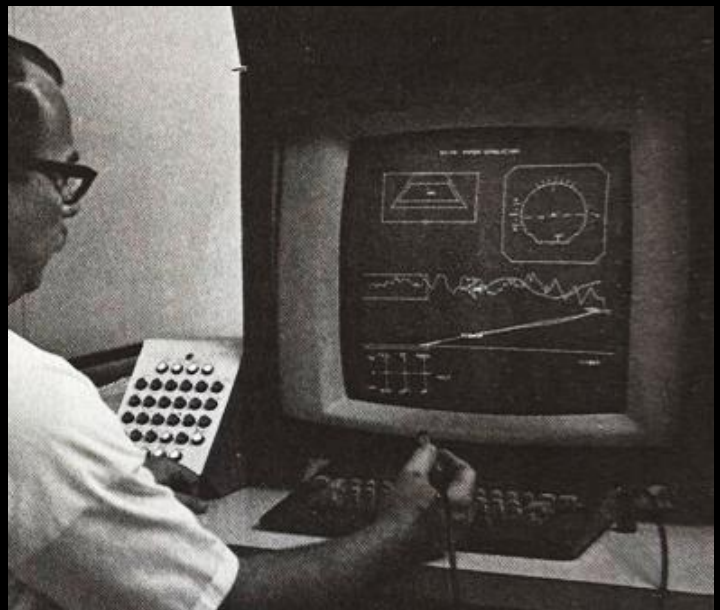
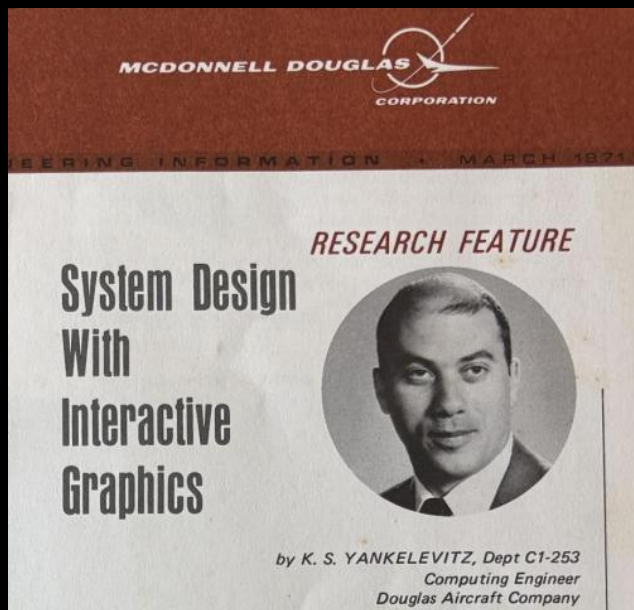


**ELECTRONIC GAMES MAY BE MORE
THAN JUST GAMES. AFTER ALL.**

ELECTRONIC GAMES MAGAZINE. 1984



THE QUADFATHER: KEN YANKELEVITZ



In 1971 Ken Yankelevitz helped aircraft pilots to traverse new computer-generated worlds. Ten years later he did the same for severely physically disabled people. Thirty years on and it was his turn to be helped.

Life-preserving electronics are something pilots and many paralysed people share a need for. Be that through fly-by-wire systems, breathing apparatus, motors, alerts and/or communication systems. Once the vitals are covered, life-affirming joy comes from having some choice and control over the journey and the destination.

Ken was born during World War II, growing up on the East Coast of the USA. He attended the University of Maryland, thrumming at that time with research and development projects linked to the Cold War and the space race. Aerospace, electrical and computing-related fields were booming in the late 1950s and '60s.

In February 1964, Ken married Diane, his high school sweetheart. For their honeymoon, they drove coast-to-coast in a second-hand camper, along with Ken's widowed mother. En route, they planned visits to the three major US cities with aeronautical engineering openings. Ultimately Long Beach, California was chosen, with work found at Douglas Aircraft (later McDonnell Douglas) and a new home for a new life.

Diane later gave birth to two bright young daughters, Joanne and Lynne. Ken's work developed into computer flight simulators that aimed to be

cheaper and more flexible than the alternative roving CCTV camera systems of the time. Those systems required gargantuan physical model landscapes, relayed by TV into a replica cockpit. As the pilots grappled with their controls, computer controlled hydraulic rams shifted and tilted them about in synchronisation with the view. NASA used a similar system for moon landing training.

Joanne: *"I know [Dad] worked on flight simulators at Douglas (we got to go try them out during an employee family open house). I also know he didn't want to work on war planes and that was part of why he eventually left to do something more altruistic with his talents."*



McDonnell Douglas VITAL II 1973 (images via: San Diego Air and Space Museum archives)

In 1979, Ken created a version of the PILOT programming language for the family's TRS-80 computer. PILOT was aimed at making programming computers easier for children, teachers and parents.

Lynne: *"I was definitely the guinea pig on some of his early coding stuff... a lot of if x=y then do this and if x doesn't = y then do this and o=yes or no, etc."*

Joanne: “I remember learning some coding along with Lynne [...] I’m not sure if that was for a wider audience or just something Dad did for us because it was new and exciting for him.”



PILOT
A LANGUAGE FOR:
 * **CHILDREN**
 * **TEACHERS**
 * **PARENTS**

TRS-80 advert: Isaac Asimov caught playing Space Invaders (left). Atari’s 1980 PILOT (right).

Alongside this new microchip technology at home was their Atari VCS games console. In 1981 Lynne and Joanne were two of a million plus Atarians. They played the likes of *Pong* (*Video Olympics*), *Breakout*, *Space Invaders* and *Asteroids* on their small black and white TV. When they broke one of the joysticks, they changed history.



ATARI®

Video Computer System™

THERE’S NO COMPARING IT WITH ANY OTHER VIDEO GAME.

Only ATARI makes the games the world wants most. Games that are innovative. Intense. Incredibly involving. And totally original.

In 1980 ATARI invaded the minds of millions with *Space Invaders*.* It went on to become the single most popular video game in the world and thereby launched the space age game category.

Today ATARI Missile Command™ and *Asteroids*™ are the fastest selling home video games in the country. And judging by its current success in the arcades, ATARI Pac Man** is slated for the same next year.


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*Indicates trademark of the Taito America Corp.
 **Indicates trademark of the Midway Mfg. Co.
 © 1981 Atari Inc.

Lynne and Joanne Yankelevitz (1970s). Atari VCS 1981 advert: “...Pac-Man coming soon.”

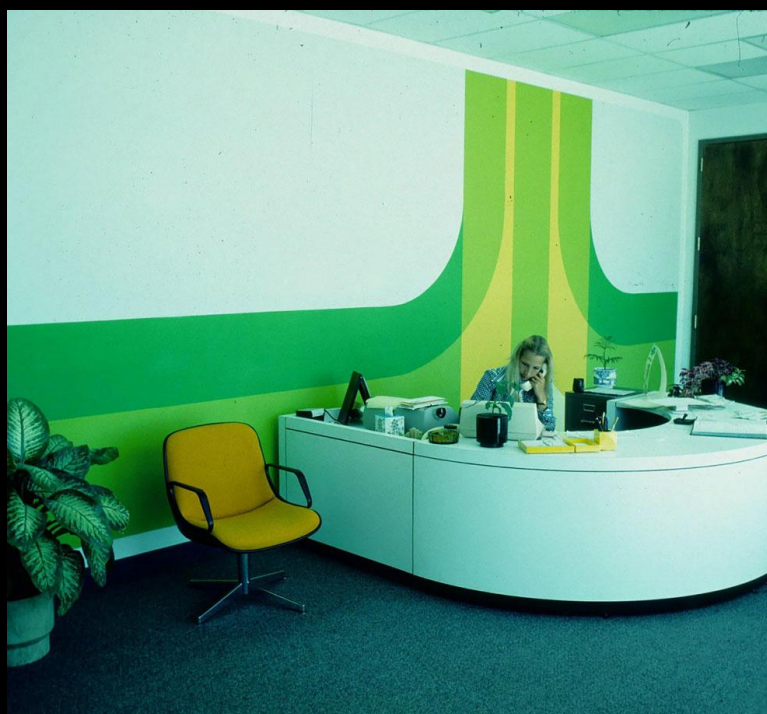
Ken: “My kids VCS joystick broke and I disassembled it to try to fix it. When I saw how cheap it was made I built one using arcade joystick parts that were good for millions of cycles.”



Example of a disassembled Atari Joystick (left). Ken's 'unbreakable' controller (right).

This “unbreakable” black box controller contained one red button for fire, and four white buttons for up down left and right. These used quiet soft-touch leaf-switches similar to those found in *Asteroids* arcade machines. With this, games could be played with light prods from a finger or toe to the pounding of fists. It could take it.

Atari found out and decided to invite Ken to show it to them at their 1265 Borregas Avenue, Sunnyvale, California headquarters: The Willy Wonka's Chocolate Factory of Silicon Valley. Lynne went too. A trip too good to miss.



Atari HQ circa 1976.

WE'VE GOT A GOLDEN TICKET?

Lynne: *"I remember going to Atari headquarters with him and I got to play in a big game room while he had a meeting".*

The games room was full of Atari's coin-operated machines, all set to free play. The rules stated: "for the enjoyment of up to 50 Atari employees and their guests at a time... No badge – No games!".



Atari's games room circa 1980/1981 (via arcadeblogger.com)

Coincidentally, the Atari Games Room was being used part-time for Recreational Therapy. Special evenings were arranged with the nearby Stanford Children's Hospital in Palo Alto, to help lift the spirits of some of their young patients.

Lynne: *"I think it was then [at the meeting] that [Dad] discovered all of the broken joysticks they had and were going to throw away so he bought them at a bulk price and a truck delivered a mound of joysticks in our backyard."*

COIN CONNECTION

ATARI INC., 1265 BORREGAS AVENUE, SUNNYVALE, CALIFORNIA 94086

Atari's Game Room—Recreational Therapy

The game room at Atari's corporate headquarters building has always been a favorite spot for employees, their families and friends. But the game room serves another purpose as well. The recreational therapy staff at Stanford's Children's Hospital in Palo Alto, California, often brings small groups of patients to Atari for an evening out. The children enjoy playing the games, which are all set on free play. The trip down to Atari provides them a welcome break from the routine confinement of their hospital beds.

The games definitely lift the children's spirits. Occasionally a special trip will be arranged during the afternoon, to cheer up a child who is feeling particularly depressed. A change in treatment or a progressively worsening condition can introduce a lot of stress in the children's environment, but the Atari game room seems to be the kind of place where the tension evaporates.

continued on last page



The Rules

The Game Room is for your enjoyment. You are responsible for your guests. Help make it a fun place for all by following the rules.

The Game Room is to be used by ATARI permanent and temporary employees and their guests only.

The maximum occupancy of the Game Room is limited to 50. Please use discretion as to the number of guests you bring.

Children under 10 will be in the custody of the employee responsible or another guest 18 years or older.

Groups over six will be allowed in the Game Room only if the employee responsible has cleared a date and approximate time with Security (Ext. 2416), at least two days in advance, during the hours of 8:00 am to 4:00 pm, Monday through Friday. Security will forward a list of groups to the front desk at CHQ.

You must present your badge and sign in and out. **NO BADGE—NO GAMES!**

No smoking, drinking or eating are allowed in the Game Room.

enjoyed both the magnificent scenery and the party. It was certainly an appropriate setting for the award ceremony.

continued on next page

VOLUME 4 NUMBER 12

© ATARI INC., 1980

DECEMBER 1980

Lynne: *"If your joystick broke you could get a replacement from Atari and they didn't bother fixing the broken ones, they just kept them and were going to put them in the landfill, so my dad figured out that it was just a wire that needed to be soldered. He bought a truckload [which] was delivered in a big pile in our backyard. Then we would fix them and he would sell them as refurbished at the Orange County Swap Meet (a big outdoor market that happened during the weekends at the Orange County Fairgrounds [...]). He shared a booth with a friend who sold video games and he had his Atari controllers and would also let kids test his push button controllers."*



Ken at a Swap Meet surrounded by Atari hardware.

ATARI REFERRALS

Ken: “[K Y Enterprises] was started in 1981 when Atari referred me to a teenage quadriplegic in Pennsylvania who wanted to play video games [...] who could not use the VCS joystick. He was depressed and his family and church were searching for something to spark his interest in living after his accident.”

“Atari did not want to get involved with special controllers for the disabled because the market was not big enough and very diverse.”

It wasn't that Atari didn't care. Their founding philosophy was “Easy to Learn, Difficult to Master”. This was born of lessons learnt from Syzygy's 1971 game Computer Space, which was too hard and too fast for too many. By 1981 Atari had involved themselves in many fascinating disability related projects. One was the 1978 Atari Healthcare Systems Vidcom, a communication device aimed at deaf and/or mute people.



**Introducing
vidcom I & II**
The Portable Communications System for the Non-Verbal.

After critical evaluation by speech and hearing professionals and extensive field testing by non-verbal individuals, Atari Professional Products Division is proud to present VIDCOM I and II, a major advance in communication aids technology. The VIDCOM System allows natural face-to-face communications and is compatible with all existing telecommunications equipment. It provides a new tool for the enhancement of the rehabilitative and educational process. And most importantly, VIDCOM represents a functional communications alternative for the severely speech and/or hearing impaired.

VIDCOM is available in two models. **VIDCOM I™** is a portable, hand-held unit that displays a message on its large, forward-facing LED display, as it is typed out on a full alphanumeric keyboard. Features include tactile and visual feedback mechanisms, large recessed key pads for easy manipulation by those with limited control of fine motor movement and a fixed preprogrammed vocabulary of 21 frequently used words. **VIDCOM II™** includes the hand-held unit, plus a portable acoustic coupler for communications between two VIDCOMs or link-up with any standard telecommunications device. The acoustic coupler also allows for computer interface and includes a tape recorder jack for prerecording and playback of messages. Both the VIDCOM I and VIDCOM II are battery or AC operated.

Atari is confident that VIDCOM can serve you, and we wish to place it in your hands for evaluation.

PROFESSIONAL PRODUCTS DIVISION
1183 Bordeaux Drive, Sunnyvale, CA 94086
Toll Free (800) 538-1636 TTY and VOICE
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VIDCOM II™—Carrying case stores hand-held unit and AC Adaptor; contains acoustic coupler and rechargeable battery pack.
VIDCOM I and VIDCOM II are trademarks of Atari, Inc.

ATARI

386 the volta review

Atari Engineer Michael Albaugh on Vidcom: "Atari/Warner was okay with this sort of project, until they found out that to be classed as a medical device (and thus be eligible for disability discounts or whatever), Warner had to turn *all* their accounting info [to the government]. Disclosing their entire operational and financial structure to make/sell a niche product was not happening."



Ken: “[The Atari referrals] led me to one of the foremost rehab facilities in the country, Rancho Los Amigos Hospital [Downey, California] where I met several rehab specialists and Kirk Kilgour...”

Rancho had a history of bringing in engineers to work with their patients. There is record of a tongue-controlled switch being used to operate an electro-mechanical arm and electric wheelchair back in 1969. Commercial sip-puff systems with their roots back to Stoke Mandeville Hospital's 1960 POSM/Possum were also well established by 1981. Ken would have been made aware of some of this, I imagine.

The related accessible videogaming work of the likes of the New York Veterans Administration Prosthetics Centre around 1972, and of Robbie and Gary Marince around 1980, would much more likely have gone under the radar. Engineers creating tailored assistive technology often work in small bubbles, where knowledge can struggle to spread. This was especially the case around leisure-based solutions.



Other sip-puff / head-control systems dating back to 1960.

KIRK KILGOUR



Published in the *McDonnell Douglas Spirit* newsletter (October 1982) was the story of Olympic volleyball player, Kirk Kilgour. Kirk suffered a spinal cord injury in 1976 during training in Rome. By 1981, he had been searching for years for some way to play videogames. According to Ken, *"He asked the [Rancho Los Amigos] hospital engineering department to build a controller for his home video game, but they were unable to come up with a design."*

The hospital authorities asked Ken to visit Kilgour at his home. *"He gave me a challenge [...] We worked together for four months on a number of different designs before I came up with the mouth operated controller Kirk was comfortable with. There are a lot of problems to be solved for disabled persons like Kirk."*

Diane Yankelevitz documented some of this in the 1983 *RESNA* (*Rehabilitation Engineering Society of North America*) conference paper, and later in an article for *Electronic Games* magazine in December 1984: *"Kirk Kilgour [...] a well-known [volleyball] coaching figure in both Europe and America [...] is a quadriplegic, but still a very competitive man [...]"*

Now he plays [videogames] for hours at a time and can wipe out a screen of space invaders using a mouth controller. He also has a multiple game board which allows him to select from up to eight cartridges with the press of a button."

"Kirk's interest in computers started with an Atari 400. He wrote his 1984 coach's manual with the Letter Perfect word processing program. He recently started a new part-time job selling Apple computers to the handicapped. He's using a voice-activated program and exploring environmental control, as well as expanding his knowledge of computers and his own job opportunities."

Ken: *"The [Rancho] children's recreation therapy department embraced [this work]. Some of the patients were as young as 8 years old, and the motor skills and coordination needed to play the games with a mouth controller strengthened their neck and mouth muscles, the only ones they could still use."*



From this time on, building assistive technology for disabled people became Ken's mission. Among other things, his work helped to create the Atarian responaut, the Assistive Technology VidKid, the "Quad-god" if you will (see later). Or more plainly, new video gamers, no longer relegated to the sidelines.

Via Personal Computers and the Handicapped (by Peter A McWilliams, published in 1984): "Bless Ken's heart," says Mickey Christianson, a therapist at Rancho Los Amigos Hospital in Long Beach. "He comes here on weekends and at night to help our patients. His controllers give our paralyzed patients a chance to do some of the things other children can do."

"...anytime a disabled person called Atari looking for a special joystick, Atari gave them Ken's name."

Ken: "The fun they had and the joy it brought them convinced me to continue this work."



Ken crouching with some of his Atari hardware, circa 1982.

RAYMOND BALSLEY



“Video Game Whiz Raymond A. Balsley, 11, plays Atari’s Pac Man using his tongue. The special video game controller he uses was designed and built by DAC flight systems engineer Ken Yankelevitz, who assists Raymond.” via McDonnell Douglas Spirit newsletter, October 1982.

In the photo above you can see Ken trying to find the optimum position to mount Raymond’s mouth controller, well clear of his ventilator tube. For independent play, this level of care was critical.

To start a game, or change the game type, players would normally have to lean over and push down on the console SELECT and RESET levers. Ken offered an option for this with alternative control. Of note, changing the game selection in Pac-Man to *Special Feature* game variation 3 or 7, made the ghosts very slow, and Pac-Man either fast or slow. Likewise, play could be made harder too, if things became too much of a breeze.

Photos of the 1982 Rancho games room show a pool, mini-pinball and air-hockey table on offer. A sound system with huge speaker facing Raymond can be seen. The contents of closed drawers and cupboards can be imagined. On the walls, a clock (that likely went too fast for some), and posters including of David Bowie (*Young Americans* and *Heroes* era), a cat staring at its own reflection, *Foreigner's 4* album art (*Waiting for a Girl Like You* and *Jukebox Hero* era) and a poster of Hawaii. Of all the games, only the Atari appears to be accessible to someone like Raymond. The child to his right, laid out flat may have struggled even with the Atari at that point in time.



Above: Ken helping Raymond get set-up in the Rancho games room.

Below: Atari VCS Pac-Man, Space Invaders and Bowling in black and white.





Raymond being helped by another child to play Space Invaders.



Raymond and friend in electric wheelchairs, in a head-to-head bowling competition.



There isn't a lot of information to be found easily on Raymond Balsley. He became quadriplegic after being hit by a car while riding his bicycle. He's seen playing Atari Pac-Man, Space Invaders and Bowling. He does seem to have been the first to share his case publicly (in the *Spirit* newsletter and again in *Electronic Games* magazine). Clearly, he and his family wanted to support Ken and the cause.

Hints of a fun and maybe rebellious nature can be gleaned from his photos. Right next to a sign on the door stating, "NO FOOD OR DRINK", Raymond sits with a cupcake on his wheelchair tray. He's seen wearing a big Goofy badge on his striped tracksuit. Perhaps his favourite cartoon character. Perhaps from a happy visit to Disneyland.



JOHN CARASIK



Diane Yankelevitz RESNA 1983: *John Carasik is a 12-year-old boy with severe cerebral palsy. He is spastic and has almost no control over the muscles in his body [...] His favorite game varies and his scores are always improving. At last count, he had gotten over 30,000 on Missile Command. John has just recently been able to play video games because he's acquired a controller he can use. He plays with a button controller that he operates with his feet. It is mounted on the footrest of his wheelchair and consists of five large soft-touch button switches. He resets the game with a similar button mounted on the side of his chair.*

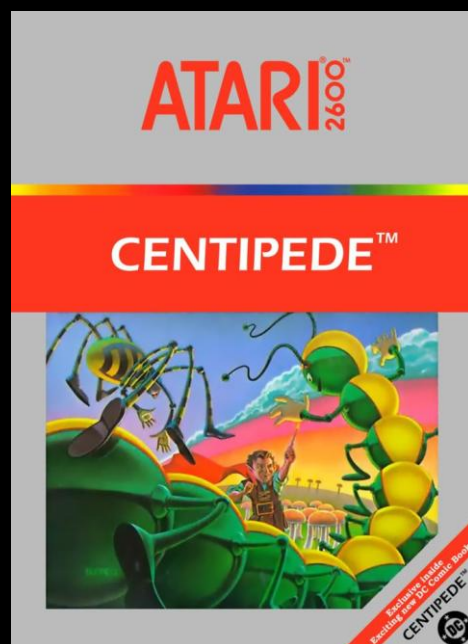
John is non-vocal and uses a computer to communicate. Most of his conversation consists of a list of the cartridges he wants for his video game. The controller has opened up a whole new world for him. Before he got it, video games were a frustration for him and his mother. She would operate the joystick under his direction, but never seemed to react fast enough. She tried all sorts of methods of strapping the joystick to John's wheelchair and body at various points, trying to find some way for him to be able to operate it himself. Even so, she'd have to be with him to reset the game every time it was over. But it's a different story today. John can play for an hour or more, totally independently."

Diane in *Electronic Games* (December 1984): “John Carasik [...] convinced his mother after a few months of using a head switch to let him try using his right foot. She originally opposed this because of her belief that it would increase his spastic movements. He showed her that although his leg movements looked spastic, he actually did have control. She watched him score consistently higher on the games (over 32,000 on Atari 2600 Centipede) until she realized that as he did have control of his right leg and that control was increasing as John played.”

“As a result of her observations and those of John's medical supplier, John was deemed capable of operating a power wheelchair with his foot. He's only had it a few months now, but it's something John's mother thought would never be possible for him due to his severe spastic movements. John's controller [expanded to include] a switch to operate his multi-game board. For the first time in his life, he can play by himself at something he really enjoys.”



Margaret Carasik and her son, John in *Electronic Games* December 1984 (AI enhanced).



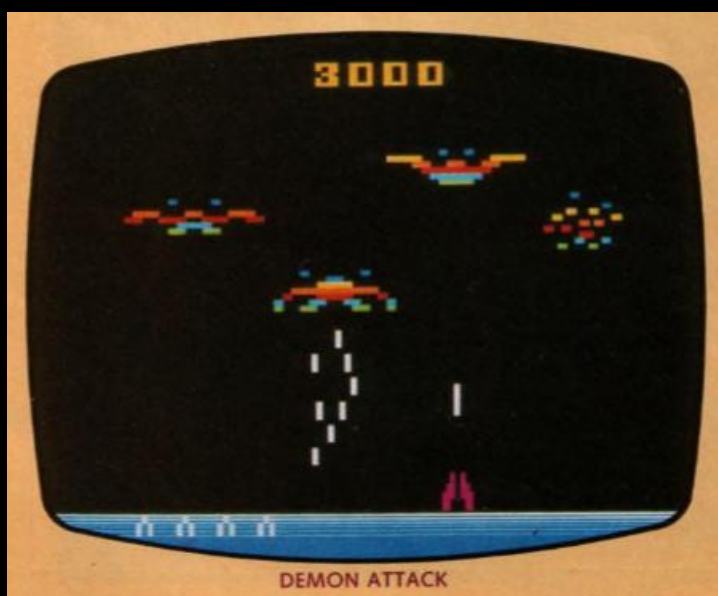
TOMMY GARCIA



Diane in *Electronic Games* (December 1984): “[Tommy Garcia] is a C-2 quadriplegic, able to move only his head. He plays videogames with a mouth-operated joystick like [Kirk Kilgour] but Tommy is on a respirator to help him breathe. He also has a diaphragmatic pacemaker. His biggest fear is that his life-support machine will malfunction. He has no control of his chest muscles to breathe on his own; they’re paralyzed. He has learned to breathe by himself with his neck muscles, and his mother swears that it’s due to his home arcading. Tommy has a puff switch to “fire” at space aliens on his mouth-operated joystick. When he’s on a respirator, he breathes when the respirator does, not necessarily when he needs to fire a quick shot at a space invader closing in on him. When Tommy became paralyzed, he could barely move his head. He moves it so much while playing videogames that his neck muscles have strengthened. His therapist concedes that the games have certainly motivated Tommy, and motivation is the key to learning to neck breathe.”



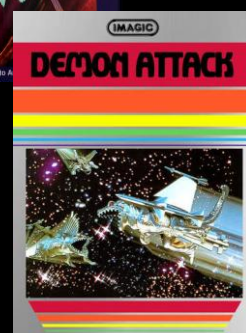
From Ken's photos, Tommy can be seen in one photo playing Imagic's *Demon Attack* game using the Model 103 "mouth operated controller for quads". Black PVC piping is used with a large table clamp to get it at the right spot. Brother David stands watching the onscreen onslaught intently in support. I wonder if they discovered the co-operative games (9 and 10) where active control swaps between either player every 4 seconds.



A model 103 (left), *Demon Attack* artist's impression (right).



Playing Donkey Kong (above). Using sip-puff and the model 105 two button head-switch (below).



Diane in RESNA (1983): *“Use of a head-operated video game controller keeps Tommy Garcia, a C-2 quadriplegic occupied while he is confined to bed due to a pressure sore. This controller is limited to two-directional action – either up/down or left/right and uses a puff/suck switch for “firing”. One of the games it works well with is Space Invaders”. Demon Attack would have worked well too. Donkey Kong would not.*

THE (MANY) OTHERS

There are too many people, hospitals and clinics across the USA and Canada that Ken supported to mention. Many stories are now lost. For some, fragmented clues remain in a lone photo. Who was this below, playing Pac-Man from his wheelchair, wearing hip-hop era sports clothing and baseball cap, knowing he was being photographed? What's that curious grey Atari on his TV? And how much of a difference did this access make to his life? How did he get there? What was he like? What happened next?



For others, just a trace of text remains such as this from that December 1984 *Electronic Games* article: *Rebecca Lloyd, whose 15-year-old son, Adam, became a quadriplegic last May. "When he came home from the hospital, we hooked up the [mouth-operated] joystick to his videogame [alongside his sister...] he was thrilled. His friends marvel at how he always out-scores them, but the most important thing is what he told us: 'This makes me feel normal again.'*

Another snippet from RESNA 1983: *"Sandy Blatt, a 35-year-old quadriplegic from Pittsburgh, says of video games, 'It's so necessary, especially when you're dealing with a disability all day long. It's great to jump on one of those machines and have a good time. It's independent recreation. It's one more way for me to become a part of society again. It makes it possible to become less of a second-class citizen and more first class. That's the bottom line for me.'"*



Two boys playing Space Invaders, one from a hospital bed. Another photo with a tale untold.

PAN AM

Word of Ken's controllers spread quickly pan-America.

Recommendation from Atari, alongside the testimony and example of existing users and supporters all helped. The October 1982 *Spirit* article aimed at McDonnell Douglas employees and customers led into a run of local then national press news items. And right in the heart of US videogame culture, was a small advert placed in *Electronic Games*, the first dedicated American video-games magazine.

October's edition went to print during the first golden age of electronic gaming culture. Flicking through the pages revealed news of Atari's 1982 Special Olympics support, a "*how to cheat at video-games*" guide, *Tron*, a guide for wiring an Atari joystick port to a Coleco table-top *Pac-Man* or *Galaxian*. And there on page 83, the first FingerTip Controller advert.

FingerTip Controller
for the Atari®



\$19.95

Works with all games
that use a joystick

Direct from the manufacturer
KY ENTERPRISES
195 Claremont, #288, Long Beach, CA 90803
(213) 433-5244
Available in kit form—\$14.95.
Shipping charge \$3. Calif. residents add \$1.30 tax.

- 5 responsive arcade-quality durable buttons for 4 directions & "fire"
- Faster direction changes
- Rapid firing improves scores
- 2 year warantee
- 30-day moneyback guarantee
- Left-hand models available
- Attaches to top of video game console



Controllers for handicapped also available.
Write for information.

"Works with all games that use a joystick.... KY Enterprises... \$19.95... Kit form \$14.95... Left-hand models available... Arcade-quality... Rapid-firing improves scores... Controllers for handicapped also available. Write for information".

As a side note, it was possible to cheat with a FingerTip controller with the pack-in Atari game *Combat*. Pressing up + down or left + right (normally impossible with a standard joystick) gave tanks and biplanes turbo speed. Jets could also be made to temporarily freeze mid-flight.

Five more adverts were placed in *Electronic Games* up until March 1983.

The Players Guide To Programmable Videogames

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You Can Be A
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See the
System in the
Suitcase
THE
ULTIMATE
GAMING
GIFT

plug into fun
electronic
GAMES

12

0 15572 06114 6

and movement segment and fight the skirmish that was programmed.

The score flashes on screen after the battle. Check to see how much ammunition and life is left, then program the next encounter. The game ends when one vessel scores six or more hits against the other, or runs out of fuel.

Sea *Duel* is every engaging. Since it doesn't depend on clever graphics for its appeal, it is perfectly suited for Microvision.

PINBALL

M.B. Electronics:\$17

Designing a pinball game for a screen that measures just 1¼-in. on a side must be a test of programming skill.

The gamer chooses to play 9, 7, 5, 3 or 1 ball, at fast or slow speed. The surprise in the game is that he also chooses the size of the paddle, because the ball in the game is batted around the screen by the scanner, rather than shooting from entry slots and bouncing from spinners.

Flipper games go pint-sized with M.B.'s pinball.

The only ornamentation on the screen is four red circles in a diamond pattern in the center of the field. Serve the ball from your paddle, then use the control knob to keep the ball bouncing off the sides of the walls and the red bumper circles. Score 1 point every time the ball hits a bump. Hit the same bumper four times and it lights.

This is a rather minimal pinball game. It lucks graphics altogether and could have benefited from a prettier overlay to provide some of the attractive elements arcades love in pinball machines. However, it's a good ball and paddle game. The arcade has to be deft-tingered to keep up with it when the ball starts ricocheting between the bumpers, walls and ceiling at top speed.

G

116 Electronic Games

NO. 12 JULY/AUGUST

\$2.50

ANALOG COMPUTING

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LIVEWIRE!

ATARI 800

Inside: the new ATARI computers!

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PAGE 14

A.N.A.L.O.G. COMPUTING

ISSUE 12

panies and complaining your voice can be heard. It is also a good idea to write letters of praise to the companies whose policies you feel are fair, for positive reinforcement. I believe in getting quality software on quality media when I pay a premium price for it, and I think it is my right as a purchaser to have a back up copy for insurance against needless down time when my original is lost or damaged. If we were getting our programs on an indestructible medium, I could understand the company's insistence on a back-up, but diskettes and cassettes are perishable! □

Dear Editor:

Thank you for including ABC in your review of BASIC compilers for Atari computers. We at Monarch Data Systems felt the review was honest and fair in showing both positive and negative aspects of all the products.

There was, however, one mistake in the review regarding the line number that caused ABC to generate an error. The review reported that the error occurred on problem 66 of the adventure program. It was really line 68 that caused the problem. Line 66 has only three GOSUBs but line 68 has 25! Due to an incorrect comment in the compiler, the current version of ABC only supports at most 20 GOSUBs in a statement. This minor problem will of course be fixed in future releases.

We would also like to clarify two points that have caused some confusion to our customers.

1. ABC does allow variable expressions in DIM, GSUB, GOTTO, and RESTORE statements.
2. ABC automatically shows both the error code and BASIC line number when errors occur at run-time.

Thanks for letting us clarify these points and keep up the great work on the magazine.

Sincerely,
E. Goldberg

Director of Marketing
Monarch Data Systems

Sorry about the typo. Incidentally, if you want to compile an adventure in the 3rd Dimension with Atari's ABC (version 1.02 or earlier), simply replace the following lines:

```
66 GOSUB 16:GOSUB 28:M=0;  
67:G13=C15:G15=C25:C25=CMB5  
67:GOSUB 28:G15=M+1;M=1;  
67:G15=P25:P25=T1  
67:BEZT>Your locat1on1=1  
67:LOCAT1ON1=C15:Y=1;M=1;  
67:15 THEN ON T-2:G15 GOSUB 48  
68 ON 49,49,47,47,47,47,47,  
68 ON 2 GOSUB 10,31,51,57,  
51,57,57,57,57,57,57,57,  
57,59,48,41,47,45,44;
```

—B.M.

Dear A.N.A.L.O.G.:

I have a question concerning your recent article on disk copy programs. My friend, who owns an Apple II, tells me about games he has copied from his friend using Nibbles Away 2. It would be a waste of time to go on about my honest intentions in using such a program, but I can assure you that they would be honest. Anyway, it said in the article that "if you want to make dupes of Choplifter," etc., etc., "forget it!" Well, honestly or not, this is what my friend is doing, and I am wondering if there is anything like this for the ATARI. Your article said that there was not. It also talked much about the mechanical workings of the 810. Do the Apple and the ATARI drives differ so much that the Apple is able to produce a copy of an Apple game, but the ATARI is not able to make a copy of an ATARI game?

I hope you can clarify this for me.

Sincerely,
Chris Bulc
Carlsle, MA

Apple disk drives are faster than ATARIs. This is not intended as a slur; rather, it indicates the Apple drive's lack of built-in controller circuitry. The Apple's disk access functions are

directed by an external controller board that plugs into the computer. This arrangement makes it possible to try an Apple disk almost any way you want — unlike the semi-intelligent ATARI drive, which allows only one type of read and two types of writes. The result is that it is much harder to copy-protect an ATARI disk than it is to protect an ATARI disk. This fact has been lost on programmers like Dan Gorlin (the author of Choplifter), who deserves a fair profit from the sales of his game and would probably be very inclined to know why your "friend" is making unauthorized backups.

—B.M.

Send letters to:

READER COMMENT
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WORCESTER, MA 01603

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For Atari® 400/800 Computers

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durable-quality double ballbearing. Lifetime-warranty.
Left hand models available. STC® W313
L-12 R-12 units

Model 101—Fingert Controller™ \$19.95
KIT \$14.95

Model 102—Mount operational joystick for
quadragesims \$55.00 Write for catalog

Shipping & handling fee: Calif. residents add 6% tax

Customized Video Games and Controllers

195 Claremont, Suite 208

Long Beach, CA 90801

(213) 433-5244

One advert for the more serious ANALOG computing magazine in July 1983, showed a picture of a mouth operated joystick for \$65.

The \$14.95 (plus shipping) *FingerTip* controller kit came with a six-step illustrated instructions sheet. All that was needed was a soldering iron, solder, a flat-bladed screwdriver and 20 minutes. For comparison, the similar *Starplex Deluxe* controller sold for around \$29.95 with poorer quality buttons, and the relatively fragile Atari CX40 joystick for \$9.95.

advice
Simply unscrew
break the solder connection
- the contacts.

KY ENTERPRISES

3039 EAST SECOND STREET - LONG BEACH, CA 90803 - (213) 433-5244

INSTRUCTIONS FOR BUILDING YOUR OWN FINGERTIP CONTROLLER

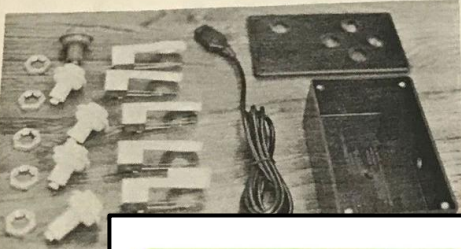
The kit includes: 5 buttons, 5 holders, 5 nuts, 1 box, 1 lid, 1 cable,
4 screws, 1 piece of bare wire.

You will need: a soldering iron, solder

1. Install the buttons and holders loosely in the lid of the box. The red button goes off to the left side. (To make a left handed controller, turn the lid so that the red button is on the right.) You will notice one of the white buttons is longer than the others. It goes in the "right" position and should be installed last. Its holder has a thicker ring than the others. After all switches are in place, tighten them.
2. Insert the cable in the box.
3. Have someone, or something, hold the box and lid and solder the wires. First run a wire in a complete loop around the bottom contact of each switch. This is your ground. Then solder the wires as follows: orange-fire black-ground
white-up blue-down green-left brown-right
4. Plug the controller into your Atari game unit and check to see if the switches function properly. Use a game that requires the use of all 5 buttons for the test.
5. Check to see that the switches are making contact. Adjust the switches for more or less responsiveness by bending contacts with a needle-nose pliers.
6. Screw lid to box. Congratulations- you're finished!

Install buttons
Solder ground wire

Solder cable
to switches



FingerTip Controller™

REPLACES JOYSTICK
For Atari® 400/800 Computers

8-way directional action. Two year warranty.
30-day moneyback guarantee. Five responsive
arcade-quality durable buttons. Unbreakable plastic
case. Left-hand models available. L6" W3¼"
H2". 6 ft. cable.



**Model 101—FingerTip Controller™ \$19.95
KIT \$14.95**



**Model 103—Mouth operated joystick for
quadraplegics \$65.00 Write for catalog.**

Shipping & handling \$3. Calif. residents add 6½% tax.

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Customized Video Games and Controllers
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(213) 433-5244

Conte

see on the screen. The set comes packaged with a DONKEY KONG cartridge, so we tried it out first. To put it simply, it was the best graphic translation we'd ever seen of an arcade game into a home system.

We have since seen the DONKEY KONG cartridges that Coleco makes for the Atari and the Intellivision systems, and they don't even seem like the same game. The reason is that ColecoVision has a larger memory than the other two. This allows its games to have not only better graphics, but also more variety in the playing possibilities.

When we checked out the other cartridges, we weren't at all disappointed. (You can read about our excitement over Coleco's VENTURE in Big Tip 1, on pages 22-24.) The biggest surprise came when we slipped the SMURFS cartridge into the slot.

We were sure the cartridge wouldn't appeal to us. Smurfs are characters for very young kids. We're grownups. What could those characters mean to us?

Well, the picture that showed up on our screen was so appealing, so cartoon-like, that we forgot how grownup we were. We got into that game as deeply as we had gotten into the others.

For an extra \$60 or so, you can get an adapter that allows you to play any cartridge made for Atari on a Coleco Vision console. These games won't look any better than they do on Atari. But the adapter does mean that you can accommodate many more games than you can on any other system.

FINGERTIP CONTROLLER

Not everyone is happy using a joystick. Some home players long for the button controls found on many arcade games. So, a few hardware manufacturers have tried to fill the need with controllers that replace the joystick with buttons.

Isn't a good idea to buy this kind of attachment through the mail, if you can

avoid it. You can never be sure that the piece will actually do what the ad says it will do. It's best to try to find a video store that sells hardware, and try out the controller you're thinking of buying.

If you can't find such a store, however, we've seen a controller that we can recommend. It's made by KY Enterprises, and it's called the FingerTip Controller.

Unlike some other button controllers, it has its four buttons placed logically—the top button is for moving up on the screen, the bottom for moving down, and so on. That means you don't have to learn what each button is for, and you won't get frustrated trying to use it.

The FingerTip Controller has two problems you should know about. First, it's made for right-handed players, just as most joysticks are. (The action button is on the left.) Second, it isn't very good for games that call for diagonal movement. To move diagonally, you have to press two buttons at exactly the same time, and that takes some practice.

But if a button control is more to your liking than a joystick, this is one you can depend on. The FingerTip Controller costs \$19.95. Or you can buy a kit for \$14.95, and assemble the controller yourself. If you can't get it in a store, you can mail a check or money order to KY Enterprises, 195 Claremont #288, Long Beach, California 90803.

April 1982 11

★ BUTTON CONTROLLERS FOR ATARI AND VIC

If you like the idea of a pushbutton controller, but lack the time, talent, or inclination to construct one, you may want to purchase one of the ready-made controllers described below.

Starplex Controller

The Starplex controller from Starplex Electronics, offers an authentic "Asteroids-style" button configuration, as well as the fastest set of pushbuttons I have ever seen. In addition, an optional AA battery powers a "rapid-fire" mode, automatically repeating fire faster than you can do it by hand.

Because the pushbutton array is large and has a light touch, the controller takes a bit of getting used to. Eventually, how-

ever, I found that the lightning fast direction changes possible with Starplex resulted in higher scores.

It should be mentioned that because many games do not allow a new shot to be fired until an old one leaves the screen, the "rapid-fire" option will not always work optimally. Still, you can fire continuously merely by holding the button down, rather than having to re-press the trigger for each shot (or battery of shots). Over the long haul this reduces fatigue, and the incidence of "joystick elbow."

The unit lists for \$29.95, which is a bargain for the most authentic game of Asteroids this side of the coin-op. It improved my score on several other games as well.

KY Enterprises

The controller offered by KY Enterprises uses a directional-style configuration, less suitable for Asteroids but more versatile overall. For those unfamiliar with the arcade configuration, it is much easier to master this logical layout.

The unit exhibits extra sturdy construction—as if its makers knew it would have to withstand a few bouces off the floor. It is very large, and can be cradled

or used on a tabletop by even the tiniest kids. The buttons themselves sit in raised collars, and, though not as fast as the buttons or the Starplex unit, appear to be the "regulation" coin-op standard. They are large and easy to control.

The KY Enterprises controller is priced at \$19.95, and is available in left- or right-handed models. They also manufacture controllers for the handicapped.

Accu-Play

A third pushbutton controller, the Accu-Play Control Board, we did not have an opportunity to test. It sells for \$29.95 from Accu-Tech Products.




Many favourable reviews of the FingerTip controller were published in video gaming press around 1983. It would have been hard for avid American gamers to miss it.

KY Enterprises July 1982 *Customized Video Game Controllers* sheet includes: An upgraded FingerTip controller with *paddle* dial and START and SELECT buttons (requiring a modification to the Atari). Two mouth operated controllers, a head switch system, a U-shaped modified joystick. Also a portable Atari set-up with integral game controls and *Tatung* portable TV. Various upgrades and a personalised service.

CUSTOMIZED VIDEO GAME CONTROLLERS

Atari® Controllers designed for the disabled

Model 101



Hand/wrist joystick controller plugs into your Atari with no modifications. Includes 5 soft-touch buttons (four directions and "fire"). Left-hand model available. \$20

Model 105



Head Switch includes 2 soft-touch buttons for right/left or up/down function. Also "fire" switch. \$30

Model 102



Hand/wrist controller Same as Model 101; also includes paddle, game reset and select switches. Left-hand model available. Modification needed (see below). \$45

Model 106



Modified joystick with slip-on cradle mounted on a plastic base with a soft-touch fire button. \$25

Model 103



Mouth operated controller for quads with joystick, puff switch for firing, game select and reset. Modification needed (see below). \$65

Model 107



Modified joystick same as Model 106 with select and reset buttons included. Modification needed (see below). \$35.

Model 104



Mouth controller same as model 103; also includes paddle controller. Modification needed (see below). \$75

Model 403



Portable self-contained video game unit integrates a video game, TV (B&W or color) and controls for joystick, paddle, game select & reset, difficulty levels. \$400 (b&w), \$600 (color).

Other models

Other controllers available. Prices vary.

Multi-Game Board Allows remote selection of cartridges. Eliminates the need to handle a cartridge each time a different game is desired. Pushbutton switch changes the game. Can be included in Model 403. \$150.

Modifications

Models 102, 103, 104, & 107 require a simple modification to your Atari® game unit in order for the remote switches to function. You can request the wiring instructions, or send us your game unit and we'll make the modification free of charge. (You pay postage.) The modification may void your Atari® factory warranty.

Atari® Game Units

Limited number of reconditioned Atari® game units available. \$80

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Selection of cartridges available at discount prices.

Personalized Service

We suggest you write or call (evenings or weekends) to discuss your specific needs and we'll recommend the best controller for you.

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Money back within 30 days (less postage). All products guaranteed for 90 days against defects for a full refund or replacement. After 90 days we will repair items for a minimum service charge.

Payment

Please send full amount with your order. Shipping charge \$3. California residents add 6½% sales tax.

KY ENTERPRISES 3039 East Second Street Long Beach, CA 90803 213/433-5244

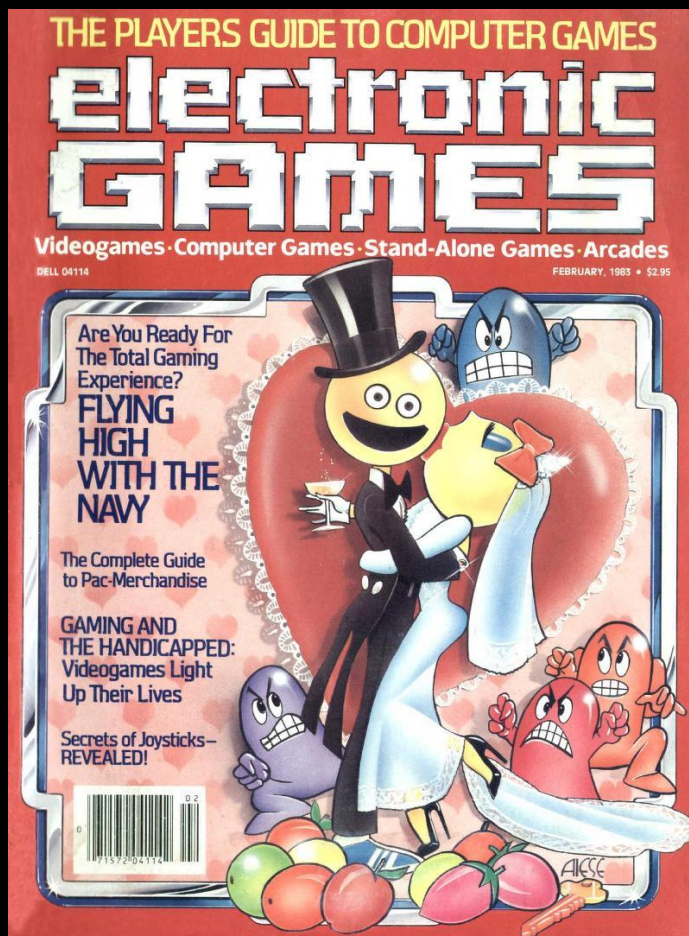
Orders for the controllers started to pour in. To keep up with the demand, Ken employed his daughters at first to help out.

Joanne: *"I remember sitting in the garage for hours soldering those button controllers for 25 cents apiece when I was 10."*

Lynne: *"I thought we started at 5 cents per joystick and then as we got older got more. Maybe we negotiated a raise."*

Lynne: *"I know when I was in high school he started paying my friends to join me in soldering the joysticks which would have been around 1982 or 1983, as the mound of joysticks was huge. I think he kept getting more."*

Wife Diane's human-angle articles for *RESNA* and *Electronic Games* (February 1983 and December 1984) further cemented the message of what these controllers meant. Serendipitously, that *Electronic Games* 1983 edition featured a piece on the US Navy's LAMPS helicopter simulator, described as the *Ultimate Video Game*.



Electronic Games Feb 1983: Front-cover and contents leading to Diane Yankelevitz's article.

GAMING and the HANDICAPPED

Special Controllers Let Everyone Play

By DIANE YANKELEVITZ

Some people think videogames are so bad they're trying to ban them from their communities, but a growing number of folks have found reason for praising them. They are the severely disabled, people who are able to play the Atari VCS using custom controllers. Tommy Gonzalez, 13, is a videogame freak, the kind you hear about who plays Pac-Man for hours on a single quarter. Once he was playing the only Pac-Man machine in his neighborhood for such a long time that a group of older boys got impatient waiting for their turns and threw him into a trash can! That was before a

gunshot severed his spinal cord. Tommy is now a C-3 quadriplegic. He is only able to move his head and needs the aid of a respirator to breathe. With the help of a specially adapted mouth control he's back to playing Atari VCS videogames for hours at a time. The difference is that now it's one of the very few things he can do for himself. John Carasic is a 12-year old boy with cerebral palsy. Currently, his favorite videogame is Asteroids. John has just recently become able to play videogames because he's acquired a

controller he can use. John is spastic and has almost no control over the muscles in his body. But the ones he does control, he can use to smash electronic space debris with as much—if not more—pleasure as any youngster his age. John has a pressure switch mounted on his wheelchair by his right knee which is wired for a fire-button control. In back of his head sits a plate with two switches which he hits by moving his head sideways—left and right controls. With the flick of a switch, they turn into up-and-down controllers. (So far, a way hasn't been figured out to allow him to play all four directions at once.) A soft-touch button is placed where he can swing his leg over and hit it for the reset function, so he's able to play all by himself. John is unable to speak and has a computer with which he communicates. When asked to say something, he lists the videogame cartridges he wants to buy next.



84 Electronic Games



Raymond Balsley, quadriplegic, plays using a mouth controller

Kirk Kilgour was perhaps the finest hitter/blocker to ever play for the U.S. National Volleyball Team. He won the NCAA Most Valuable Player Award during his collegiate career and is a well-known coaching figure in both America and Europe. He presently coaches Pepperdine University in Malibu, CA. Kirk is a quadriplegic. He is also a very competitive man who plays Atari VCS videogames for hours at a time and can wipe out a screen of space invaders using a mouth control. He also has a multiple game board which allows him to select from up to eight cartridges with the press of a button.

Tommy, John and Kirk are examples of a growing number of severely handicapped people who are discovering for the first time, that there is something they can do on their own that is fun. Some people consider videogames a waste of time, but these people find it a tremendous morale booster as well as an interesting way to develop the muscular skills they need in order to function. For instance, with the practice John is getting in controlling his head movement, he may one day be able to operate a power wheelchair. Handling the four-button joy-

stick requires the same motion as the one needed to operate a push-button phone or an adaptive driving panel. Operating a paddle control requires the same motion as turning a stove knob or a doorknob. The adaptive controllers can be used by quadriplegics, paraplegics, amputees, those with muscular dystrophy, cerebral palsy and stroke victims.

The person who designs these special adaptive devices is Ken Yankelevitz, an aerospace engineer and computer programmer. After taking the Atari joysticks apart to see what made them tick, or not tick, he decided to try to design a more reliable one. He showed the management at Atari, Inc., some of his ideas and they began referring handicapped people to him.

The challenge was to convert a unit that had been designed for manual manipulation into a unit that could be used by someone not possessing the normal capabilities. Ken experimented with different ideas, including puff, suck and bite switches, telephone keypads mounted at mouth height, helmets and various switches. He worked directly with the quadriplegics, and with their eager reactions and enthusiasm for the project, found a de-

sign that would work. The device allows the severely handicapped to play the very same videogames that millions of other kids are playing.

He found that each handicap is slightly different and requires different hardware to allow the person to operate it effectively, so he began designing many different switching devices. The most popular and versatile is a soft-touch button box controller.

Most young adults with spinal cord injuries had their accidents while involved in some exciting activity, like motorcycle riding. These are not sedentary people and one of their biggest mental problems is boredom. They sit at home or in hospitals staring at TV for hours because there hasn't been much else they could do. Playing videogames gives them a chance to be active, to respond both mentally and physically as they dodge asteroids, defend cities or maneuver a chicken across a 10-lane highway while horns honk and engines roar.

Several hospitals in Southern California are using the controls in their children's and young adults' units and people all over the country are benefiting from these controllers.

Now, who says videogames are bad?



A special head-activated controller is used by John Carasic

Electronic Games 85

"Special Controllers Let Everyone Play".

Other early coverage included The Los Angeles Times (12th June 1983) item, "Disabled Get Video Power". Journalist Peter A McWilliams, published more life-affirming detail in his book "Personal Computers and the Handicapped (Jan 1984):

Yet to show a profit (Ken's special controllers are generally less expensive than regular mass-produced joysticks), Ken refers to the entire activity as, "An expensive hobby."

"Disabled people are just like everybody else... especially kids."

"Some kids use the same type device as the game controller to operate their wheelchairs," Ken explains. "Playing games teaches them accuracy and coordination, which they can use in steering the chairs. It can also be good exercise." So, there are practical benefits to game playing. "Sure," says Ken, "but mostly it's just fun."

By 1983, Ken was supporting the use of Atari, Colecovision, Commodore, Texas Instruments, Apple and Radio Shack TRS 80 computers. By 1984 over 100 controllers were said to have been donated or loaned to individuals and institutions in California alone.

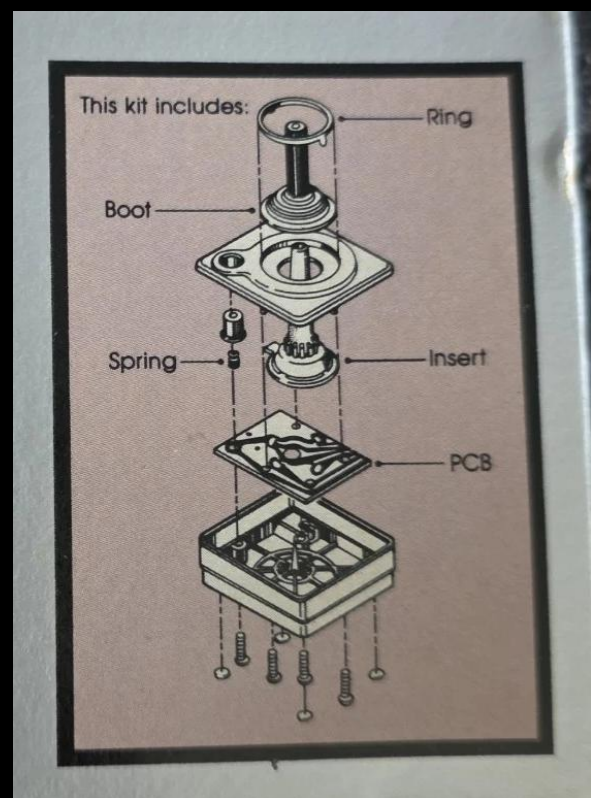
ATARI: FLYING HIGH THEN FALLING FAST

In 1981 Atari was the greatest videogame company on Earth. They were at the pinnacle of their success. How could it ever end?

Between '81 and '82 Atari's biggest selling VCS games, including Asteroids, Defender, Berzerk, Missile Command, and Pac-Man all came with "Special Feature" labelled easier play modes. Boosting accessibility seemed important.

They continued to make referrals to Ken Yankelevitz when disabled people contacted them in need of special custom controllers.

The issue with broken joysticks was addressed with a cheap joystick repair kit in 1982, and myriad 3rd party alternatives.



Easy left-handed modification guides were shared in magazines and newsletters. Third party Suncom sold the "lefty" joystick adapter for an even easier solution.

Atari, aware that very young children could struggle with their games and controllers, paired up with the Children's Computer Workshop. Both with an eye on the educational market. From this came the Atari Kids' Controller, effectively a big blue keypad with soft-press keys. It launched

alongside three *Sesame Street* cartridges all with low pressure gameplay options. Each title came with its own cardboard controller overlay sheet embossed with action symbols. These told a player where to press and what each button did.

Although the *Kids' Controller* was not compatible with standard joystick games, it did work with Atari's aging *Keyboard Controller* titles, such as *Brain Games*. It could also work as the flight-computer "video touch pad" controller for *Star Raiders*. Looking at them all together, I do wonder if Atari took any inspiration from Ken's *FingerTip* controller.



Spot the difference: Kid's Controllers, FingerTip controllers and CX50 Keyboard controllers.

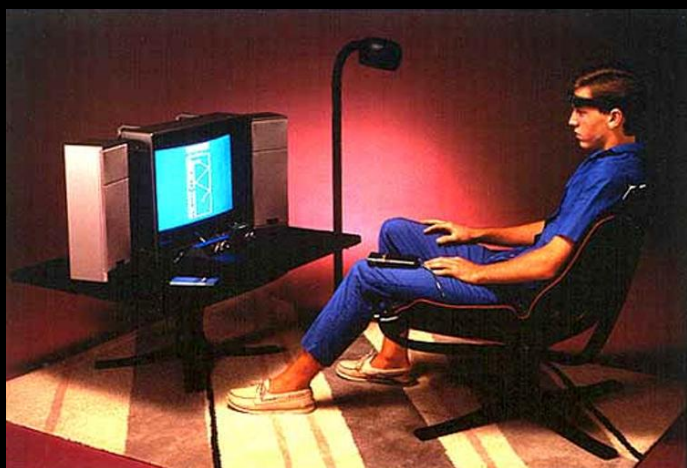
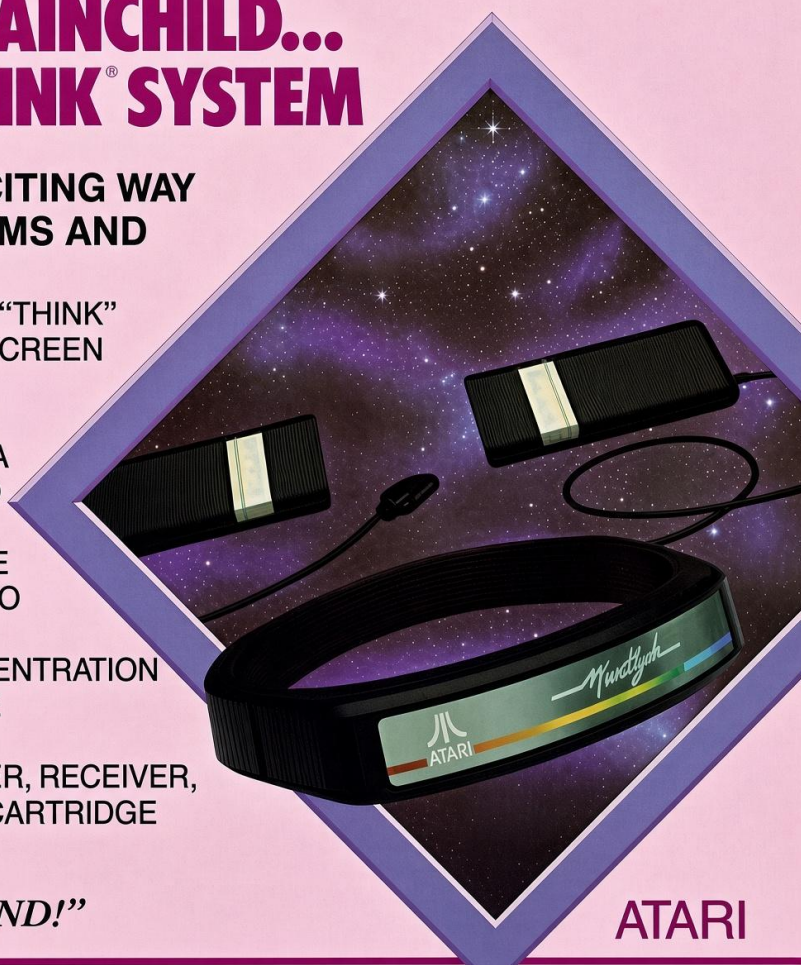
Also of a curious parallel, was work on a hands-free controller, the Atari Mindlink System. Working prototypes were available to play with at the Summer 1984 Consumer Electronics Show in Chicago. Atari's PR team termed it: "*The Day the Future Began*".

OUR NEWEST BRAINCHILD... THE ATARI MINDLINK® SYSTEM

AN ENTIRELY NEW AND EXCITING WAY TO USE ATARI GAME SYSTEMS AND COMPUTERS:

- PLACED AROUND FOREHEAD, YOU "THINK" THE MOVEMENT OF OBJECTS ON SCREEN
- WORKS ON EMG TECHNOLOGY— (MEASURES MUSCLE ACTIVITY)
- TRANSMITS TO GAME CONSOLE VIA INFRARED REMOTE CONTROL—NO WIRES ATTACHED
- EXCITING, VERSATILE, EXPANDABLE
- OPENS UP ENTIRELY NEW AREAS TO VIDEO GAMING
- REWARDS RELAXATION AND CONCENTRATION
- INCREASES COMPUTER AND GAME SYSTEM INTENT TO PURCHASE
- INCLUDES INFRA-RED TRANSMITTER, RECEIVER, HEAD BAND AND ONE SOFTWARE CARTRIDGE

**"THE STATE OF THE ART
FOR THE STATE OF YOUR MIND!"**



Atari's 1984 Mindlink (left), and Ken Yankelevitz 1982 mouth-controller (right). Both players with their palms flat in front of them.

The *Mindlink* had tantalising possibilities. Hands-free control, with future potential to work with all standard joystick games. According to *AtariMuseum.com*, a representative of the Special Olympics approached

Atari at their CES booth with an exciting idea: A fully funded proposal for the development of new sports games to be used at the next Special Olympics. Atari had proudly supported the event in 1982 and 1983. What might future support look like? With Mindlink? But it wasn't to be. Atari and many others came crashing down to Earth after a painful financial collapse in the over saturated home computing and videogaming markets. They were bought out and were never the same again.

EZRA

Another of Ken's passion projects was in making an affordable multi-purpose environmental control system. He named his EZRA, short for Easy Remote Access.

EZRA took advantage of off-the-shelf affordable technology, modified and ingeniously grouped together. It could be operated by a single switch plugged into an adapted car-alarm remote control. This communicated with a receiver connected to an Atari 8-bit computer, which could then in turn talk to a variety of consumer electronic devices.



The system developed across the years, with the 1994 version giving access to TV, VCR, Radio, CD, lights, home appliances including door control, communication tools, telephone and bed control for comfort. Life-changing for those needing it. Just imagine not being able to do any one of those things for a moment.

THE NINTENDO GENERATION ONWARDS

Between 1985 and 1989, it was the Japanese Nintendo Entertainment System (NES) that rekindled the home fires of US video game mania. Games like Super Mario Bros, The Legend of Zelda, Metroid, Castlevania and R.C. Pro-Am at the vanguard.

The NES Game and Watch inspired gamepads were little finger-tip controllers too. The extra “B” button added moderate extra complexity over the Atari joystick era. Ken would have been quickly minded to make alternative accessible controllers for this new wave machine. And he did.

Lynne: “[Dad...] tried to pitch [his accessible controllers] to Nintendo at some point and had the same result. So he did it on his own [...] several years later was when one of those companies came out with one.”

Nintendo Fun Club News - Winter 1987

NEW PRODUCTS



HANDS-FREE CONTROLLER

A new way to get more kids in on the video game challenge.

It all started with a phone call from the midwest. An avid young Nintendo video game player had been involved in a serious car accident and lost all use of her hands. Her mother called to ask if Nintendo had a product that might help her daughter continue her favorite pastime—video game play.

As it turned out, Nintendo did have a product under development intended for use by handicapped kids who don't have the use of their hands.

It's called the "Hands-Free" Controller. And although it looks like something out of the spaceage, it's really quite simple. It's designed around a "puff and sip" concept. To make the A button work, you simply puff or blow into a straw-like plastic tube. To make the B button work, you sip.

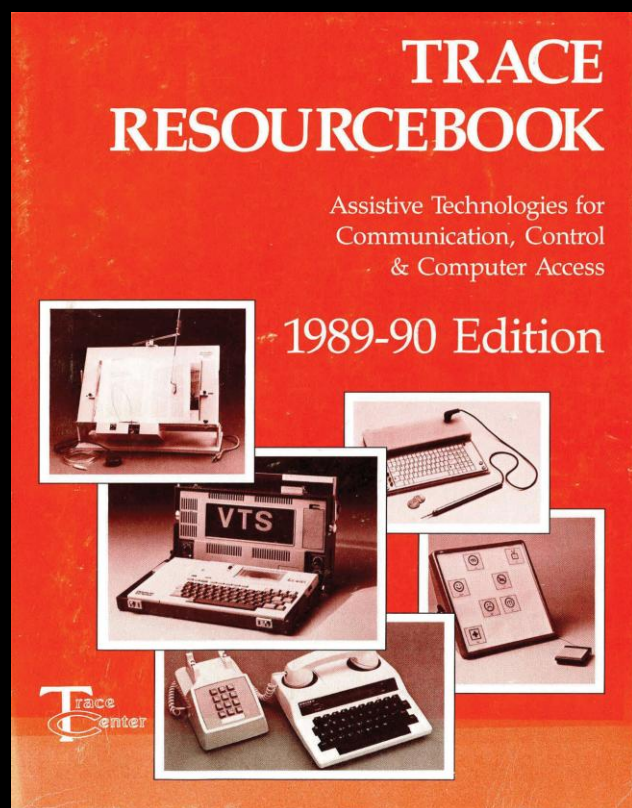
Kids at Children's Orthopedic Hospital in Seattle, Washington are testing the prototype and say it's great. Keep your eye on this section for the latest news on other Nintendo product developments.



Winter 1987 Nintendo Fun Club newsletter.

Within the Winter 1987 Nintendo Fun Club newsletter, a new official hands-free controller for physically disabled players was announced.

One thing that is certain, is that KY Enterprises were advertising a "Mouth Operated Joystick for Nintendo" for sale at \$85 in the 1989-1990 Trace Resource book. Prices there were fixed at a cut-off of March 1989. It seems unlikely to me that Ken's NES Mouth Operated Joystick didn't predate the commercially available Hands Free Controller.



Product Name: Mouth Operated Joystick for Nintendo

Vendor: KY Enterprises/Custom Computer Solutions

Computer:

Cost: \$85.00

The Mouth Operated Joystick for Nintendo provides an alternate input method to the Nintendo game system. A lever switch is used to start and reset the games. The joystick is moved with the mouth. Button A is operated with a puff and Button B is operated with a sip. Two controllers are provided on the same plug: the Mouth Operated Joystick and a regular hand controller, allowing for team play.

Head movement is required to operate this joystick. A 24" gooseneck mount is included.

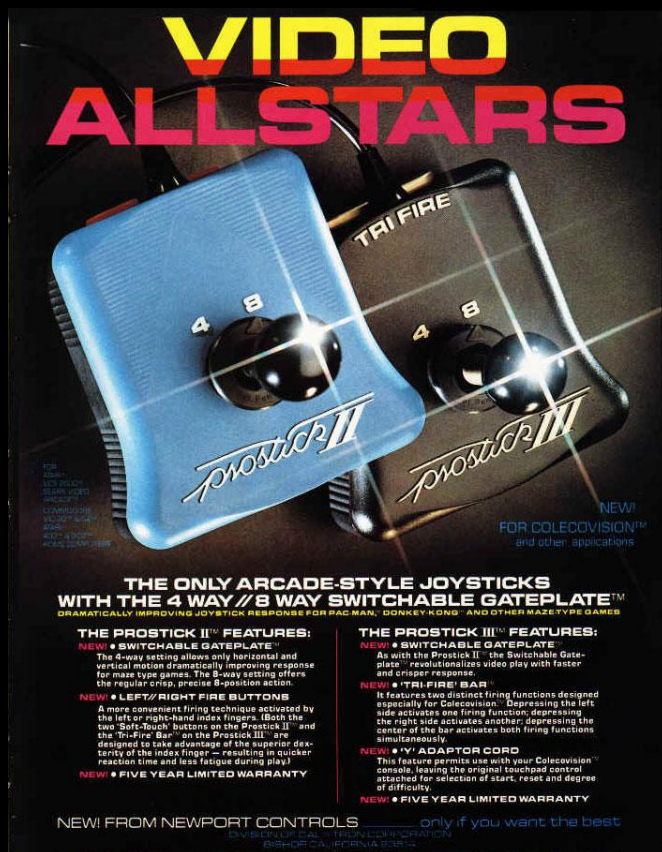
The Trace Resource Book was a vital resource for many working in disability fields across the USA, viewed by all manner of occupational therapists and experts in the field of disability support. Perhaps one of the most important places for a mouth-controller to be seen.

One thing is certain. It was brilliant all round that some of the Nintendo generation had options.

Things rarely stood-still. SEGA's 16-bit Genesis/Megadrive console was quickly supported too. Sonic the Hedgehog, EA sports titles, Streets of Rage II and on and on. It was all to be possible.

Adam (Ken's nephew): *"[I] remember helping [testing] with the Nintendo and Sega stuff, [from 1989 into the 1990s...] it was really the same thing with each new controller. Just figuring out how to incorporate another button to the current controller he had."*

With an eye on making things affordable, Ken was still recycling his mountain of Atari spares. From the NES and up to and including Playstation era controllers he repurposed the blue Newport Controls Prostick as the main shell.



VIDEO ALLSTARS

PROSTICK II **PROSTICK III**

THE ONLY ARCADE-STYLE JOYSTICKS WITH THE 4 WAY // 8 WAY SWITCHABLE GATEPLATE™
DRAMATICALLY IMPROVING JOYSTICK RESPONSE FOR PAC MAN, DONKEY KONG, AND OTHER MAZE TYPE GAMES

THE PROSTICK II™ FEATURES:

- NEW! • SWITCHABLE GATEPLATE™**
The 4-way setting allows only horizontal and vertical motion dramatically improving response for maze type games. The 8-way setting offers the regular crisp, precise 8-position action.
- NEW! • LEFT/RIGHT FIRE BUTTONS**
A more convenient firing technique activated by the left/right-hand index fingers. (Both the two 'Soft-Touch' buttons on the Prostick II™ and the 'Tri-Fire Bar' on the Prostick III™ are designed to take advantage of the superior dexterity of the index finger — resulting in quicker reaction time and less fatigue during play.)
- NEW! • FIVE YEAR LIMITED WARRANTY**

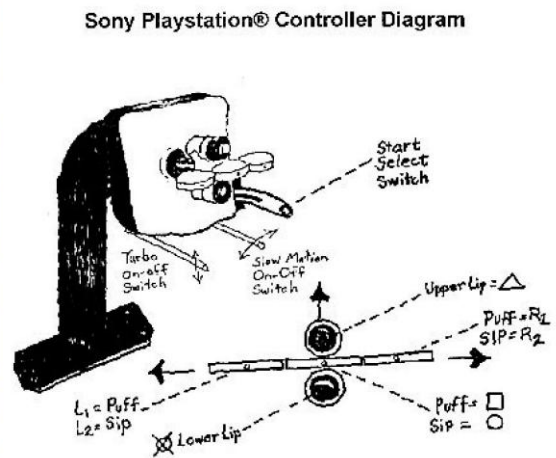
THE PROSTICK III™ FEATURES:

- NEW! • SWITCHABLE GATEPLATE™**
As with the Prostick II™, the Switchable Gateplate™ revolutionizes video play with faster and crisper response.
- NEW! • TRI-FIRE BAR™**
It features two distinct firing functions designed especially for ColecoVision™. Depressing the left side activates one firing function; depressing the right side activates another; depressing the center of the bar activates both firing functions simultaneously.
- NEW! • VY ADAPTOR CORD**
This feature permits use with your ColecoVision™ console, leaving the original touchpad control attached for selection of start, reset and degree of difficulty.
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The first evidence of a Playstation controller was 1997. 14 buttons via mouth-play was both a challenge to build for and a potential recipe for many unwinnable or even unplayable games.



Consider that with two hands, these new Playstation games often expected 3-4 simultaneously pressed/pushed inputs (perhaps a D-pad direction, one or two shoulder buttons, and a shape button) alongside the need to quickly swap to others. That's not easy to replicate with one mouth. Games would have to be picked more carefully than ever before.

QUADCONTROL AND THE WORLD WIDE WEB



The World Wide Web called. Ken's Quadcontrol.com went live in 1998, the same year that Sony released the twin-analogue stick Dualshock controller in the USA. The most complicated standard game controller to date. 17 buttons and two analogue joysticks.

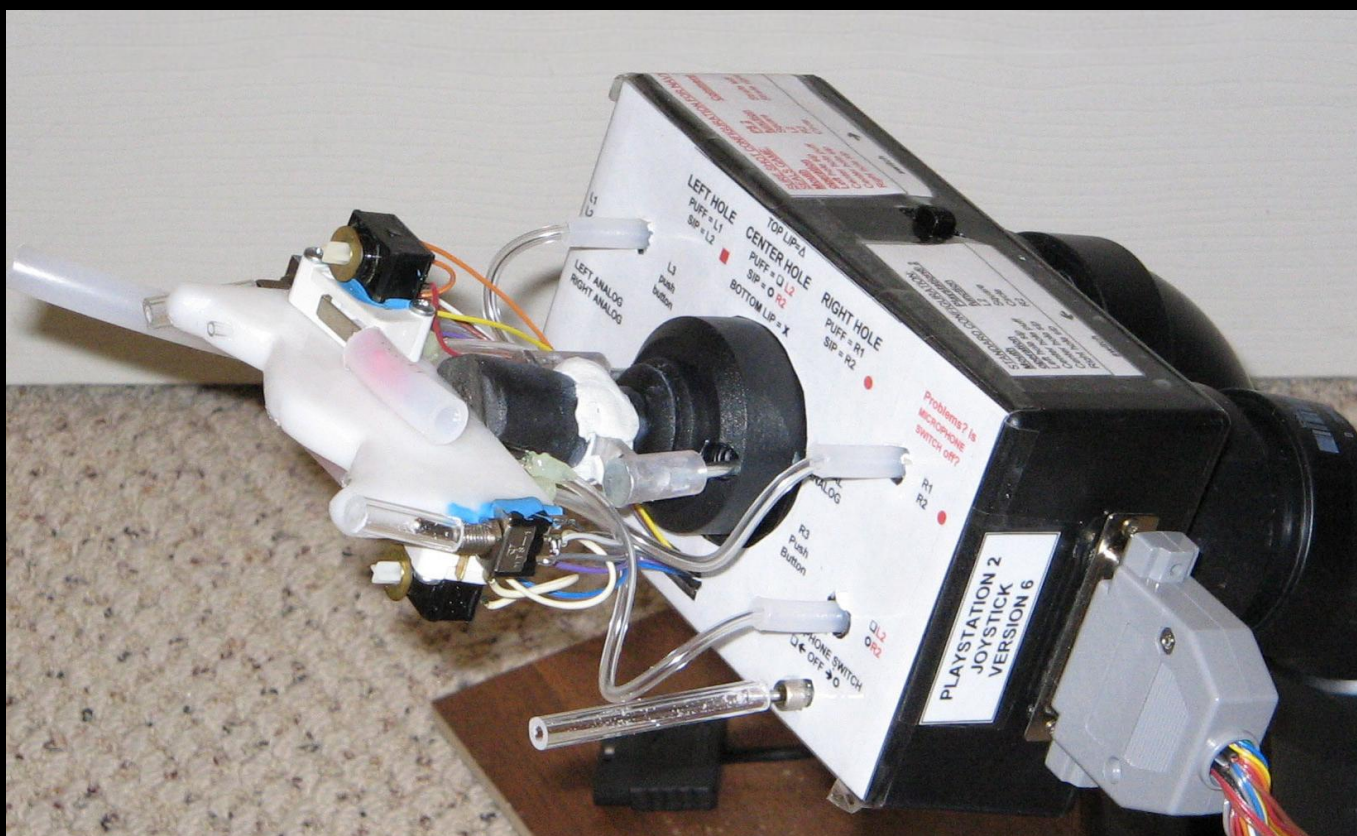
The site opened with controllers for the original Sony Playstation, SEGA Genesis, NES, N64 and Super Nintendo. Ken acknowledged that he had received technical help and referrals from many of the game manufacturers over the years by this time. He also continued to support EZRA, with extra options like satellite and juke-box CD player control.

Although the site was international, Ken soon found that supplying outside of North America could be prohibitively expensive.

In 2012 Ken told me: *"I don't ship my controllers outside the USA due to the high costs of shipping and customs forms. When they needed repair due to stuck switches, dirty switch contacts, broken wires, etc the shipping costs of \$150US and the customs paperwork made it too*

inconvenient to send it to me for repair. So I don't want to encourage people in the UK to order these controllers from me."

It wouldn't be until the 2000 release of the Sony Playstation 2 that twin-stick games started to become common place. Ken worked on the best solutions he could.

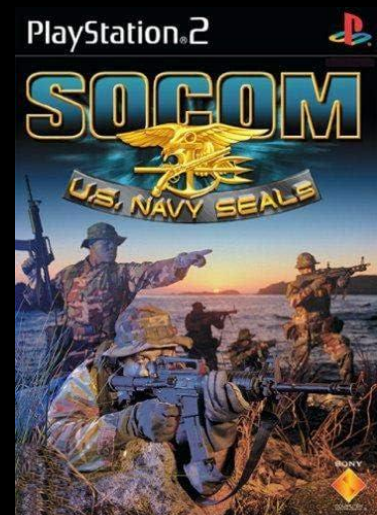


Ken took cheaper third-party gamepads, that were far easier to modify into something else, typically a mouth joystick. For the PS2 this might involve boxing up a mouth joystick with four sip-puff tubes, various switches extended with tubes, and light-force lip buttons. These were very complex to first use and to build. Imagine being given a Panpipe for the first time and playing a good tune. It took practice, especially with

more demanding games. However, some did master the controller, often after some very careful game control remapping, where offered.

“There ain’t nobody can beat me — you use your hands or not, I’ll still smoke you.”, Gary (from Quadcontrol promotional video).

In 2004 on the Quadcontrol site, Ken noted: *“One of the most popular and intricate games appears to be the [PS2] internet version of Navy Seals. Several of our customers play these games most of their waking hours, and one is ranked in the top 100 in the world.”*



PS2 SOCOM U.S. Navy Seals. One of the first PS2 online games.



Xbox 360 mouth controller (top). Various gamers.

Ken: *"Most of my customers over the years have made that controller work better than I ever believed they could make it work," he says. "Once they got online, with the XBox and the Playstation, they were able to play over the Internet against people who didn't know they were being beaten by a mouth control."* – NBC NEWS 20th December 2013 article

Some systems didn't seem to get the KY Enterprises treatment. These include the SEGA Dreamcast, Nintendo DS and Nintendo Wii. Wii motion-tracked remotes especially, for games like Wii Sports, were exceptionally difficult to adapt. No one can do it all. Wii mania had to slip by. Fortunately there was no shortage of games for Playstation and Xbox.



15 mouth controllers at the end of a production run.

30 YEARS LATER

Ken ploughed on across the years with radio-silence (generally) from mainstream news outlets after 1984. Perhaps the story considered told. This changed on Sunday the 12th of June 2011. A syndicated item gave a worrying glimpse of a possible near-future: *“Quadriplegic players fear game soon over.”*, *“Retired aerospace engineer near 70, and there’s no one yet to replace him”*.

From *Columbia Daily Tribune* 14th June 2011:

For Ruben Rios to throw a touchdown, it takes a flick of his tongue. To break away from a tackle, he puffs into a tube. Paralyzed below the shoulders after a 1988 gunshot wound, he plays games such as Madden NFL 11 with a mouth controller: lip switches, sip-and-puff tubes, and a head-operated joystick.

The device is Ken Yankelevitz's work. The retired Montana aerospace engineer has hand-made controllers for 30 years so quadriplegics can play games that usually need two hands. He began in 1981 with simple Atari designs, later adapting them for Xbox and PlayStation, with no formal ties to those companies. Users can now perform about a dozen actions with their mouths. The system is hard to learn.

Quadriplegic players fear game soon over

Man, 69, has built usable controllers alone for 30 years.

HELENA, Mont. (AP) — For Ruben Rios to throw a touchdown, it takes a flick of his tongue. To break away from a tackle, he puffs into a tube.

Rios is a quadriplegic with no use of his body below his shoulders. For Rios to play video games such as "Madden NFL 11" he uses a controller that combines lip controls, puff and sip tubes and a head-operated joystick.

That mouth controller is an innovation from Ken Yankelevitz, a Montana engineer whose hobby is hand-making unique controllers to give quadriplegics access to video games usually requiring two hands.

But with the retired Bozeman engineer's 70th birthday approaching, disabled gamers said they fear there will be no one to replace Yankelevitz, who has sustained quadriplegic game controllers for 30 years almost entirely by himself. The retired aerospace engineer hand makes the controllers with custom parts in his Montana workshop, offering them at a price just enough to cover parts.

Gamers and gaming advocates said the Yankelevitz controller's

functionality and price is unrivaled for quadriplegics.

Yankelevitz began his work on mouth-operated video game controllers in 1981 for the Atari game console to give quadriplegic people a chance to engage with one of the few activities open to them. The design was simple on the early models: users only needed to be able to push a few buttons and move a joystick through their controllers.

Over time, Yankelevitz adapted the designs to more complex consoles including the Xbox and PlayStation platforms. He has no formal relationship with any of the companies, saying they aren't interested because there isn't a sufficient market.

Quadriplegic gamers now have around a dozen different actions they can work with their mouth.

It's a complicated system that can be difficult to learn. But for quadriplegics, who suffer paralysis of both arms and both legs and who are largely dependent on others, the device gives them something entirely their own.

"After my injury, there really wasn't anything that I could do that I was actually in control of," said Rios, who lost control of his body after a gunshot wound in 1988.

When Rios began using a Yankelevitz controller in 1991, that

changed. It was a relief, he said, to enjoy something on the same level as his friends.

With video games and online communities, quadriplegics have access to friends and freedoms not possible otherwise. It's not just a basic level of control, either. Quadriplegics have proved competitive against and sometimes besting two-handed gamers.

"I can't emphasize enough how important this" is "to people with high spinal cord injuries," Rios said.

That meaning is what prompted Yankelevitz to embrace the challenge of his 30-year hobby, the reward of helping others.

"As long as I'm making a controller that will work, then they are motivated," said Yankelevitz, a former aerospace engineer.

Quadriplegics are a small portion of a growing community of gamers with all types of disabilities who are pushing for more accessible games and game controllers, said Mark Barlet, 37, a disabled veteran, gamer and president of the AbleGamers foundation. His organization works to promote gaming access.

Barlet said gaming is an important connection to the world for those with disabilities. "People have relationships that are completely and totally digital, and they are meaningful relationships," he



Ruben Rios, who is a quadriplegic, plays a video game using a special mouth controller June 2 in his home in Norwalk, Calif. When Rios plays video games, he uses top and bottom lip controls, a cross bar mouth joystick and a number of holes and tubes he can puff into to articulate actions in the game.

said.

Barlet said Yankelevitz's controller is the only one like it out there, calling it "unique in terms of accessibility."

But gaming by quadriplegics is a tiny corner of the market that Yankelevitz has sustained by himself for three decades, and his output is slowing.

He doesn't want to quit now but said that he won't be going on forever.

Recently, he shut down operation of his shop for half the year to spend time in Southern California, where he used to work.

If someone wanted to fill his shoes, it wouldn't be an easy task.

He puts each controller together by hand, using his engineering skills to solder dozens of switches and circuits. Controllers are offered

for just more than \$200 and include a one-year warranty for repairs.

"If the bottom line is profit, there's no way to make a profit on these," Yankelevitz said.

Yankelevitz said larger companies and game manufacturers have shown no interest in producing the controllers because the market is so small. He's sold just more than 800 of the devices through 30 years. Factory construction of the controller would be cost-prohibitive, more than \$1000 each, he said.

Other products don't offer near the same functionality, and they come at a much higher price. There looks to be no comparable substitute available in the near future.

"If Ken" Yankelevitz "stops making these controllers, we're going to be pretty much left out to dry," Rios said.

"After my injury, there really wasn't anything that I could do that I was actually in control of," Rios said. A Yankelevitz controller from 1991 was a relief: he could enjoy something on the same level as his friends. Some players have beaten two-handed opponents.

"I can't emphasize enough how important this" is "to people with high spinal cord injuries," Rios said.

That is why Yankelevitz kept at the hobby. "As long as I'm making a controller that will work, then they are motivated," he said.

Mark Barlet of [accessible gaming charity] AbleGamers called the controller “unique in terms of accessibility.” Gaming, he said, can be “meaningful” even when the friendships are digital.

The market is tiny. Yankelevitz has sold just over 800 units in 30 years. Each is soldered by hand and sold for just over \$200 with a one-year warranty. Factory versions would cost more than \$1,000. Larger companies have shown no interest.

“If the bottom line is profit, there’s no way to make a profit on these,” Yankelevitz said.

With his 70th birthday approaching, output is slowing. He does not want to quit yet. “If Ken Yankelevitz stops making these controllers, we’re going to be pretty much left out to dry,” Rios said.

Ken [in a 2012 OneSwitch interview]: “I hope to keep building these controllers on a part-time basis. The parts count in these controllers is high and availability of special parts have long lead times. So building them requires keeping large inventories of parts. There are about 8 hours of labor and special tools are needed so I don’t think it’s practicable to have “open source” or “how to” for builders make them.”

FRED DAVISON AND GAME ACCESSIBILITY ADVOCATES

Former Cisco electronics and software engineer Fred Davison was at a friend's house one day, when he picked up the local paper running a version of that syndicated story.

Fred: *“It was pure chance that I saw that article and realized I could design something like that. It was literally like getting hit in the head with a 2-by-4. I knew how important it was for someone experiencing the isolation and boredom that being paralyzed can bring, since I had seen how frustrating it was for my mom, to have a way to participate in multi-player video games. I thought ‘Damn, I could do this. I’ve got to do this’. It was as close to a calling as I’ve ever experienced.”*

"I called Ken the next day and arranged to go visit him. He lived about three hours away. He showed me what he was building. I realized it was mechanically really complicated and difficult to build, but I used it as an inspiration for a new design. He and I spoke a lot and he visited my place twice. The first time on his motorcycle. He was an avid motorcycle rider and he had the biggest motorcycle I had ever seen. It was huge [an 1800cc Honda Goldwing]. The second time his [illness] was becoming apparent and a friend drove him."

Plans for a new EZRA were also discussed, but shelved, up against a new wave of powerful and relatively affordable consumer home environmental control systems from Amazon, Apple and so on.

QuadControl

Video Game Controllers for Quadriplegics



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Since 1981, I have been making video-game mouth controllers and related adaptive devices. My customers are children and adults of all ages. For most, it is one of the few things they can do and be on an equal playing field with their friends. I have had technical help and referrals from many of the game manufacturers over the years. Several of our customers play video games most of their waking hours, and one is ranked in the top 100 in the world in the internet version of Navy Seals®. [READ MORE](#)

Read the AP article (June 11, 2011) about my work [HERE](#).

Attention: Valued QuadControl Customers

I am not taking orders now due health reasons but may in the future.



[Log in](#) | Copyright 2010. All rights reserved. Quad Control Video Game Controllers for Quadriplegics

On the 3rd of December 2013, the QuadControl site stated in red: *"Attention: Valued QuadControl Customers: I am not taking orders now due health reasons but may in the future"*

I got in touch via OneSwitch to send my well-wishes, wondering if I might be able to help in some way...

From: Ken Yankelevitz

Sent: Wednesday, December 04, 2013 7:13 PM

To: barrie.ellis@oneswitch.org.uk

Subject: RE: Quad Control Contact: Get well soon

Hi Barrie,

Thanks for your complements about the controllers. I am 72 years old and have Parkinson Disease[]. I am having difficulty holding the soldering iron steady enough to assembly the controllers. If I can find someone who can help me with the soldering maybe I'll try to continue making controllers.*

Ken

I then offered to try to help by getting in touch with others in the field of accessible gaming in the USA. I wasn't aware of Fred Davison at that time, and perhaps Ken wasn't sure if that tie-up was definitely going to reap a replacement. Ken quickly got back:

You can contact anyone who is interested in making the mouth controllers. If they are in the USA I can teach them how I make them.

The parts count in these controllers is high and availability of special parts have long lead times. So building them requires keeping large inventories of parts.

There are about 8 hours of labor and special tools are needed so I don't think it's practicable to have "open source" or "how to" for builders make them.

I was building about 75-100 controllers a year

Ken

* This early diagnosis of Parkinson's was later revised as Corticobasal Degeneration (CBD), a rare, progressive neurodegenerative disease of the brain.

One of the people contacted was Steve Spohn of the AbleGamers. I ended with:

Would be great, considering all the many years he's been supporting disabled gamers (since 1981) if we could sort some help out for him some how."

From: Steve Spohn

Sent: Tuesday, December 10, 2013 3:58 PM

To: Barrie Ellis

Ken is such an amazing guy. I will reach out to him and see how we can help. Thanks for the heads up.

Mark Barlet who co-founded AbleGamers, later recollected: *One strong memory I have is how worried he was that no one would continue his work. He told me he was getting older and knew the world was moving toward digital methods, but he lacked the time [...] to make that leap.*

The practical solution and hard development work came from Fred Davison. He made a simpler to replicate physical design, using an ARM processor as the brain (ARM with all it's fascinating links to the 1980s Acorn BBC Micro Assistive Technology era). The system was to be reprogrammable with several tiers of controls available to the user on the fly. It needed investment to make it happen. A *Kickstarter* appeal started on the 4th of February 2014 seeking to raise \$10,000.

Fred: When the Kickstarter launched, [Ken] donated \$5000, as did AbleGamers [...] Many current QuadStick users are former customers of Ken Yankelevits' QuadControl. Ken was instrumental in mentoring me during the design of the QuadStick. [...] He was the largest individual contributor during the Kickstarter campaign, which provided the wherewithal to start production two years ago. He loved making the QuadControl. It was one of the first things he mentioned when we met.

The QuadStick Kickstarter ran for 30 days and raised \$27,905 from 336 backers. It was an instant success with no direct competitor. An accessibility disaster had been averted.

QuadStick

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The QuadStick is a mouth operated gamepad, mouse, keyboard and TV remote control for quadriplegics



Early version of the Quadstick, with teal mouth joystick.

Via Fred Davison March 2016: *"This is a message I am relaying on behalf of Ken Yankelevitz's sister-in-law, Carol Miller Fradkin, in an attempt to reach Ken former customers:"*

Dear Barrie:

I have some news about Ken, who—as you may know—built video game controllers for quadriplegics for over 30 years, beginning in 1981. I'm hoping you will share this information with those who were fortunate enough to have known Ken and used his products (or had a family member who did), because now you have an opportunity to return his kindness. And NO, I'm not asking for money.

For those who aren't familiar with Ken, his company was Quad Control. Ken is a retired engineer, who built each controller by hand, including mouth controls, puff and sip switches, and head-operated joysticks, and he charged customers only enough to cover his materials. Ken sold over 800 of the controllers while he was active.

Over the last several years, Ken has been dealing with the rare degenerative disease Cortical Basal Ganglionic Degeneration (CBGD). This is something which gets progressively worse, and affects Ken's

balance, mobility, reading, and motor skills. His activities are very limited at this point. His hands, which he used for so many years to solder the switches and circuits for the controllers, are no longer able to operate his computer or answer his cell phone; however, he does have a voice activated phone now and can talk on speakerphone. I do have to say that I have never heard him feel sorry for himself or wonder why he is going through this. He is very matter-of-fact about it, and just figures out how to deal with each functional loss as it occurs. He is now living in Long Beach, California, where he and his wife lived for many years and raised their children. His wife (my sister) passed away in Montana, before the onset of Ken's illness.

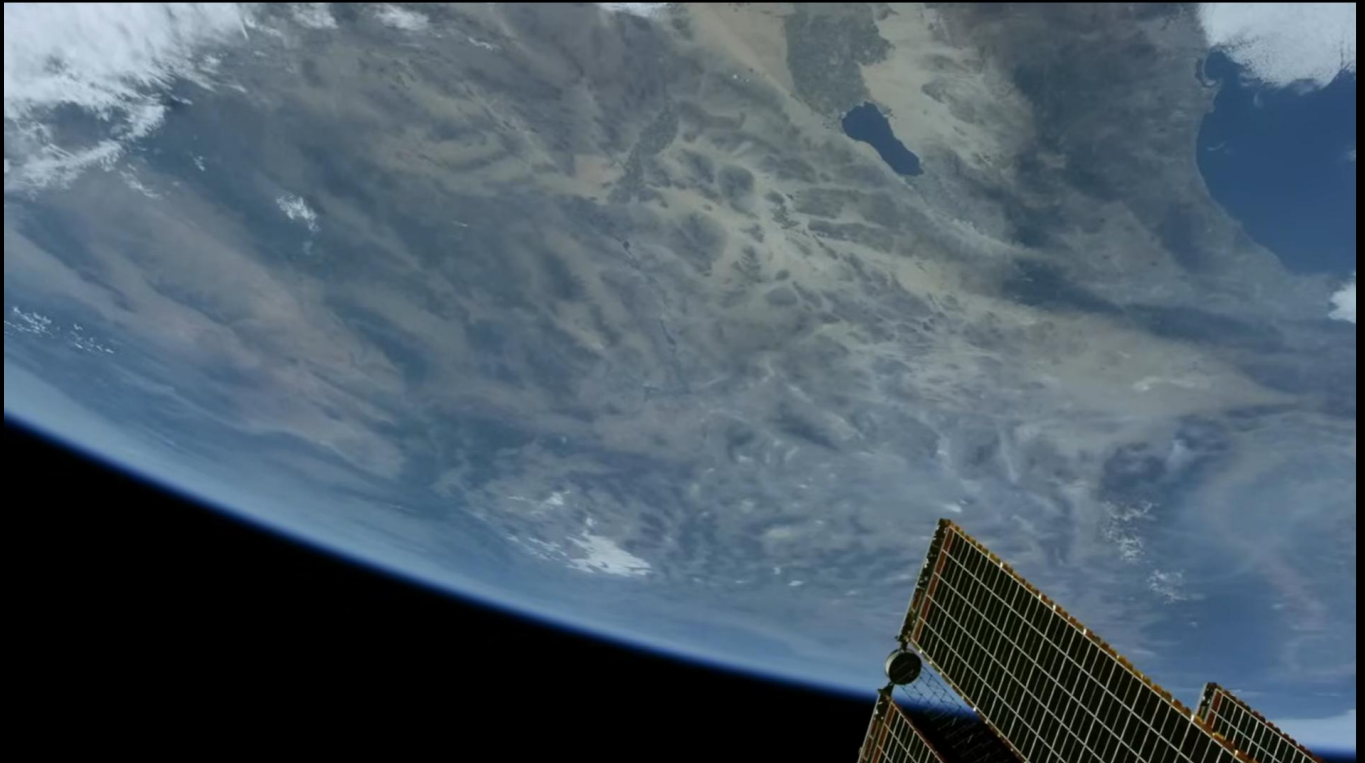
Ken is no longer able to be productive, but his family and I think it would mean a great deal to him if those he helped through the years would send some greetings, and maybe tell Ken how he was able to positively impact their lives. If you would like to do this, please send your note to me at [...]. I will print them out, place them in a special binder, and send it to Long Beach so that his caregivers, friends and family can read them to him. You are welcome to include one photograph, if you choose. if you prefer to put something in the mail to me, send me a note and I will give you my address. I can forward emails at a later date to one of his friends, but if you send yours in the next week or so, it will definitely have a place in the binder. It's important that we get these to him while he's still able to appreciate them.

Thank you in advance for your help, and I wish you all the very best,

Carol Miller Fradkin

I was just one to send in what I had. Back then, my information was far short of what you are reading here. Many of the photos within this article come retrospectively from that special binder.

AN ENDING (ASCENT)



Ken worked on many accessibility projects, and as with all engineers, not all were completed. He seems to have completed a modified car from one photo. He supported a local horse-riding charity run for disabled people in later life. He had ideas for a highly accessible Microsoft Flight-simulator control rig and hopes for an EZRA Mk.II. He got to see his quadriplegic gaming controllers carry on in safe hands of Fred Davison and Quadstick.

From Sister-in-law Carol Fradkin, in November 2016:

“Ken got his wish for an end to his suffering the end of August. It happened naturally, and with family by his side.”

“I know he was touched by your letter, which is part of the permanent binder his family now keeps. It is a worthy testament to a life well lived. He not only shared it with all of his visitors and current caregivers, but also with those caring for him in the hospice facility. It had a great impact on the caregivers, who relayed that they were so moved and would take extra special care of this man who had helped so many others.”

GAME OVER. PLAYER ONE PRESS START BUTTON.

Ken built controllers with his hands until he could do it no more, helping until it was his time to be helped. According to his family, this work was never done for profit. He took the baton from Possum's sip-puff systems of the 1960s, knowingly or not, and ran with it like few others. He will forever be a key figure in the foundations of the accessible gaming movement. His work is living on...

At the time of writing the Quadstick had been in production for 10 years. Virtuoso streamers, such as RockyNoHands, WheeledGamer and SteamyBiscuit, share the Quadstick word online. Rocky in particular has a *Fortnite* controller demo with over 10 million views alone.

On the 10th of July 2024 the 83-minute documentary *Quad Gods* was broadcast on HBO and streamed on Max. It tells a story of the first '*fully quadriplegic esports team*', many using QuadSticks. An honest, gritty, sometimes funny, story of friendship in the highly competitive world of esports. Without Ken's life's work and that broken Atari joystick, would any of this have happened?



Quad Gods documentary art work (inset) and Quad Gods at an esports event (main).

"May his memory always be a blessing".

From 10@10, Montana Sports Network interview, broadcast June 2011:

Ken: "This is part of being part of the community. I'm giving back. What our contribution through our short period on life here, what we've accomplished, can be summed up in a couple of things, and this is probably my legacy."



CREDITS

Many thanks to Ken and Diane's daughters, Lynne Given and Joanne Herdrich; to sister-in-law Carol Miller Fradkin; and to Fred Davison of QuadStick. All have been generous with their time, memories and support.

Thanks also to accessible-gaming historian Markus Spöhrer, whose IGDA GASIG talk prompted me to complete this chapter after he admitted how hard he had found it to source good quality photos; to Tony 'Arcade Blogger' Temple sharing the Atari games room video; and to the Atari History Museum (Ctrl-Alt-Rees), the Atari Compendium, Gregg Vanderheiden, Mark Barlet, and the Internet Archive for their shared memories. Also, to WinryGames for proof-reading, and 'The Chatters' on the WinryGames Discord server for their best interpretation of the blurry Rancho games room's rules.

This and other Ken Yankelevitz resources can be found at the OneSwitch accessible gaming museum: https://www.oneswitch.org.uk/page/ken_yankelevitz

REFERENCES

1971 flight-simulator work. pp. 2–3.

Yankelevitz, K. S. (1971) 'System Design With Interactive Graphics', *TIE Technical Idea Exchange*, McDonnell Douglas, March.

[https://www.oneswitch.org.uk/OS-](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1971_TIE_Ken_Yankelevitz_Flight_Sim.pdf)

[REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1971_TIE_Ken_Yankelevitz_Flight_Sim.pdf](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1971_TIE_Ken_Yankelevitz_Flight_Sim.pdf)

PILOT on the family TRS-80. p. 3.

Family recollection (Given and Herdrich, 2026) plus Pilot Programming System v1.1 (1979) (Ken Yankelevitz)), via: <http://cpmarchives.classiccmp.org/trs80/Software/Model%201/P/>

Atari Games Room visit. pp. 6–7.

Atari Coin-Op (1980) *Coin Connection*, December.

Vidcom / Atari Healthcare Systems. p. 9.

Albaugh, M., quoted in Atari Compendium, 'Vidcom'.

https://www.ataricompendium.com/game_library/prototypes/misc/vidcom.html

Sip-puff and head-control before Ken. p. 10.

Nickel, V. L. and others (1969) electrically powered orthotic systems at Rancho Los Amigos.

<https://www.ovid.com/jnls/jbjsjournal/abstract/00004623-196951020-00012~electrically-powered-orthotic-systems>

See also POSM/Possum (1960), VAPC Odyssey work (1972) and Marince (c.1980):

https://oneswitch.org.uk/page/ken_yankelevitz

Kirk Kilgour and Raymond Balsley. pp. 11–17.

McDonnell Douglas (1982) *Spirit* newsletter, October, p.4.

[https://www.oneswitch.org.uk/OS-](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1982_10_McDonnel_Douglas_Spirit_Vol_12_No_10.pdf)

[REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1982_10_McDonnel_Douglas_Spirit_Vol_12_No_10.pdf](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1982_10_McDonnel_Douglas_Spirit_Vol_12_No_10.pdf)

John Carasik, Tommy Garcia, Sandy Blatt. pp. 18–24.

Yankelevitz, K. and Yankelevitz, D. (1983) ‘Adaptive Controllers for Video Games and Computers’, RESNA 6th Annual Conference, San Diego.

[https://www.oneswitch.org.uk/OS-](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/VARIOUS/EDUCATION/RESNA/1983_RESNA_CONFERENCE.pdf)

[REPOSITORY/MUSEUM/VARIOUS/EDUCATION/RESNA/1983_RESNA_CONFERENCE.pdf](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/VARIOUS/EDUCATION/RESNA/1983_RESNA_CONFERENCE.pdf)

Kirk, John, Tommy, Adam Lloyd. pp. 11–23.

Yankelevitz, D. (1984) feature, *Electronic Games*, December.

[https://www.oneswitch.org.uk/OS-](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1984_12_Electronic_Games_Diane_Yankelevitz.pdf)

[REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1984_12_Electronic_Games_Diane_Yankelevitz.pdf](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/1984_12_Electronic_Games_Diane_Yankelevitz.pdf)

FingerTip Controller adverts and kit. pp. 25–27.

KY Enterprises (1982) advertisement, *Electronic Games*, October, p. 83.

Further notices: *Joystik* (April 1983), *Blip* (April 1983), *A.N.A.L.O.G. Computing* (July 1983).

Diane’s first magazine article. p. 29.

Yankelevitz, D. (1983) ‘Gaming and the Handicapped’, *Electronic Games*, February.

https://archive.org/details/Electronic_Games_Volume_01_Number_12_1983-02_Reese_Communications_US/page/n83/mode/2up

Early press. pp. 13, 30.

‘Disabled Get Video Power’ (1983) *Los Angeles Times*, 12 June.

<https://www.newspapers.com/image/633612736/>

McWilliams, P. A. (1984) *Personal Computers and the Handicapped*. New York: Quantum / Doubleday.

Atari Kids' Controller. pp. 31–32.

Atari Kids' Controller notes via AtariAge / OneSwitch Atari Access list.

https://oneswitch.org.uk/page/ken_yankelevitz

Atari Mindlink and the Special Olympics. pp. 33–34.

Vendel, C. and Lapham, B. 'The Atari Mindlink System', Atari History Museum.

<https://atarimuseum.ctrl-alt-rees.com/videogames/consoles/2600/mindlink.html>

Archived copy:

<https://web.archive.org/web/20210621144702/http://www.atarimuseum.com/videogames/consoles/2600/mindlink.html>

EZRA environmental control. pp. 34, 39, 46.

Quad Control website, archived 1998–2013, including EZRA pages.

<https://web.archive.org/web/20150214123045/http://quadcontrol.com/>

Nintendo Hands-Free Controller. p. 35.

Nintendo of America (1987) 'Hands-Free Controller', *Nintendo Fun Club News*, Winter.

KYE mouth joystick listed before Nintendo's went on sale. p. 36.

Trace Center (1989–1990) *Trace Resourcebook*. Mouth Operated Joystick for Nintendo, KY Enterprises.

QuadControl.com. p. 39.

Yankelevitz, K. Quad Control site (Internet Archive).

<https://web.archive.org/web/20150214123045/http://quadcontrol.com/>

Thirty years later (1981-2011). pp. 43–45.

Dockery, S. / Associated Press (2011) 'Quadriplegic players fear game soon over', syndicated; NBC News, 11 June.

https://web.archive.org/web/20131222050208/http://www.nbcnews.com/id/43365521/ns/technology_and_science-games/

Ken in need of help. pp. 45–48.

Yankelevitz, K. (2012–2013) emails with Barrie Ellis.

[https://www.oneswitch.org.uk/OS-](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/2012_OneSwitch_interview_with_Ken_Yankelevitz.pdf)

[REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/2012_OneSwitch_interview_with_Ken_Yankelevitz.pdf](https://www.oneswitch.org.uk/OS-REPOSITORY/MUSEUM/1980s/Ken_Yankelevitz/ARTICLES/2012_OneSwitch_interview_with_Ken_Yankelevitz.pdf)

Fred Davison and the QuadStick. pp. 45–49, 52.

Davison, F. (2014) QuadStick Kickstarter and later accounts.

<https://www.kickstarter.com/projects/227850484/quadstick-a-game-controller-for-quadrilegics>

<https://www.quadstick.com/>

Carol's letter. pp. 49–51.

Fradkin, C. M. (2016) letter to former QuadControl customers, March; note of 23 November 2016.

Ken on his legacy. p. 53.

Montana Sports Network (2011) *10@10* interview, June.

Photographs and recollections. throughout.

Include many from Given, L., Herdrich, J., Fradkin, C. M. and Fradkin, A. (2016, 2019, 2026). Also via Markus Spöhrer and OneSwitch.org.uk and accessible gaming archives.

'Opens up a new world'

Engineer helps handicapped play video games

By Dan Synovec

Long Beach

Raymond A. Balsley, 11, is a quadriplegic, paralyzed from the neck down and breathing with the help of a life-support system.

He's also a whiz at video games, thanks to DAC flight systems engineer Ken Yankelevitz.

Yankelevitz designs and makes video game controllers for disabled persons.

He has designed a mouth-operated control for Atari video games for enthusiasts with limited hand and finger movements.

A mounting stand brings the controls to a comfortable height.

Raymond was paralyzed 15 months ago when he was hit by a car while riding his bicycle.

"Bless Ken's heart," said Mickey A. Christianson, who is a therapist at Rancho Los Amigos Hospital. "He comes here on weekends and at night to help our patients. His controllers give our paralyzed patients a chance to do some of the things other children can do."

It was a former Olympic volleyball player, paralyzed from the neck down following a training injury, who got Yankelevitz interested in designing video games for disabled persons.

"Kirk Kilgour suffered a spinal cord injury six years ago," Yankelevitz said. "He asked the hospital engineering department to build a controller for his home video game, but they were unable to come up with a design."

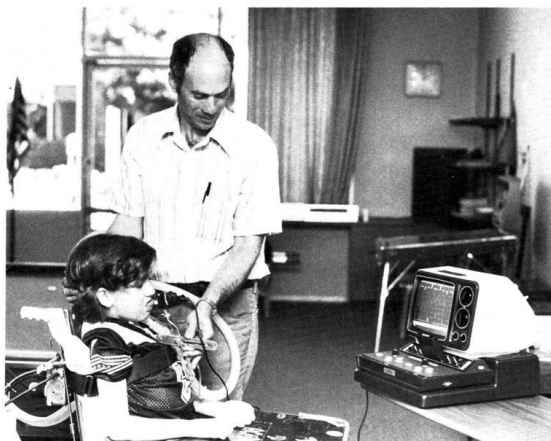
Yankelevitz, who works on computer-controlled aircraft simulators, said hospital authorities asked him to visit Kilgour at his home.

"He gave me a challenge," Yankelevitz said. "We worked together for four months on a number of different designs before I came up with the mouth operated controller Kirk was comfortable with."

"There are a lot of problems to be solved for disabled persons like Kirk. What I design and build is a solution for some of their recreational problems."

The project snowballed after he helped Kilgour. Other disabled patients asked him to design controllers to meet their needs. Today, Yankelevitz offers seven different video game controllers for Atari sets, as well as a portable, self-contained video game unit which he builds. He sells all of the items at cost.

Some of the institutions using



VIDEO GAME WHIZ Raymond A. Balsley, 11, plays Atari's Pac Man using his tongue. The special video game controller he uses was designed and built by DAC flight systems engineer Ken Yankelevitz, who assists Raymond.

equipment provided by Yankelevitz include Memorial Hospital of Long Beach, Northridge Hospital, Long Beach Veterans Hospital and the Carl Harvey School for the Physically Handicapped.

"I've sold, donated or loaned more than 100 controllers and more than 25 portable video game units to disabled persons and institutions," he said.

The Academy of Motion Picture Arts and Sciences purchased four of his portable units and 10 of his controllers for the Rancho Los Amigos Hospital's children's unit.

"Parents are amazed at the capabilities of their disabled children who now are playing video games," Yankelevitz said. "Suddenly their child is able to compete with members of the family and with their friends."

Yankelevitz receives requests from disabled persons throughout the United States and Canada.

"There is so much that is left to be done to help these people," he added. "We can use our aerospace technology to design products for the disabled. I am giving them a tool. They must figure out how to use it."

He said that when a quadriplegic masters the use of the mouth controller he can learn to use a computer.

"This will open up a whole new world for the quadriplegic," he said.

First supersonic bomb rack delivered

St. Louis

MDC has delivered to the Air Force the first of 150 bomb racks that will enable fighter aircraft to drop multiple bombs at supersonic speeds.

The bomb racks are being built under a \$15 million contract.

The new racks will be used on MDC F-15 Eagle fighters assigned to the Rapid Deployment Force at Langley Air Force Base, Virginia. The 16.5-foot-long racks can also be configured for use with the F-16.

Designed by MCAIR, the bomb racks, designated BRU 26A/A, are assembled at MDC's Titusville, Florida division.

Each bomb rack can carry up to six 810-pound bombs and can release them at supersonic speeds. Previous racks designed for supersonic release speeds could carry only one bomb.

The F-15s at Langley will be equipped with three bomb racks each, with provisions for carrying two more on the conformal fuel tanks for a total of five per aircraft.

Fifth Run-for-Fun expected to draw record turnout of joggers

St. Louis

Indications point to a record turnout for MDC's fifth Run-for-Fun later this month. Over 1,000 personnel and family members at St. Louis, Southern California and several other locations are gearing up for the annual company-sponsored event on the United Nations holiday weekend.

At Spirit presstime, more than 600 runners had registered for the Monday, 25 Oct., run in Forest Park. In Southern California over 400 registration forms had been sent in for the Saturday, 23 Oct., run at Huntington Beach. Both of these major runs will be held regardless of the weather.

Company personnel at Tulsa, Titusville, Houston, Patuxent River and several other MDC facilities are planning their own 10-kilometer runs.

"When we began this event five years ago, we had no idea it would become as popular as it has," said MDC chairman Sandy McDonnell, who originated the first Run-for-Fun after having participated in a similar run in 1978 in New Zealand.

"This year's event promises to see a record number of participants in all age groups at all locations," he said.

"I'm also pleased to see that so many

of our people from past runs have signed up again," he said. "It's nice to know that a lot of those runners weren't into the sport before our first UN run, but since have gotten into shape and now run on a regular basis."

Sandy McDonnell has been a running enthusiast for more than 20 years.

Those who complete the 10 kilometers in 90 minutes or less will get an embroidered 1982 Run-for-Fun patch. All who participate in the event will receive a Run-for-Fun T-shirt.

The St. Louis run starts promptly at 9:30 a.m. and finishes at 11 a.m. at the McDonnell Planetarium.

Runners who have registered must pick up their run numbers and T-shirts at registration tables from 8:15 to 9:15 a.m. Monday.

Planetarium restrooms will be available before and after the run. Drinks will be provided at points along the run course.

Free parking will be available for runners, families and friends in the Planetarium parking lots and on adjacent Forest Park roadways.

The registration form is repeated below. Unregistered runners cannot be accommodated on run day.

7 KC-10s refuel 20 C-141 transports

Long Beach

Seven MDC KC-10A Extenders recently took the place of 20 KC-135 tankers for the aerial refueling of 20 C-141B airlifters during Operation Reforger, a combined military exercise involving air and ground units.

The seven Strategic Air Command KC-10 advanced tanker/cargo planes flew from Loring Air Base, Maine. Near Goose Bay, Labrador, each of the large aerial tankers refueled several C-141 transports. The transports carried elements of the 82nd Airborne Division to an airdrop over Germany later in the day.

Each C-141 received 65,000 pounds of fuel from one of the KC-10s.

Some 14 hours later, the same

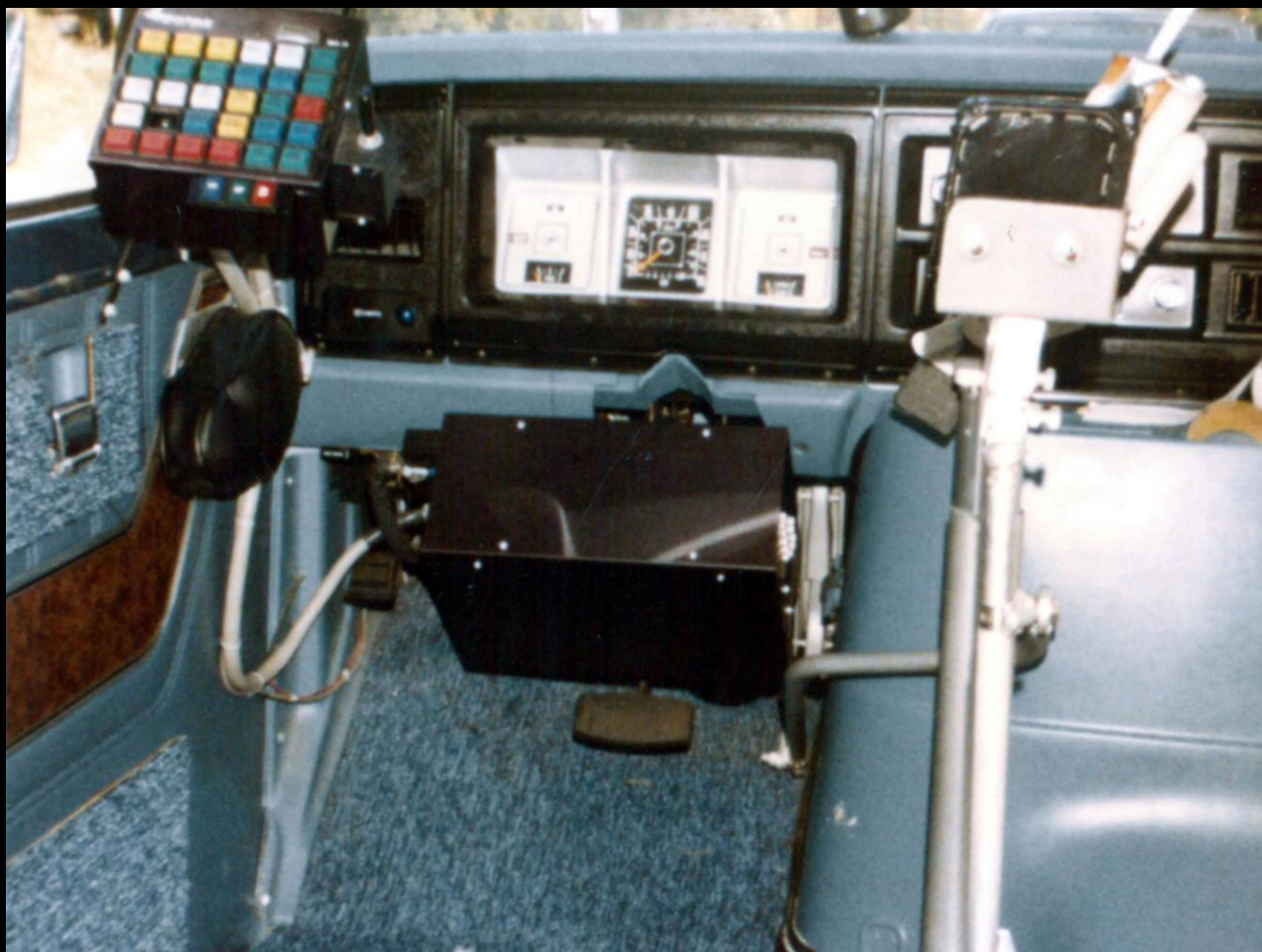
KC-10s refueled the same C-141s returning to the United States. The Refueling offloads were slightly smaller than on the trip to Europe, with each C-141 receiving 60,000 pounds of fuel.

The maximum fuel offload from a single KC-10 was 195,000 pounds.

The C-141s also received fuel from 20 KC-135 tankers assigned to the European Tanker Task Force in the United Kingdom.

The KC-10 is the newest aircraft in the Air Force inventory. So far, 11 have been delivered to the Air Force by McDonnell Douglas Corporation. Five more are on order, and the Air Force plans to purchase 60 KC-10s.

RUN for FUN		REGISTRATION FORM	
(A separate form must be submitted for each runner)			
Monday 25 October 1982			
RUNNER'S NAME _____		HOME PHONE _____	
AGE _____	SEX _____	Relationship (if not employee) _____	RETIREE ☐
"T" Shirt Size (Circle One)			
Adult: M - L - XL		Children: M - L	
EMPLOYEE'S NAME _____		MDC _____	
DEPT _____		BADGE NO. _____ EXTENSION _____	
Complete and send by 13 October 1982: Spirit, Dept. H003, HQ Bldg.			



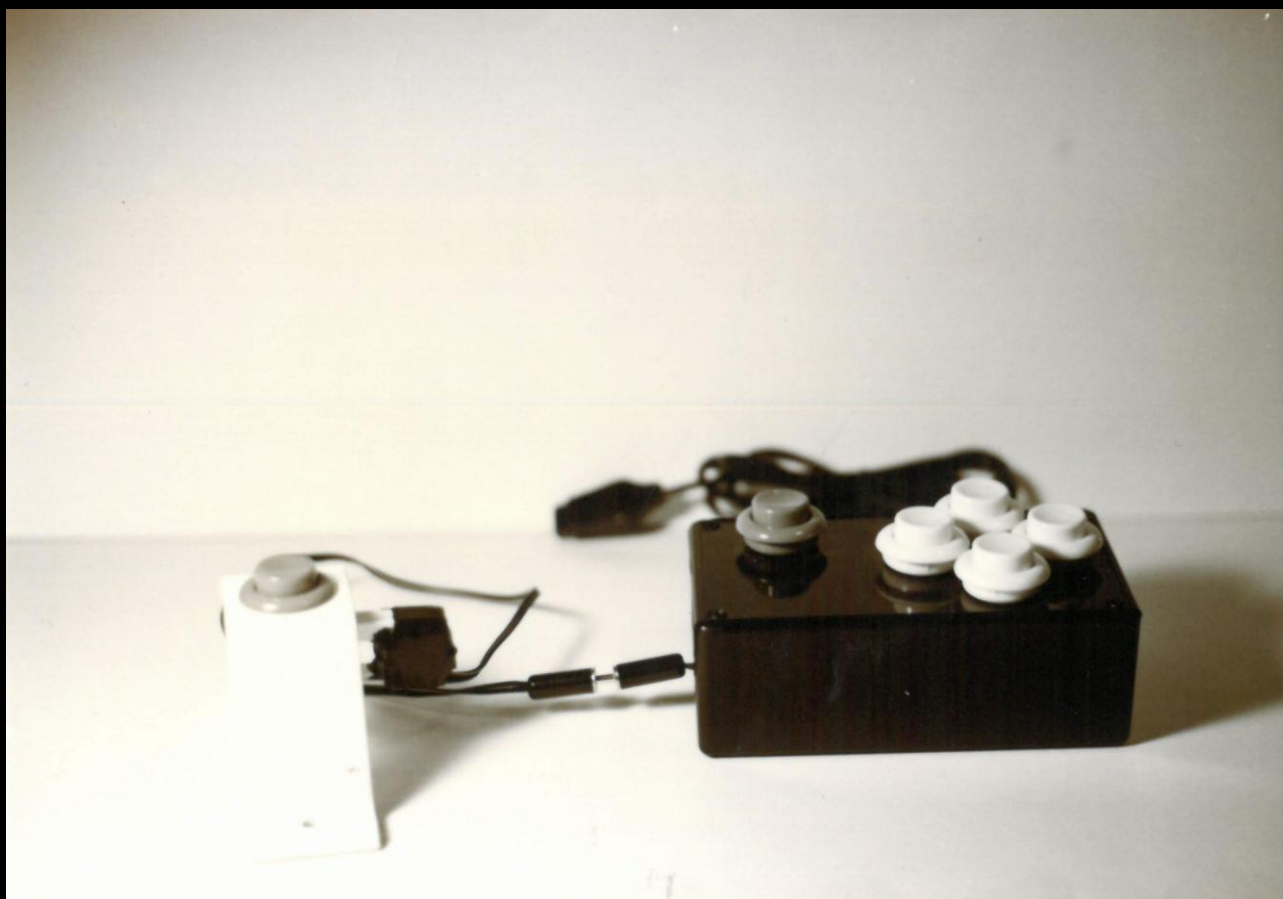
Adapted car controls.



Model 403: Portable self-contained [Atari VCS] video game unit.



Model 101: Pair of FingerTip controllers.



Model 101: Hand / wrist joystick (aka FingerTip controller) with external accessibility switch.



Model 102: Hand / wrist controller with paddle and select and reset buttons.



Model 103: Mouth operated controller for quads.



Model 103 Mouth controller on long PVC piping mount plus Model 403 video game unit.



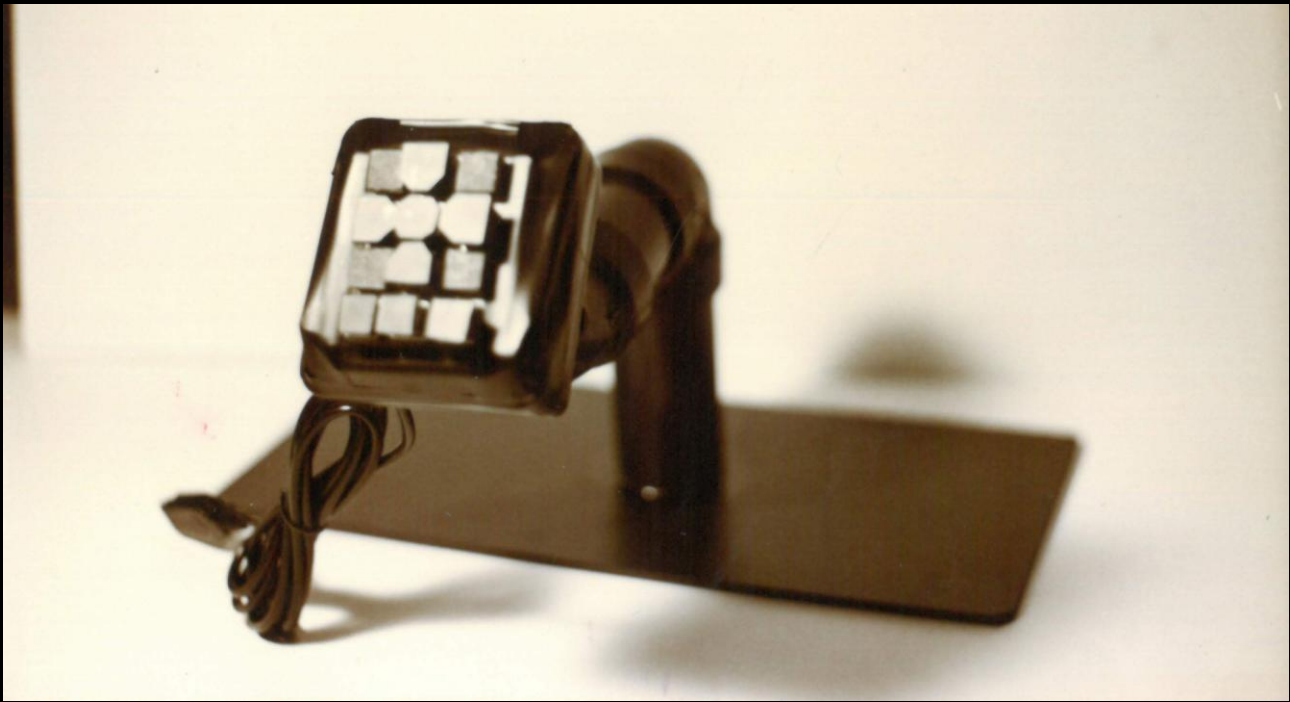
Model 105: Head Switch.



Model 107 derivative, modified joystick with slip on crade and three soft touch buttons.



Custom CX40 joystick with fire button hooked up for limb control.



Atari era tongue controller based upon a telephone number-pad.



Child using the same style of tongue controller.



DOC DIAGNOSES A SOFTWARE SHORTAGE

I am writing to you on behalf of a "friend" currently in the Computer Users' Hospital of Waco. What I am about to show you are the files on his condition. Please try to hold back the tears. My friend's name has been withheld for obvious purposes.

Patient: John Doe

Diagnosis: Deadly depression caused by the lack of games, construction sets, and graphics creations software for the Adam Computer System. Also extreme boredom caused by the constant play of the only game available for his system — Buck Rogers: Planet of Zoom.

Care: The only known cure is for the Game Doctor to find out when some new games will be produced on digital data packs.

As you can see, it's a sad, sad case. Just before he slipped into a "Coleocomma," he mumbled the words, "Where's my Tunnels and Trolls, Sword and Sorceror, Troll's Tale. . ."

Casey Jones
Waco, TX

Ed: According to the Doc's diagnosis, four digital data games are available from Coleco at this very moment: Donkey Kong, Donkey Kong Junior, Zaxxon and Super Subroc. In addition, Victory Software has some digital data pack games for the Adam.

If the condition persists, have your friend take two silicon chips and call the Doc in the morning.

ONE FOR THE RECORD

In regard to the letter concerning software piracy in your November issue, I have one comment. The law

does allow the rightful owner of a software package to make one archival copy. This copy may be modified for use by the owner.

Michael Hamaoka
Havre, MT

CONTROLLERS FOR THE HANDICAPPED

It was with great interest that I read your article "Gaming and the Handicapped" (Feb. 1983).

I am the parent of a 4½-year-old child who recently suffered an attack of a virus in his brain stem which has left him a quadriplegic, but with unimpaired mental faculties.

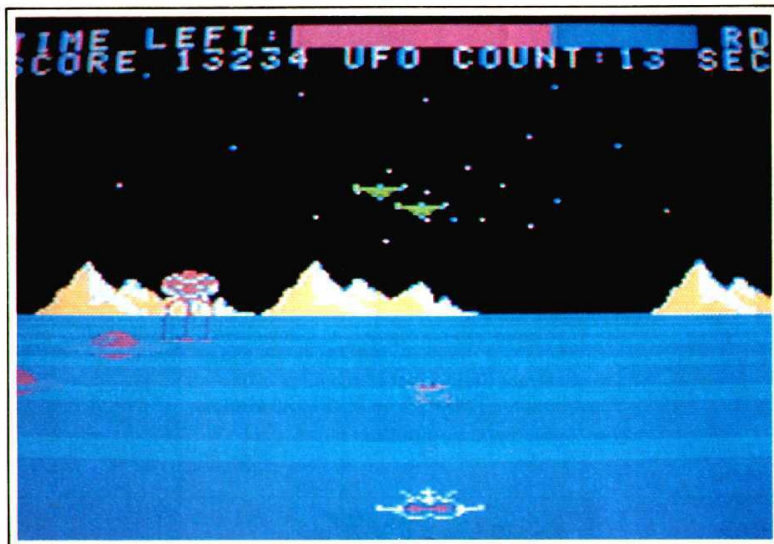
The purpose of this letter is to ask for your assistance regarding any technical information applicable to this situation, especially anything relating to controllers, pressure switches, and the like.

Ronald A. Cowden
New Zealand

Ed: Anyone who wants this information can write to Ken at KY Enterprises, 195 Claremont Ave. #288, Long Beach, CA 90803.

WHAT'S BAD FOR THE GOOSE MAY BE GOOD FOR THE GANDER

In your July issue, you did a review on **Computer Wars** for the VIC-20. The review said, "Computer Wars has mediocre graphics, poor sound effects, and only fair play-action." This is understandable coming from a VIC-20, but **Computer Wars** is also made for Atari computers, which have better graphics and sound effects. People who read the **Computer Wars** review are automatically going to think it's a



BUCK ROGERS (COLECO)

Ronald Cowden from New Zealand in the letters page of Electronic Games October 1984.

ELECTRONIC GAMING AND THE HANDICAPPED

Game Controllers for the Handicapped: More Than Just Toys

By DIANE YANKELEVITZ

Last year, Electronic Games reported on severely handicapped people using custom-made adaptive controllers to play videogames. Many people have written to request more information about the source of these controllers and about the people who were featured in the story. The article featured several handicapped people. Here's an update on their progress.

John Carasik, a 15 year old, convinced his mother after a few months of using a head switch to let him try using his right foot. She originally opposed this because of her belief that it would increase his spastic movements. He showed her that although his leg movements looked spastic, he actually did have control. She watched him score consistently higher on the games (over 32,000 on Atari 2600 Centipede) until she realized that he did have control of his right leg and that control was increasing as John played. As a result of her observations and those of John's medical supplier, John was deemed capable of operating a power wheelchair with his foot. He's only had it a few months now, but it's something John's mother thought would never be possible for him due to his severe spastic movements.

John's controller is a heavy-duty plastic box with five arcade button switches clamped to the foot of his wheelchair. This gives him eight directions and an action button. A separate reset switch is placed on the seat between his legs, and he also has a switch to operate his multi-game board. For the first time in his life, he can play by himself at something he really enjoys.

Kirk Kilgour was on the USA Olympic volleyball team and played professionally in Italy, where volleyball is a national sport, until his accident. Now in his 30's, Kirk is a quadriplegic able to move only his head

and shoulders. In spite of his disability, he coaches volleyball at Pepperdine University in southern California. Since he's a very competitive person and can't compete in sports anymore, he loves to challenge his friends to videogames, which is something he can do very well. He uses a mouth-operated joystick that he helped design. It's a lollipop-shaped disk he can grab onto with his teeth. The joystick is mounted on a stand which clamps to a table on his wheelchair tray.

Kirk's interest in computers started with an Atari 400. He wrote his 1984 coach's manual with the Letter Perfect word processing program. He recently started a new part-time job selling Apple computers to the handicapped. He's using a voice-activated program and exploring environmental control, as well as expanding his knowledge of computers and his own job opportunities.

Tommy Garcia, another 15 year old,



Former Olympian Kirk Kilgour (left) watches his points add up. Above, Margaret Carasik and her son, John, adjust the switch that operates his multi-game board. Right, Tommy Garcia and his brother, David, play videogames together.



is a C-2 quadriplegic, able to move only his head. He plays videogames with a mouth-operated joystick like Kirk's. But Tommy is on a respirator to help him breathe. He also has a diaphragmatic pacemaker. His biggest fear is that his life-support machine will malfunction. He has no control of his chest muscles to breathe on his own; they're paralyzed. He has learned to breathe by himself with his neck muscles and his mother swears that it's due to his home arcing Tommy has a puff switch to "fire" at space aliens on his mouth-operated joystick. When he's on a respirator, he breathes when the respirator does, not necessarily when he needs to fire a quick shot at a space invader closing in on him. When Tommy became paralyzed, he could barely move his head. He moves it so much while playing videogames that his neck muscles have strengthened. His therapist concedes that the games have certainly motivated Tommy, and motivation is the key to learning to neck breathe.

And, if that's not enough to bring tears of joy to your eyes, folks, here's a quote from Rebecca Lloyd, whose 15-year-old son, Adam, became a quadriplegic last May.

"When he came home from the hospital, we hooked up the [mouth-operated] joystick to his videogame and he was thrilled. His friends and sister marvel at how he always out-scores them, but the most important thing is what he told us: 'This makes me feel normal again.'"

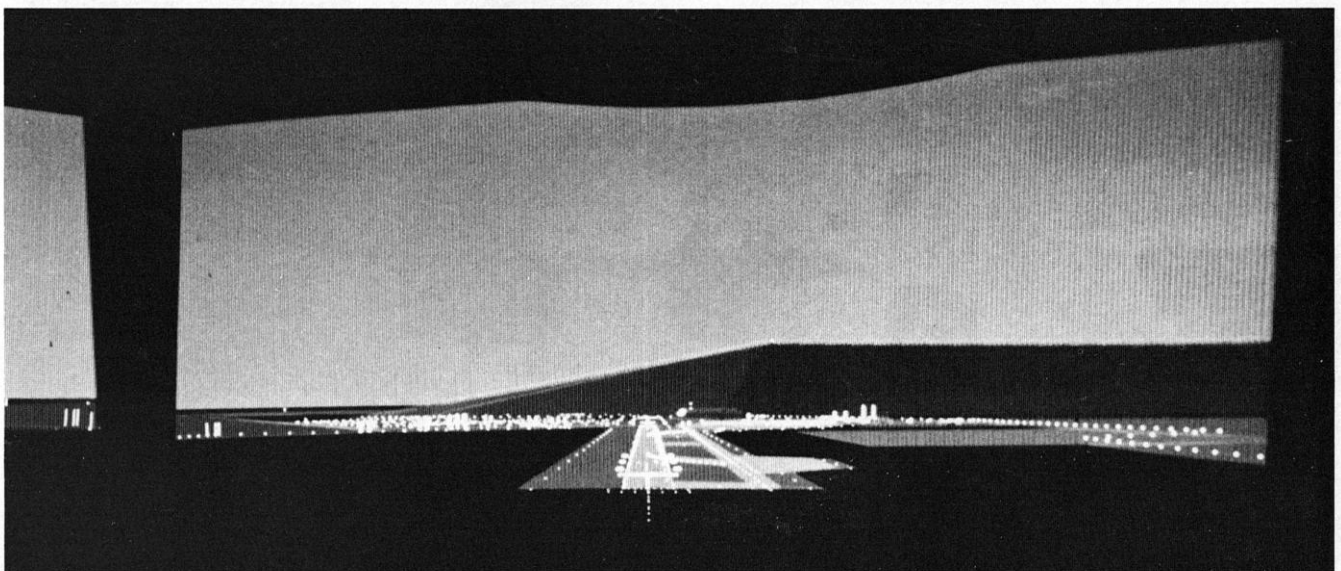
Electronic games may be more than just games, after all.

6

72 Electronic Games

Electronic Games 73

Diane Yankelevitz article in Electronic Games December 1984.



HONG KONG LANDING — The co-pilot's view of a dusk landing in Hong Kong is displayed by a McDonnell Douglas Electronics Company Vital visual simulation system. The "aircraft" is DC-10 and, in this view, the runway is three miles away.

McDonnell Douglas Spirit article February 1982. The pinnacle of videogame technology at the time.



Games Room: "Patients ONLY (12 YEARS OLD AND UP ONLY). NO FOOD OR DRINK".



Raymond Balsley in a Bowling challenge.