

Edited Transcript of Richard Shepherd's talk at Peace College, Raleigh on Tuesday April 14th 2009

Good evening, ladies and gentlemen, my name is Richard Shepherd. I was the designer and builder of the electronic control equipment, which operates this Steinway concert grand piano.

We have before us a magnificent example of the early craft of the Steinway Company. Originally built in its heyday, this 1909 instrument was bought by Zenph Studios in 2005, renovated during 2006 by Faust-Harrison in New York, and then flown over to me in North Yorkshire UK, where the complex recording/reproducing equipment was fitted. It was finally flown back here to North Carolina in late 2007.

There are only two Steinway concert grands in the world equipped with this high-definition system. The other I built for my friend David Long in the UK, so this is a pretty rare instrument that you're witnessing here tonight. But I'm here to say a few words about how the technology works and how I became involved with the project.

From early childhood, the bent of my natural inclination was towards the sciences - and anything electrical was preferable. Music was a secondary passion, but it had to be classical and especially piano. An uncle had an early reproducing piano; you may remember those pneumatically operated Pianolas that you pedaled with your feet whilst a punched paper roll produced music from the piano and the keys magically moved. It never seemed entirely satisfactory, but it fascinated me as a six-year-old child.

Reproducing pianos have been constantly developed by musically-inclined engineers from the early 1900's using whatever technology was available at the time. Modern electronic techniques and computers offer huge scope for performance improvements and this instrument is the latest in the high-quality arena, enabling extraordinary realism and musical subtlety that were earlier quite impossible to achieve. Much credit is owed to my friend Wayne Stahnke, who pioneered the technology in the 1980's. Wayne is president of Live Performance Inc., manufacturers of the LX high-quality reproducing piano system and I had heard one of his SE pianos about 10 years ago - I was determined one day to make such an instrument for myself.

It was only when I retired, after we sold the electronics company that I had co-founded with some partners, that I found I had time on my hands and resources enough to fulfill the childhood dream of my uncle's Pianola by making a piano that played properly. The system built into this Steinway is capable of recording a pianist's performance, as well as replaying it.

The recording process does not involve the sound of the piano. Instead, a fine optical system - one for every note - measures the hammer velocity as it impacts the

strings: this is a measure of the loudness. The precise hammer strike time is taken, and the duration of the note as held down by the pianist is noted. So from this you get four facts: which note, how loud, when, and for how long. If you store all these data as a file in a computer, and you also continually measure and record the position of the pedals, then you have totally captured all of the relevant actions made by the live pianist as he played the piano.

To replay that data file, the piano is equipped with a set of precisely controlled electrical solenoid actuators – one for each note and pedal. By careful design it is possible to re-create the original mechanical motions made by the pianist with such accuracy that it is nearly impossible to hear any difference from the pianist's original performance. Thus, if you reproduce the hammer speeds and timing instances, then you will recreate the performance, but at the same time you must also precisely control the damper positions – the pedal action – because that is a very subtle part of the art of piano playing.

Now, one of the problems of convincing skeptical musicians that the technology is capable of capturing precise nuances of interpretation is that when they experience the re-play they very often declare that it is somehow different. Strangely, much of this assessment has to do with the self-evident lack of a pianist's hands and his body motions during play-back. It is quite surprising how much of the total live experience involves the visual aspects of his performance.

[I'm going to demonstrate the system's fidelity by playing a short section of a Chopin Nocturne "live" to you with my own hands, and we'll immediately replay it. But I invite you to close your eyes during the whole of this demo.]

[So you have now heard what this piano's capability of accurate reproduction is about. That is the key to everything Zenph is trying to do with it.]

By the way, the pedals do not move on replay: it is quite deliberate. The action and everything inside to do with pedals works, but there's no point in moving the actual pedals; they're capable of making noises and getting in the way, but the dampers etc move smoothly and properly.

I became involved with Zenph quite out of the blue. The telephone rang one day at home in North Yorkshire, England, and the cheerful and articulate John Q. Walker, president of Zenph, said he had heard that I had made a high-quality electronic reproducing piano. Could he fly over and have a demonstration? At that time I had completed two engineering prototypes for the Bösendorfer Company in Vienna - somehow word had leaked out. Anyway, John flew over and visited me to my home, and he explained how his company, Zenph, planned to recreate Rachmaninoff's performances from the scratchy old 78's available.

By loading the audio waveforms of the original 78s into their computers, the Zenph Process is able to get behind the sound of the piano and deduce what notes and

actions the pianist must have made to produce that performance. The resulting computer file is capable of driving this piano's mechanism. Now, I'm not going to go into the details of how they do that, but in essence that's what happens.

Now, Rachmaninoff always played a Steinway, but there was no modern reproducing mechanism for a Steinway. Would it be possible to re-do my early work and fit it into a refurbished Steinway-D? We came to an arrangement to allow John's dream of recreating Rachmaninoff's famous recordings, and this piano and its complex electronic mechanism (carefully hidden beneath) was the vehicle for success.

And so, last night, until 2 AM this morning, we were all here with the Sony Masterworks team, making the ultimate modern stereo recording of Rachmaninoff playing this piano, in this hall. This new CD recording will be issued through the Sony Masterworks label in September, and you will have the privilege of having heard the original piano in the hall in which that CD was made.

John Q's dream came true last night, as did my own: the six-year-old boy who had been beneath his uncle's Pianola. The making of this recording was, to me, a tremendous honor and a great pleasure to be entrusted with such a part in this extraordinary endeavor that Zenph have put together. I hope you will appreciate the realism of the Rachmaninoff recital this evening, because everything that you hear on this piano was played originally by Rachmaninoff. The keystrokes, timings, the amplitudes, the pedal motions and everything else, were all taken off the 78 rpm recordings that he made. So you are hearing the nearest thing that we know to Rachmaninoff being at the keyboard of this piano. Thank you very much for listening to me, and please enjoy the evening.