

Trying to restore or replicate some of the video game hardware items that we built at Sanders in the 1960s has been keeping me busy for some time. The object of that exercise is the desire to assemble once more at least one working model of games and accessories such as guns and joysticks that we built back then. In particular, there are three models that typify the evolution from the earliest "chase" and "gun" games to the "ping pong" and "golf" games that had evolved by 1968. These game units had seen active duty in court rooms all over the U.S. - only to eventually wind up in dead storage.

Some of this game hardware was rescued by David Winter and by me from storage where they had been placed by the lawyers at the end of the various law suits against infringers of our video game patents. David and I made trips to Chicago and wrestled with hundreds of boxes for several days but managed to rescue just a few hardware items. The original joystick for the Brown Box golf game was one of them.

Various TV Game units built in 1967 and 1968 never did show up, much to our disappointment. Nor did we find the "**Active Card**" for programming the Odyssey game in a novel way. I had made that card for Magnavox in 1972.

Thereby hangs the present tale. Let's step back briefly to 1972 to see what happened.

Magnavox was a year late bringing the first Odyssey game system to market. It took them forever to negotiate a license agreement with Sanders Associates. When that was finally in place, the engineers in Fort Wayne had to hustle to get a commercial version of our Brown Box switch-programmable game into production. That left them little choice but to copy the design of the Brown Box with only minor changes. By now we're into 1971 and our 1968 design is already looking a bit long in the tooth. Integrated circuits were coming down in price rapidly and if we had a choice, we would have cheerfully junked the Brown Box' discrete component design. But starting from scratch was simply out of the question if Magnavox was to get Odyssey into distribution by mid-1972.

Odyssey did reasonably well in the market place in 1972 despite advertising and marketing gaffes that I need not resurrect here. Over 130,000 units were sold that year and by 1975, when the unit was finally phased out, the old Odyssey had racked up sales of over 330,000 games systems. Not too shabby for a brand new product category.

On a personal basis, I was anxious to see Sanders recover the money that was spent in the 1966 to 1969 period on engineer Bill Rusch, my tech Bill Harrison and on me to develop the Brown Box and its predecessors. Since Magnavox was our one and only licensee at this juncture, and sublicensing wasn't even the gleam in anybody's eye yet, the numbers of Odysseys shipped and sold directly impacted my reputation at the home front. That's what we're all measured by in business.

I tried to impact that situation by pushing Lou Etlinger, our corporate director of patents, to get me into a contractual relationship with Magnavox so that I could support their game business with new concepts and technical advice. Lou and Gerry Martin, Magnavox' VP

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for Consoles Program Planning exchanged a stream of memos during 1971 trying to put that arrangement legally in place.

You would think it would be easy to support a licensee with conceptual and technical aid intended to help the company improve their position in the marketplace. Unfortunately, there is nothing simple in the real world about cooperation between two companies that involves letting representatives from one peek under the other's blanket. To make it possible for me to support their future product development meant that I had to be in intimate contact with their Odyssey marketing and engineering personnel and Magnavox fairly gagged on that idea.

Meanwhile I wasn't about to sit on my haunches while the managerial types were crossing t's and dotting i's. There had not been any funding available at Sanders - and hence no activity - to work on video games ever since 1969. Consequently, coworkers Bill Rusch and Bill Harrison had long since rejoined their home groups and I was currently the chief engineer of the electro-optics division at Sanders. Growing crystals for solid state lasers was among my major concerns in the lab, definitely not video games.

So...if any of my novel ideas on how to add to the perceived play value of the Odyssey system were going to get anywhere, I had to build some demo hardware myself and on my own time.

And so it was that I sat in my home lab during the winter evenings of 1972 to 1973 and worked on ideas that I hoped would extend Odyssey's lease on life and make the cash registers ring for a little longer. Along the way I had the pleasure of working on the bench on something I was really interested in. You don't get a chance to get near the "bench" much when you're the chief engineer.

Technically, coming up with practical ideas that might work wasn't that hard. At the time, I could have drawn Odyssey's schematic diagram from memory. My starting point was the fact that the guys at Fort Wayne had wrung about all the variations on a theme of Haydn from the existing system and its plug-in cards. These were simply double-sided printed-circuit cards whose function it was to interconnect various subsystems inside the Odyssey in different logical arrangements. For example, some of the interconnections saw to it that there was a central net line when plugging in a ping-pong game card or that the line was moved to the left by the handball game card.

Trying to come up with still another interconnection scheme to create a new game that would be a novel addition to the existing 16-odd cards already in the market place - that just wasn't an option. I needed to do something radically different.

Making internal changes in the Odyssey game unit also wasn't in the cards. Any suggestion on my part to Ft. Wayne to do that would have gone down like a lead balloon. But getting creative with the cards *was* a practical course of action. First of all, program cards were after-market, stand-alone items; and secondly, whatever I did to them would be

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by Ralph H. Baer

simple enough so as not require expensive tooling and it would not impact existing card production either. So that was the way to go.

Give a problem like this to an engineer and he'll come up with an answer, come hell or high water. It was immediately obvious that if new interconnections of existing circuitry wouldn't do the job, additional circuitry was needed to provide novel features. Now, since the program cards were basically double sided p.c. cards, then why now populate them with *active* components such as transistors, resistors, diodes and capacitors to form new circuits that would work with the existing ones inside the Odyssey to produce new results?

That was the way to go. Now all that was missing was *what* to do with this general concept.

By the time I faced that problem, Atari Pong arcade games had shown up and were becoming a huge hit with the public. Alan Alcorn had designed Atari's first Pong game that featured, among other things, that characteristic pong sound of a paddle and ball meeting in midair. In retrospect, I could have kicked myself for not incorporating sound into the Brown Box. The subject had come up before: One of our early gun games made some explosive sounds but we judged the cost of the extra parts - and the speaker in particular - not to be worth the play value. We were wrong, of course.

So clearly, the first order of business was to create an "active" card for Odyssey that would make the "missing" pong sounds. I designed and built up some circuitry that did just that. Since the output of the digital flip-flop in the Odyssey that moves the ball-spot back-and-forth is available on one of the pins of the ping-ping p.c. card (Card No.1) I could apply its positive and negative transitions to some timing and sound generating circuits that would produce a nice pong sound through a small loudspeaker. That done, I saw that there was lots of room left on the "new" No.1 card so I figured that I would make use of that, too.

Looking at the schematic, it turned out that I could easily give each player a separate ball speed control so that players could adjust his or her ball speed to match playing ability. All that it took to do that was a couple of two-cent silicon diodes and two small potentiometers, the kind that are familiar as volume controls in older radios and TV sets.

The whole process of designing and building this novel "active" plug-in card was a matter of a few days' effort, no more. It was really neat to be able to play ping-pong with that "missing" sound in action; the individual speed controls also answered a player need. So far, so good!

I immediately went to work on additional "active card" ideas. The first of these was to modify the volley ball game so that it would be playable by people with less than three hands. Meanwhile, I called up Lou Etlinger and asked him to watch a demo of the "Sound Card". He came, he saw but he didn't conquer. Legal relationships between Sanders and Magnavox concerning my ability to support the Odyssey program were still not

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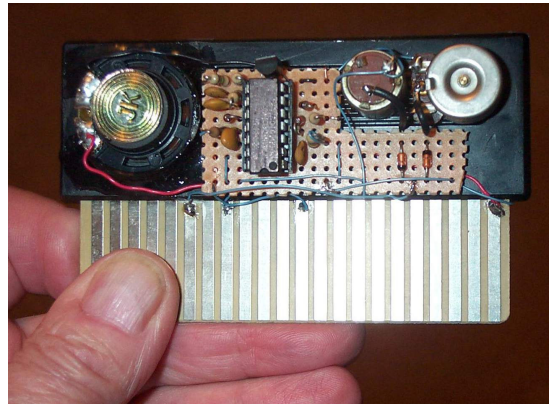
straightened out. I was told to sit back and wait before shipping the "Sound Card" off to Fort Wayne.

I'm still waiting. That "active card" has long since been among the missing.

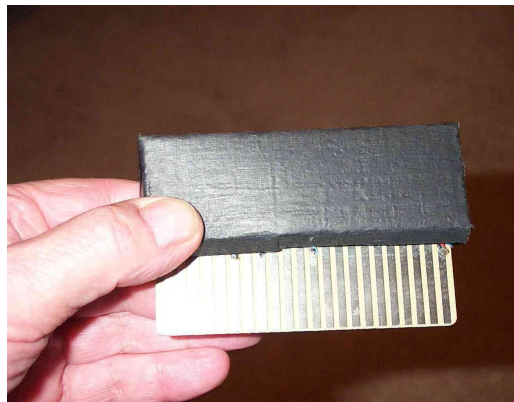
Just recently, I took the bull by the horns and undid history. I took a standard Odyssey No.1 card and modified it to work just like the lost "active card". It works as advertised and definitely enhances ping pong play.



Front view with speaker & speed controls



Rear view showing "new" circuitry



Rear view with cover in place

Now, if I get real ambitious sometime soon, I may just turn out a "new" volley ball "active card". That'll be a little more difficult to do than the "SOUND" card but that's OK.

We'll see what happens.

Update by David Winter: Later, Ralph built another active game cartridge which played a slightly modified version of Squash. Sound was implemented, and the original fixed wall was now moving to the right little by little, increasing the game difficulty. These two cartridges were donated to the Museum of the Moving Image in New-York, NY.

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