Foreword

Ralph H. Baer

As you will discover presently, *The Medium of the Video Game* deals in a thoughtful and scholarly manner with a great many aspects of video games. Because video games are now so much a part of our cultural landscape, it is sometimes hard to realize that they have not always been around—but they haven't.

Mark asked me to write this foreword because I was there at the very beginning of this saga. So here it is, but be forewarned! It's not easy to distance oneself from a parochial view of who did what, when, and where.

First of all, the concept of playing video games did not just appear from nowhere. It had to be invented. So, we might take a minute to consider the nature of inventions.

Let us just consider two specific classes: those inventions relating to a novel system concept and those that basically revolve around a novel method—resulting in a better product. The former class of inventions is one that “connects-the-dots”; the latter is generally in the nature of an “improvement.”

Not too many people appear to understand this difference between the process of making an invention based on a novel system concept versus an invention that results in a better, or even novel, product. Of course, quite frequently inventions that “connect the dots” also have novel, even exciting, “method” content. That tends to confuse the issue.

To illustrate the point: the idea of running a computer under the control of a disc drive—a Disk Operating System, or DOS—is an example of a conceptual breakthrough . . . connecting the dots. Every last one of our present-day desktop and laptop computers still runs that way twenty years later. (Let's not get hung up on who claims to be the “Father of DOS.” Hint: It wasn't B.G.) Every year there are faster, more capacious disc drives out

there doing their job faster because engineers keep coming up with improvements—better methods.

Stepping back in history, it's instructive to take a look at electric power generation as an example: technologically, everything was in place to generate, distribute, and utilize electricity for industrial and home applications in the late 1800s. But it was Edison who conceived of putting all the elements together and acting upon his idea, or concept, and who built central power stations, created a switched distribution network, and, last but not least, developed usable light bulbs; the fact that Edison put it all together allows us to call him the “Father of the Electric Power Industry.”

It's the concept, stupid! . . . as the current phrase goes, slightly paraphrased.

Along the way Edison and his staff developed many novel ways of generating, transmitting, controlling, and using the electric currents delivered by the system of his original concept. One of the technical improvements was the design of a higher voltage generator which delivered power more efficiently than previous designs. Some of the design specifics of that generator undoubtedly qualify as inventions. But those specifics didn't make Edison the “Father of the electric industry”; connecting the dots—putting it all together—is what constituted Edison's breakthrough.

With these definitions in mind, we can move on to the question of who invented video games.

Let's start with Steve Russell and others at MIT who bootlegged spare time on a DEC-1 computer in the early sixties and wrote software routines that eventually became space ships and missiles under the “player's” control. Did Russell or his associates invent video games?

Complex question, that. In the first place, in the sixties the term “video” was reserved for displays featuring a raster scan system. By definition, a video signal was comprised of an analog representation of the brightness levels along a raster line and was always associated with horizontal and vertical synchronization signals. It also may have had color components, usually present in the form of another analog signal, the color subcarrier signal.

Now, did the display of the PDP-1 have any of these characteristics? No, it didn't. Its display was of the vector type, which generated images by moving the electron beam around inside the CRT much as one might move a pencil over a piece of paper to draw the outlines of a figure. There was no raster.

So: Does that mean that Steve Russell did not design and play a video

game? Well, yes and no. The term “video game” was not coined until the mid-seventies. But did Russell and his compadres play games under control of a computer and using a CRT display? You bet they did! Does that make Steve Russell the inventor of CRT games? Well, not really. CRT displays operating under electronic control and allowing human interaction were used by the military for training in missile guidance and other purposes both in this country’s services and others during and after WWII. So that’s not new. Were these applications truly “games”? That depends a lot on who’s asking the question!

What Steve Russell and associates did was certainly highly creative and displayed a unique level of skill and insight into the ways of making a slow computer with limited facilities do their bidding. They certainly connected some dots! Had they applied for patents covering interactive game playing such as *Spacewar!* on a computer and CRT display, they would most certainly have been awarded a number of patent claims which might have become valuable years later. But they didn’t . . . after all, theirs was an unauthorized, after-hours project. There were good reasons why they did not think in terms of protecting their code: Who but a select few had access to a refrigerator-sized, \$100,000 computer? So they freely gave their code away and with that any chance of material rewards for their creativity, as least as far as I know.

Then there was Willy Higginbotham. In 1958, during an open house demonstration for visitors at Brookhaven National Labs, Higginbotham hooked an oscilloscope up to an analog computer. With this setup he dazzled onlookers by graphing the path of a dot which acted like a bouncing ball; the latter could be launched by pressing a button; the ball then “bounced” repeatedly—a more-or-less standard physics demonstration.

Much has been made of this simple but entertaining demo of basic ball dynamics. In fact, revisionists have turned that demonstration into a ping-pong game. It was nothing of the kind. But was it a game? More specifically, was it a video game?

I don’t know. But even if it was a “video game,” what became of it? The answer is: Nothing! In fact, it would never have seen the light of day again if it hadn’t been dug up many years later by attorneys who were trying to “prove” that the concept of video games was “old” and not an invention by such interlopers as yours truly.

Nolan Bushnell is another key player in our story. His interest in playing interactive games displayed on a computer screen started when he was a student at the University of Utah, where he, like many other students,

played *Spacewar!* The young Bushnell had the definitely novel concept of putting a pay-and-play *Spacewar!*-like game in an arcade environment. Having worked in an arcade at a Salt Lake City amusement park one summer, he “connected the dots.”

He persevered and eventually designed and built a freestanding arcade game called *Computer Space*, which started the arcade video game business in 1971. And although *Computer Space* was not a commercial success—it was too expensive and too complicated to play, I am told—it was nevertheless the first video arcade game. Nolan Bushnell connected the dots.

Now, I come to my own story:

People frequently can’t resist telling others, in my presence, that I was involved in creating the first video game. Hearing that bit of imprecise information, the listener invariably asks: “What game did you invent?” Hoping, no doubt, to hear me say *Pac-Man*, *Space Invaders*, *Donkey Kong*, or some other personal favorite.

When I reply that I didn’t actually invent any of these games, but that I came up with the concept of playing games on a home TV set, the listener’s eyes glaze over. Video games have become so much part of our culture that people tend to think that they have always been around.

They haven’t. And when the idea of playing games on a home TV set first occurred to me in the early fifties, the reception was cool, to say the least. As another engineer and I worked on designing and building a TV set at Loral in 1951, I kept thinking: “How can we differentiate our TV set from everybody else’s?” I had a suggestion: “How about making it play some simple games?” I was told to forget about that dumb idea.

I didn’t forget the idea. By 1966, there were over 60 million TV sets in U.S. homes alone, to say nothing of those in the rest of the world. What were they good for if there was nothing on that anybody wanted to watch?

Being a television engineer by degree, I appreciated the fact that if TV sets weren’t mass-produced, they would be expensive. They are really low-cost raster-scan graphic displays, although people didn’t think of them that way in the 1960s.

The more I thought about using a standard home TV set to play games, the better I liked the idea. It definitely had legs. On September 1, 1966, I sat down and wrote a four-page paper describing my ideas for playing interactive games using an ordinary TV set. I had a fellow engineer witness and date those four pages, and we went to work.

At the time, I ran the Equipment Design Division at Sanders Associates, a large military electronics firm in New Hampshire, which became a

Lockheed company in the early eighties and is now a BAE System division. My operation was big—I had more than five hundred engineers, techs, and support people. I could afford to put a technician on the bench for a couple of weeks to determine the feasibility of that concept without rippling the overhead. No one need know.

There was no relationship between what was normally going on in my division and this early video game activity. I just decided to act on my long-held views of what to do with a TV set other than watch the standard fare. My immediate concern was to look into the technical feasibility of coming up with a novel and attractive product (for a price). What to do with it all if it panned out—that could wait.

It didn't take us long to figure out how to move a couple of spots around on the screen under player control. Pretty soon we were able to make some very neat demonstrations to the corporate director of patents and Sanders' director of R&D. Playing chase games and shooting at the screen turned them on. They supported me with funding and saw to it that patent applications were taken care of early in the game.

The work went forward. At various intervals the executive VP, my boss, would inquire whether I was still "screwing around with that stuff." It was difficult to see the payback at the time. Years later, when the millions came in via the patent licensing and the infringement litigation route, everybody "reminded" me of how supportive they had been of my video game efforts.

By 1968—two years and many bucks later—the now official project had gone through five sets of ever-improving game devices. Our "consoles" now allowed us to play ping-pong games, handball, volleyball, light-gun shooting-games, and quiz games as well as various forms of chase games, a golf game using an actual golf ball and putter, board games, and so forth.

By now, we had filed numerous patent applications with the U.S. Patent and Trademark Office in Washington, DC. During one of the conference meetings with one of the patent examiners there, I set up a small GE TV set and one of our early game boxes which I had brought along. I began playing games while my Sanders patent attorney associate was haggling with the examiner about the details of one of our patent applications. At first, the examiner objected, but within a half-hour the curious were streaming in from all over the floor to look at and play "TV games." Word got around fast that morning. The consensus was: "Man, this is different and it's fun!"

What we presented to the patent office was the concept of playing interactive games on a home TV set, along with numerous ideas for technical ways of making it happen cost-effectively. The use of CRT monitors, as later used in arcade games, was also part of our earliest patent applications. So was the concept of playing games over the “cable.” By 1967, all of these concepts had been “reduced to practice,” the patent office’s way of saying that we had actually designed and built all of this stuff by then.

The U.S. patent office reviewed the relevant “patent art” and decided to “allow” more than a few important claims. The examiners clearly recognized that we had connected a new set of dots.

Our final, switch-programmable demonstration unit was housed in a box covered with brown, wood-grained adhesive paper to dress it up a bit: our Brown Box. In 1968 and 1969 we showed that box to all of the U.S. TV set manufacturers then in business in the hope that one of them would see fit to take a license. RCA, Sylvania, GE, Motorola, Zenith, and Magnavox all paraded through New Hampshire. Everyone was impressed; no one moved off a dime.

Finally, Magnavox took a license in 1971. We helped them engineer a production version of our Brown Box which was called *Odyssey*—Magnavox’s Model ITL-200. They chose not to incorporate our method of producing colored backgrounds—too expensive; they didn’t want sound, either—also too expensive. In the design process, they changed our switch-programming system to plug-in carts, which was a great idea.

In March of 1972 Magnavox’s exclusive dealerships all over the country staged coordinated demonstrations of the new product line for the year. I attended one early demo in New York at Bowling Green in Central Park. *Odyssey* was the hit of the show. I was elated! Sitting among the dealers in the audience, I was hard-put not to jump up and down and yell: “That’s my baby!”

On the other side of the country in Burlingame, California, at the Airport Marina Hotel, a product-line show was under way in late May. Nolan Bushnell was one of the visitors who came and played the *Odyssey* unit hands-on. He must have liked the idea of the *Odyssey* ping-pong game because he instructed newly hired employee Alan Alcorn to build a coin-op video game version of ping-pong. Alan designed several clever and novel features into this ping-pong machine. He could do these creative things because he was not constrained by the price limitations of a consumer product.

That machine was, of course, *PONG*, and *PONG* launched the arcade

video game industry with a bang. Nolan Bushnell deserves the credit for this feat, without a doubt. He connected the dots. In my estimation, that makes him the “father of the arcade video game industry.”

A few years later Nolan Bushnell signed up Atari as Magnavox’s first licensee under our patents—several of which had been issued by then. In a series of lawsuits stretching over twenty years, these patents were upheld in various federal courts. A lot of money for licenses and infringement changed hands over those years. At the conclusion of the first trial in Chicago in 1976, Federal District Judge John Grady read his decision from the bench. He singled out my ‘480 patent as the “pioneering patent in this art,” the field of home video games. That patent was first filed in January of 1968. It was based on the work we did during the first year of our project, 1966–1967, to define game concepts and convert them to hardware. Since holding the first patent in a new field makes you legally the original inventor of that conceptual landscape—at least under U.S. patent laws—I am the official inventor of home TV games, signed, sealed, and delivered by the U.S. Patent and Trademark Office.

That’s what happened as a consequence of a simple idea I had way back and finally got around to pursuing in 1966. I knew nothing about Steve Russell’s or Nolan Bushnell’s work. I was just a guy with a TV engineering degree who wanted to do something with all those 60 million TV sets out there besides tuning in Channel 2, 4, or 7. And I did. If that makes me the “father of the home video game industry”—well, OK.

It’s all about connecting the dots.

The instant success of *PONG* is legendary and certainly doesn’t need retelling here. There is also no doubt that the appearance of *PONG* machines during 1972 helped sell Odyssey home TV games. It was the only way to approximate the *PONG* experience at home. Nearly 100,000 Odyssey units wound up in people’s homes including some fifteen or twenty thousand light guns and optional carts. The home video game industry was launched!

Because Atari’s *PONG* was an instant success, other arcade manufacturers quickly copied the design, and *PONG*-like machines proliferated by the next year. That game business has been roaring ahead ever since, with just a few “bad” years now and then. Nolan Bushnell got a nice big order for a home TV game version of *PONG* from Sears in 1974. That helped Atari rise like a rocket. There was no stopping them in the 1970s. By then, “video games” were permanently engraved on the map of the home entertainment industry.

Which, of course, still leaves the question of who “invented” video games? The short answer still is: “Let me tell you . . . It’s a long story. . . .”
I’ll let you be the judge.
End of the story! Enjoy the book!

B 2481 D

United States Patent [19]

Baer

[11] **3,728,480**

[45] **Apr. 17, 1973**

[54] **TELEVISION GAMING AND TRAINING APPARATUS**

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[51] Int. Cl. **H04n 7/18**

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[57] **ABSTRACT**

The present invention pertains to an apparatus and method, in conjunction with standard monochrome and color television receivers, for the generation, display, manipulation, and use of symbols or geometric figures upon the screen of the television receivers for the purpose of training simulation, for playing games, and for engaging in other activities by one or more participants. The invention comprises in one embodiment a control unit, connecting means and in some applications a television screen overlay mask utilized in conjunction with a standard television receiver. The control unit includes the control means, switches and electronic circuitry for the generation, manipulation and control of video signals which are to be displayed on the television screen. The connecting means couples the video signals to the receiver antenna terminals thereby using existing electronic circuits within the receiver to process and display the signals. An overlay mask which may be removably attached to the television screen may determine the nature of the game to be played or the training simulated. Control units are provided for each of the participants. Alternatively, games, training simulations and other activities may be carried out in conjunction with background and other pictorial information originated in the television receiver by commercial TV, closed-circuit TV or a CATV station.

46 Claims, 26 Drawing Figures

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THE MEDIUM OF THE VIDEO GAME

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