

## **VIDEOGAME HISTORY: A little matter of record keeping**

by Ralph H. Baer

Just a bit of advice for young technologists and scientists: A tale about the Importance of Keeping Records.

Oscar Wilde may have written about the **Importance of Being Earnest** but what young engineers and budding technologists and scientists should know about **record keeping** is a lot more important to their (future) success and self-esteem.

Technology graduates enter the field having been taught next to nothing useful and memorable about the patent system. Lifelong record keeping is an inseparable part of that system. Many will live to regret their lack of record keeping years later. This paper is a tale which – I hope –will shed some light of what happens in the real world when you do take care of your notes and of your formal records as a matter of daily routine.....and what happens when you don't.

My experience with the patent system had its origins in lawsuits resulting from the simple fact that I came up with the seminal idea of using an ordinary home TV set as display on which to play games.

Videogame history has been chronicled by many respectable historians among them Lenny Herman, Steven Kent, Mark Wolf, J.F. Williams, Rusel DeMaria and others including myself. When I worked on my book “Videogames: In the Beginning”, I relied mainly on written documents that David Winter – that most meticulous and most knowledgeable collector of classical videogames - and on assorted archival material. That included hardware and documents which David and I had been lucky enough to rescue from a slow, moldering death in legal storage where the material had been quietly reposing for decades.

Let me jump ahead a bit: I learned many years ago that relying on memory is just not good enough when it comes to reconstructing an event. Human memory is like a piece of information that starts out on the web, already flawed and continues to show up in new places – frequently edited on the basis of no direct insight at all – and under different headings in an ever-increasing number of sites and thus becomes the accepted wisdom,

In chronicling videogame history in my book “Videogames: In the Beginning”, even I had to rely occasionally on anecdotal bits and pieces that were given to me verbally or which I collected from various sources, knowing that only some of it might reflect what actually happened. But I know better than to think of them as “facts” and I mention their origin and leave it up to the reader whether they want to take the source at their word.

Among such questionable sources of information were numerous recordings on audio tape, VHS videotape, CD's and DVDs generated at trade shows, Cable TV interviews and so forth, which immortalize the sage pronouncements of industry maven's, engineers, programmers and other seminal players. Many of these individuals did play an important, even pivotal, role in moving videogames along in the early days of that industry. Some recordings were made their during appearances at CGExpo or similar retro-game show; or they were part of interviews that later appeared on Public Television or on game networks.

Nobody watching these productions critically can be under the illusion that what you see and hear is a factual revelation from an unimpeachable source. Much of the stuff that passes for bona fide recollections is so fatally flawed as to boggle the mind.

### Case in Point: The Magnavox Videogame Patents Infringement Lawsuits

Let's examine the numerous stories floating around about the various videogame patent infringement lawsuits that were carried on by Magnavox and Sanders Associates, the owners of the seminal Baer patents and of the Baer, Rusch and Harrison patents. Those lawsuits started in the mid-seventies and ran all the way through the 1990's, the last of them for past infringement only, since the patents had long since lapsed. Bally, Seeburg, Mattel, Activision, Nintendo, Data East, Taito and others fought lengthy legal battles against the Magnavox/Sanders team in an effort to avoid having to pay license fees. They lost everyone of those lawsuit, both in the initial actions in various Federal District Courts and finally, ignominiously, in the Court of Appeals. Then they had to pay up!

Such technically knowledgeable individuals as members of the original MIT team of Space War hackers were repeatedly called on to appear for depositions or to serve as fact or expert witnesses during actual trials. Some of the individuals involved in the fascinating creation of the original Atari company made similar appearances. In most – maybe all - cases it can be assumed that they testified to what they believed to be true. In any event, many assertions they made way back then have become dogma through endless repetitions over the years.

Here is some background: By 1971 the Magnavox Company in Ft. Wayne, Indiana had acquired exclusive rights to the Baer, Rusch and Harrison patents assigned to Sanders Associates. Under the Sanders-Magnavox license agreement it was Magnavox' responsibility to get all infringers of those patents under license through litigation or to negotiate license agreements with firms that did not challenge the patents.

The first Odyssey Model 1TL200 videogame (then called a TV game) was first demonstrated to public in September of 1971 during a series of market tests. Groups of individuals were asked to play the games and express their preferences. After several changes, having been breathlessly rumored by Magnavox as an upcoming "Mystery Product" , the Odyssey game system was officially demonstrated to the press and

released to the public in May of 1972. It went into distribution starting in the summer of 1972. Circuit-wise, the Odyssey game was nearly identical with the Baer/Harrison engineering model called the “Brown Box” of 1968. That TV game system played a variety of games, most importantly two-player sports games such as ping-pong and handball.

The video arcade game business had its genesis almost at the same time. The first generation of ping-pong-like arcade games were designed, built and distributed in November of 1972, Atari’s Pong game being the first of many similar games. Parenthetically, they had their genesis in the fact that Nolan Bushnell, Atari’s president, played the Odyssey’s ping-pong game at a Magnavox dealership in May of 1972, thus making Pong a “knock-off of that Odyssey ping-pong game. Midway, Seeburg and other arcade game manufacturers jumped into the ring and actually produced larger quantities of Pong knock-offs in 1973 than the 7,000 units Atari was able to produce and deliver to distributors that year. All of these competing games were variations of the basic two-player Pong games. Therefore, they all had manually controlled paddles and a machine-controlled ball. In later versions the paddles became “soccer players” kicking a ball around or they were “hockey players” with sticks hitting a puck. Same game, different graphics plus minor changes in some of the crude screen graphics such as the goals.

No matter what has been said or written about what the Sanders patents supposedly covered and how they were infringed, it all comes down to this simple definition:

THE LAWSUITS WERE MAINLY ABOUT INFRINGING ON THOSE CLAIMS IN OUR PATENTS THAT DEALT WITH THE INTERACTION BETWEEN MACHINE-CONTROLLED AND MANUALLY CONTROLLED SYMBOLS ON SCREEN. IF THERE WAS A CHANGE IN THE PATH, DIRECTION or VELOCITY OF THE MACHINE CONTROLLED SYMBOL IMMEDIATELY AFTER “CONTACTING” – i.e. COMING INTO COINCIDENCE WITH ONE OF THE MANUALLY CONTROLLED SYMBOLS ON SCREEN - THEN THE GAME EXHIBITING THESE FUNCTIONS INFRINGED OUR PATENTS.

That’s it! That’s all there was to it. The two operative Claims in one of the patents containing those constraints were potent because just about every videogame on the market during the years of 1972 through about 1976 depended on those game elements.

You would never know that simple, basic fact by listening to what all those individuals thought they remembered when they were called to the witness stand during those lawsuits. As usual, what they remembered “most” was what their lawyers had drilled into their heads.

The first lawsuit which Magnavox and Sanders initiated were directed against Atari, Bally, Seeburg and others that were joined in an effort to get our patents invalidated. I met Nolan Bushnell, then Atari’s chairman, and his lawyer, on the steps of Chicago’s Federal District Court a few days before the action started. Bushnell had a subsequent meeting with Tom Briody, Magnavox’ director of patents; at that meeting Bushnell

decided to opt out of the impending suit. His company became our first licensee right then and there. He felt that by doing so Atari would be able to count on an even playing field; furthermore, Bushnell got an attractive paid-up license. The suit went forward against the other firms. They lost.

Why?

That first lawsuit (as well as all of the subsequent ones) dragged on for several weeks. I spent an entire week on the stand as a fact witness in most of this and the later cases. Invariably I found myself being exercised through every scrap of documentation we had ever generated in the lab during the 1960's. There were about three linear feet of those. At first, a huge amount of time was spent bringing the judge up to speed on electronics basics and on television technology in particular. Subsequently, details of the circuitry we used in designing the Brown Box and subsequently used in the Odyssey game were belabored at infinitum. In particular, the circuitry we had designed to play our so-called de/dt hockey games were given much undeserved attention. Some of that was an effort to befuddle the court with emphasis on the differences in hardware design approaches and to deflect him from sticking to basics: Did the accused games have manually-controlled symbols on screen and did they react in one way or another upon coincidence with machine-controlled symbols on screen. Period!

We invariably had all of our 1960's hardware on display in the court room, starting with the earliest TV Game No.1 on through the Brown Box – TV Game No.7 – Also on display was the add-on “de/dt” game system to the Brown Box – our TV Game No.8 - that Harrison and I had started to develop in 1969. That unit was supposed to play a hockey game in which the puck on screen moved dynamically, i.e. with a velocity and in a direction related to how it was “hit” and how hard it was hit. We called that type of game a de/dt game, because the puck's velocity was the derivative of the voltage generated by the joy stick controlling the hockey-stick's motion. Since that ball circuitry was designed to differentiate the analog joy-stick's output voltage, the opposition lawyers spent an inordinate amount of time yammering about the analog nature of our circuitry versus the vaunted “digital “ nature of the circuitry in their accused arcade games.

### Analog vs. Digital Circuitry

All of those arguments had absolutely nothing to do with the price of tea in China. The lawsuits were not about “de/dt” games in the first place; the operative Claims of our patents were those dealing with the interaction of manually controlled symbols and machine controlled symbols....all totally independent of what circuit type might have been chosen to create the displayed symbols, or to detect their coincidence and cause their reaction to each other. On top of all that, most of the circuitry we designed to accomplish those functions was undeniably digital.

But once the seed is planted, a tree is on its way. Mother Nature may decide that it grow and grow, no matter the weather. So it is with misinformation: Plant the seed and it just grows.

There is a long trail of misinformation circulating to this day which came out of those weeks of garbled testimony in the courtroom. Both Mr. Bushnell appearing as a witness as well as others seemed to have been primed by the lawyers to make a big deal of the supposed fact that Odyssey's circuitry was "analog" and their arcade games were designed and built with TTL digital logic IC's. To this day I do not understand why our lawyers didn't cut off that line of attack early on. Consider this: The Brown Box and, therefore, the Odyssey unit uses digital flip-flops for the reversal of the ball after coincidence. Both systems generate a digital coincidence (rail-to-rail) signal by AND-ing the rail-to-rail ball and paddle signals in diode AND gates. These are all DIGITAL circuits - no ifs, ands and buts about it. Yes, these digital circuits were built with discrete components: transistors, diodes, resistors and capacitors. That was the only cost-effective way to go in the mid-sixties. We tried to come up with a TTL Integrated Circuits design but those I.C.'s were too expensive and above all, too power hungry. In my book, "Video Games: In the Beginning", I have reproduced the schematic of the digital I.C. design we came up with and then abandoned for those two reasons. So it isn't that we did what we did because we were dumb designers but for good and valid reasons.

Furthermore, the ball and the paddle symbol generators consist of four one-shots, two for horizontal and vertical positioning of a displayed spot on screen, and two for establishing the width and height of the symbols. Those are hybrid pulse-and-digital circuits and not analog circuits by anybody's definition.

There *was* a Channel 3 or 4 oscillator which was modulated by the sync and video signal of those machines. That was analog circuitry. The same stuff is in every fancy modern videogame console to this day, or at least through recent history. Every home videogame starting with my breadboards in 1967 uses an r.f. oscillator-modulator module and has for the last thirty years. It's just another thing I pioneered along with the use of joysticks, tethered hand controllers, plug-in game cards and light-guns for videogames, or the use of digitized faces as well as interactive games using graphics and data living happily on shiny 12 inch discs and, eventually on the five inch variety!

There is more: The vertical and horizontal sync generator circuits were free-running multi-vibrators rather than the crystal-controlled oscillator-divider chains used in arcade games. The latter required a large number of IC's just for the job of sync generation, an option that was not open to us who had to design a cost-effective consumer product with mid-1960's components. Those multi-vibrators are pulse circuits, not analog circuits.

Enough of that!

All this quibbling about the difference in circuit design had nothing to do with the Claims which everybody infringed. It was just a red herring. The opposition lawyers probably understood the nature and function of these elementary, early circuits. Conceivably, they

dragged in all of that “analog vs. digital” stuff simply to snow the judge. How their well-prepared and often technically very astute technical expert witnesses could have been misled into repeating this evident nonsense, that beats me. I have heard straight arrows like Alan Alcorn, the designer of Atari’s Pong game, and others repeat some of this stuff just recently. Bad information never seems to die.

After Bally et al lost that first lawsuit in Chicago, the case went to the Court of Appeals where the verdict was upheld and a lot of money changed hands, including substantial penalties. Mattel was next in the barrel, also in the Chicago court but with a different judge who had to be educated in the technology elements all over again. We won, they lost. The case went to appeal and they lost again. Something like sixteen million dollars changed hands (in 1970’s money - multiply that by 3.6 to get to our current watered down currency).

After that it was Activision’s turn in the barrel with the same result in San Francisco’s Federal District Court and, later, in the Court of Appeals. Unfortunately, Activision went broke in the early eighties before we could collect.

We also had no problem convincing the Canadian patent system during a visit to Ottawa and a London judge that we were entitled to royalties from infringers in Canada and Great Britain. Remarkably, the foreigners did not tolerate anywhere near as much dancing around the analog vs. digital smoke screen to come to a conclusion. I got several largely enjoyable foreign trips out of those proceedings.

It wasn’t all fun and games. More than once, my Brown Box would quit working just before I was about to give a demonstration to the judge and I had to run out during lunch recess to buy some tools and fix the darn thing. All that moving around from place to place didn’t do the old girl any good. I barely beat the judge’s return to the court room in Chicago on one such occasion and had a similar tight squeeze in San Francisco and in Ottawa.

### Who really invented the Home Videogame?

Also at issue but not of major importance during the lawsuits was the opposition’s attempt to show that prior art negated my claims to have invented home TV games. As a matter of historical fact, my major contribution to the then non-existing videogame business in 1966 was the concept of making the home TV set into an interactive game terminal, though we certainly did not call it that. We just called it “TV games”, which it was. The lawsuits had only a minor relationship to that basic invention. Those lawsuits were all about infringing the so-called “hit” and “hitting” symbols and their interaction upon coincidence. , which was covered by those two Claims in our ‘507 patent. I was pleased, however, to have Federal Circuit Judge Grady describe my ‘480 patent as the Pioneer Patent of the videogame industry when he read his decision from the bench at the conclusion of the first trial. His decision, including that remark, appear in 201-USPQ, a page of which is reproduced below.

A recent article re. 201-USPQ Magnavox vs. Activision appeared in Gamer: Aviator on August 15, 2005. Anyone interested in more detail on the court fights might go to [http://www.patentarcade.com/archives/2005\\_08\\_01\\_patentarcade\\_archive.html](http://www.patentarcade.com/archives/2005_08_01_patentarcade_archive.html)

Having explained what the lawsuits were really all about, let me sneak in and debunk another myth about the alleged superiority of the digital design used in early Pong-type arcade games versus those supposedly poor, unreliable, unstable and uncontrollable analog circuits in the Brown Box and in the Odyssey game. These myths have been kicked around for decades like a soccer ball that never touches ground long enough for anyone to notice that it is full of hot air. When reminded of the fact that the concept for Pong was lifted from the ping-pong game which Nolan Bushnell played at a Magnavox dealership demo in May of 1972, there is this typical rebuttal: Yes, maybe playing the Odyssey game had something to do with Pong, but the Odyssey was a poor game by comparison: It was unstable; it was boring; the controls were unresponsive. It usually goes on from there and heads towards the digital-versus-analog bogeyman.

Anyone who has actually played an Odyssey ping-pong game knows that it is totally stable and challenging on several levels: First of all, the use of its “English” controls allows both players to make life tough for their opponent by controlling the vertical path of the “ball” that just left their “paddle”. Secondly, there is a variable-speed control that allows the contestants to select any speed which they think they can handle. The same thing goes for the rest of the “ball” games. It is those two features which make an Odyssey ping-pong game challenging. As to the lack of scoring: “Real” tennis and ping-pong games have been scored by shouting out the score since time immemorial so why bother with expensive on-screen scoring? We actually had rudimentary scoring in TV Game No.2, Anno Domini 1967. It used a thermometer-like column and a graduated overlay but we did away with that scheme in the Brown Box. As to the lack of sound: That was something else. We just didn’t think of it. Everything is obvious in hindsight.

So much for the vaunted deficiencies of the first home videogame. Now, it would be nice if this trip through videogame history might clear the air about certain events that took place way back when. Hope springs eternal, but I, for one, know better than to bank on it.

The Bottom Line:

The moral of the story is simple: If it ain’t documented, it doesn’t count.

Sanders/Magnavox would have been about 100 million dollars poorer if it hadn’t been for all of those original documents gracing those courtrooms. If anyone is anxious to have a detailed look at these documents - hundreds of them - then go to this Smithsonian website and read to your heart's content:

<[http://invention.smithsonian.org/downloads/Baer\\_videogame\\_devt.pdf](http://invention.smithsonian.org/downloads/Baer_videogame_devt.pdf)> and to this Smithsonian website: < [http://invention.smithsonian.org/resources/fa\\_baer\\_index.aspx](http://invention.smithsonian.org/resources/fa_baer_index.aspx)>

Once more: If it ain't documented, it doesn't count.

Now this is something every young engineer should learn and practice starting at an early age. You can't roll the camera of life in REVERSE. Do it now.

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The Importance

## Case: **Magnavox v. Activision (N.D. Cal. 1985) [P]**

Posted by Ross Dannenberg (Gamertag: Aviator) on Monday, August 15, 2005.

### **The Magnavox Co. v. Activision, Inc.**

1985 WL 9469 (N.D. Cal. 1985)

In a case of infringement involving one of the earliest video game patents, Magnavox asserted its exclusive licensing rights on television console "ball and paddle" games like the classic PONG. Pong:



(Photo courtesy of [David Winter, Pong Story](#); (c) David Winter)

The patent-in-suit was U.S. Letters Patent Re. 28,507, a reissue patent originally

issued on April 25, 1972. The '507 reissue patent was one of several related patents obtained by Sanders Associates, another Plaintiff in this case. In 1967, Sanders became the first to combine toys, games, and television, defining the brand new art of television video games. Sanders' subsequent patents claimed exclusive rights on a large variety of television games. Two of the asserted claims in the '507 patent read as follows:

*51. Apparatus for generating symbols upon the screen of a television receiver to be manipulated by at least one participant, comprising :means for generating a hitting symbol; and means for generating a hit symbol including means for ascertaining coincidence between said hitting symbol and said hit symbol and means for imparting a distinct motion to said hit symbol upon coincidence.*

*52. The combination of claim 51 wherein said means for generating a hitting symbol includes means for providing horizontal and vertical control signals for varying the horizontal and vertical positions of said hitting symbol.*

Deciphering the above legalese, the '507 patent described a common gaming scenario: a player (the hitting symbol) moving around the screen and making contact with a ball (the hit symbol), sending the ball off in a different direction. Sanders, having become a TV console gaming pioneer, had now secured the rights to a set of actions that countless video game designers would want when creating sports games, combat games, and puzzle games, etc.

In 1971, Sanders sold the exclusive licensing rights under the '507 patent to Magnavox, who shortly thereafter introduced the first of the ball and paddle, under the name "Odyssey." It didn't take long for other game designers to catch on. Atari released the television console classic "PONG" in 1975, after securing a license from Magnavox for the right to make and sell the '507-type ball-and-paddle game. More game designers flocked to this new market, and Activision was among the youngest and most ambitious of them.

Activision designed and manufactured television console games for the Atari 2600, the Commodore 64, and for IBM and Apple computers. It produced a Tennis, Hockey, and Grand Prix game, among others, which followed the general 'ball and paddle' format covered by the '507 patent. When Activision failed to obtain a license from Magnavox before developing these games, Magnavox and Sanders filed this infringement suit. Magnavox had much at stake in this case; they had already made approximately \$40 million in licensing royalties based on the '507 patent and had no desire to be cut out of the loop. The stakes were raised even higher when Activision responded to the infringement action by promptly challenging the validity of the '507 patent with 9 pieces of prior art brought before the court. If the court invalidated the '507

patent, Magnavox risked losing its entire royalty stream, and being left completely behind by Atari and its television gaming competitors.

Fortunately for Magnavox, the '507 patent had previously endured and survived validity challenges in two previous cases. In, *The Magnavox Co. v. Chicago Dynamic Industries*, 201 U.S.P.Q. 25 (N.D.Ill.1977) and *The Magnavox Co. v. Mattel, Inc.*, 216 U.S.P.Q. 28 (N.D.Ill.1982), '507 patent had been challenged against many of the same pieces of prior art offered by Activision. However, since Activision was not a party to those cases, the judge in this case performed an exhaustive review of the technology and the cited prior art references before making an independent decision. In the end, as in the previous cases, the court found that '507 patent was valid over the prior art. Activision now faced an uphill battle, proving that its games did not infringe the claims of the '507 patent. Activision's main argument was that the "means-plus-function" language of the claims (i.e. the means ascertaining coincidence, the means for imparting a distinct motion to said hit symbol, etc.) should be narrowly construed to apply ONLY to the circuitry described in the language of the '507 patent. Game circuitry had, of course, changed significantly in the last 10 years, and Activision wanted Magnavox's claims to apply only to "slicer circuits that make sawtooth waveforms," the dominant circuit technology of 1970. Most modern games, including Activision's, now used a microprocessor design. The court, however, declined to limit '507 patent, "The use of the microprocessor technology, which became available only after the invention of the '507 reissue patent ... does not alter the basic nature of those games or avoid the '507 reissue patent.

"After holding that Activision's games did literally infringe, the court further noted that the Doctrine of Equivalents would have also applied in favor of Magnavox. Magnavox had enjoyed wide licensing and much commercial success based on the '507 patent. These facts justified a wide range of equivalents, and support the conclusion that Activision's games were substantially the same as those claimed in the '507 patent. Activision next argued that since Atari had acquired a license from Magnavox to develop games under the '507 patent, all purchasers of the Atari 2600 console had either an explicit or implied license to buy and use other games falling under the same patent. The court quickly rejected the explicit license argument, holding that Atari 2600 purchasers only had a license to use that gaming console, not to buy and use other infringing games. Similarly, Atari console buyers did not acquire an implicit license to buy and use Activision games. No evidence had been shown that any game purchasers relied on this legal theory of implicit licensing while purchasing an Activision game. Further, any thoughts by purchasers concerning their freedom to use Activision games came from Activision itself and not from statements or actions of the Plaintiffs. The court similarly dismissed Activision's argument that

using its games in an Atari console constituted a “permitted adaptation” of the license given to every purchaser. The only minor victory for Activision came when the court found that its infringement of the ‘507 patent had not been willful. Activision’s founders, before starting the company, had brought their business plan to a patent attorney to seek legal advice regarding their proposed games. Since their counsel had failed to mention the ‘507 patent, Activision had acted reasonably in believing that there was no such patent.