



“I had Tesla coils with a thousand volts going through them in my lab!”
David Thiel



DAVID THIEL

From Q*bert's cussing to the roar of the crowd in Winter Games, David Thiel's long career in the videogame and pinball business has seldom been off key

Words by Paul Drury

If you've ever wondered what qualifications people needed to break into the early videogame industry, David Thiel has an interesting answer. "I started off as a pipe organ major and after one year, decided that was the road to madness," he says, without a hint of a cackle. "It was such a solitary pursuit. I switched to technical theatre and can design sets, do lights... and I've never used any of it since." His skills as a coder and a musician were vital for getting his first role in the industry at Gottlieb, though, and soon he was creating audio for all the company's coin-ops, including *Mad Planets* and the all-conquering *Q*bert*. He moved into the home computer and console market in the mid-Eighties, cofounding Incredible Technologies, and has worked on almost 30 pinball machines, producing unique sound and music for such marvellous tables as *The Hobbit*, *Avatar* and *Pirates Of The Caribbean*.

David, are you the guy that taught Q*bert to swear?

Yes, I'm that guy! It did have a lot to do with swearing, actually. I'd not done any game audio and that's not why I was hired. I was a programmer and delighted to be working on 8-bit computers because my background was in mainframes and that could be very frustrating. I'd got an Apple II and could see the potential and I really liked videogames. After graduating from college in 1972, I spent the next seven years playing keyboards in bands and between sets, I'd play some of those early arcade games they had in the venues.

Any bands we might have heard of?

Check out Chewawa Allstar on YouTube [We did and they rock – Ed]. We played the Chicago circuit through the Seventies, six nights a week, earning our chops, until disco hit and ended all that. I got a job selling synthesisers in a store which was also the first Apple dealership in Chicago, so at the back of the shop, we had Apple IIs and that's where I learned to program. That got me a job at an insurance company and from there I got the gig at Gottlieb.

Gottlieb was only just setting up a videogames division when you joined in 1982, having been a leader in the pinball industry since the Thirties.

Yeah, but in the early Eighties, because of the rise of coin-op videogames, you couldn't give a pinball machine away, certainly in America.

The management at Columbia, who now owned Gottlieb, said they needed to get into videogames. Gottlieb didn't want to because they thought it was a passing thing!

How did you end up handling the audio for the company's new videogames' division?

I put my hand up! I was creating graphics utilities because otherwise the artists were using grid paper and coloured pencils... and when management realised they needed sound for their first in-house game, *Reactor*, I just raised my hand and said 'I can do that! Just give me the hardware'. I became the sound guy... for all the in-house projects.

Reactor was designed and coded by the legendary Tim Skelly, who had made his name at Cinematronics with such games as *Rip-Off* and *Warrior*.

Tim was a rock and roll guy and that was my world, too. I thought our audience of 11-year-old boys didn't want to hear the sounds of *Pac-Man*, all that 8-bit music. Sure, they learned to love it, but it was kind of like Stockholm syndrome. I wanted to make music and sounds for games that was much more their native language. But you see, there's virtually no sound hardware on that board – you have to do everything in software. Every sound you hear is an algorithm! I wrote some crazy algorithms and if you listen to *Reactor*, it's rocking! There's a bass drum and bassline and it sounds nasty.

The game also has speech, which was still quite a novelty back then.

We used a board created for a pinball machine and rather than going down the sampling route, which would take up a lot of memory, [the technology] used a synthesiser, the Votrax chip, which allowed you to talk a lot more – albeit, badly. Which would be cool if you only ever did robot games.



» David (bottom right) played keyboards in Chewawa Allstar before his videogame career began. You'll find them on YouTube in their mid-Seventies pomp.



» Tim Skelly, creator of *Reactor*, included David in one of his cartoons which appeared in Skelly's collection, *Shoot The Robot, Then Shoot Mom*.

“Gottlieb were really being dicks with their employees. I was paid a low-level engineer's salary when Q*bert had made them millions”
David Thiel



» [C64] *Winter Games*: there's no business like snow business...

► Was it quite difficult to get it to say anything intelligible?

I was having a really hard time getting it to say simple things. Just the words 'bonus points' sounded like 'bogus points'. That chip was made by a company called Federal Screw Works and the irony has never been lost on me. After days trying to get it to work, I thought 'What the hell – what if I just put random numbers into the chip?' And it sounded cool! This was clearly the finest use of this technology. And that got used in *Q*bert*.

Ah, you swearing at the technology led to Q*bert swearing on-screen!

Yup, Q*bert's voice came out of frustration during my work on *Reactor*. I saw Q*bert bouncing around on this pyramid and said to Warren [Davis – programmer and co-designer] 'Have I got something for you! This will be great for this game!' I told him I had a pitch control so for the other characters, we can make really low sounds or high-pitched squeaky sounds... I knew we could use all these unique voices as gameplay cues, so when you hear this sound, you know a bad guy is about to appear. That's more than decoration – that's a functional cue.

Sound is often underrated in games, especially back then. Did you feel you were advocating for its importance?

That's been my quest for my entire career. We were developing a new medium and I was lucky enough to have been there in the beginning, helping to develop the vocabulary of this new form of entertainment and engagement. It was different because it was interactive. Now, books are interactive as you have to create things in your mind from the words on the page... but it's linear – the book isn't going to change. This new medium was interactive and so we were exploring what was fun about that. What do people want to do, to see, to hear? I've spent my whole career exploring that: how to code non-verbal information in the audio space.

Did you explain to the programmers your approach to sound design as integral to the player experience?

Typically I'd keep the deep theory to myself [laughs]. I would explain why I needed them to call each particular sound because they had meaning for the player. It would need a bit more work from the programmer, like 'If an enemy comes in from the left, call this sound, but if it's from the right, call this one... or when the player has done something four times, call this sound so he knows he's achieved something'.

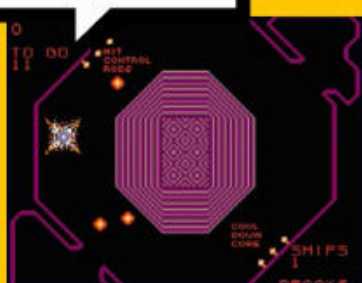
And the sound when Q*bert falls off the cube is just funny.

Oh I'd try to get humour in wherever possible. It's hard with anything interactive because something that's funny the first time, gets old fast. If Q*bert said a phrase every time he fell, you'd be done with it after the fourth time but a non-speech thing... and there's that kinaesthetic element, too. Rick Tighe put a pinball flipper in the cabinet which makes a thwack when Q*bert hits the bottom. You can really feel it! I was brought up on Warner Brothers cartoons and that is pure Wile E Coyote.

You also worked on *Mad Planets*, which has a rocking musical score and lots of sound effects playing. How many sound channels are you using there?

[Grins broadly] Ah, here's something else about how humans parse audio which you can leverage. I figured this out when playing *Robotron*... if you'd been playing for three minutes and were all sweaty and someone asked you how many sounds you thought were playing simultaneously [in the game], you'd definitely answer four of five. But no, *Robotron* only ever plays one sound at a time. In *Mad Planets*, there's a beat in the background, then there's an explosion, and then the beat carries on. Your mind thinks 'Oh the explosion was very loud,' not, 'Hey where did the music go?' Your mind thinks continuous sounds are masked by louder sounds.

FIVE TO PLAY David picks the soundtrack to his gaming life



REACTOR

■ Tim Skelly, the creator of such glorious vector titles as *Warrior* and *Star Castle*, came to Gottlieb on a three-game deal. *Reactor* was his only released title, with David providing a rocking soundtrack to this innovative and highly original coin-op.



Q*BERT

■ David's best-known game is an excellent example of the importance of audio to the player experience. The sound of *Q*bert* jumping across the pyramid and his infamous profanities when he dies are as iconic as his elongated nose.



MAD PLANETS

■ 'Forgotten gem' is an overused term but is wholly apt for this brilliant blaster. Designed by the late Kan Yabumoto and with graphics by Jeff Lee, David produced a banging score, perfectly complimenting the frenetic action on-screen.



WINTER GAMES

■ After leaving the arcade industry behind, David was part of the team behind this hugely popular sports title. From the tension of ski jumping to the elegance of figure skating, this multi-event collection was another gold medal winner from Epyx.



FAMILY GUY

■ David has worked on many great pinball tables over the years, from *AC/DC* to *Avatar*, but we have a very soft spot for this witty and varied table based on the best animated TV show ever (sorry, Homer). Stewie's mini-table is just adorable.



» [Adam] *Richard Scarry's Best Electronic Workbook Ever* pre-dated the CD-ROM approach to interactive edutainment. How we miss that.

How do you go about creating a good blast sound?

Your audience has never been near a real laser blast, but they've seen *Star Wars*, so I used the same reference points as they did. Hollywood led the charge on this! Very few people have been next to a gun when it's fired and guns in a Hollywood movie do not sound like guns in the real world. People have heard gunshots in hundreds of movies and on TV – those are all the creation of some clever sound engineer who is going for an emotional effect.

Did you have a library of sounds you could draw from?

For a long time, Blockbuster video store was my reference library [laughs]. If I thought I needed a certain sound, I'd rent a film which I thought might have it in, listen to it and then write an algorithm to try and replicate [that sound].

So you weren't punching a melon in a Foley studio to get a good splat sound, then?

No, it was all done in software. Chris Brewer, who would go on to design *MACH 3*, liked to play with 'big electricity' – Tesla coils with a thousand volts going through them. He made them with giant transformers and coat hanger wire. He brought them to my lab and that inspired the sounds in *Reactor*.

It sounds like Dr Frankenstein's lab. When you worked on an actual film licence, *Krull*, was the process different because you had assets from the movie?

We were owned by Columbia Pictures, who were producing the film, and we were doing the game while it was in production. We had pictures, the

script and the music by James Horner, which I couldn't use in the end. The game is not so abstract – it's Prince Colwyn running around a swamp, so I wanted the sound of you putting your foot into a swamp and then pulling it out. How do you do that in an algorithm? I wrote tiny little loops [of code] for a week and finally I got something evocative of feet going in and out of mud. That week was intense.

We like the low rumble of the rocks you have to dodge on the first level of *Krull*.

That began with an algorithm I'd seen at Eugene Jarvis and Larry de Mar's [the co-creators of *Defender* and *Robotron*] studio when they'd set up Vid Kidz. They invited me over one evening because they said they admired my work on *Reactor* and they wanted to talk about working together. They had an oscilloscope and you know that great explosion at the end of *Defender*, like the world is ending? They played that and I looked at the wave pattern on the screen and thought 'Oh, that's how you do it! Of course!' I didn't copy it but I could see the technique they were using... it's a triangle wave but the trick is, the slope is based on a random number, so it's going to be all over the place. That gives it that chaotic, explosive quality. The rumble of those rocks in *Krull* and the explosions in *Mad Planets* and *MACH 3*, they are all my enhancement of that fundamental notion of how you do it.

You mention *MACH 3*, which was of course a laserdisc game. Did creating audio for that format require a different approach?

Here's a tragic story that only people who know the SID chip will understand.

You have the right audience here at Retro Gamer!

SELECTED TIMELINE

GAMES

- REACTOR [1981] ARCADE
- Q*BERT [1982] ARCADE
- MAD PLANETS [1982] ARCADE
- KRULL [1982] ARCADE
- INSECTOR [1982 – UNRELEASED] ARCADE
- ARTILLERY DUEL [1983] ATARI 2600
- BEAM RIDER [1983] C64/COLECOVISION/ATARI 800
- PITFALL! [1983] C64/COLECOVISION/ATARI 800
- PITSTOP [1983] VARIOUS
- MACH 3 [1983] ARCADE
- JEOPARDY [1984] C64/ADAM
- RICHARD SCARRY'S BEST ELECTRONIC WORKBOOK EVER [1984] ADAM/C64
- WINTER GAMES [1984] C64/AMIGA
- ROCK N' BOLT [1984] C64/COLECOVISION
- THETHREE STOOGES [1986] AMIGA
- CHAMPIONSHIP WRESTLING [1986] C64
- CAPCOM BOWLING [1988] ARCADE
- GOLDENTEE GOLD [1989] ARCADE
- WHEEL OF FORTUNE [1989] ARCADE
- SLICK SHOT [1989] ARCADE
- DYNO BOP [1990] ARCADE
- BATTLE TECH [1991] VR INSTALLATION
- TIME KILLERS [1992] ARCADE
- ANGRY ROBOT: ATTACK OF THE TITAN [2014] MOBILE
- TREASURE TOMBS [2015] MOBILE

PINBALL

- Q*BERT'S QUEST [1983]
- LASER WAR [1987]
- SECRET SERVICE [1988]
- TORPEDO ALLEY [1988]
- TIME MACHINE [1989]
- MONDAY NIGHT FOOTBALL [1989]
- PIRATES OF THE CARIBBEAN [2006 – DATA EAST PINBALL]
- FAMILY GUY [2007]
- SPIDER-MAN [2007]
- INDIANA JONES [2008]
- WHEEL OF FORTUNE [2008]
- NBA [2009]
- CSI [2009]
- IRON MAN [2010]
- AVATAR [2010]
- TRON [2011]
- THE ROLLING STONES [2011]
- TRANSFORMERS [2011]
- THE AVENGERS [2012]
- AC/DC [2012]
- X-MEN [2012]
- STAR TREK [2013]
- MUSTANG [2014]
- THE HOBBIT [2016]
- ALIEN [2016]
- DIALLED IN [2016]
- LEXY LIGHTSPEED ESCAPE FROM EARTH [2017]
- PIRATES OF THE CARIBBEAN [2017 – JERSEY JACK PINBALL]
- RETRO ATOMIC ZOMBIE ADVENTURELAND [2021]



► I had finished *Krull* and management said I could design a new sound board [for their coin-op games]. Commodore gave me engineering samples and I was going to put two SID chips, with really good capacitors and really good filters, something they didn't do on the C64, plus another processor on this board. It would have six channels of sound plus a TI chip for speech. I had a C64 at home so I knew what the SID could do and that's why I wanted it – it was wildly better than anything else on the market. I had a wire wrap prototype made up and I knew we had something that would blow everyone else away. I was ecstatic! Then a white-shirted guy from purchasing showed up and said Commodore had decided they needed all the SID chips they were producing for their own products. I was crestfallen. That was my worst day at Gottlieb.

Was this one of the reasons why you left Gottlieb in 1983?

Gottlieb were really being dicks with their employees, like when *Video Games* magazine came to do a feature on *Q*bert*, we weren't allowed to use our real names. I was J Walkman. If you're creating something, you wanna say 'Hey mom, look what I did!' and they were cutting that off. Plus I was working six days a week, supporting all the game projects, working like crazy and being paid a low level engineer's salary when *Q*bert* had made them millions. Also, I could see the coin-op industry was

in trouble. Games weren't being made and there were all these problems with laserdisc [technology].

You joined Action Graphics as an 'aesthetic engineer'. Erm, did you come up with that job title?

Yes, I did. I was a programmer but I was dealing with aesthetics – they thought I was nuts but let me do it.

You work on conversions of such games as *Beam Rider*, *Pitfall!* and *Pitstop* for various machines, including the C64, ColecoVision and Atari 2600. In terms of creating audio, did each machine require a different approach?

[laughs] They're all like snowflakes – every one is different. I mean, they all have a sound chip, which is usually three or four channels and there's a register and you can make it play —a tone... but you have to play with pitch in insane ways!

Did you enjoy working on the famous SID chip?

It was great! I mean, it's the moral equivalent of three mini Moogs. It's an extremely powerful thing and the guy who designed it [Bob Yannes] was a unique individual. Very few digital engineers know about analogue but this was his passion and people are still using it today to make music.

You are one of the few people we have spoken to who worked on Coleco's short-lived Adam computer.

At the time, we didn't know it was going to fail as spectacularly as it did [laughs]. It was the first multimedia machine and the game I worked on, *Richard Scarry's Best Electronic Workbook*, is really the precursor to CD-ROM titles. The Adam had a computer-controlled tape drive so you had access to big data and it even had this daisywheel printer, so you could, for example, store all your recipes and print them out, as well as having all these ColecoVision games and new games that leveraged this big storage. It was sounding like the ultimate home computer!

When Action Graphics folded, you set up a

“The SID chip in the C64 was great! It's the moral equivalent of three mini Moogs”

David Thiel

new company, Free Radical Software, with Richard and Elaine Ditton.

Was that a risky venture for you?

It was a huge risk. We estimated we had about 90 days' work to do on the project we were

working on, *Winter Games*, when Action Graphics went down and the three of us looked at each other and said, 'We can just stop now and never see our back pay or we can finish this game.' We thought it was going to be a pretty good game so we spent the next three months working on it at home and it turned out to be a big hit for Epyx on the C64. Richard, Elaine and I were all in debt and had no investors but we still decided to form a company because we knew Epyx wanted to port it to everything... and we knew all the platforms!

So the company was built on the success of *Winter Games*.

I personally coded the Atari ST version, Richard did the Amiga one, Elaine worked on the PC release, there was a Mac release... it was ported to anything that wasn't nailed down. The money from that helped us pay our mortgages through that time and then pinball loomed large. Richard had always wanted to write a pinball operating system and Gary Stern's new venture, Data East Pinball, needed one... that contract allowed us to move out of our bedrooms into 10,000 square feet in Arlington. The landlord refused to put the name and Free Radical Software on the sign outside so we changed our name to Incredible Technologies.

You worked on several pinball tables for Data East, including *Secret Service* and *Time Machine*. Were you happy to be back in the coin-op business?

You have a lot more resources than for home games and you kind of 'own' those resources. You make a sound and put in on [the board]. You're the master of your own domain! It's not like you're making sounds on the C64 and the programmer sees you as eating his resources. I got to design the sound board for Data East and configured it to be the first stereo board for a pinball machine. That was great.

CHAIN REACTOR

"A certain kind of player really liked it," explains David of *Reactor*, the first game Tim Skelly designed for Gottlieb. "To play it successfully, you had to be sneaky and stealthy. There's tons of subtlety and the engineers at Gottlieb and I thought it was the greatest game ever... but teenage boys wanna storm in and punch something." The game, for all its beauty and originality, was not a hit in the arcades but surprisingly was ported to home consoles through a publishing deal with Parker Brothers. "It even had a TV advert which featured my music," grins David. "I'd spent the last decade playing in bands, recording and touring, and after a year at Gottlieb, my music is on television! I knew I'd made the right decision getting into videogames."



» [ColecoVision] *Rock N' Bolt* was a clever little puzzle game David worked on during his short time at Action Graphics.



» [Atari 2600] *Artillery Duel*: David managed to coax decent sound effects from even the most humble of sound chips.



» [Amiga] *The Three Stooges* was one of many fine releases from Incredible Technologies, the company David cofounded.



» [Arcade] *MACH 3* was Gottlieb's first venture into the doomed laserdisc format.

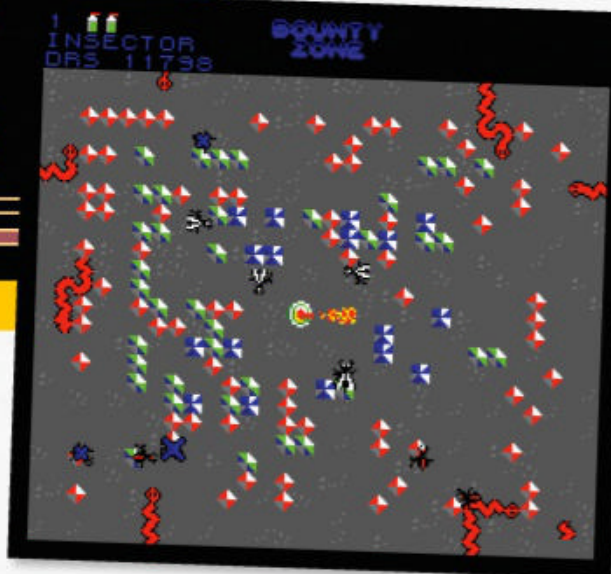


» [Arcade] *Krull* was based on the film of the same name and was actually better, which may be damning it with faint praise.



» [Atari 800] *Pitstop*: careful with that nozzle...

» [Arcade] *Insector*: an unreleased game from Tim Skelly with David providing the audio – it now exists on MAME.



In the Nineties, you join Microsoft and end up sharing the stage with Bill Gates at the CES in 1995 – as a parrot.

They relocated me 1,700 miles for that [laughs]. Microsoft had hired Tim Skelly and they got to the point in their project where they needed sound and he said 'I know a guy...' They'd been working on this anthropomorphised user interface... some of their Stanford guys had done research and come to the conclusion people would have a better experience with a computer if they were dealing with a character. That's probably true but the ability to provide that even in 2021 isn't really there. That's why Siri and Alexa don't have a visual element. Tim had been working on this character Peedy the Parrot and we had this Silicon Graphics workstation and another computer doing the voice recognition. It had a decent vocabulary it could understand but in terms of speech, they went with synthesis and frankly the best synthesiser you could buy in the mid-Nineties didn't sound much better than the Votrax one I used in the Gottlieb days.

What did you do?

They had taken all this trouble to make a beautifully animated parrot and his voice sounded terrible. I couldn't code some brilliant text to voice software in eight weeks, so I pre-recorded all the voice clips they needed for this CD changer they wanted to demo. Hey, I can do a parrot! [does impressive impression of Captain Flint from *Treasure Island*] I did that for weeks... and if we ever needed new vocabulary, I was there to do it!

In the new millennium, you returned to pinball and have worked on almost 30 tables. Have you a favourite?

Family Guy I like. My wife is very tolerant of my work and she'd choose that one. We got Seth [MacFarlane – creator of the series] in a recording booth and he did a huge amount of voices for that machine. My favourite, though, is actually a British game, *Alien*. It's from Highway Pinball and though the guy behind that company couldn't manage a one-car funeral, he hired some really good people from the USA. I was one of them and the game turned out really well. Only 200 were built... and I've got one! It's the only machine I own and my wife provides the voice of Mother.

So if you had to choose: joysticks or flippers?

[Thinks for a while] I like doing videogames but if I got a job in the industry now, I'd spend six months just doing gun sounds, so at this point in time, it's flippers. I'm currently working on four pinball tables for three different manufacturers and they should all be out this year. I'm doing more work now than I've ever done in my long career! ★

Thanks to Martyn Carroll for his help with this article.

YOU ASK THE QUESTIONS

Readers can get involved at www.retrogamer.net/forum

MERMAN: What sort of sound driver did you use on the C64?

Something I wrote myself. I was working on a game called *Rock N' Bolt* and the programmer wanted music while you were playing and that's hard with only three voices. Something's gotta give. My custom driver which sat on top of the SID chip did a clever thing – I ran six channels of sound through a three channel device. If a sound effect had to happen, it 'stole' that channel but in such a way that the other channel was still running but just not touching the hardware, so when the sound effect is done, the music picks up where it would've been and you just think you didn't hear it because the sound effect was so loud!

NORTHWAY: Did you have tools on the C64 that would analyse real sounds and generate similar synthetic sound effects?

No! It was all my brain thinking 'How can I torture SID to produce a sound that reminds me of, say, the crowd applauding?' It was all clever pitch modulations and filters to get you in that ballpark.

TT: Were you any good at the arcade games you worked on?

I was pretty good at *Reactor* but not so good at *Q*bert*. We did have a game room at Gottlieb with our competitors' games in as well as ours. When I was in the mid-afternoon doldrums and I needed a stimulant, I'd go in there and play *Robotron*, *Centipede* and *Missile Command*. Those were my three. I could get pretty deep into *Robotron*. I didn't drink coffee and if *Robotron* can't get your adrenal gland going, nothing will.