KILOBYTE

MAGAZINE

2019 / 1

8BIT ONLY

CONTENT

GHOST IN THE MACHINE

KILOBYTE MAGAZINE's **GEM AWARD** for games with exceptionally clever concepts, great playability and/or impressive technical features.

Kilobyte HIGHSCORE

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Photo: Boris Kretzinger

Schneider

Schneider
Diskette
2D-48tpi

There are nice covers in your diskbox as well – we're sure of it! Please send your scans or photos to: kilobytemag@gmail. com

SCHNEIDRAD_____
Schneider sold Amstrad computers and equipment under their name in Germany. A clever deal by Alan Sugar as the company had a good re-

putation for affordable electronics in Germany and all the sales contacts Amstrad needed. For a time, they also offered blank floppy disks. *(bk)*

GOING BANANAS

Floppy disks had some strange brand names going in the 80s and 90s. One of them are Banana disks. I had to restore the label of this one digitally, and it really shows that they had either no clue what to emphasize on there, or they were not taking themselves seriously. It's reversible – oh really? Big news. And it sports two write protect notches – wow. Granted, most disks back then only had one write protect notch. But it was no trouble at all to make another one. Not really worth paying one penny more for it. *(bk)*

banana

Part No: 2 Rev
D/Sided D/Density
2 write protect notches
Reversible

banana
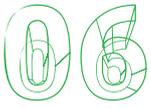
POINT AND CLICK

WHAT DOUGLAS ENGELBART DIDN'T KNOW ABOUT MICE
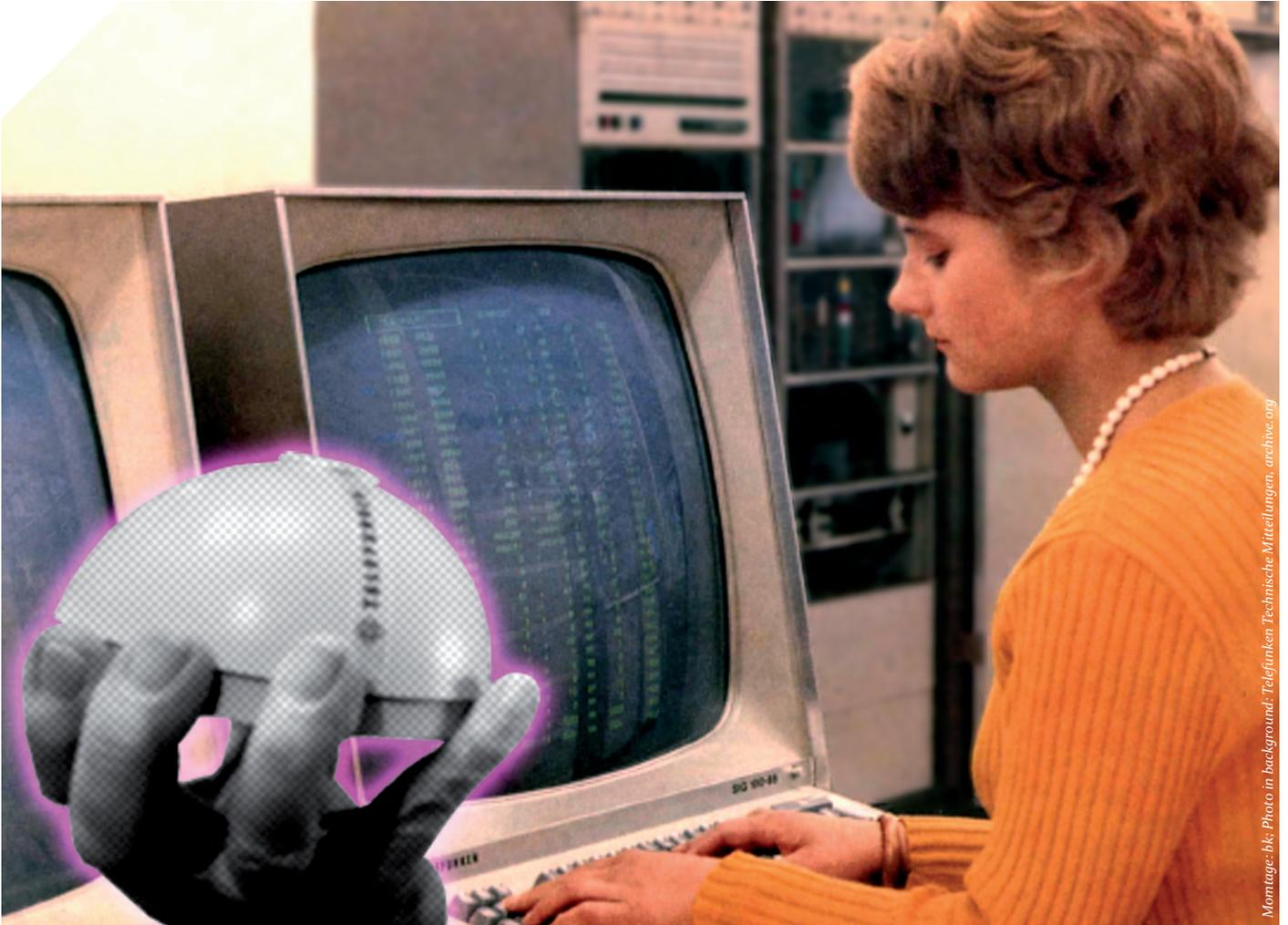
Two months ahead of Douglas Engelbart, Rainer Mallebrein and his team of engineers developed the first computer mouse at Telefunken, Germany.

Depending on how old you are, this thing looks either like a prop from an old scifi television show or a bell you'd expect at a hotel's reception desk. But it actually is the first computer mouse that was sold with a computer. Not for home use, but for special duties like radar surveillance for military or air traffic control. It is called "Rollkugelsteuerung" (RKS) which translates roughly to trackball steering, and it's from 1968. The very same year that Douglas Engelbart presented his now well-known "mother of all demos", featuring a pointing device just like

this – but not quite the same as this. Two months before, German-based hitech company AEG Telefunken presented their RKS along with their computer system TR440. It was then the most powerful computer system developed in Europe, being able to execulte 800.000 operations per second. It was very expensive and only 46 units were built between 1968 and 1974. But its most remarkable feature looking back now is the then unseemingly RKS, merely a footnote in Telefunken's brochures. In fact, this device was even considert to be not patent worthy by the German

patent office, where its designer Rainer Mallebrein had hoped to achieve just that. The technical progression, the patent office lamented, was not sufficient for a patent. That was correct, as Rainer Mallebrein admits 40 years later in a newspaper interview, with regard to the mechanics of the device. However, the innovation was within the problem-solving-capability for the user. But Mallebrein and his team never went for another shot. Maybe even more so because they themselves thought that all they did was reversing the trackball: instead of spinning a fixed ball around, you could now roll the ball across the table. It was a simple deduction for them. Douglas Engelbart was not aware of their invention, but together with his team came to the very same conclusion at the time. They, too, knew how a trackball worked, and they found a way to reverse the input method so that it was easier to use, but functioned slightly different. But why change the trackball concept at all? The answer, according to Mallebrein, had to do with the furniture of the potential clients. The monitors, or "Sichtgeräte" (SIG), as Telefunken called them, were standing on a wooden desk together with the keyboards. The trackball, for comfortable use, was not a device to place next to the keyboard, but something they had to drill holes for in the table and install it. They feared that customers would not like this, and so they came up with their more elegant solution. The customers they were having in mind were the air traffic controllers who could point their cursor across the screen, click on an aircraft symbol on it and get or alter information about it. The mouse itself is a halfed sphere with one button on its top. It did not transmit every step impuls directly. Instead, when the button was pressed, it "collected" the motion till the next button pressing, calculated the movement and then transmitted this information to the computer. This was unheard-of space-age-stuff, but the potential clients were not that eager to buy the quite expensive systems. And when they did, ironically, they often opted for the trackball instead of the RKS if they needed a device like that. So Telefunken did only senn a handfull of their devices with their 46 computers. It is a wonder that any one of them survived till today, but their inventor, Rainer Mallebrein, preserved one which he gave to the German Computer Museum in Stuttgart 2014. *(bk)*

Did you spot the mouse in this picture? It's easy to overlook and it is not even mentioned in the Telefunken brochure from which this photo was taken.

SACRED BOARDS

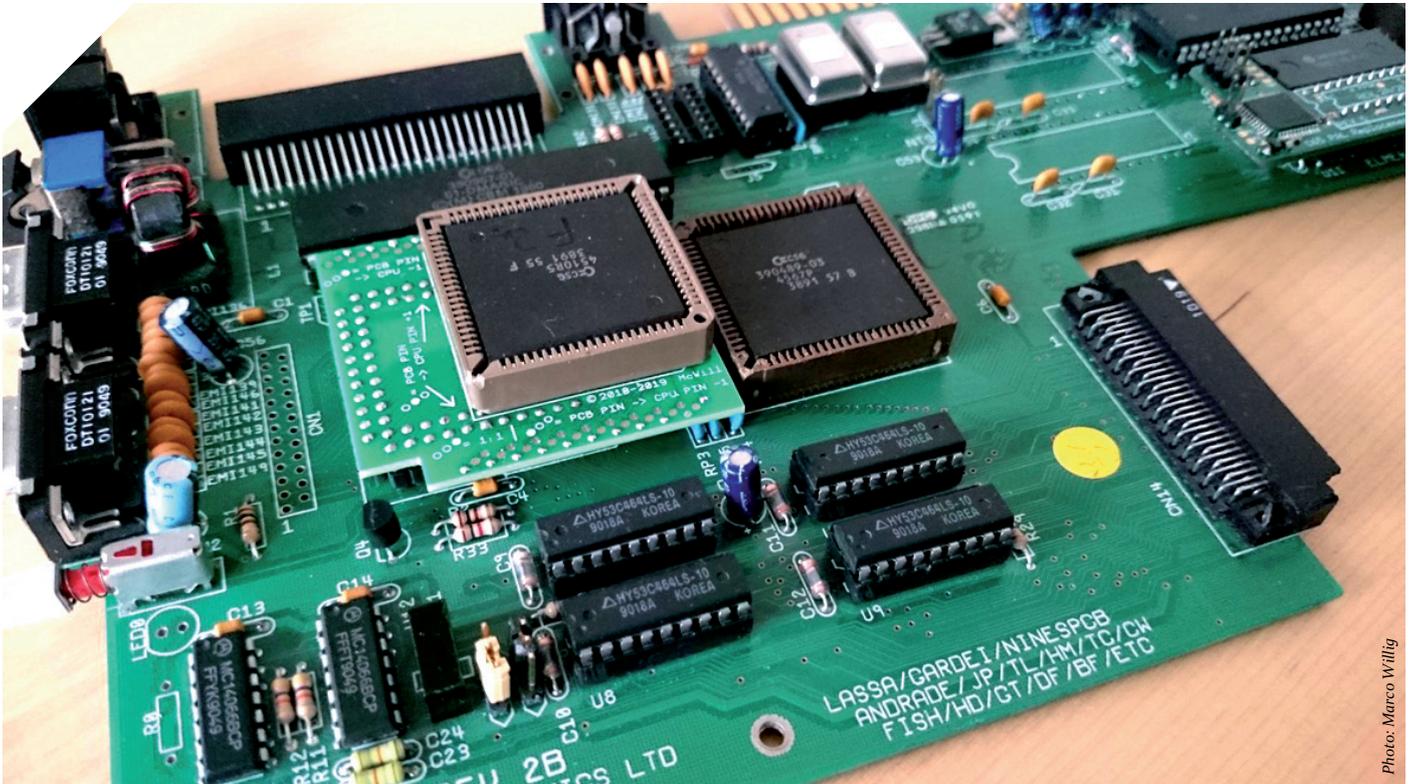## THE ONE-MAN REPAIR SERVICE FOR C65s

Photo: Marco Willig

Depending on the Revision of the C65 board at hand, you'll need an adaptor to use certain CPU revisions.

If your C64 turns belly up, you might have enough faith in your soldering skill to roll up your sleeves, fire that iron up and try to repair it yourself. After all, what's the worst that could happen, it is already damaged and chips are still rather easy to find. But what if you had a computer that was really scarce. A prototype maybe, without plenty of chips to find when something breaks? Would you still be willing to repair it yourself? That was exactly the question Marco Willig asked himself after he bought his first C65 mainboard back in 2016. Many chips were missing, but he wanted a C65 very much, so he took the opportunity. It wasn't hard to find RAMs and SIDs for the machine, but searching for the CPU

and VIC-III posed a tough challenge. Luckily for him, the seller from whom he got his C65 board offered him two more boards several months later. "It was a defective Revision 5 board and an unequipped Revision 2B one. They were still rather expensive, but I had spend much time studying the schematics of the Revision 5 board, so I was able to fix it within two weeks", Marco remembers. And that was when his passion for repairing C65 boards ignited, having one functioning and two spare part ones on his shelf. "I've known my way around the soldering iron for 25 years, had much experience with other Commodore machines and was quite optimistic that I could do it. Besides, a working C65 is always better than a defunct one",

Marco smiles. He dug into the ghost of the machine, learnt all the little details that made it tick, but two problems had to be tackled in another way if he wanted to repair his other boards: what to do when CPU and VIC-III are needed. So he began working on an FPGA design for the CPU, the 4510, building on his FPGA design of a C64 that he presented at eJag Fest 2018. "Unthinkable to open up a 4510 and take photos, so I had to take another approach", he says. Thankfully, this chip is rather a slightly enhanced version of the well-documented 6502 with two integrated 6526 I/O adapters, so he could work from there. "Because the timing of the C65 CPU is different, it wasn't quite as easy as I had hoped originally", he remembers adding: "There are still some things to do before I can release it." In the meantime, having shown his work at eJagfest and mentioned it here and there online, some people asked him for help with their defective C65s. "It was coincidence, really. And although there is not a huge demand, it's reasonable wanting a working computer over a dead one." He repaired quite a few machines since then. "Most of the time, short circuits and discontinuities of or sort or another are the main culprits. This is a delicate matter, as electical shorts can damage the chips, but thankfully, they are quite robust. I remember that I once had a bad DMAgic chip that did not trigger resets correctly anymore, but the

client was content leaving it like this because after switching the machine off and on a few times, it worked again."

With the C65, it is extremely important to know the specifics of each board revision. You can't for example just put a 4510R5 CPU in an earlier board as the pin design had been changed in the latest revision. So Marco built an adaptor with switches that allow to use any revision CPU in any board.

Despite his knowledge about the C65, Marco is not involved in the MEGA65 project which aims for a new machine that is compatible with the original and adds a few extras here and there. He wants to stick to the original hardware – and every C65 owner who has a problem with his machine will thank him for that. Not only did he design the CPU adaptor, but also produced a reproduction of the RAM expansion card for the C65 that is even rarer than the machine itself.

And if you don't have a C65, chances are quite good that you are familiar with his great work anyway. If the famous McWill display mods for the Atari Lynx and Sega Game Gear ring a bell, now you know why. But if you are one of the lucky C65 owners: If you have a problem, if no one else can help you, maybe you can hire: McWill. Keep an eye out for the release of his FPGA 4510 CPU and if you have any questions, you'll find the C65 repair thread on forum64. de.   *(bk)*

Photo: Marco Willig
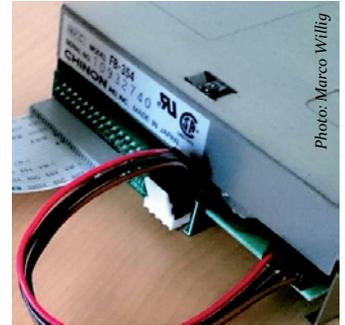
Marco also made an adaptor to connect standard floppy drives to the C65 without the need for soldering.

THE FINAL FRONTIER

8BIT CHIPS IN SPACE

Space – the final frontier. But to boldly go where noone has gone before, some very special passengers had to get on for the ride on rockets: integrated circuits. At first, custom CPUs were built in discrete logic to perform the necessary tasks onboard of space crafts like Pioneer 10 and 11. Launched in 1972, they are now at least twelve billion kilometers away from earth. The last signal received from them dates back to 2003. So their instruments proved to be quite reliable, working after 31 years of cosmic radiation. That basically means they worked despire being fired upon by protons and alpha particles. Over time, the chips

desintegrate faster than they would on earth. Many space crafts use several CPUs, so that ground control can access different components indepontent of a main logic that might fail. One 8bit processor was used quite often for space quests: The RCA 1802. It was introduced in 1976 and is being produced to this day by a company called Renesas. It can operate on very low power, slowing the processor down to a clock speed of zero if necessary, putting it to a kind of hibernation. But it had another thing going for it: The 1802 was also available as silicon on sapphire technology. This means that a very thin layer of silicon rests on a sapphire wafer. Those sapphire crystals are artificially grown, by the way, which makes them harder and more robust, giving the chip a great long-term stability. It withstands radiation as well as low and high temperatures far better than any common silicon chip you'd find in household electronic devices. Naturally, those

so-called SOS-chips (for silicon on sapphire) are quite expensive and are produced in a very low quantity, propelling their price per piece easily to a couple of thousand dollars. This is why you won't find them in any device you might have at home – with the exception of maybe a Hewlett-Packard HP-10C calculator, but that is a different story.

At the time when RCA offered a radiation hardened 1802 mircoprocessor, they had not many competitors in that field. So they became first choice for several applications, and their chips were set to conquer the stars: The first space shuttles in 1981 used 1802 for their display controllers. NASA's space probe Galileo, launched in 1989, used a total of six 1802 which controled the high and low level modules. And it even found its way onto the Hubble space telescope.

And that's just three examples. But if you think that 8bit chips were not used for space missions after the 80s

Photo: Konstantin Lanzet, Wikipedia
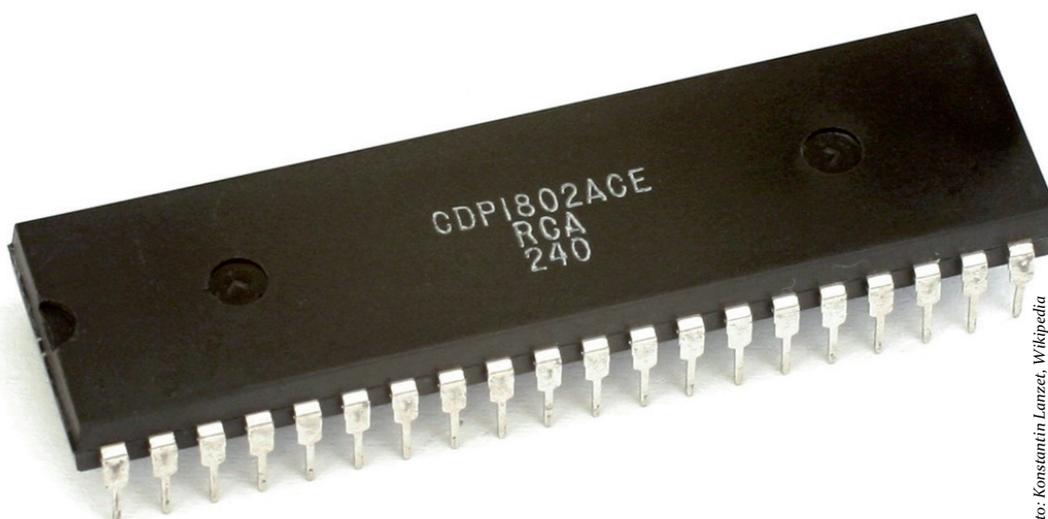
Although the 1802 was aboard many space ships, it was not used for the famous Voyager probes or the Viking mission.

were over, you would be mistaken. Another chip was used quite frequently and it just so happens that it was also released in 1976: Intel's 8085. It sported built-in serial I/O, five prioritized interrupts, ran at 2 Mhz and operated on a single 5-volt power supply. It was so hot that Soviet Russia bothered to develop a clone based on the 80C85, powering it up to 5 MHz while reducing the current it needed further. Sojourner, the little vehicle that drove around Mars during the Pathfinder mission launched in 1997, was equipped with this little CPU. And when in 2007 the THEMIS mission began to study energy releases from Earth's magnetosphere, one old acquaintance was on board: Yes, again the 80C85.

By using well-tested designs and a certain degree of redundancy if one system fails, space agencies like NASA minimize the risks attached to every space mission. "The more understanding you have of a device's failure modes and causes, the higher the confidence level that it will perform under mission environments and lifetime", says a NASA presentation from 2013. It's not at all about the speed of a chip in space. It is all about reliability and radiation shielding. One glitch or system reset at a critical time could have catastrophic effects. 8bit chips with a quite limited design, harbouring only a few thousand transistors, are ideal for the job. They perform perfectly. And although the computer

equipment NASA uses nowadays is a bit more advanced (like Power-PC era stuff), it is still outdated – and used for exactly that reason. Speaking of performance: Remember that the computer on the Apollo mission only had 36 kilobytes of memory and ran at one megahertz. It was absolutely sufficient for the job. So if NASA is using old tech today, how are chances that 8bit CPUs and controllers are still in use today? Well, the chances are getting slimmer. There are more radiation hardened chips to choose from nowadays, but power consumption might still be a strong suit of 8bit chips, performing certain limited tasks. But why are there no SOS Z80 or SOS 6502 chips out there? This might be because the demand for this expensive technology was quite low at the time, with other, more advanced chips filling up the slot and the 1802 already being offered. Also, the companies producing those chips had no way of producing them without large invests and even subcontracting arms manufacturers to guarantee the availability of their product. Rockwell, MOS Technology (and subsequently CSG), Synertek or Zilog were all aiming for mass production, not for the faint hope of government contracts. It would be nice to know that some 8bit technology made it into the intertellar probes that both Pioneers and both Voyagers are now. But they did not use any 1802 or 8085, but their own discrete logic CPUs. *(bk)*

SCENE WORLD

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SID TO GO

LISTENING TO YOUR FAVORITE SID TUNES EVERYWHERE

All he wanted was a decent online SID player. And because there was none, he made it: "An online player gives me immediate access to HVSC and CGSC without having to download anything first. Just everything ready to play, search through and rate no matter if I'm on my desktop, on my iPhone or on my iPad", says Jens-Christian Huus, who is well-known among SID aficionados under his handle JCH. DeepSID is his work. You'll find it online at http://deepsid.chordian. net. Now what makes it so special? "I tried to make an online SID player that could offer a lot of really useful features and information not found anywhere else. Easily available STIL information, the player used for each tune, rating the tunes, live

piano roll, discussion threads, and much more." KILOBYTE MAGAZINE talked to him about his project and his C64 dedication over the years.

When did you start this project and what inspired you to do so?

It all started out by being miffed by the inadequacies of existing SID players, both online and offline. I wanted to listen to HVSC tunes from one end to another, but I wasn't comfortable going through more than 50.000 tunes with any of those players. Most didn't handle STIL information well. It always seemed to be something they wanted to hide away in a pop-up window. Why not always show it straight up when clicking a tune? This thinking began

rolling a snowball down a hill. I also wanted to be able to rate the SID tunes. And as I was making my table with comparison of C64 editors, I really wanted a good way to search and list the tunes made in particular players. I also wanted an easy way to see when they were made, to find the newest ones.

Before long, I had a long list of wishes that none of the other SID players could do, and I was seriously considering making my own online player. Another big yank in that direction was when I discovered how difficult it was to play SID tunes on my iPad. There was one player in the app store, but I really didn't like how it handled its user interface. I wanted a web player where HVSC didn't also have to be downloaded and set up. I just wanted it to be there, ready to be played.

So I was close to making the jump, but I was still holding back because of one thing – the JavaScript emulator. I had previously made an extension of a visualization SID page that used a JavaScript player, but it didn't play everything well and it couldn't do digi tunes. Hermit's emulator was better, but still couldn't do digi. I then decided that a requirement had to be support for digi tunes. This is where the project could very well have stranded and there would never have been any DeepSID, were it not for me discovering Jürgen Wothke's Tiny'R'Sid web site. He had an emulator that had support for digi tunes. It wasn't perfect in
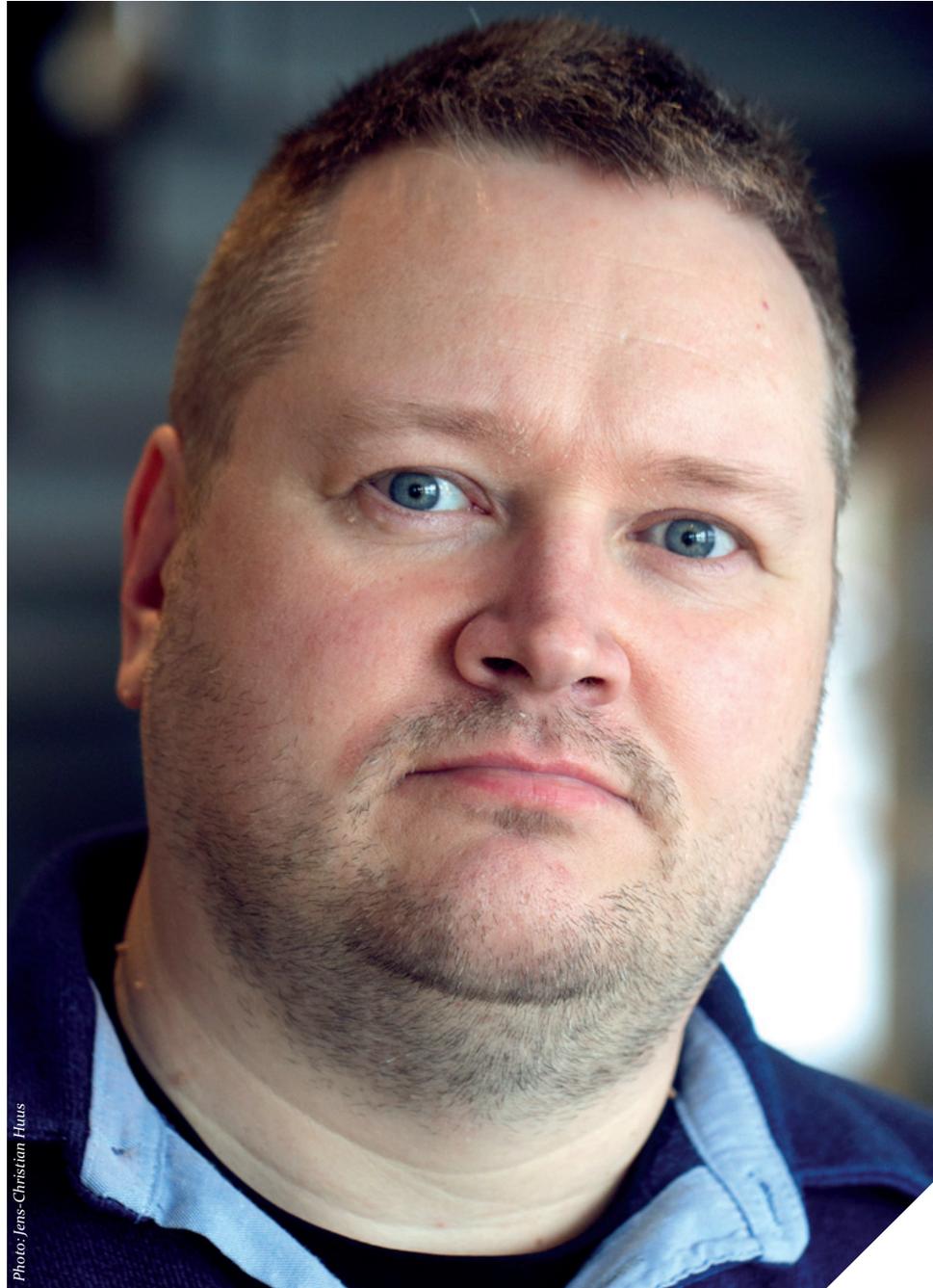
Photo: Jens-Christian Huus

emulating everything, but the fact that it could do the digi tunes was enough for me to finally take the plunge and start coding.

DeepSID uses six different SID emulators to choose from: Web-SID, Hermit's, SOASC Automatic, 6581R2, 6581R4 and 8580R5. For

SID aficionados, it's self-explanatory when to choose a 8580 or 6581. But what are the differences between the first two?

Only the first two, WebSid and Hermit's, are true JavaScript emulators. The SOASC handlers actually play pre-recorded C64 music as FLAC or MP3 files streamed from a different site.

WebSid was the first emulator and it's the only one that can play digi tunes. It emulates most SID tunes faithfully most of the time, and it even supports advanced digi such as 8-bit pulse digi and other techniques than the standard 4-bit D418 stuff. It's also the only emulator that can play the MUS files in Compute's Gazette SID Collection as those files require a separate player. And WebSid can also distinguish between PAL and NTSC speeds.

Another great advantage is that I regularly talk to its coder, Jürgen Wothke, and he's happy to improve the emulator if I find a song that doesn't play quite right.

The advantage of Hermit's emulator is that it's extremely compact and sometimes regular SID tunes sound slightly better (or more correct) in it, albeit the latest improvements to WebSid seem to have blurred this distinction a little. Especially hard restart, a SID technique used to stabilize the ADSR envelopes, tend to sound better in it. It doesn't do any digi (or other RSID) at all though, and it also can't do NTSC nor MUS

files. But a great advantage here is that I can understand Hermit's code well enough to make minor changes myself. I've done this to add reading of registers, a buffer callback, toggling voices, and more.

Why did you choose the 6581R2 and R4 revisions specifically?

SOASC, short for Stone Oakvalley's Authentic SID Collection, is actually responsible for delivering the pre-recorded audio files and they already had these distinctions. R2 and R4 are 6581 SID chip revisions referring to a light and a dark filter setting. R5 is the 8580 SID chip.

What are your future plans for DeepSID?

Actually most of the features I wanted to have pretty much made it by now. There are some minor ones I'd like to do later, such as a dark color scheme for the entire site. Other than that, mostly tweaking and updating the database when new versions of HVSC or CGSC are released.

At one point I was almost adding support for the MobyGames API. I even got hold of the API key from its author and made some notes and preparations. But the problem is that at the end of the day, it's doesn't offer all that much that GameBase64 doesn't already do in its tab, and the really big showstopper is that I wouldn't be able to script a connec-

tion between HVSC paths and game entries like I did with GameBase64. I would have had to make my own connections between SID tunes and what games they were used in. Maybe I could still have done that, however. I'm still thinking about it, because a big bad about Game-Base64 is that it hasn't been updated in almost three years, and many new and great C64 games have been released since then.

The thing with adding features is also to consider how much they will realistically be used. Try logging in, enter the gear icon tab in the top right corner, then take a look at the password change option and the export feature below it. Those two features were added in the middle of March. None of them have been used since they were added.

One thing I've been wishing for ever since I released the site is for someone to make an awesome JavaScript port of the reSID engine. A complete port, with support for everything that the offline version can also do. It doesn't matter if it needs a quantum computer to run; it could be another handler option. Maybe some code to detect how fast the PC is could even auto-select it.

Being a well-known SID musician yourself, which SIDs have inspired you most?

Almost everything that Rob Hubbard did. The first one I heard from him was Monty on the Run and I was so impressed by the palette of talent he could offer. His player was so much better than everything else at that time, with many previously unheard effects, yet he was also capable of composing extremely catchy tunes and often with solos. It was really hard not to get inspired by all that. It was like if Elton John had arrived with his best tunes while simultaneously inventing the piano.

Photo: bk

DIGITAL RETRO PARK

FROM COLLECTING STUFF TO FOUNDING A MUSEUM

Why do you collect old computers or vintage gaming consoles? The answers collectors give to this question vary. For some of them, it is not all about the fun we once had in our younger years with those machines. It is also about preserving and showing them to people who do not collect, maybe even have never seen those quirky old things. This is exactly the idea that sparked the Digital Retro Park in Offenbach, Germany in 2014. Three guys with a lot of ambition, a lot of hardware and a dream began the first steps towards their museum: A small exhibition in a small industrial museum. For a month, the team dedicated most of their free time to this project, guiding visitors through the exhibition and explaining what made the different computers so special. "We never liked museums where all exhibits were put away in display cabinets, we wanted to create a place where visitors could not only touch, but also play with everything", says Falk Heinzelmann, one of the three original founders. Enthusiasm is one thing, but for a museum, the

team needed money, and a lot of it. "We thought that it would be nice to have enough to finance our first year without any hassle", remembers Falk. That would equal 25.000 Euros, the team expected. So they started a crowdfunding campaign. All they had going for them were a a few articles about exhibitions they had already done before, their spirit and some old hardware. They had still to find a room, furniture and a plan on how to proceed after the first year was over. "We felt that the time was right to try it. After all, we had nothing to lose", says Falk. And so their campaign kicked in. Spreading the word via newspapers, online, personally and even via local television, they got closer to their goal with every day that went by. Still, the goal seemed too ambitious for a while. But then, within the very last day of the campaign, a big financial support from the Aventis foundation secured their success. "We had worked so hard for this and we just could not believe that we did it", remembers Falk. But there was still a lot of work to do. Foremost finding a room for their museum proved to be a tough challenge. And it took them some years, until in 2018, they finally found a location in Offenbach. During that time, they kept doing exhibitions within the Rhein-Main region, talked to their supporters, fulfilled the pledges that were linked to their campaign and dedicated even more time into their dream. It's a blueprint for anyone who dreams

of opening up their own museum: The work never stops – and so does the need for funding. "Our first year will be over soon, and our financing along with it", says Falk. If they can't secure enough money to go on, they'd probably have to close their doors. The rent is eating up their savings fast and all of them put a lot of work in their project without any salary. Getting financial support in any form from the local authorities or the state is a long and tedious process they cannot wait for. "It's one thing to make a museum out of the things you collect, but it's a whole other matter to keep this museum open", says Falk. The team spent most for their fee-time and nearly all their weekends at the museum, repairing damaged stuff, guiding visitors around the place, planning upcoming exhibitions ... there is always a lot to do. "That is something you have to know: If you start a museum, you dedicate your life to it."   *(bk)*

The Digital Retro Park in Germany is a success story on how to get from a collection to a museum. But it's also a great showcase on how much work and money is needed to keep such a museum going.

This title reminds you on something? Of course it does, moron. Flight of Ikarus. Duh!

The NES got *Parodius*. The Sega Master System got *Fantasy Zone* – and now it got *Flight of Pigarus*. And this is one impressive looking virtual scrolling Shoot-'em-up. The story is as precise as it is short. According to the manual, "you are Pigarus, the flying pig. Score as many points as you can in the allotted time." This instruction gets only trumped by the instructions of Pong, "avoid missing ball for high-score." So you fly around with your pig, shooting ducks, cows, flowers and many more things this charming game throws at you. Collect some bonus jewels to increase your score and upgrade your power by grabbing power capsules. If you get hit by an enemy, your shot gets degraded until you only have one your basic shot left. Get hit one more time and you'll lose a life. This is actually quite a fair system, however, it can already be tough to progress through the first level if you don't pay close attention to the enemy attack waves. You got to

learn them or have very quick reactions. Impressive: The background looks more like something you'd see in a 16bit game, very detailed. And on a first glance, this game could easily be mistaken for an Amiga or even Mage Drive game – chapeau! You can shoot a lot of what you see down there, which is very satisfactory. Also, shootings chests on the ground will spawn jewels and rake up your score. And why bother sparing anything down there, anyway. You're just a pig, so behave like one. Although a very cute one. And boy, there is a whole lot going on onscreen without any noticable framerate drop. This, also, is something you'd rather expect from a 16bit game.

There are two options to choose from: playing for two minutes or playing for five minutes. All you have to do is survive and shoot as many things as possible, making this a great party game to go for the best possible highscore. The music is also superp, developer Kagesan really created something very special here that needs to be on every Everdrive out there. The ROM image can be downloaded for free via SMSpower and there sadly is not cartridge ver-

sion to be bought. But the zip file with the digital image comes with a authentic box art image and pdf manual in the style of the old Sega Master System ones.

It's a funny, highly-addictive game that just shows how much fun their developers had putting it together. And if you think it looks great on a LCD, try this on a regular CRT television. It's simply mindblowingly entertaining.   *(bk)*

WHAT REMAINS

The first thing that comes to mind when you load up *What Remains* on your NES is *Stranger Things*. Not only does the font look like the one of the celebrated Netflix show. The title music does, too. And although the copyright claims it to be released in 1986, it is a brand new graphic adventure game for the good old Nintendo Entertainment System. You play as a young skater girl that wants to visit her good friend Michael and enjoy a rad skate session in the park. Nothing special so far, you watch your mum go to work, go outside and suddenly some car drives by. Whoever was in there seemed in quite a hurry and throws a NES game at you. Or at least that what that cartrigde looks like. The label does not tell you anything helpful, it just reads "DNY Corp." Not your typical rental store copy, that's fore sure. But as Michael has a

Nintendo and you don't, this strange occurance won't alter your plans. So out you go then – and welcome to a great 8bit world to discover.
You start in the streets in front of your home in a small city. A guy near you walks up and down the street and he seems to be excited about something. So naturally you walk over and talk to him. And this is where you will start to fall in love with the wit and charm of this game. He is celebrating 1986 and is looking forward to the 21st century, where everything will be connected and just awesome. Right? Well … going back inside, you can discover the flat you and your mum live in. There is a copy of Time Magazine lying on the kitchen table: "Wallstreet scam, making millions with your money", it reads. And our heroine thinks to herself: "Finally people will learn about this culture and stop repeat-

ing the same mistakes!" Well … and this is where you notice that his game is not lightheartedly funny, but also offers you some social criticism in small nibbles. And there is much to discover here. Strolling around this world, talking to the people and entering buildings like a tobacco shop, the diner your mum works in or an aerobics studio, you'll not only get the right dosage of 80s flair, but also a view on the world that fits this era – and sadly, in many regards, our current century as well. After you traipsed round the city, you come find Michael's apartment. He will only be at home after you made the whole tour through the city and went by the storefront with all the television sets, overhearing an interesting broadcast. At Michael's place, you check out the NES game, break the code by playing a very rudimentary breakout clone and learn about a high-level conspiracy. You decide to spread the word in a charming way: you blow a whistle (pun intended) and get on everybody's nerves by doing so. The

only one who believes you, aside from a paranoid conspiracist on the street, is your mum. And after you told her, you will be able to progress to the park. Thereafter, you'll get so see a lot more places in the city (like an Arcade – yes, you thought they'd forgotten to put one in, right?) and outside the city. Playing an hour or so into this game, you have to admit: They indeed succeeded at combining a visual novel with adventure elements into a story about two kids saving the world. It is unagitated, yet captivating. The graphics style makes it look a bit like Retro City Rampage, the city and park are vibrant and it is really fun to talk to every single NPC you can find. The texts are clever and the jokes the game makes about itself from time to time are also a nice addition. You just can't help but fall in love with this little gem. It's a must-play on the NES! Go grab it for free or on cart! *(bk)*

„God bless expert panels that are put together by fact checking journalists!"

♥×3　008520　42　STAGE 09

For some, a nightly stroll is romantic. But for Sir Bernard, it has become a tiresome necessity. The good knight has been cursed by a witch, and the only way that he can find any sleep at night is by taking a long walk through the enchanted castle Scarkeep ini his trusty old yellow pyjamas. Only then, after a long time of walking, he will be able to close his eyes and rest for a while. But of course walking through this castle is not an easy task, as it is full of evil creatures at night. They are not too fond of him disturbing their nightly routine of walking up and down, talking about the latest gossip from the floors they cannot reach. And there is a lot of them: 80 floors in total. The only way for Sir Bernard

to get rid of the curse is to wander through all of them. "Each monster has its own specific behavior, so it is very important to understand how they move and react to Sir Bernard to be able to successfully complete the game", game author Juan J. Martínez explains in the manual. To complete each screen, the player has to walk over all floor tiles, which will then change color, indicating that they've been touched by him. After he walked all tiles, a key will appear that he needs to fetch and get to the exit. This endeavor is getting more and more difficult the further you progress into the game. All the more so because you need to complete the rooms within only 60 seconds. Some itmes can be collected that stop

time or reset the timer. Touch any enemy or get hit by their arrows, and you will lose one of your three lives. But for every 10.000 points, you will gain an extra life. A password feature allows the player to continue at the last stage he left before turning off the game. "Without passwords or snapshots, if you're emulating, I don't think many people would see the end", says Juan on the MSX forums, acknowledging the difficulty of the game's later levels.

The graphics are cute and if you are familiar with the games by Juan, you will recognize his style. Although this time, he programmed on the MSX instead of Amstrad. The sys-

tem sees an increased activity by retro programmers lately. Musically, we get a quite catchy tune here. Although the title is free, there is a collector's edition of the game available from Polyplay. The boxed cartridge costs 35 Euros and contains a manual, a poster and a micro SD-card that contains the game image (as ROM and CAS files) for use with emulators as well as the MP3 soundtrack.

The game certainly takes some inspiration from *Miner 2049er*, building on that base and adding some nice features to the gameplay. It will work on any MSX computer with at least 16K RAM. *(bk)*

GAME ON

WOLFLING (C64)

When the night begins, I shapeshift. As soon as the moon rises on the sky, I turn into a wolf. I was born this way, and I tried to hide it as long as I could. Because in our world, this kind of mutation is considered a thread. Baron Baranov hunts for us Wolflings and imprison us in his dungeon. I managed to avoid his catchers for several years, but finally, they got me. The Baron fears all creatures of the night. But I will try to escape his prison. And maybe, I can even break my curse. I am Ling, and this is my adventure.

Wolfling by Matthias Bock is a quite special Jump'n'run. You control Ling, who transforms into a wolf when the moon rises. You can tranform back into the girl by holding down the fire button, but she will change again if the level is moonlight-basked. The advantage of playing as Ling: She can jump higher than the wolf can. But his bite attack is quite strong. However, timing his leaping attacks can prove quite difficult. Inside the Baron's castle, you'll mostly play as her, but outside, you will be the wolf, fighting off strange squid monsters (oh, thoese squids ... they are a huge pain in the ...), trying not to jump back in the depths of the dungeon you came from. Find all five moonstones and survive

Squids. You will hate those squids. Lure them into jumping off the walls and then let them do their dance. Don't bother attacking them if you can jump over them. What are they doing on land anyway?

the horrors of the night. The game crams 40 screens into 47K, and it plays nicely. Not surprising: Matthias is no newbee when it comes to programming the C64. He already did *Powerglove* and the infamous *Tiger Claw*. The scrolling of this game is based on the former. Wolfling has neat graphics done by Zoltan Haller, making great use of hires and multicolor graphics for the backgrounds. The music was done by Pierre Martin, who also did the soundtrack for *Powerglove*. *(bk)*

Photo: kimuraz, pixabay (Mt. Fuji), Samueles, pixabay (Samurai Statue).

Japan's feudal era saw famines, warlords fighting each other and the beginning of commercial and cultural exchange between the land of the rising sun and Europe. With all its daimos, samurais and shoguns, it is a fascinating time period that inspired a few great games. When we think of ancient Japan, we actually often mean Japan from 1300 till around 1800. There are a few games on the C64 that cover that era, most of them are either strategy games or economy simulations. Tenno, released in late 2018 by Matthias and Florian Auer, fits the latter. It is, actually, a rewritten and polished version of Kaiser. If you ever played that one, you'll feel immediately at home with Tenno. It takes the player back to the year 1400: "The great Emperor of Japan is dead, without leaving a successor. Clans previously bound by honour to the emperor were unleashed and declared war. The fight for the throne of Japan has begun." This is what the game tells you at the beginning. So you start off with your joystick in port one (oddly enough for any game after 1984). You can either play alone or with up to five other players via hot-seat. If you play alone, you can't fight anyone, of course. But random events and keeping your population fed will keep you busy anyway. Actually, seeing to it that every one of your inhabitants has enough rice to

eat is your foremost priority. Buy as much rice as you can store when it's cheap, as bad harvests will drive the market price up, nearly ruining you. Interesting, when you think about it, how unable your population is to meet their demand for food at all. They just can't manage it. And you have no way of telling them to invest in agriculture. All you can do round after round is hoping they somehow managed to farm in at least half of what is needed, maybe even a bit more than that. And then you have to buy the rest. Don't think you can save a buck or two on their behalf – it won't go down well on them. There will be uprisings and you also might lose some of your land if you choose to go this path. So keep them fed at all costs while spend some money on tax bureaus, which are the only early on to receive a considerable regular income. But don't go wild on the taxation: keep it normal. There is really no reason to lower

taxes, but raising them is also a rather bad idea as it will spawn unrests rather quickly. Build as many tax bureaus as fast as you can. And only then start building the more expensive workshops. There is a limit on how many bureaus and workshops you can buy: for every thousand pieces of land you own, you can buy one of each. And with more inhabitans, more land and more soldiers, you will also be able to build forts and ultimately a palace.

Every round, you will get statistics about how many births and deaths in your part of Japan have ocurred, how many people have left your reign and how many immigrated. Manage your land wisely and you will get promoted until – if you reach more than 5.200 people and 100.000 gold and 30.000 pieces of land – you will finally be called Tenno. It is a long way, and you'll have to endure some long loading times in between, but it's well worth it!   *(bk)*

If you are easily bored by statistics, go and play The Last Ninja instead. This one is for adults! Sadly, there is no music here, only occasional sound effects and jingles that sound rather dull. The graphics are also basic, but sufficient for this type of game.

Always edgy, never dull: Digiloi makes you wonder what the next game of Tero Heikkinen will look like.

You have not played a game like Digiloi before. Well, you might have played the genre as it's an action game where you run around, shoot at enemies and collect something that will ultimately save the world. But it's an all-PETSCII game at that. Yes, you read right: There is nothing but PETSCII things in this game. It's huge, blocky and chunky and it will pull you in with it's charm. Oh, and it comes with a story: A computer weapons ecosystem is about to take over the whole planet. You need to disable the master computer by finding three floppy keys and insert them in the terminal. That's it. If you wonder who is behind this phenominal idea: It's Tero Heikkinen from Finland

who is better known by his handle "Dr.TerrorZ" in the C64 scene. And it is not his first PETSCII only game, as he has proven with Fort Django. But this time around, he managed to make the game more playable, as it really controls precise and plays as fast as you'd expect. "There's nothing special about using PETSCII for games, it was done a lot back in the day. However, not many full screen action games were done using the technique, probably because sprites are far more useful and the clunky char-by-char movement was not that attractive", Tero explains on his "oldmachinery" blog at blogspot. And while it does not provide 60 fps, scrolling and of course blocky color clashing that all C64 users

laughed about when they saw it on a Spectrum, this is a whole different affair at hand. Nobody laughs now, as it really is a uniquely crafted game with a great tune to acompany it and a nice little level design that will keep you at it for some time until you finally beat it. It's not that hard overall, but it will take some tries to understand what you have to do and where you'll have to go. Figuring this out is part of the fun of this game. Tero also converted Digiloi to the Plus/4. "As the game routine operates most heavily in an invisible back-buffer, there are not that many unique routines and addresses in use. So I could convert the game fairly fast to Plus/4 simply by changing the speedcode to point to Plus/4

character and color memory addresses", he explains on his blog. This conversion resulted in an even better performance: "It's more interesting to see that the code runs roughly 30 percent faster at places, even without trying any Plus/4 specific tricks."

Tero made a motivating, accessible game that is fun and can be played through in about eight minutes, if you know exactly what to do. Might be interesting to see a speedrun some day on C64 and Plus/4 in comparison. It's a game you want to show those of your friends who always belittled you for your ongoing 8bit passion while sharing a beer, talking about the good old times and convince them to buy a C64 again. *(bk)*

Run and gun at its best: Blast your way through the levels, but beware of those nasty hopping robots that can't be killed – unlike the UFOs in this picture. But be careful, they will bombard you!

Ninja Odyssey is the best-looking Jump'n'Run on the Intellivision to date. And it plays well, too!

Jump'n'runs have not been the strong suit of Mattel's Intellivision console. Not that it wasn't capable of the sidescrolling part or anything else technically. But the genre really took of with Mario on the NES at a time when this console was slowly on its way into obscurity. Oscar Kenneth took up the challenge, fired up IntyBASIC, read "Programming games for Intellivision" from talented coder Oscar Toledo and got to work. At first, he did not look for Mario as inspiration but rather Wonderboy on the Mater System. "Thilo's Odissey is a Wonder Boy clone – shamelessly similar in some aspects – but with my personal touch and also redesigning the game for the Intellivision hardware capabilities", Kenneth explains on the AtariAge forums. The game featured the well-known blonde little

fella, dodging fires and rocks, killing snakes while collecting hearts to fill up his continuously decreasing life bar. So far, so familiar. But as the development continued and the response from Intellivision fans made it clear that this is an awesome game they'd love to add to their collection of boxed ones, changes needed to be made. This is how it became Ninja Odyssey. So much for the genesis of this game, now let's sit back for a moment and take in what is being presented here: A Jump'n'Run like nothing you've seen before on the Intellivision. There has been Princess Quest in 2014 by Oscar Toledo, which is without any question great. But this one deserves the crown: constant 60 fps (on NTSC), smooth scrolling, detailed and colorful graphics, a nice level design and last but not least level bosses to

Our blue hero can perform double jumps to get across some obstacles.

fight against. Three ancestral ghosts, to be more precise, who haunt the homeland of our brave hero in the hidden valley of Teguma. They need to be defeated to restore peace. The game is challenging at times, but never unfair, allowing you to continue from where you died until your three lives are over. Although there is no highscore counter visible while you play, a score is calculated in the background and you get points for every enemy you kill, item you collect and at the end of the level also for your remaining health. The music is neat and fits the game nicely and the level backgrounds are rich in variety for what you are used to on the Intellivision. As of this writing, neither Ninja Odyssey nor TNT cowboy are available at Naberhood games, who carried all Elektronite productions so far. Elektroni-

te is looking for a new distribution channel. If you email elektronite@ hotmail.com, they'll send you instructions on how to purchase their ROMs and physical games. You'll need an LTO Flash! Cartridge for the ROMs, though. *(bk)*

Level bosses in an Intellivision game? The ghost already looks impressive. But wait till you see what Oscar Kenneth did with his upcoming Antropomorphic Force!

GAME ON

An animated intro-duction, text messages from NPCs and so many levels: Developer Kai Magazine throws around Kilobytes like there is no limit. Oh wait, there barely is one anymore.

When you think of a game system, there are always certain game genres you connect instantly with them. The Atari 2600 has some great arcade conversions, the Colecovision has even better ones. When you think of the Super Nintendo, you may have fond memories of JRPGs. And you won't ever think that JRPG and Intellivision would ever go into one sentence, right? Well, think again. Because TNT Cowboy is here not only to change your point of view in this regard. It also might also change what you think of games on the system in general. It's best described as a hybrid that combines elements of JRPGs – not just with regard to visuals – with a western setting, some world exploration elements and action that will remind you on Bomberman. With more than 200 Kilobytes, it gives the console something to chew on that would not have been possible back in the Intellivision's heyday. The visuals make it look more like something you'd expect on a NES. And although the roleplay elements are still pretty basic, the concept works very well on the system.

STARTING AS A NOBODY_____
You start as a cowboy who wants to make a name for himself. So you spend what little money you have saved to go to a city in the West. Here, you'll get in touch with the inhabitants and also receive some missions to earn money and respect and finally find out what all this strangeness happening in this town is about. The game has basically three different layers: The city mode where you talk to NPCs, visit shops and buy stuff you need for your quests, the map mode where you wander between the city and your

IT'S A GEM!
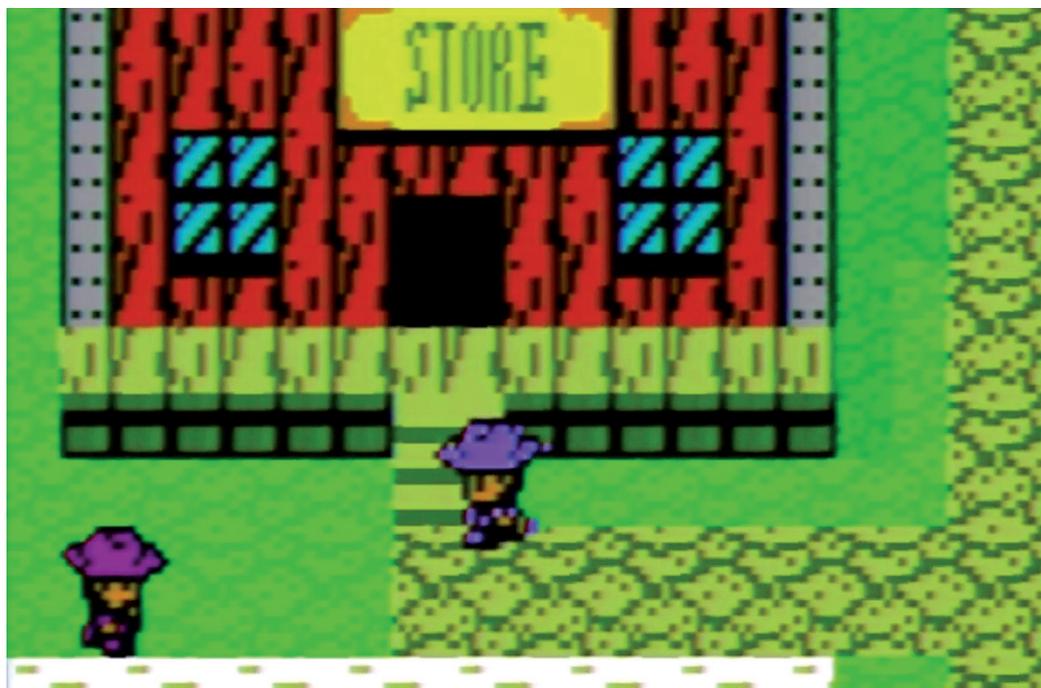
The graphics look impressive and offers a good impression on what to expect from this game: top-notch entertainment!

next destination, and the dungeon mode where you kill enemies Bomberman style.

At start, your pockets are nearly empty. You talk to a guy next to a shop from whom you learn that you can't carry any weapons around this city without a permit. So you go off to buy one for TNT – hence the name. This game is not about shooting stuff, it's about blowing it up big time. Apparently, bullets would only tickle the things you are out to kill. And with that in your pocket, you get the very first assignment from the bartender at the saloon: Go to the warehouses east of the city to clear them of evil bats and rats that have infested it. To regain health or save your progress, you can visit the local doctor. And yes, that's right: you can indeed save your progress onto cartridge. This is a big deal on the Intellivision and an essen-

tial feature for any good adventure game. Leaving town brings you to the world map where you navigate your character to the dungeon of choice. Beside the warehouses this also includes Mines, Temples and Forts, all with different enemies and more than one level. Entering the dungeon, the game plays quite like Bomberman: you place your TNT to blast obstacles away and to kill enemies. You need to blow up all the badies in one level until you are allowed to exit. After you've completed the tour de force, go back to the location where you received your quest and get your reward in form of money and reputation. The more the people think of you, the sooner they'll send you out against skeletons and ghosts. Moreover, by leveling up your reputation, you'll hear more from the NPCs about what happened here and you can

look forward to the conclusion of this whole story. The controls work as they should: placing TNT, walking around, speaking to strangers – you will quickly feel at home in this world.

Graphically, TNT Cowboy has to be one of the most impressive games on the Intellivision as well. The design of the characters is really well executed and the attention to detail at times is just amazing. If you walk through one of the shadows that are cast by the buildings in the city, the color of your sprite will also darken until you step back into sunlight. The music is pleasing, too. Developer Kai Magazine delivered a benchmark game on the system while the community was already rejoicing his earlier released jump'n'run platformer Ninja Odyssey. Oscar Kenneth is the mastermind behind this, and he develops retro games for a living. His output is impressive and he programs mostly for 8bit systems. He takes rightfully pride in the fact that the game runs on constant 50 fps on PAL machines and 60 fps on NTSC ones. TNT Cowboy is also in fact the largest Intellivision game to date.

US-based publisher Electronite is selling only as digital file as of this writing while the production of cartridges with box and manual is expected to start later this year. Also coming this year is another game from Kai Magazine, as Kenneth announced on the AtariAge forums: Antropomorphic Force will be an arcade-style shooter with speech synthesis and huge level bosses that plays and looks quite stunning – we had a chance to see a glimpse at a convention. *(bk)*

Chasing ghosts: Enemies vary depending on the dungeon you go. And some of them need a little more than just one little box of TNT to call it quits.

BERKS FOUR (PLUS/4)
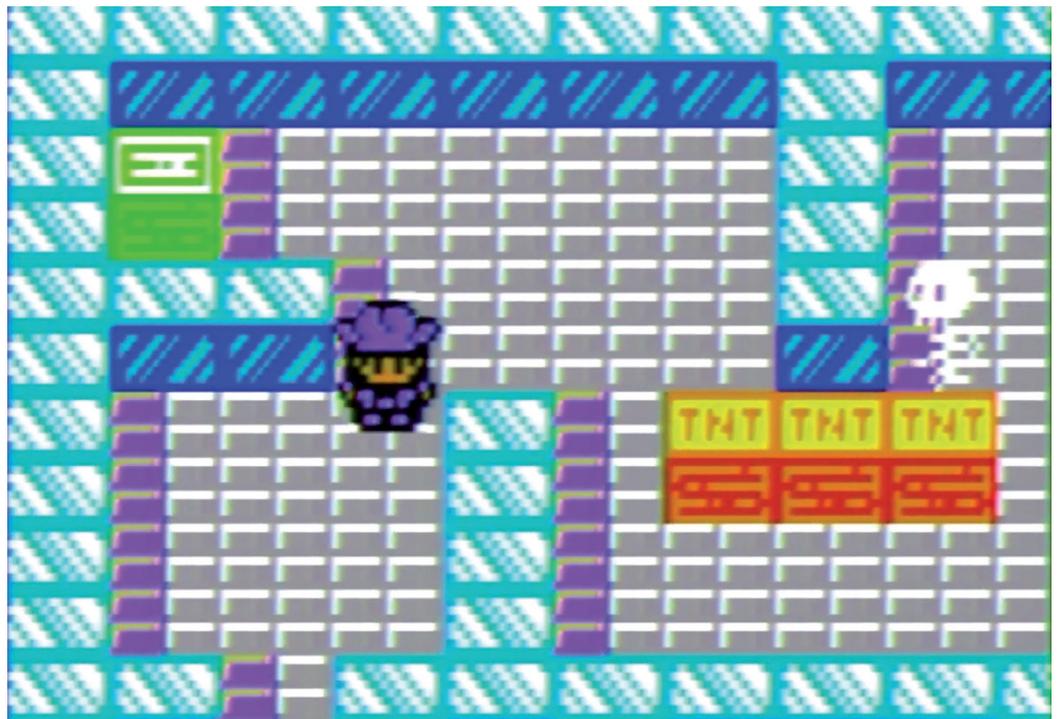

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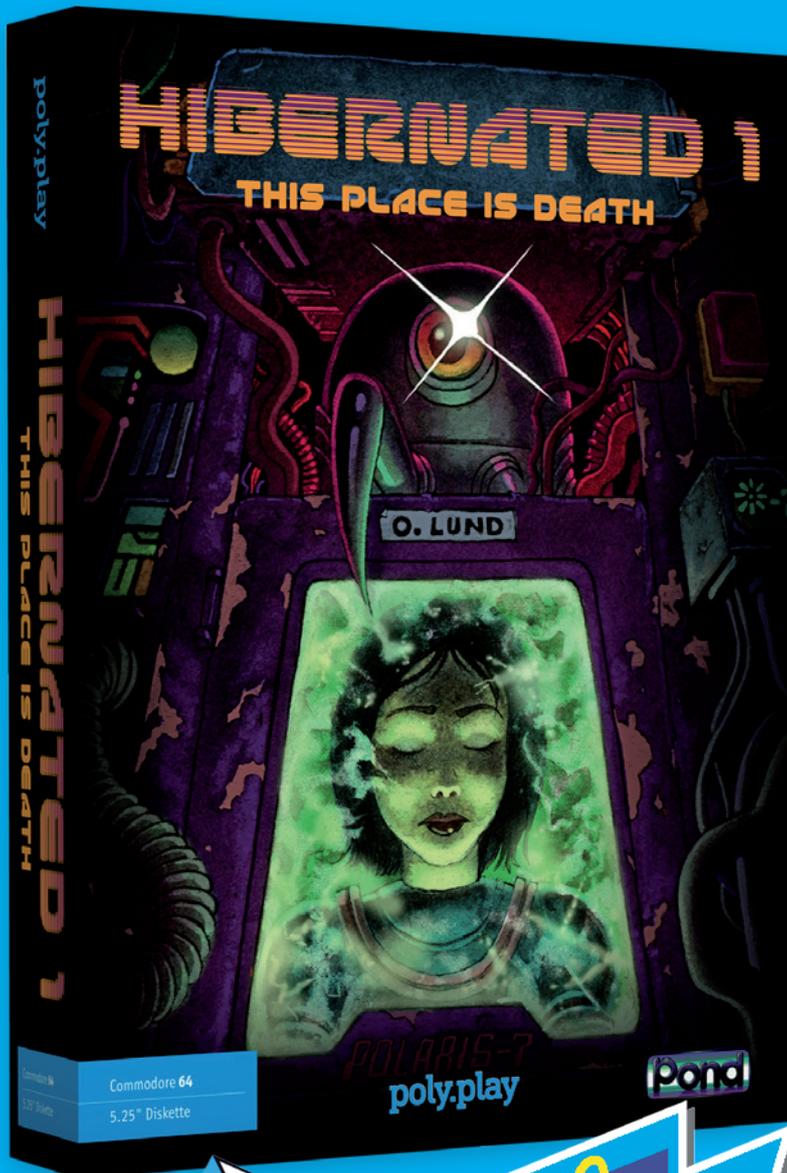
It took coder Jon Williams 24 years for to write the sequel to his third installment of Berks. It looks a bit like Berzerk, but it plays quite different. You control none of the men shown above (who are called Berks), but the shielded rhombus in the lower left corner of the screen. You can kill the guys, but only stun the other diamond shaped objects for a short while by shooting at them. Everything on screen is trying to get you – and if they do, you lose a life. Shoot your way through to the key and get into the next room. If you collect all the keys in the given rooms, you'll gain access to the crystal chamber where you find the crystal and get access to the next labyrinth. The farther you get

into the game, the faster it becomes. Graphically, it has only slightly changed from the first game of the series. But gameplaywise, Jon took full advantage of the 64K available, including many levels and different playfields. It is indeed challenging, but fun to play. You'll need to lure the diamonds in traps to stun them and get to the keys. It helps that a stunned enemy is blocking others which want to go in your direction. The sound effects will remind you on typical Atari stuff – very nice and fitting for this kind of game, too. All in all, the (free) release Berks Four was a nice surprise as Jon Williams was inactive since his last game on the Plussy, Frank Bruno's Boxing. Hopefully, there's more to come.*(bk)*

What is it with these Berks? Why are they wandering aimlessly around in those labyrinths? Don't they need to be somewhere? You'll never know!