headphone amplifier score only a little lower (150 kHz). The power bandwidth of the power amplifiers is 50kHz. The reason for this is very simple. Temporal Coherence is very well aware of a pure time and phase behaviour. I don't want to say that other manufacturers do not think about this, but at TC the importance of the response in time domain is a continuously returning item. Manufacturers usually talk about the frequency response of a component and that is very logical. The frequency domain is a very pleasant (mathematical) way to express things and a handy way to do calculations. Adjustments in the frequency characteristic can have an influence on the phase and time behaviour which you don't see reflected in the frequency domain. If you don't keep an eye on the phase and time response, you run the risk that it all looks very nice on paper, but the produced sound is not well in the end. Phase shifts and transit time differences have a clear audible influence, but these are often largely underestimated. As far as Temporal Coherence is concerned, the phase and time response is one of the corner stones of the design. Choosing a wide band base of design, you can avoid many problems.

### **Power amplifier and headphone amplifier**

The concepts of the power amplifier and the headphone amplifier are basically identical. Both amplifiers use exactly the same printed circuit board. The essential difference is, of course, that the power amplifier is equipped with a fat power supply which enables it to produce 75 Watts effective per channel. The power supply of the headphone amplifier is suited for a maximum of 400 milliWatt effective and the amplifier is optimised for headphone impedances (min. 30  $\Omega$ ). The headphone amplifier is actually a small power amplifier because it is not equipped with a volume control. The control is, like the ordinary power amplifier, done by means of the control amplifier. Just as with the control amplifier, the construction of the power amplifiers is completely discrete (what else did you expect?) and it has a wide-band response.

### **Reproduction**

After a listening session with the Diamant and a chat on the approach of Temporal Coherence, I was, of course, offered the possibility to listen to the headphone amplifier. I was handed a Sennheiser HD 800 for this, a headphone in the grand manner, which is already in itself a real joy to listen to. But especially with a headphone, the signal delivery becomes more and more important and this works very well with the TC amplifier. Remarkable with this combination is the great accuracy and the large presence of ease in the sound stage. The reproduction goes very deep and it is crystal clear in the mid-range and the upper high. Remarkable is the very quiet reproduction (always very clearly audible in the musically quiet moments). I like to use the pieces of Arvo Pärt for this purpose, which is loaded with quiet musical moments. With many headphone amplifiers you than still hear a number of electronic artefacts (hum, noise, etc.) but not with the Temporal Coherence: quiet is really quiet. In a second listening session at my home with a slightly less esoteric headphones (the Beyer Dynamic DT770 Pro and a Philips SHP895) these properties again were immediately audible. The reproduction is deep, supple and loose with a lot of ease in the sound image. Listening

for a long time is no problem at all and before you notice it you have listened to four complete albums from your record collection. I hear that ease and suppleness in the reproduction also in the normal power amplifier, which, of course, was also handed to me to try at home, which I combined with my personal reference monitor of PMC (the TB1S). What is remarkable of this loudspeaker is that it can create a wide and deep sound stage, but it is critical in the control of its source. When something goes wrong, the image pulls towards the loudspeakers. Possibly the pure temporal response is the cause of this. Alike the Temporal Coherence power amplifier I hear precisely what I want to hear. A wide and deep sound stage with detail and ease which is completely detached from the loudspeakers.

### In summary

The electronics components of Temporal Coherence do not have that special shape as the loudspeakers of the brand. There is no need for it because the shape of the loudspeakers is completely dedicated to their function. Like with the amplifiers where a standard (but very nicely made) housing suffices excellently. Audio is about music and these amplifiers produce it at the highest level. This is the real no-nonsense approach at the highest level.

Detailed information and specifications:

Brand;	Temporal Coherence	
Type:	Control amplifier	
Inputs:	6	
Sensitivity:	200 mV <sub>eff</sub>	
Outputs:	3 (2 regulated, 1 unregulated)	
Rumble filter;	Yes	
Frequency response:	2 – 200 000 Hz	
Type:	Power amplifier	
Input sensitivity:	1.5 V <sub>eff</sub>	
Output power:	2 x 75 Watt 6 Ω	
Frequency response:	2 – 150 000 Hz	
Power bandwidth:	2 – 50 000 Hz	
Type:	Power amplifier	
Input sensitivity:	1.5 V <sub>eff</sub>	
Output power:	2 x 400 mW 300 Ω	
Frequency response:	2 – 150 000 Hz	
Power bandwidth:	2 – 50 000 Hz	
Remark:	Suitable for headphones with an impedance of minimal 30 Ω	
Prices:	Control amplifier:	€ 4000,-
	Power amplifier:	€ 4500,-
	Headphone amplifier:	€ 2500,-

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