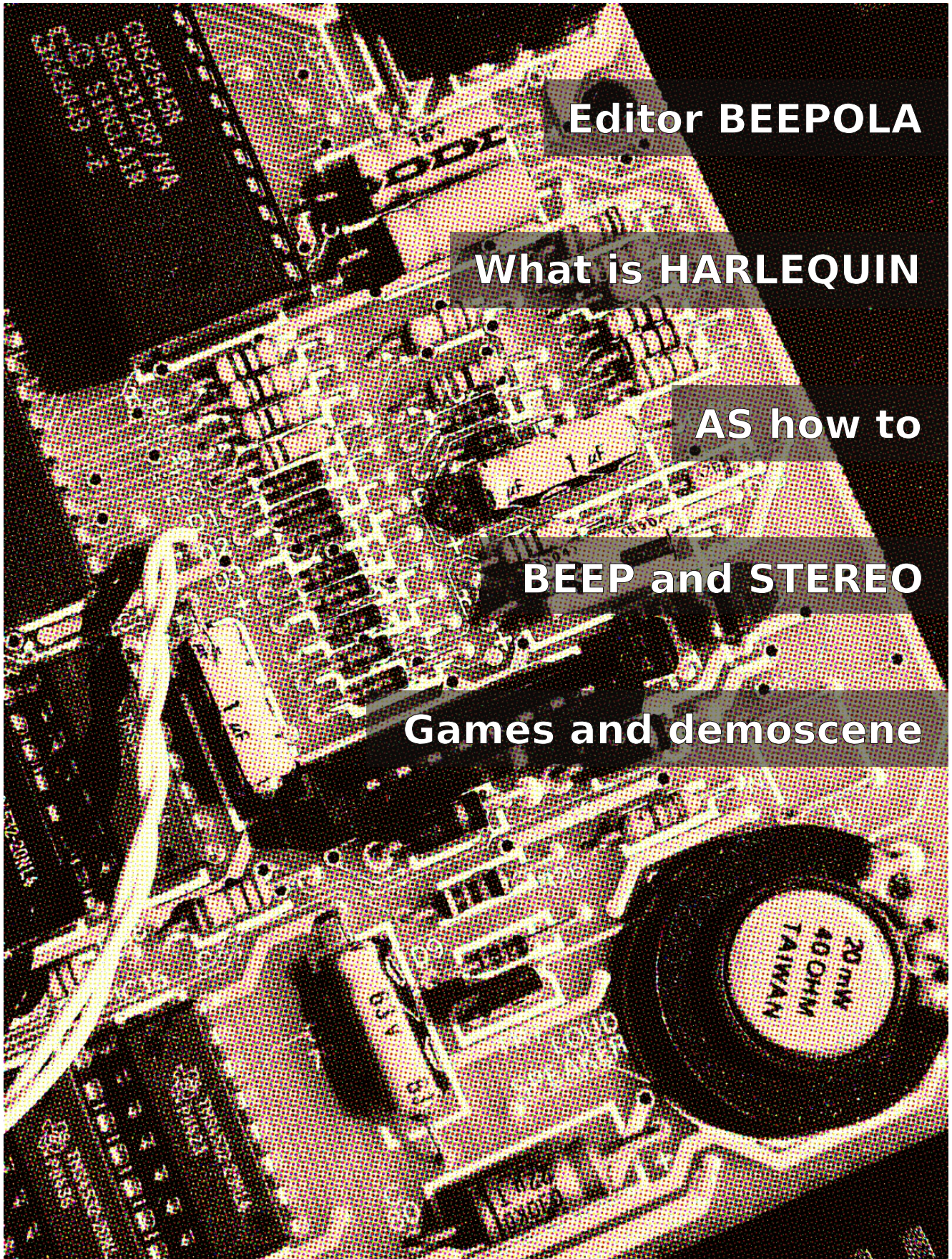Editor BEEPOLA

What is HARLEQUIN
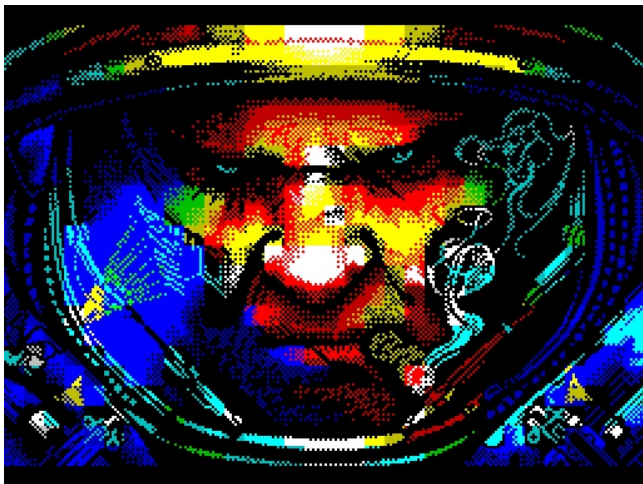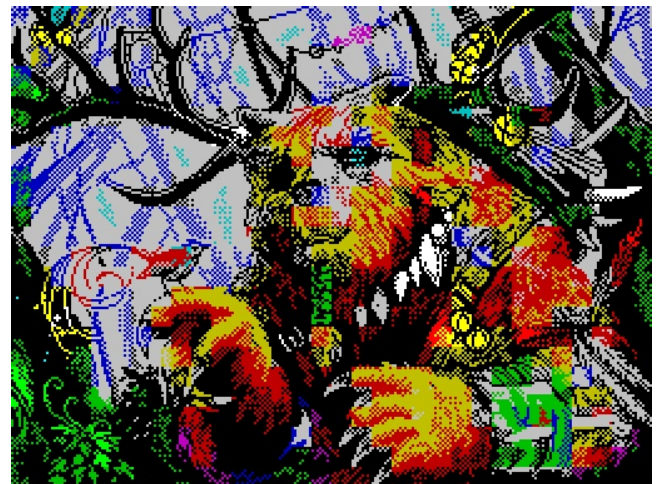
AS how to

BEEP and STEREO

Games and demoscene

Witches are good friends with piggies (c) Vassa 2014, first place at ArtField 2014

Screen come true (c) Trix 2014, second place at DiHalt Lite 2014

Mercenary 4. The Heaven's Devil (c) Diver 2014, first place at Forever 15

Bear (c) Dimidrol, first place at Multimatograf X

Hi Spec-chums!

It is unbelievable how fast can time fly. I haven't realized properly the delay between planed and real release date of this issue until some people asked me if the magazine is already dead. Well, it isn't, it just had to walk over a few complications. So, what is happening behind the scenes?

Most important thing that happened is Polish version of the magazine. Thanks to great people around speccy.pl portal, Spectrum Today is available in three languages. For this moment it is maximum of what I can manage, but there are some more plans in this area for (not so close) future. The aim for all the translations from very beginning was reaching the readers. The Speccy scene is still big and the need of a magazine appeared from time to time during last years. And I believe that if there are readers, there are also people who can write articles and make the magazine more interesting read for everybody. This already started to happen and this issue is no more just one man show. I'd like to thank you all, who sent me an article, feed back or just enjoy the reading on the following pages. I am having good time and satisfaction for time spent doing all this!

It is quite a lot of things happening around the scene and sometimes it is difficult to catch up all what is going on. We've got Nirvana, the thing that make miracles with game graphics. Also there were about 100 pieces of Harlequin clone manufactured, so all the new games have some new hardware to be played on. The demoscene wasn't sleeping too and we've got tons of great production. I think it is great to be on the Speccy scene right today!

The main focus this year will be put on the publishing dates. I'd like to synchronize all three language versions to be published at once. This will not happen with the next issue, but hopefully summer will be the definitive time for that. Also, some works on the layout have been done to improve the visual quality of the magazine and will come with the next issue.

I am trying to expand the Tech section a bit more. There is some interest in programming articles (doesn't matter if those are about the games, demos or system utilities, all is very welcome) and all ideas are welcome. It is easy, if there is something you'd like to see in the magazine, just let me know and I will try to work it out. There is so lot of happening on the scene anyway that I am sure there will be not any problem to get topics for the articles at all.

I wish you a good time spent with your Speccies, doesn't matter if you just play games or you actually do something, the scene is here for all of us to enjoy it!

**ellvis/zeroteam**
ellvis@zeroteam.sk

Bomb Munchies

Preview was in last issue and full version came out on 1st of March. The game is actually faster, we have more characters to choose from, it is possible to play with as few as 2 characters and the game was slightly changed during time up. New version came up at the end of June, adding more game modes and speed up the things again. Review will be published in next issue, it is great game for parties and meetings!
http://www.worldofspectrum.org/forums/showthread.php?t=46188

Assembloids

Logical game about faces completion was quite a hit last year on various platforms (**Flash**, **C64**, **Atari**). We are interested in port for ZX Spectrum that is ongoing now. The game will use multicolour engine **Nirvana** and from the first published tech demo we can really look for it!
http://www.worldofspectrum.org/forums/showthread.php?t=47629
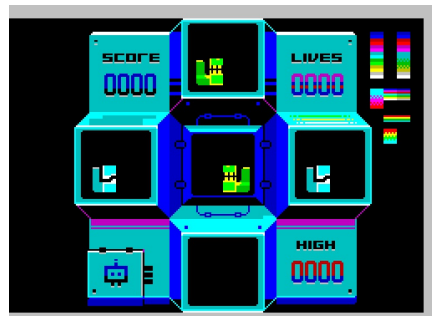
Assembloids

Transport Game

Climacus (author of **Retro Invaders**, **Knightmare**, **RIP** and more) work on his next game, this time it is transport simulation. Inspiration come from famous **Transport Tycoon**, even if the game will be from top view and not isometric. There is not yet even demo, but Climacus uploaded a video of game play on youtube. If anyone is interested and want to help with the game, the development thread is   here:
http://www.worldofspectrum.org/forums/showthread.php?t=46893

Alien Breed

LuMan is working on conversion of **Alien Breed** from **Amiga** for some time already. Works are not going anyhow fast (work, family and so on), but some progress is shown from time to time.
http://www.worldofspectrum.org/forums/showthread.php?t=47134

Gamex 2

Jonathan Cauldwell is working on continuation of **Gamex**. It is mix of small action games where during each win we can bet some money to some next game and get rich by that way. There is demoversion available that contain 13 games.
http://www.worldofspectrum.org/forums/showthread.php?t=46779

Gamex2

Hobbit

Hobbit is one of many games that got alternative loading screen. The speciality of this game is the fact, that it was not enough and re-drawing of main location graphics in the game is in progress. It is community project where people discuss the results together. The main programming is done by **Einar Saukas**. Even **Veronika Megler**, co-author of original game, was contacted and she is quite impressed by the project. New version of the game will be for **Spectrum 128k**.
http://www.worldofspectrum.org/forums/showthread.php?t=46969

Mr. Heli

Rafal Miazga, famous not just for writing own games but also for colouring some of the old ones, took a closer look on **Mr. Heli**. Original version have graphics converted from **CPC**, where it is in lower resolution so it doesn't look very good. Ralf worked hard to re-draw all the graphics in the game so now it look properly as it should look like on the Spectrum. Great work!
http://www.worldofspectrum.org/forums/showthread.php?t=47172

Mr. Heli - original graphics

Mr. Heli - new graphics

Shape Shifter

Ian Munro released demoversion of his new logic game **Shape Shifter**. We have 8 levels and our task is to fill up the grid with various blocks (shapes are known from Tetris). It look easy on first sight, but due the fact that we can't rotate the shapes the game will test our logic. Overall game look is very good so let's hope the final version will be finished soon.
http://www.worldofspectrum.org/forums/showthread.php?t=47866
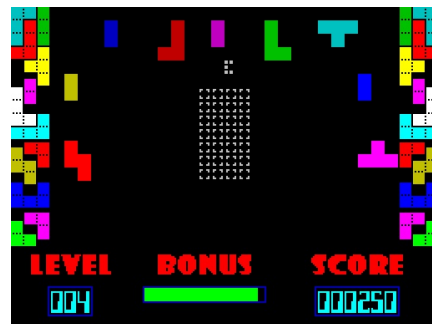
Shape Shifter

2nd Spectrum Compo

Whole name is 2nd Spectrum Compo: "**From the Arcade and the 16bits (ST, Amiga, PC) to the Spectrum**" and it is continuation of interesting competition which goal is to port Spanish games to the **ZX Spectrum**. This second round was started just one day after the first round, games from 16. bit computers were added and also the deadline was extended. It's worth to wait for the results!
http://rincondelspectrum.blogspot.fi/2014/03/ii-concurso-de-los-recreativos-y-los-16.html

RTC patch for Esxdos

Esxdos got **RTC patch**. There is just **betaversion** published yet (**0.86 beta 4**) and there is not any reall hardware to use it (except small serie of boards that **Velesoft** produced and contain also **Kempston joystick**), but it is surely good news for the future.
http://board.esxdos.org/viewtopic.php?id=5

Birthday

Once again we have experienced how fast the time flies, because it was **32 years** in April already that the **ZX Spectrum** was released! At least this way **happy birthday** and let's look forward for another 32 years!
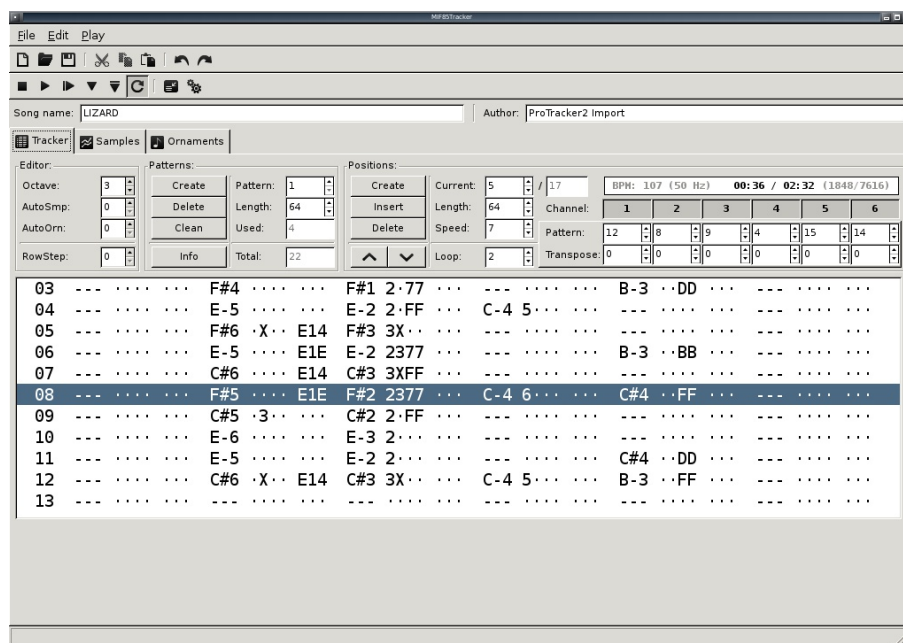
ZEsarUX

New **emulator** of Sinclair computers appeared. Except Spectrums (**16k**, **48k**, **128k**, **+2** and **+2a**) it emulate also **ZX80** and **ZX81**. Interesting things is emulation of **Microdigital TK90X** and **TK95**, which are Brazilian clones. Emulator is written in C language, actual version is **1.0.1** and is targeted primary on **Linux** environment. One of the interesting functions is changing the computer hardware during the program run, for example. Emulator passed just short development time, so the emulation itself is not ideal, but author (**Cesar Hernandez Bano**) still work on it and welcome any feedback.
http://sourceforge.net/projects/zesarux/

MIF85Tracker

New tracker for soundchip **SAA** (**Sam Coupé**) shown up. It is work of **Martin Bórik** and it's targeted for sound card for **PMD85** computer. There is still just beta version available that doesn't contain compiler and lot of functions are not implemented yet, but it contain few demo demosongs from Sam Coupé (it support musics from **ProTracker**). Full version will add support for **Spectrum** and **Sam Coupé**. Autor also plan to support **AY** chip after finishing the SAA sound chip support.
http://sourceforge.net/projects/mif85tracker

Fullscreen multicolour

Alone Coder found out the way how it's possible to extend **Nirvana** engine possibilities to fullscreen (actual version does not draw to 1 attribute wide frame around the screen). Next version should be really **fullscreen**. It look like small revolution in graphics that started at the end of last year releasing Nirvana engine is still not over.
http://www.worldofspectrum.org/forums/showthread.php?t=45538

CCZ80++

There is new **C cross-compiler** for **Z80** named **CCZ80++**. Language is extended for classes, objects and syntax is similar to **C++**. Project is new, developed out of **CCZ80** and author welcome any feedback and bug reports. Target platforms are for example **Spectrum**, **MSX**, **CPC** and **CP/M Plus**. For installation we will need **Windows** and **Microsoft .NET 4 Client profile**, it is possible to use **Wine** or **MONO** under Linux or MAC.
http://ccz80pp.webcindario.com/ccz80pp-en.html

zxart.ee

Internet gallery **ZX Art** moved to the new address some time ago and started to grown up on it's content. Except regular updates of pictures from competitions there are also pictures from games added. The new is also music section with **AY** musics. Browsing the archive is possible by authors, competitions or by direct searching of names.
http://zxart.ee/

SE Basic IV

SE Basic is project of new version of **ROM** for **ZX Spectrum** and compatible computers. It is not enhancement of original ROM but complete new code, based on ROM **ZX81**, **Beta Basic** and **Sam Coupé**. All is released under **GNU/GPL2** license. Among other things, compatibility with **Esxdos** running on **divIDE** was sorted out. SE Basic have some interesting features as **ULA+** support, extended graphic mode from **Timex** (80 characters per line) support for non-tokenized BASIC commands writing (commands have to be written as words). Release of **Chloe**, that is new Spectrum clone with support of all features of SE Basic, is on the way so it will be possible to test all it's features for real.
http://cheveron.github.io/sebasic4/

Spectrumania 2014

Annual meeting of Spectrum users will happen in **Wittemberg**/Germany during 23rd and 24th of August. It is not demoparty, but meeting with hardware, software, discussions and even some development right on the place. This year the place was changed because growing number of visitors. Except **ZX Spectrum**, also users of **Sinclair Ql**, **ZX80** or **ZX81** are welcome too. As it is not possible to sleep on the place, it is needed to fill up registration formular to arrange sleeping. Registration is running at http://doodle.com/2rrhisdinii6p3cc#table

DiHalt 2014

Next DiHalt party will happen on 12th and 13th of July in the forest at the lake next to the **Nizhny Novgorod** city. We can compete in **graphics** (classic screen or gigascreen), **BEEP** music, **AY/YM** music, **Turbo-FM** music, **1024b** intro and **demo**. Except the musics, the categories are combined with competitions on C64. Competitions will run on **ZX Evolution** (PentEvo baseconf) and **ZX Spectrum +2** with **divIDE**. It is possible to send remote entry without being there personally, each entry should contain this filled text file with information about the entry:

Nick/Realname:
Group:
Full name of work:
Compo:
Requirements:
Duration (minutes):
Contacts:
P.S.:

Entries have to be send to **dihalt2014@yandex.ru**.
Official web page is at http://www.dihalt.org.ru/index_eng.html

MIF85Tracker

FBI/Unbelievables

FBI, civil name Thomas Eberle, is main person behind the SINTECH. I
talked with him about Spectrum scene in Germany

■ **What is the story behind the Sintech? How and when it started and how it evolved over the years?**

Back in 1989 I sold my Spectrum Plus, so this was my first business. One year later I sold the 48k Spectrum of my sister and another year later I bought a Spectrum 128 for me. I was at that time just 18 years old and had no knowledge how to do international business. If I would know how to do it, I would have probably spent all my money in games, magazines and hardware from United Kingdom. But in Germany all these things were nearly not available. 3 years later I had finished my education school for international business and had to go to the army. However, after the first tough months it started to be easier and I had some spare time which I mostly used


demo Everlast from 2006

with the Spectrum. It was 1994 already and all official magazines like CRASHED, SINCLAIR USER or YOUR SINCLAIR closed. So I bought mainly fanzines and wrote articles for them, but I was angry because many of them closed after a short period just because the editors were maybe not rethinking before, what a huge lot of work it is. I decided to do it better. There was a big German Spectrum club and their magazine still appeared, but it was clear that the editor just wanted make money with. The members had to send in ready pages and he just did the copying, sometimes only 10 pages for the price of 10 German Marks per issue. I told to myself that this guy have probably no mood anymore to run the club and will sell it. And I was right and bought the club. At this time the club had only 50 members (200 the year before, but as the editor did bad work, many skipped), but I made a restart and the magazine is running till today. I soon discovered that people want buy Spectrum items, but cannot because in Germany is nothing available. I contacted several companies in the name of the Spectrum-User-Club, but didn´t get a reply. So I thought myself that they would answer to a real company and tried again in the name of SINTECH. Soon I got a lot of offers from CODEMASTERS, OCEAN, Hi-Tec, Alternative Software, Domark and some smaller shops. I started to offer the games, this was the official start of SINTECH. As these companies offered not only Spectrum, but also other software, I soon expanded

and offered also C-64 and Amstrad CPC, later as well Atari XL, Atari ST and Amiga. I also sent out price lists to all people I know and to addresses I got from magazines. One day I got a message in from PROXIMA in Usti nab Labem. They really wanted to buy huge stocks, so I dealt with CODEMASTERS and we bought software in pallets and selling to Proxima very cheap. Of course as everything, this business ended one day, but it was good time. In 2002 I decided to stop that small business and make SINTECH bigger. We started to sell stuff for modern day computer and consoles. But to sell software was horrible. The people often ordered games and then canceled their order after I sent it. So I had the loss of postage. I stopped that and started to sell special gaming items like Dance Mats, Guitars, Adapters. This business was better, but not good. Then my Playstation 2 went broken. I googled that this is a laser problem and discovered that I can buy the lasers cheap in China. So I bought not just one, but 5. I used one and the other ones I offered on Ebay. It took just a few hours and all 4 were sold. So I ordered more... and SINTECH went into spare parts. The business went bigger and bigger because we sold spare parts for more and more machines like iPods, iPhones or Samsung phones. Today SINTECH is still a small company, but about 100 times bigger then when it started. We have 3 people working in the stock and 3 in the office. This year we celebrate the 20th anniversary and we will move to a new own building. Looking back I had good and tough times. I wanted give up several times, but never did and that´s good.
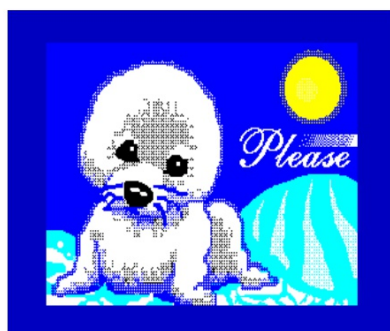
SUC-Session 205 from March 2005

■ **Is the German Spectrum club still running? Can you tell us some information about it (like activities, membership, meetings etc)?**

Some years ago I gave the leadership of the Spectrum-User-Club to Mirko, but I am still helping him with the magazines. Also there is another German Club called "Spectrum-Profi-Club". This club was once in Cologne, but the editor died some years ago and after a period of disappearing, a group of people took over the work. It is a German/Austrian team that produces the SPC Magazine 4 times per year. The Spectrum-User-Club produces the SCENE+ Disk-Magazine 2-3 times per year and it comes with a printed newsletter. However, that newsletter got bigger and bigger and is now usually more than 20 pages. So both clubs are still there, some users are surely members of both. I guess the total number of members in both clubs is about 100. Our disk-magazine appears for MB02, Opus and +D. There is a TAP and real Tape version as well and once we did even a D80 version, but there was not enough interest. The magazines are the main work of both clubs, but also the user meetings. There is the Spectrumania in Wittenberg, which is not organized by a club, but we do the promotion. There is a SPC meeting, which has unfortunately not many visitors. We plan in 2015 to do a show in South Germany.

diskmagazine Scene+ 63

■ **Having two active Spectrum clubs is more then most countries have this days, is there some central point for German Spectrum scene on Internet?**

Yes, Germany is a "magazine-country". Many years the SPC (Spectrum-Profi-Club) and my SUC (Spectrum-User-Club) produced a monthly magazine. But the content was more and more the same, so we decided to close our paper magazine and produce therefore a paper magazine. But just when we made the decision, the editor of the SPC magazine had an accident and never recovered. One year there was no magazine then, after that LCD took over the SPC magazine. We also found out that our readers like the programs on disk, but do not want editorial stuff on the screen. So we started to produce a newsletter which became thicker and thicker and has now 24 pages, same as the magazine before. So the magazine is reborn. As LCD is from Austria, our club is the only German and our magazine is available in English and German. Unfortunately there is no major

FBI/Unbelievables

point for all German people in the internet. We once started a bulletin board, but it was not sucessfull. There are the pages of the clubs (SPC: www.womoteam.de , SUC: www.speccy-scene.de) and a German forum including the SPC (but also ZX81, QL, C5, Sam Coupe, Amiga): http://forum.tlienhard.com/phpBB3/viewforum.php?f=5 . But at the end best is international communication on the forums of www.worldofspectrum.org

Profi clubu Köln magazine, issue 234

■ **After demise of some famous demogroups (The Mad Guys for example) in '90s there was not much heard from Germany's scene. What do you think people mainly focus on the Speccy scene now?**

There was never a healthy demoscene in Germany. TMG (The Mad Guys) were surely the most famous. In 1997 XTERMINATOR released his last demo but it was not the end. His last work was "PENG II" which I really like, but is in German language. However, Vision and Talisman stopped even sooner than XTERMINATOR and although Talisman lived only few kilometers from my home, contact broke down. Never say never again, Talisman and Xterminator are still sometimes in the WorldofSpectrum forum and there is the website http://www.themadguys.de. Only other group are the Unbelievables, that was first

Spectrum 30 show, Cambridge, United Kingdom 2012 (photo by Rockrabilias)

Fred (renamed to LEGEND) and me (Ebi, later FBI). Later joined Odin (inactive now) and Mic. Our last work was a contribution to Spectrum30 in 2012. So sometimes we are still active, we have many projects, but lack of time as we already do the magazine.

Some other guys did small demos in the best demo time (1992-1995). However, most of them are not anymore active or decided to do other projects than demo coding. In Germany people were always more hardware-interested. So although the scene is small (max. 50 active users), many build new hardware from circuits found in the internet. So one built a new version of the MB02, many built a HARLEQUIN or Divide, +D etc. Also gladly these guys offer repairs. The main focus nowadays is helping to keep the hardware alive and games...yes...still games.

■ **Do you have any bigger plans or a wish(es) you'd like to do/organize?**

Yes, I have many ideas. After organizing Spectrum30 my idea was to organize a yearly show. However, I was hoping for attendance of about 400 people, but there were only 150. This is still the biggest show of the past maybe 15 or 20 years, but I think if this will become yearly, maybe only

50 users or even less will come. So idea is to make it all 5 years, Spectrum35 should be next. Besides that I am moving with house and company to another city and there I discovered rooms which are perfect for a Spectrum show. It is a big house outside the city, a big room for surely more than 30 tables and sleeping room upstairs. In the 90s I organized Spectrum-shows here in the Southwest of Germany, but then stopped it because of the lack of a good and affordable room. Now when I can get this room, the yearly event will start again from 2015. So these are my plans, one big show in England all 5 years and a yearly event in Germany.

■ **What is your opinion about current Speccy scene? And what is your opinion about new games and demos and what do you think about communication between various (cz&sk, uk, pl, ru, etc) scenes?**

Although I should be more up to date I am really fascinated what happens so fast. For example now we have multicolour games, maybe next time we will have Multiplayer-LAN-games? So many things still happens in the Spectrum scene. I still feel like in the 90s when I first time came to Czech Republic and discovered the MB02. But still a problem is that there are many scenes existing without contact to other groups in other countries. For example there are Spectrum-users also in Romania, but I do not know even one. Also in CZ still happens many things and not to forget Russia. There is a language problem, but also a problem of the people who are happy to spread their news in their area and not even interested to share this internationally. I hope with our magazines we can get many international users and communication between them. ■

Cousin Horace
(c) Alessandro Grussu

Horace is experiencing his big comeback lately. To have more of it, a big portion of Horace's adventures is coming to us!

The game brings a story about Horace's cousin from America, who is going to be visited by our truly Horace. However it happen that Horace is kidnapped by his enemies (Spiders and Guardians) so his American cousin have to save him.

The game will consist of five different levels and now we can take a closer look on three of them. Levels are loaded as stand-alone files and when we pass each one, we have to reset the computer to load another.

First level will take us to the tower. It is classic platformer based on Churrera engine, with good graphics and nice playability. Few enemies are familiar from old Horace's adventures. The aim of this level will be getting to the top of the tower to take a key, coming back down to take a pill that will allow Horace to kill his enemies and then get rid of them all.

Second level will take us to the air. There was a helicopter at the tower's roof so we will fly and shoot a bit for now. It is typical shoot'em up flying from left to right. Special thing is the fact that we have probably a hole in our gas tank as we are loosing fuel very fast. There are some gas cans on the ground appearing occasionally so except taking care about the enemies, we have to watch also gas level and the canisters.

Fourth level is a maze. We are on secret enemy base and have to find 5 security codes to central computer. Playing area is seen from the above and we will have to avoid the enemies (but we can also defend ourselves against them) and lasers, contact with some items will also decrease our energy.

There are not levels 3 and 5 in the demoversion. Third level will be an adventure, where we will have to use items and also communicate with other characters. Fifth level will be action game that nothing is known about yet. Whole game will contain story, that will stick all the levels together and also a comics graphics to explain what is going on in the story line. We can expect also intro and outro.

Alessandro Grussu did some good games already, so I believe that Cousin Horace will not disappoint either. Mix of various genres look interesting, let's see how it will end up with the playability balance. Dull season will hopefully not happen this year! ∎

Castlevania
(c) SaNchez

We are playing as Simon Belmont, descendant of famous lineage that fight vampires and such vermin for generations. We have shield with us, indispensable whip and we are on the way to Castlevania, the castle of Dracula.

Demoversion contain no menu and we are immediately in the game after load. We start in town and there are also other people besides us. When we meet some of them and press fire, we get to know something. Except other people, we can get some information also from various posters that are hanging on the walls, again by using the fire button on right place (the game is in Russian only at the moment). Except those, there are also two shops. We will identify them by opened doors, it is

The game begin in town

enough to press up in the doors and we are in. First shop will sell us better and more powerful whips, there are three of them (each one cost 100 gold), second shop will sell us daggers with holy water (we can have up to 15 of them and each shopping cost 50 gold). We are starting the game with 300 gold.
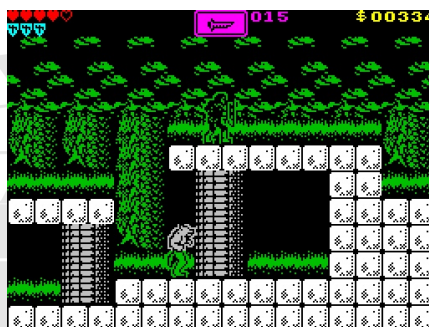
Dark forest

Beyond the town, dark forest begins together with some action. Werewolves appear there and sometimes also some vampire. Better whip we have, better defense it do for us. Each defeated enemy will give us 5 gold, so we can go back to town later and buy better equipment. The forest is not large and soon we come to the river that cannot be crossed. On one of the screens we can see stairs and use them to go to underground. Skeletons wait us there. Their captiousness is in the fact, that when
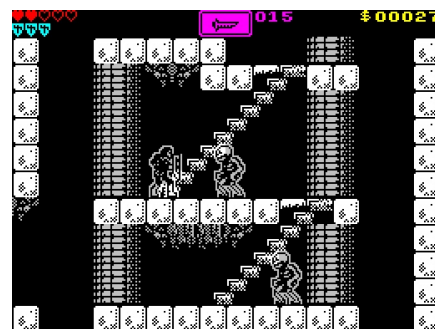
Down in the underground

they spot us, they start to run to us.

The game is not anyhow big, it show us just 3 short locations and the game principles. Graphics are great, all is smooth and nicely detailed. In forest the main character blend with the background, but it is possible to use to it. Each game location have it's own music for AY. Playability is very good.

Castlevania is one of the flag-ships of Konami, that came out for first time in 1986. Spectrum was never successful in Japan, so we had to wait a little for a version for our computers. Full version was about to be released in April, but it didn't happened. Because SaNchez, who surprised us two years ago with great game Survivisection, is responsible for the game, I believe full version of Castlevania will be released soon. ∎

The Charm

(c) 2014 Salpicao Soft & Retroworks

Last of the knights can save the kingdom

As last knight that is loyal to a king, we go across country and try to break bad spell and free the kingdom.

As always in such situations, we are in the world were somehow everything is against us. In fact everything that moves in the game is our enemy. Not just apparent beings as animals (bats, birds, fishes and so on), skeletons and trolls, but also mushrooms or drops of water. But we wouldn't be proper knight if we can't defend oou self. We have few magic shots that will always destroy the enemy. But we have just few of them and also enemies will appear again in a while. We can't solve the second problem, but we can replenish the shots with bottles that can be found in playing area. Besides bottles we can also find small figures that will replenish our energy.

Our task is to get six keys from mysterious gate. We will get them if we give back various items to various beings inhabiting the kingdom. Items are spread all over the kingdom and also it is our task to find out what belong to who (but it have it's logic, burning torch is for the dragon, for example). The problem comes up when we don't have the right item, we will lose energy touching the being.

We can see the list of carrying items on the left side under the playing area and we can carry up to three items. On right side, there is indicator of magic potion, it mean the amount of shots we can shoot. Bottles will not replenish it's amount to full state but just partly. Next is the number of lives (we start with three of them) and next to it is our energy. That is shown as redrawing of our head with a skull.
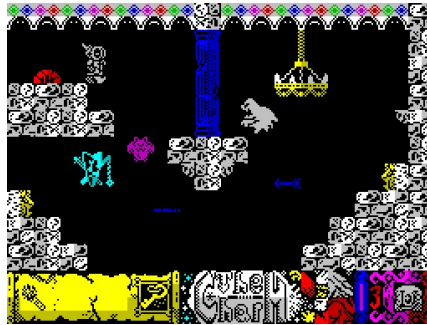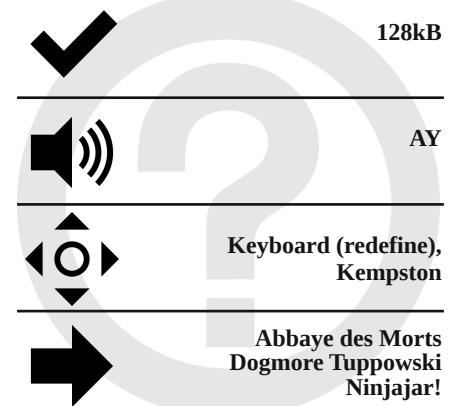

Something is happening all the time

The kingdom is extensive, colourful and will take us to the castle and also to the underground. Water is waving (also the grass under water), waterfalls are falling down. Enemies are also animated and graphics are nicely detailed. The movement of main character is a bit slow, but it is not a problem to get use to it. Jumps can go very high and very far and it need a bit of practice to handle the controls. But then the gameplay is really good. Nice AY music play during the game.

Interesting fact is, that this is new version of game The Chard, that was about to be released in 1990. That never happened, it was released just now as a duel with The Charm. We have a chance to compare both games.

The Charm is very interesting platformer, that drag into another world if one will not get discouraged by very first view. It brings refreshment to the genre and also a lot of fun. ■

✔	**128kB**
🔊	**AY**
controls	**Keyboard (redefine), Kempston**
➡	**Abbaye des Morts Dogmore Tuppowski Ninjajar!**

Killer Bees

(c) 2014 Gary James

It's dangerous to have bees as enemies

The bees are synonym for a team work. They live in colonies and work for benefit of the community. And not just work, it is surely better not to make them angry.

We are controlling a hive of white bees in some arena. Figures appear and we must fly over them with the bees. Each figure that is hit enough will more and more slow down and finally die and a grave will show up on the screen. That work as a

✔	**48kB/128kB**
🔊	**AY**
controls	**Keyboard, Kempston, Sinclair**
➡	**PSSST Smash TV**

barrier to other figures, so they change direction while running into it. When we kill all the figures, we go to the next level. That's all the game principle, but there is a little bit more to it anyway.

There are 2 types of figures. Red ones are running counter-clockwise and blue ones clockwise. As we pass the levels, figures run faster and faster till we have problems to follow them with our bees. There is no need to press fire to sting them, the bees do it automatically. When we stop to sting a figure while is slowed down, we risk the things to speed up again, so it will take us time again to kill.

To make things more difficult, after a while another hive of bees will come from one of the tunnels around the playing area. If it have green colour, it randomly fly over the playing area and if it catch our bees, it will slowly kill them. Our defense is fire button, we can fire a bunch of stings to left and right. If we hit the enemy hive, it will disappear. We have just one try, we have to kill another figure to get opportunity to fire another stings. If the enemy hive is purple, it will follow us and our only advantage is speed.

At the end of each level, number of survived bees will be multiplied with the number of level and added to the score. There is twenty levels together and from tenth it is really fast action with plenty to do.

During the game we can see on screen the number of current level, score and if we can fire the stings there is blinking notice (Sting Ray). The sounds are for AY. Killer Bees come from game console Magnavox Oddysey2 and is originally from 1983. Graphics look like that, but it is colourful, fast and is very good controlled. It is very good action if one want to just switch off for a while. ■
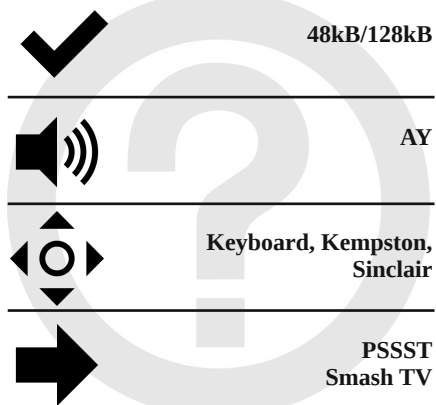
El Stompo

(c) 2014 Stonechat Productions

It's not easy to be service engineer today

I've always thought that repairing the television sets is boring and stereotype work. Lately I've found out that it is not like that and I hope to try it again soon.

El Stompo is game, where we are repairing the television sets. It is not a simulation of workshop, it's a platformer where we have to run away from various monsters, switch the switches, wait for the right timing and even use items. And the main repair? It's easy, we just have to stomp on every television.

Each level consist of one screen. We have to stomp on every television to change

✔	**48kB/128kB**
🔊	**BEEP**
◀◉▶ ▲▼	**Keyboard (redefine)**
➡	**The Lost Tapes of Albion** **Sun Bucket** **Endless Forms Most Beautiful**

the fizzle to simple animation. When we repair all the tv sets, we go to the next level. To have things more complicated, there are some other creatures on the screen (head on spring, cruller and so on) that try to circumvent our repairing attempts. Besides the enemies we have to take care also about the fire and spikes that also appear in the game. Platforms are of more types. Yellow bricks will break if we jump on them, the green bricks can be passed just three times, yellow switches open and close the trap doors. There are also some items that have to be used in correct situations. If we want to move the stone, we have to eat the hamburger first. If someone don't want to let us to pass in the game, we have to have the proper item. Squirrel want nut, ape want a banana and so on. Frequent things are switches, those turn on and off some platforms. Important is the fact that not just we are the ones who operate them, but everyone who walk around them. Even if it look complicated on the first sight, the game is bringing new features step by step, so the difficulty rise slowly. Some of the levels are based on fast reactions and some are based on thinking. That mean we have time to rest after fast chase but also it will not happen that levels are sinking down in never ending thinking. The control of the main character is fast enough and the game

is played very good. Also, we have infinite lives by default. As for sound, the game support just BEEP.
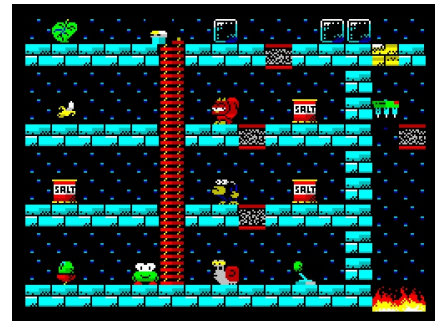
Everybody want something

Something extra are the graphics. El Stompo use multicolour engine Nirvana and it is obvious on first sight. Everything is unbelievably colourful and despite of it also animated. It doesn't really look like a Spectrum and one enjoy all those graphical details in so many colours. Each screens are varied and doesn't act boring.

El Stompo is very nice surprise between the platformers, it is greatly playable and funny game that use graphics to highlight impression, but does not hide behind it. Even without all those colours it will be still a great little game with a lot of fun! ■
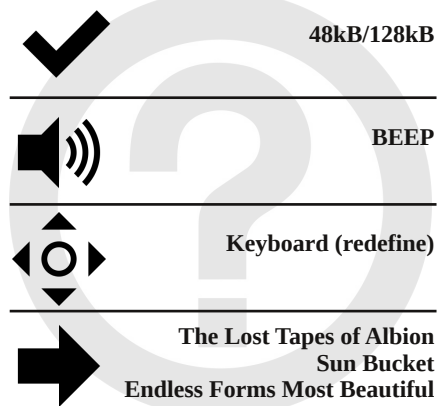
The World's Hardest Game

(c) 2014 Debris

Sometimes it's better to go insane

Just frustration and stress, nothing more is hidden in this game. Despite of that it's a challenge. The world's hardest game sounds as a really noble name.

The principle is easy, we are controlling small square, which have to be moved from one coloured field to another. Usually we have to collect balls (empty ones). Moving balls are deadly for us. Some levels contain just one coloured field, we have to return back to the start after collecting all the balls. If there are more coloured fields in the playing area, we have to go to the very last one and others works as teleports in case we will lose a life (so we will not start the level from the beginning, but from the last visited coloured field). As I am reading what I wrote about the game now, it look pretty easy.

Technical realization is interesting. As for the graphics, the game is simple, we are controlling square of 5x5 pixels, we are avoiding balls of 4x4 pixels and collecting balls of 4x4 pixels again. For the easiness and simplicity, the background is filled up
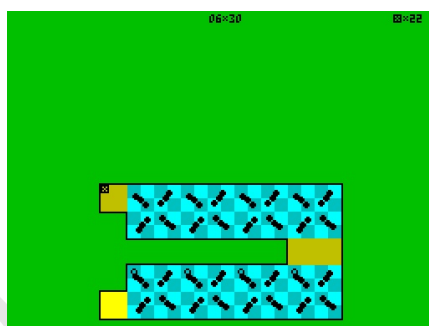
with a chessboard, so we can move more precisely into tinny places. Each level occupy different area, it is always just a small part of the screen. At very up we can see which level out of 30 we play and a number of lives we lost already. Right, the game count with big difficulty from the very beginning and thus counting the deaths (I personally lost 1073 lives already and I am playing level 16). Technical preciseness show up in a moment when we realize how many things move on the screen at once. There is not any problem to count 96 sprites moving at once smoothly.

Playability is surprisingly great, controls are very good, collisions are

detected accurately. The game still attract to have another go, each passed level makes a good feeling as it was very last one. We can use no passwords for reaching levels, no possibility of saving the current progress (just snapshot), the game keep up with it's name in this way very precisely. I'd like to recommend this game to everyone who think that new games are too easy. (The game ended on 7th place in the Retro Games Battle 2014 competition) ■
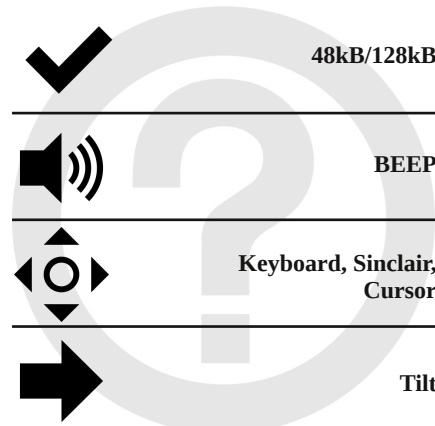
✔	**48kB/128kB**
🔊	**BEEP**
◀◉▶ ▲▼	**Keyboard, Sinclair, Cursor**
➡	**Tilt**

Captain Drexx

(c) 2014 Hacker VBI

Once again fighting with predominance

Captain Drexx got difficult task, to defend base against enemy attacks. Even as it is a fight against predominance, there is still a chance.

Captain Drexx is probably first adaptation of Tower Defense for the Spectrum. There is a path on the screen that is used by enemy armies and we build up defense towers against them so they will do as big damages as possible and annihilate the enemy before they will reach our base that is located at the end of the road.


Begining is quite easy

After the game starts, we see the playing area. Yellow attribute come through the road that will be used by enemy armies in a while, so we can orientate oneself very quickly where are best places to build up the defense towers. There are few kinds of the towers and each one have different radius. That is marked by yellow (or white if we don't have enough of money) attribute circle around the tower. A principle apply that more expensive the tower is, bigger radius it have. That bring us to the important thing, money. Each tower cost us something and our funds are not too big. We can usually build up just two or one tower at the beginning of level. We are getting money by eliminating the enemies.

Right tower placing mean better effectiveness for us. If we build up tower next to straight road, it will have less occasions to shoot at the enemy then tower that is placed at the curve so enemy armies

✔   128kB

🔊   AY

◄◉►   Keyboard

➡   Nether Earth

have to go around it for a while. This is important strategy mostly in later levels without with we can't get much further. On the other side, we can't build the tower directly on the road to block the enemy progress. Important is also the fact, that we have no control over already placed towers, they fire automatically. Also, towers that we placed on the playing area already stay there till end of the level and we cannot sell or demolish them.
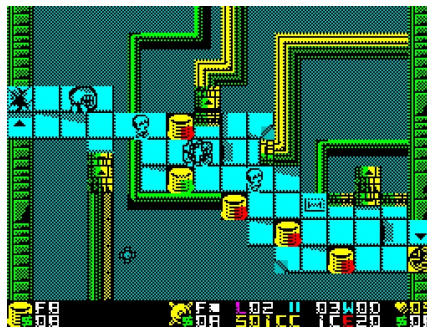
More and more enemies are comming in

There are four kinds of towers to be used. First three are directly firing, fourth one slows down the enemies. Each tower can be upgraded two times, those are marked by colour square. Green mean basic version, purple is first upgrade and red mean most upgraded version of the tower. Even if we have 4 kinds of towers together, the game will make them available consecutively. First levels are played with just one type of tower, then freezing tower is added, then cheapest tower is replaced with more expensive one and so on till we can use all the towers at once in later levels.

**We need less of more expensive towers**

Main strategic element in the game are money and we will be suffering it's shortage all the time. So we have to decide carefully if it is better to buy new towers or to upgrade existing ones. Upgrades are usually cheaper then new towers, but overall amount of towers have also it's serious impact on the current situation in the game. Enemies that were slowed down are easier target and also stay longer in the firing range so it is advisable to combine the towers.

Enemies are of various kinds. Some

invasions are based on just one unit, some are based on more units at once. It is obvious that each unit have it's own stamina and also the speed of it's movement. At the end of each level, extra strong enemy will go through the path.

The game is over when we are not able to defend our base. Situation is better by the fact that few enemies can reach the base, at the beginning we lose just when tenth enemy will reach our base.

Graphics of the game are very good. The towers are easy to recognize from each other, we can see which one is upgraded to which level thanks to colour rectangles. Enemy armies are varied and all of them also nicely animated. Simple animations can be spotted also on the towers where they show it's firing. Even when the game slows down during massive enemy attacks (it is really a lot of sprites on the screen after all!), it is still compendious. The towers placement is done via attributes, so it make this part of the game simple. We don't see the main bullets, but each enemy that got a hit is covered by a smoke for a while so we can easily spot a hit. During massive attacks we can easily see if some of the towers have low efficiency and it is better to build another one on some different place.
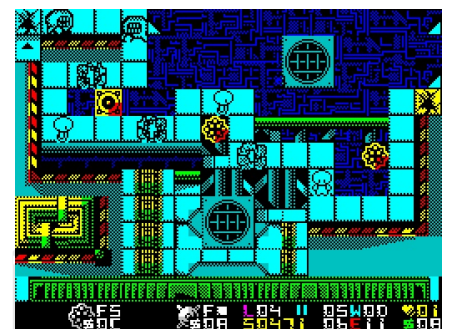
One of the problematic places

There is a music for AY playing during the game and also sounds (for AY too). The game starts with an easy levels, but it soon go difficult and for example fourth level is really hard. We don't have to start over and over from the beginning when we lose, but we have a possibility to play last reached level till we will make it through.

Captain Drexx is surely greatly executed game, that wasn't on the Spectrum before. Even if it apply quite a high difficulty, I believe it will not discourage anyone and will try to defend all the bases. It is fun and together with very good execution also obvious choice for a good time spent by playing. (The game ended on fourth place in Retro Game Battle 2014 competition) ■

Ninjajar!

(c) 2014 Mojon Twins
Hunting the kidnappers

Even ninja is just a human and humans experience various things. Once we come to visit our girlfriend, we find out that she was kidnapped. We can do nothing else but to rescue her. Kidnapping is not a pleasant thing, but this journey will be surely interesting.

Ninjajar is a nice example how to make action adventure from the platform game. Jumping around the platforms, lifts and avoiding the enemies is still there, new are conversations with other characters,

128kB

AY

Keyboard, Kempston, Sinclair

Goku Mal
Tenebra Macabre
Abbaye des Morts

collecting the items and solving the puzzles. As we come through the world, we get to know new things that will help us to free our beloved.

Jumping part is more or less classic platformer build on the Churrera engine. The new is possibility of defense against the enemies, because we're ninja, our punch is deadly. Also we can break up some stones and collect the coins that are hiding inside. Those can be used later for buying lives for example. Adventure part is based on collecting and using of the items. Various characters will tell us what they need for helping us and it is up on us to solve that. If we hold something useful in current situation, it will happen automatically. Sometimes we need to read tables that can be found around the game world to better understand how to solve some puzzles.

The game will take us through all the game world that is displayed at the beginning of each level in a form of a map. Under the map is a password, so we can continue later from the level which we played last time. We will take a look not just into the forest, but also to the village, caves, between the clouds and also under the water.

Interesting thing is also quite a big amount of secret locations, that contain usually some bonuses in a form of coins or lives (or both).

Graphics are nice, movement is smooth and overall it play good. Environment is not animated at all. There are sounds together with music during the game, both for the AY.

Ninjajar is very good connection of two genres. None of the element is too difficult and the game is long enough to stay for some time. Also it is made in a funny way, the musics and also various references point to the 80's (Michael Knight as salesman for example). It is worth of trying! ■

Altair

(c) 2014 IBM

Universe is often not a friendly place

Altair was originally old Spanish coin-up, that was released in 1981 by Cidelsia. 33 years later, within the "From the Coin Ops to the Spectrum - Spanish Arcade games" competition came to the Spectrum.

We are controlling a space ship that is being attacked by enemy forces. It is always 6 of them and they differ by colour and some characteristics. At the beginning they shoot just seldom, later add on intensity and change the position depending on us.

At the very first look the game remind legendary Galaga a bit, but there are some differences. Enemies appear individually, but always from one place (space ship, intergalactic tunnel or worm hole, what ever you want). Enemies always fly down, when they reach the bottom of the screen they fly up and so on all around untill we shoot them. We can fly up and down too, when we reach other end of the screen, our ship will turn around and we can shoot to the other direction. This behaviour is of great use during the play. Our ship is also interesting by small red wings on it's sides. We can lose them without losing a life. At the beginning of

each formation we appear always down at the screen and have both wings and doesn't matter how many of them we've lost in previous game.

The attack just started

After passing of eight formations, big boss will come. He sit in his own big space ship and our aim is to shoot inside. That is done by shooting the white field at the bottom of the big space ship. When we destroy the boss, there are again another enemy formations and all is going all around, it is just a little bit more difficult.

Graphics copy it's coin-up original quite good. Everything is colourfull and move smoothly, playability is good. We can see just actual and hi score on the screen,

down is the name of original game authors (Cidelsia). Rest of the screen is playing area. Even if the game is a bit difficult, it is possible to pass few levels after a short training. Small curiosity is score counting, when we die, score is lowered to the amount we had when actual enemy formation started.

Altair get close but deserved first place and bring coin-up atmosphere to the Spectrum. If you like to shoot, take a look on this little game. ■

48kB/128kB

BEEP

Keyboard (redefine), Kempston, Sinclair

Galctians
Galxians

Gravibots

(c) 2014 Denis Grachev

Before you walk to the other side, take a look also up and down

As old saying tells, robot is good servant very but bad master. And as it accumulated too much of them, we have to do something with that.

Our task is to walk through 20 screens and clean up each one from the robots. We have for that spikes, one robot, anti-gravitation switches and a brain, that will help us to easily solve every logical problem.

Robots behave expectable. They walk one way until they reach some barrier. Then they just walk back. If there is a hole in their way, they just fall inside. And if

48kB/128kB

BEEP/AY

**Keyboard, Kempston, Sinclair**

Dreamwalker Sector

there is anti-gravitational switch on the ground, they fall to the roof (or back to the ground from roof). And these switches are the only thing in the game that can help us to change the movement of the robots. Some are placed permanently, some can be taken and placed elsewhere.

So, our task in each screen is to aim the robots to walk into the spikes (they have to collide with the sharp side of the spikes, collision with other sides work as ordinary barrier and the same apply also for us). We have to avoid the spikes together with the contact with other robots. Our advantage is that we can walk freely as we want and anti-gravitational switches have no effect on us. We can switch the gravity anytime we want.

As I mentioned already, there are two kinds of anti-gravitational switches in the game. Purple ones are placed permanently and we can't move them. Green ones can be taken and placed where we want, but just once. After they are dropped back, they change to the purple ones and we cannot move them anymore. Also, we can take just one switch at a time (border will change the colour from black to blue). Important is also the fact, that other robots react also on the green switches that can be taken by us.

Graphics are very good. Even if

everything is small, animations are smooth and the game is very nicely coloured. It contain the sounds for BEEP and musics for AY (in the menu and during the game). Controls are comfortable and the game react fast enough. Each fifth level have a password so we don't have to start always from the beginning.
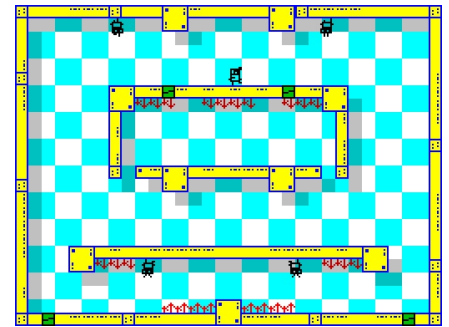
I recognize myself this way better

Gravibots is interesting and very well executed game. It is not very complicated, but will surely bother the center of logical thinking. Also, it is not too extensive, so it will not become boring before it's won. Original game, that is worth to play. (The game ended on fifth place in Retro Game Battle 2014) ■
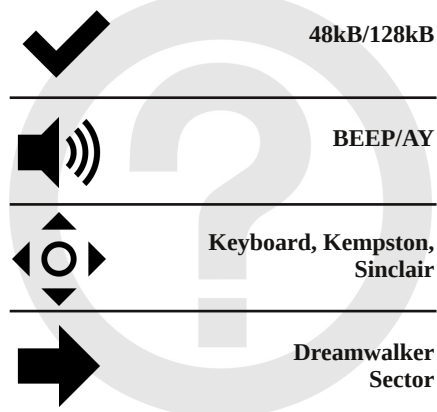
Sun Bucket

(c) 2014 Stonechat Productions

Light-bulbs all around

How many programmers are needed for changing the light bulb? None, it is hardware problem!

We are in the role of some robot on the wheels and our task is to light up all the light bulbs on the screen. It is done easily, it is enough to move over the light bulb and it will light on. When we do it will all of them, we go to the next level. There are some other robots and creatures trying to

48kB/128kB

BEEP

Keyboard (redefine)

**The Lost Tapes of Albion
El Stompo
Endless Forms Most Beautiful**

stop us in our effort and we have to avoid any contact with them.

**I've just lighted all the light bulbs**

The game is some mix between classic platformer and painter and it is mainly based on the fact that we can't jump. So we use the ladders and also the possibility to fall down from the screen to reach upper platform. Important feature is also the fact, that there will be always at least one light bulb that will pop out so we will have to light it again.

There are placed letters MORE in each level. If we will collect them in the right order, we will get an extra life. To not

start the game always from the beginning, each tenth level have a password, so we can skip those levels that we've passed already.

The game is somehow familiar from the very first sight. In fact it is changed version of El Stompo. TV sets were changed for the light bulbs and we don't have to stomp on them. The game is also free from all logical problems, so it is pure arcade platformer. Graphicaly it is a bit similar to it's predecessor, some details were enhanced, the spites movement for example. Also the colour details are the same, the game use Nirvana engine too, so it doesn't look like a game for old good Spectrum.

We can see our score above the playing area during the game, which (and in which order) chars were collected already and number of lives. There are some sounds for the BEEP. Who like fast platformers without logical complications, will surely enjoy all the 40 levels that Sun Bucket offers. ■
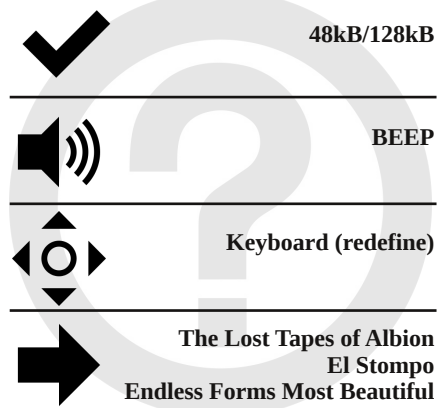
L'Abbaye des Morts

(c) 2014 Darkhorace & Jerri

Why are we running and were can we hide?

It is some months already that the story of expelled monk Jean Raymond appeared for first time. He hide in old church in hope to escape his persecutors. Right there he started to uncover mysterious legend of twelve brothers that were hiding there once too. The story stopped right here so we did not find out what happened with those brothers and also what happened to Jean Raymond. But the time came, so we can find it out now.

The beginning is the same. We appear in the forest and have to run before Knights will catch us. There is old church in our way, so we will hide there. Here we find first scraps of old story and shortly after church exploration also the way to the underground. And here it start to be interesting!

Gloomy tunels

Game l'Abbaye des Morts appeared at the end of last year in form of playable demo. It immediately impressed by good graphics, playability and a scraps of some old story. It remained to hope that the game will keep this positive things also in the full version. After few minutes of play it look like it really did.

So, we go from the church to the underground. We find out immediately that it is quite an active and huge place. We will visit catacombs, caves, hidden garden and other underground places. We will find old letters that will slowly remind us the story about the brothers that were hiding here once and what happened to them. Except that they also guide us through the game and tell us some advices how to advance. The hints are in form of a puzzles, but we will find out later that it have a perfect sense, we will just have to think a little bit. In fact, I moved in the game further few times just because those hints.

Except letters, also hearts can be found around. Those will add a life (we can have up to 9 of them) and are surely useful. They tend to be easily reachable. Except hearts, we have to pick up 12 crosses. Those are placed also on some places that are difficult to reach and will bother us a bit. Also we will have to solve out the fact, that some crosses are inverted and we cannot pick them up at all. The help is in one of the rooms that contain a switch. By use of the switch we can change inverted crosses to normal ones and then pick them up. The problem is, that the normal crosses will change for inverted ones, so we cannot pick up those. It will take us a some of switching.

Evil church

There are closed doors on few places. Those are opened with levers which are not always placed somewhere close to the doors they open. No keys and in fact no other items are present in game at all.

There is a lot of enemies around, not just by quantity but also by variety. From small spiders to fishes, firing plants, skeletons, soldiers and even a witch and a dragon. Each of the enemy have it's own speed of moving, usually also own height. Our only defense is jump, we can't kill anyone in the game.

The wheel of faith

There is big grave on few places. That work the way it save our position. The cross on the gravestone will turn when we walk around and that mean we will appear here when something will kill us. We will always appear at the last visited one. Graves are placed strategically quite good and it's presence usually mean some more difficult part of the game is coming up. This is making the game to be a little bit easier, we don't have to walk still the same screens to advance in the game.

Graphics are very good. Everything is colourfull and detailed, environment is not monotonous and one orientate very quickly. That is important also because we don't advance in the game straight from one point to another but have to go back often or to open closed doors on the places we visited already. Even if the scenery is static, there is enough of enemies that moves, water drops or something is firing so the game doesn't look static. The crosses are animated and hearts are flashing, all the movement in the game is smooth.

Hand in hand with the graphics come music that play during the game and create intriguing, a little bit mysterious atmosphere. Small disadvantage is the fact that it can't be turned off, so if someone play the game for a longer time, it can be a bit annoying.

Finally, the playability. The game starts slowly, we have to explore old church at first, then to go to underground. Even as the character control is very good, it is more and more difficult in the underground. Some screens are full of enemies and it takes a while to find out the proper action to advance. After few plays, when we are familiar with the controls situation go better and we can pass the screens more relaxed. There are still two screens in the game that are really difficult. It takes a really lot of time to find out how to pass them and even after that it is not anyhow easy. I can imagine that this will discourage a few players. The truth is that those screens are at the end of the game.

Pestilent Beast

l'Abbaye des Morts is an attractive platformer that was worth to wait for. Even if this genre is represented on the Spectrum more then enough, we have another evidence here that there is still enough place for new ideas. ■

✔	**48kB/128kB**
🔊	**BEEP/AY**
⬆⬅◉➡⬇	**Keyboard (redefine), Kempston**
➡	**The Charm Ninjajar!**

Ninja Twins Going to Zedeaks

(c) 2013, 2014 Sam Style & Mayhem & Skrju

Together but still alone

Ninjas decided to get Imperator's treasure. For this task they need various items that are hidden in the chests. They know where they are, but they don't know how to reach them. So we will help.

Ninja Twins is interesting logic game where we control two ninjas. The trick is to reach the chest with one of them (it doesn't matter with which one). The problem is the fact, that we control both of them at once. When we choose some direction, both ninjas start to go there and they stop just when they reach some barrier. And if they meet on the same cell, they fight with each other and we have to start the level from beginning. We have concrete maximum possible steps to solve each level.

Each level consist of one screen.
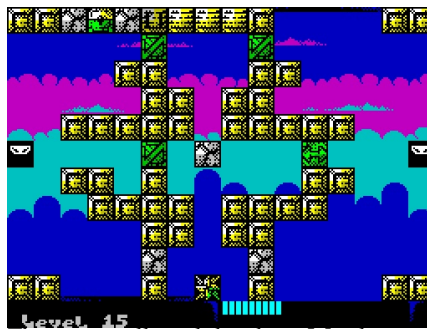
There are walls and the chest. We play step by step, every next step can be done just when the previous one is over. We can use less steps then the counter show us, but not more. There are also other things around the screen except the walls and the chest. At first there are grey cracked walls that break up when we go through them. But sometimes they hide annoying surprise in a form of ninja star that will kill us. Next are walls with an arrows, we can move them but just in the direction of the arrow and gravitation doesn't work on them, wooden boxes, those can be moved freely, but gravitation apply to them, gummy walls that will bounce us back and the last ones are teleports. Sometimes the ninja stars are unmasked, they have to be always avoided.

Ninjas were always mysterious and it is the same also in this game. They are just two black squares and we can see just their eyes. In fact, all the graphics are made to fit into attributes and are done in colourfull way. There is even paralax scroll in the background (four levels). Graphical and also musical backgrounds can be switched, in the menu and also during the game (scroll or static background, music or sounds). The background scroll is the only animated thing in the game. Nice thing is a short animation after every 8th level.

Ninja Twins is great logic game that keep interest even if player is not very successful. It is worth to not give up, the game is not too long and also not really too complicated. As a remake of flash game "Ninja Twins" from KronBits it is really a very good release! (The game took sixth place at Retro Game Battle 2014) ∎

✔	**128kB**
🔊	**AY**
✛	**Keyboard**
➡	**Quadrax Alter Ego**
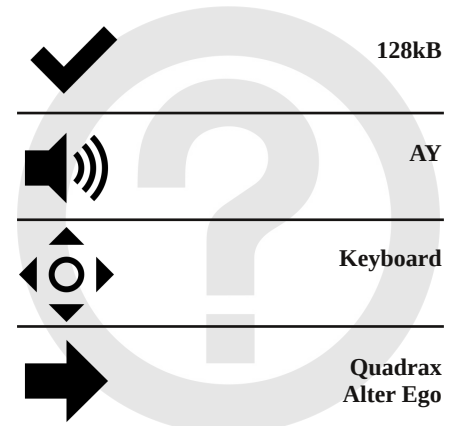
Catch a Hare

(c) 2014 Kas29

On a hunt

Except the other things, Australia is well known by artifical import of hare. Those went overpreservated and having no natural enemy did some damage. Here we have a game to see that catching a hare is not very easy task.

We have eight dogs and our task is to place them on the playing area so the hare have no way to escape. The hunt is made in turns, we start and then hare move, then we move and so on. The game is over when we catch a hare or if hare escape outside of the playing area. We go to the next level in the first case or lose a life in the second one.

There is still a chance to escape

The game is played on a chessboard. Game help us in the way that there are also solid walls on the playing area, so we need to use less dogs to catch a hare. On the other side, after few moves the hare start to move also outside of his moves, so he try to escape even before we placed a dog.

The game allow to set up a difficulty, from the easiest one, when the hare moves just diagonally, to hard, when hare move by all the directions. Beside that we can choose between a number of games, those differ not just with the background, from basic one where we can see the concrete squares so we can place the dogs more easily, to nicely drawn meadows, where it need a bit of practice to place a dog correctly and beside the classic hunt we have to catch a hare in a trap. Nothing animate when we choose basic background, others show us nicely animated hare and also dogs. And after successful catch, we will do the... it is worth to try it.

Catch a hare is simple game for having a rest that will keep on the interest for a couple of minutes. The graphics are very good and there is nice AY music playing during the game. ∎

✔	**48kB/128kB**
🔊	**BEEP/AY**
✛	**Keyboard, Kempston, Sinclair**
➡	**Hareraiser**
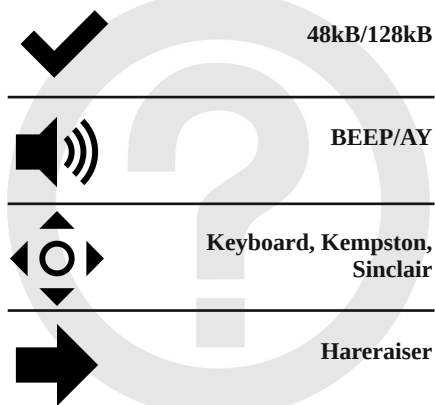
Metal Man Reloaded

(c) 2014 Oleg Origin & Stella Aragonskaya

Happy future is not always waiting for us

New York in close future doesn't look like a nice holiday destination but more as open battle zone between mafia and police. But there is policeman Matthew Cranston, called Metal Man, coming up.

We are in the role of policeman that have to break through technological predominance to accomplish his mission. Probably everything that we will meet in the game will try to stop us. Luckily, we are not alone and at least remotely we get a small help from the head quarters. Let's go straight to the game without any more hesitating.

Flying for what can't be reached

We control Metal Man and go through various platforms that can be reached by lifts. We are under fire nearly constantly (and we fire back nearly constantly) and are tried to be stopped. There is a short briefing on the screen before the each level start where we see what is our mission. It is important, because firing is not the only thing we have to in the game. For example, first level is about finding 6 parts of control chip, loading virus into the computer and then leaving the building. We will find out this in the briefing, realization is purely on us and will bother us a bit.

Because the various missions, we will have to use various machines and equipment. It doesn't matter if it is hovercraft, compacting machine or four legged robot, we will have to find out what and where to use. As we don't have any more controls except the directions and fire button, every special action is done by pressing "down" key. It's used for picking up the bonuses, using the hovercraft, setting up the switches or controlling the crane. Each level bring something different, so except reflexes we will train also brain a little bit.

In principle, all the levels are similar, the difference is more or less in the graphics, enemies and a mission we have to accomplish. One time it is all parts of a chip to be found, next time it is about finding the right way to the secret storage and it's clearing, also bombs deactivation will appear. This one will be a bit more complicated as we have just a concrete time limit to finish that level. After we will find and deactivate bomb, we have to move to another building where second bomb is placed. We have a motorbike and drive through the town full of cars and occasional road obstacles. It is surely a nice enrichment of the game. In the second building we have to find and deactivate another bomb, there is again a time limit to to that.

Enemies are realy varied

Right after the game begin we have a feeling of familiarity. The main character moves the same as Robocop. Lifts and overall game principle is very similar to some of the levels from Robocop game. Here the familiarity begins but also end, Metal Man Reloaded is full-featured game by itself. Playability is very good, but it needs a practice, because the game is really difficult. Nice feature is the fact, that there is quite a few of hidden places in each level of the game that usually contain some bonuses.

Race against time

The playing area cover most of the screen. Under it there is information panel where we can see important things connected with the game. On the left it is colourfull indicator of energy. Under it there is gun signalization - white squares mean it's usability, when it is overheated it doesn't shoot and that will shown up on it's cadence. This indicator change for a number if we pick up some bonus that will improve our weaponry and mean number of bullets left as it come always in limited amount. On the right there is a number of lives that we still have. Middle blue part of the panel is for various messages from the headquarters, those are useful sometimes. Also we can see items here that we picked up (chips, cards, keys and so on) and also how many of them still have to be find.

Graphically the game is excellent. Everything in the game is detailed, colourfull, sprites are big and lot of things are animated. Game environment is made using parallax scrolling, there are also clouds flying above our head. There are also such details as darkening of the screen when we use hovercraft for flying into the tunnel, the sky with clouds will disappear. In this way all the game is one big demonstration of graphics possibilities and it is always a lot to look at. That result in the fact that everything in the game move by eight pixels. At the first moment one nearly won't believe it is all possible on old good Spectrum.

We don't care about cautions

There are sounds for BEEP during the game and music playing in menu. The game surprisingly support also Spectrum 48k.

Metal Man Reloaded is classic shoot'em up in modern execution that connect modern components with the classic playability and it is definitive option for everyone who like action games. Special thing is also the fact, that the game was translated into several languages (Polish, Spanish, Czech). (The game ended on first place of Retro Games Battle 2014) ∎

✔	**48kB**
🔊	**BEEP**
controls	**Keyboard, Kempston, Sinclair, Cursor**
➡	**Robocop Total Recall**
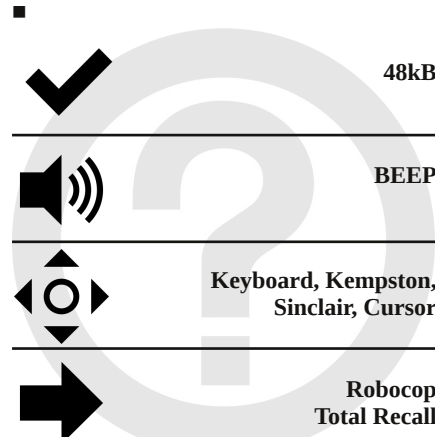
Dogmore Tuppowski - The new adventures

(c) 2014 Jarlaxe

Temple, sculptures, cave and evil wizards

Dark wizards stole statuettes from the temple. God Vah-Ka is angry and it is our task to get them gack to the altar where they belong. Otherwise there will be obligatory destruction of everything.

So we go straight into another adventure where we have to sort out the things by jumping around the platforms, avoiding the enemies and collecting the right items. We start in underground, but will go also outside and to the temple, even water is waiting us.

✔	**128kB**
🔊	**AY**
⊙	**Keyboard, Kempston, Sinclair**
➡	**Misco Jones Nightmare on Halloween**

Our aim is to return the statuettes to the altar. It is 20 of them and are placed all around the playing area. But there are two small limitations. First one is, that we can

carry just one statuette at a time. Second one is, that the temple with altar is locked by the spell. That can be broken if we kill 20 dark wizards that are somewhere in the game world. We have to jump on their heads (they are old men with a staff, but it will be not always easy). Be carefull, those are the only enemies that can be killed in the game, all others have to be avoided! The same apply for scorpions and crabs (these live in the water). Keys open the doors to the rest of the playing area. We have 20 lives, those can be replenish with

green bottles that can be found in the game.

The game world is quite extensive, but not that much to lose the orientation. This is supported by the fact, that there is basicaly just one way from underground to the outside world. On the other hand we will have to walk often to the places we've already visited.

The game has nice graphics, AY music during and is fun to play. It use Churrera engine, so there are no animations in the environment, but the enemies move probably in every screen. Even if game brings nothing really new, it keep quite a high standard of new platform games. It's recomended choice for all who like to jump around. ∎
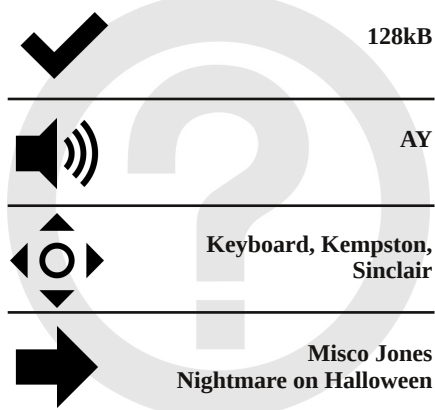
The Subject

(c)2014 Imanol Barriuso

Strange, very strange labyrinth

It always please me when some mysterious game appear. It don't have to be work of art, good playability and nice atmosphere are enough. It look to me that The Subject meets all of that.

We are in the role of person who is in some labyrinth. Sometimes we find a room, which only doors will lock us inside untill we solve some logic puzzle. Solving the puzzles will make us to reach the exit.

First interesting thing on the game is the absence of any description. No story, no information about the game, nothing. In fact we have to find out everything by ourselves, that is already a part of the game.

| ✔	**48kB/128kB**
🔊	**BEEP**
⊙	**Keyboard**
➡	**Effugit**

Luckily, the game principle is easy and it is enough to find out the controll keys.

When we solve the first room (it is needed to activate the switch next to the door and stand on the green square), we are in the main labyrinth. There are numbers in the doors, those are always different (if we come back to previous room, they will be also different then when we were there for first time). We have enough of time for everything as there is not any time-counter, so we don't have to hurry. Also, none else is in the game, no enemies. That create some mysterious atmosphere, we have no idea what we will find and also where.
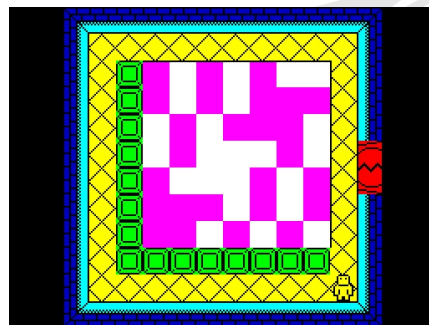
This puzzle is not complicated

The game is colourfull, graphics are simple and even if the main character is animated, it move by attributes so we can
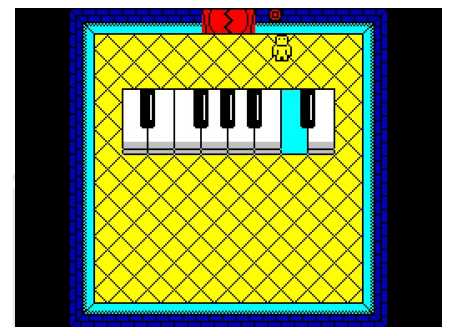
Music education

see the animation just when we walk into the wall. Sounds are simple, music is practicaly just in the room with a piano where it is needed for solving the puzzle.

The Subject is for sure an interesting game with a bit of mystery. I remembered Vinnie Vole's Existential Nightmare when I run the game for first time, luckily we have a full game here this time. I recomend this game to everybody who like puzzles and a little bit of mystery! ∎
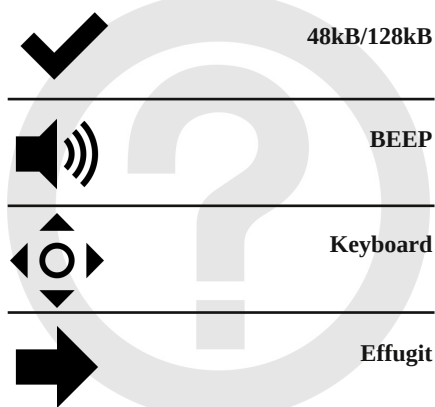
Dreamwalker - Alter Ego 2

(c) 2014 Denis Grachev

How is it to live in a dream

Dreamwalker is continuation of game Alter Ego from 2011. That one was widely accepted for it's originality, gameplay and overal execution. Our aim in the game was collecting small squares in each screen. The new element in the game was the controll of two characters at the same time, our own one and other, dreamy. The game was based on the cooperation of those two characters.
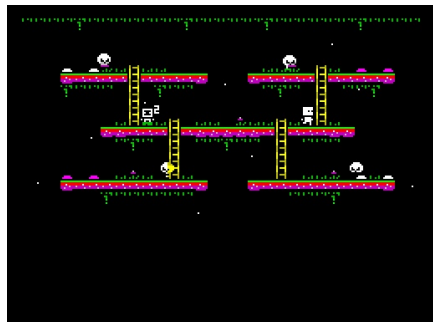
One of the easy levels

This year we've got second part named Dreamwalker. The game principle is the same, we controll two characters and have to collect small squares. Second character walk out of us depending on how we move on the screen. The main movement for us mean to go the left and right, up and down using ladders, we can't jump and can fall down from any high (except falling down from the screen). There are also skulls on the screen and we have to avoid them. Second character have an advantage. As he come from other world, contact with the skulls do nothing to him. Also, we can change the possition with the other character. When we press fire, the game will stop for a moment and we will

fly to the place where second character stand and he fly to our possition. We will use this in the game a lot.

Compared to first part, we;ve got more colours of the squares we collect. There are original purple ones that are collected by walking. White squares are also known from the first part, those are collected by second character. New are green, we can take them also when we just fly over them during possitions change. There are also cyan ones, those will change the way how the second character walk out of us. It is horizontaly or verticaly.

There are no counters or indicators on the screen during the game. Second character have a small number next to his self that show how many times we chan change with him. When we finish a level, amount of lives will show up under the playing area for a moment, or the usual Game Over.

Levels are based more on the thinking then on exact timing of the movements. Sometimes it happen that we have to move to some safe place after the level start, but even that is not in a big hurry. Important is to think about the solution of each level. Also, there is no time in the game so we can take our own tempo.

The game contain four dreams, first three have 10 levels each. After finishing each dream we get a password, so we don't have to start always from the beginning. Last dream have just five levels, but the skulls are comming also from the dream world so they don't hurt us but the second character.

It is graphics that imediately attract the attention. Nirvana engine is used and the game really show it up. It is detailed and incredibly colourfull. But it is still just

an addition, it is not what the game is based on. Everything in the game moves smooth and the controlls react fast enough.

Tricky place

Dreamwalker: Alter Ego2 is surelly a great game with interesting atmosphere. It come in versions for 48k and 128k Speccies, they differ by sounds (BEEP on 48k) and musics (each dream have own music). I recommend it to every fan of logic games! (The game took second place at Retro Games Battle 2014) ■

✔	**48kB/128kB**
🔊	**BEEP/AY**
⬆️⭕	**Keyboard, Sinclair**
➡️	**Alter Ego Gem Chaser**
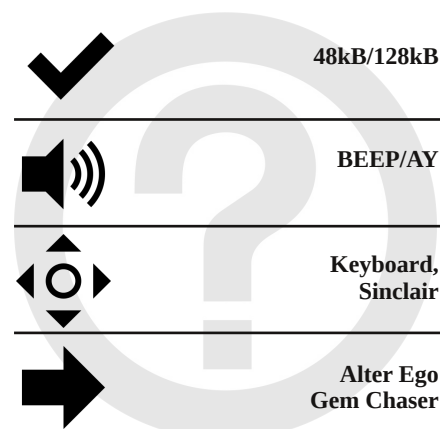
How to Write Games for ZX Spectrum

(c) 2006-2014 Jonathan Caulwell

Games from the other side

Jonathan Cauldwell is author of many games, that he write over 25 years already. And except writing the games he also write a book that show how the games can be written.

How to Write Games for ZX Spectrum is an electronic book, that Jonathan placed on his website for free download. He started to write it back in 2006, added more and more content and the current version is 0.6 from this year's spring.

The book will guide us through 18 chapters where we will see how are the things done. We will start by text print, add controlls, some sounds, collisons with the background, enemies and so on till the

complete game. Everything is shown on the examples, so one get also the real output from the book.

There is not just one game in the book. It begin with the Centipede, later come concrete routines from the games as Turbomania or Blizzard's Rift. Most of the chapters starts with a theory and then add an example, some contain really long listings of routines. Theory is written by simple way and it is not any problem to understand it. All the program listings are fully commented, so even here is not any problem to understand what is going on.

Even if the book write about the game making, chapters as keyboard, random numbers, mathematics or interrupts are usable generaly and if someone need to

solve such things, the book can help.

Jonathan assume that the readers know the assembly language so he don't explain instructions or how the proccessor work. He explain only what is needed to understand the topics of the chapters (so for example the interrupts are explained).

There is currently 106 pages of the text, but that contain also some white space. It is possible that the content of the book will grow up in the future. Every chapter have it's text, explanation is good and even if some topics can be explained a bit more, the book is really worth to read. ■

Games help
(Andrew Ryals & Pavero)

Yumiko in the haunted mansion

(c) 2012 L.C.D.

Passwords:

02. level - DANIEL
03. level - LESZEK
04. level - YOUKAI
05. level - KEFTAN
06. level - BOOGEY

07. level - BADA55
08. level - GOTHIC
09. level - BADMAN
10. level - AMNESI
11. level - SLENDR
12. level - KATSEB
13. level - GARLIC
14. level - SCARED
15. level - GHOUL5
16. level - LTMEIN
17. level - GOTHAR
18. level - CTHULU
19. level - ROKITA

20. level - LUZIFR
21. level - HITLER
22. level - HUIBUH
23. level - GWBUSH
24. level - PRMTHS
25. level - STKING
26. level - OCCULT
27. level - SATANA
28. level - GORE69
29. level - SISTER
30. level - EVIL66
31. level - HAUNTD
**32. level** - THEEND

W*H*B

(c) 2009 Bob Smith

Passwords:

02. HERE TO THERE – 05083790
03. ROLL WITH IT – 07260409
04. ONE BECOMES TWO BECOMES ONE – 03540376
05. APPLE PIE? – 27660590
06. BEAM ME UP SCOTTY! – 90441065
07. PUT IT ALL TOGETHER – 03758270
08. TIP-TOE – 10695006
09. NEGATIVE – 05034728
10. COMPLEMENTARY – 00860475
11. JUGGLING – 48150300
12. TWIST AND SHOUT! – 04996008
13. TO ME... TO YOU... – 60394751
14. ROUND AND AROUND – 10115479
15. TRICKY PATH – 19380227
16. THE KEY TO THE HOUSE – 79009233
17. THE TRUTH IS OUT THERE – 33225444
18. HERE, THERE, AND EVERYWHERE – 55197620
19. YACK YACK YACK YACK YACK! – 82313133

20. JUMP STACK'S CRACKS – 92131998
21. STICK STACK STUCK – 73983211
22. STACKS'S NEAR AND FAR – 22022133
23. QUICKSILVA – 60301769
24. VORTEX – 21074488
25. HYPERSPEED – 98125546
26. QUATERMASS – 60660666
27. DANGER UNDER FOOT – 06217794
28. FORMAL GARDEN – 88421753
29. SO MUCH CHOICE! – 00707077
30. STEP TOGETHER – 17522964
31. BONES – 11010110
32. LOCK DOWN – 59174432
33. NETWORK, NETWORK, NETWORK – 44296770
34. COMPLICATIONS – 88497923
35. HALL OF THE MOUNTAIN KING – 30313233
36. 2047 – 75547829
37. FISHBONE – 29467991
38. HOPSCOTCH – 68002318
39. SQUID'U'LIKE – 47298521
40. WITH A LITTLE HELP... – 98276121
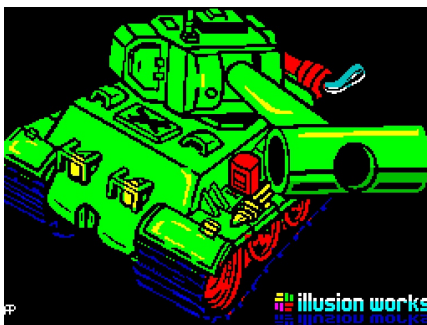
Tank Battle

(c) 2013 Illusion Works

Passwords:

02. level - tank battalion
03. level - tank line
04. level - fishy tanks
05. level - tank trouble

06. level - think tank
07. level - tank care
08. level - battle city
08. level - tank you so much
09. level - tank effort
10. level - special tanks
11. level - tankmania
12. level - tank cover
13. level - full tank
14. level - tank too many
15. level - tanksgiving

Sector:

POKE 32812,X - number of lives

Land of Mire Mare:

POKE 32028,X - number of lives

Janosik:

POKE 43381,201 - immunity

The Speccies:

POKE 45548,0 - unlimited time
POKE 38211,0 - unlimited lives

Toofy's winter nuts:

POKE 33139,189 - unlimited lives

Moderate Retribution:

POKE 48523,183 - unlimited lives

Carlos Michelis:

POKE 43443,201 - immunity (except explosions)

Shuttlebug:

POKE 29899,0 - unlimited lives

Vade Retro:

POKE 488,39,201 - immunity

Apulija 13
Game solution

Go down the runway and then turn right. Down is a hidden room. Here you can meet the author of this game, Allessandro, who will give you ZX Spectrum, with this thing in your inventory your health and ammo will be automatically replenished. It is built-in cheat, so ignore this room if you want to play fair. Now let's start the base exploration. There are locked doors and we have to find the right entry
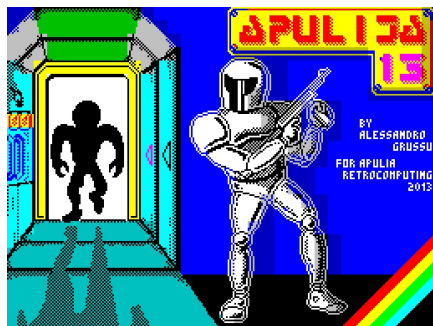
cards, each of them is marked by a letter. There is a **TIME BOMB** in the inventory from the beginning. We can carry up to three objects at once.

In the room with two ventilators and a dead body go down. Iron case in upper right corner contain first card (**E**) that open middle doors into the east corridor of the base. Go to that direction and open the door, think about the fact that you always need to have the right card to pass the locked doors. In the east corridor is a laboratory which is locked. First door on north lead to the rooms that are contaminated by radiation, you will need a **ANTI-RAD SHIELD** to survive. That can be found in the rooms to the left from the laboratory. With the shield you can easily walk through the radiation and get the **NANOREACTOR** that is needed for ship-repairment.

In the rooms next to the contaminated one is a card to access commander's room (**C**). That is located in south corridor, opposite to the contaminated rooms. Here you can find a card from laboratory (**L**) and great weapon to increase your gun-power. Get the **DATA DISC** with secret documents out of the laboratory. Now you have to act fast, place **TIME BOMB** to the generator (in contaminated rooms, close to the triangular object). Time countdown will start, take disk and nanoreactor, use card **E** to unlock the door and run to the ship. There is tough alien waiting for you. You will surely find another two cards during the base exploration (**A** and **I**), those open rest of the rooms which contain nothing interesting. ■

Pavero

Cronopios y Famas
Game solution

The game starts in front of your house, there are just **MATCHES** in your pocket. Go to the east till you will find open house doors with the stairs leading up. In the house go left and talk with Cronopio who is looking for a toothpaste, local seller won't sell it to him because he think Cronopio is wasting by it. Drop the matches and take **COIN**. Go back to the screen right to your house and go twice up to the shopkeeper.

After a short sound you can check your inventory and you will find out that you're carrying **TOOTHPASTE**. Return to Cronopio, he will be happy to get a toothpaste again and will splatter it through the window. The shopkeeper was right about the wasting. The Famas standing under the window have his hat dirty from the toothpaste now, you have to help Cronopio to clean it up.

Go back to the cross-roads with the green trees in the middle. Go up, right and up again. Take the book **ENGLISH FOR ALL**. Now return back to the crossing, go left and up. You're standing in front of a shop, now continue to the left and then twice up. Now you're in the harbor. At the very right there is a fishing Famas. Take the **FLUTE FISH** and return back to the cross-roads.

Now go twice down and then twice left. Play the flute for snake, he will disappear, now you can drop the flute. Go left to the library. Change the book

ENGLISH FOR ALL for the book **ROMANIAN FOR ALL**. Now go three times right, up, right and down. There is a commercial in the radio for a new cleaning appliance that have a different name each game. Commercial is in Romanian, so you have to have the book with yourself. Go to the shopkeeper who will give you a sample of the **CLEANER** for free.

Now you can help Famas to clean up the hat from the toothpaste. You will get **INSECT NET** as a reward. Go twice to the left and then down. You will find jumping and smiling cloud. In fact, those are strayed memories of another Cronopio, who is to the left under the harbor. If you have the **INSECT NET**, catch up the memories. Cronopio will thank you and give you a box of **CHALKS**. You don't need the **INSECT NET** anymore. Go back to the screen where you've found the strayed memories and continue to the right.

Draw a swallow on the tortoise's armor and she will disappear. Take the **PASTILLES** from the house. Go under the screen where you found the book **ENGLISH FOR ALL** and continue to the right. There is another Famas standing next to the tree and is ice cold. Change the **PASTILLES** for an **AXE**. One screen before the one where snake was go up. There is giant artichoke, use the **AXE**. Return to the house where **PASTILLES** were found and go down. Fill the hole in the wall by artichoke, then you will finally get the **KEY** from your house. ■

Pavero

AS
Installation and use

I n last issue, we've briefly described the possibilities of cross-compilation on **PC**, today we will take a look on first of them, **AS**.

Author of the AS is **Alfred Arnold**, who started to write it originally as assembler for **MC68000** processors for own needs. Later, during his studies, he started adding more and more architectures, because other non-commercial assemblers usable for students were not easily accessible. Today, AS support over 20 different processor platforms. We are interested in **Zilog** and it's **Z80**.

Installation

Current versions can be found on the website in the form of source codes. Older versions can be downloaded also as binary files for various operating systems (**MS-DOS**, **Windows** and also **OS/2**). There are not any problems with compilation, because author prepared it all for us.

After depack, we have to choose platform that fits us. If we are under **Linux**, it is enough to rename file **Makefile.def.tmpl** to **Makefile.def** and then just traditional **make** and **make install** is enough (tested under **Slackware 14.1 64bit**). If we are using **OSX**, needed file is placed in **Makefile.def-samples** directory and is named **Makefile.def-i386-osx** or **Makefile.def-x86_64-osx**, depending if we want 32 or 64 bit binary. One of this files have to be copied one directory up and renamed to **Makefile.def** (**XCode** is needed for main compilation).

It is possible to compile AS also under **MS-DOS**, there are files **MakeDef.dos** and **MakeDef.dpmi** (for protected mode support) files. Compilation under DOS require **Borland C** (at least) **3.1** and minimum of **600kB** of free memory.

I will come back to Linux for a moment, it is good to check if compiled binary exist in distribution repositories, it will be easier to install it if yes. There is **Slackbuild** for older version for easy compilation under Slackware, it's enough to slightly adjust it for current version.

How does it work

Source code is plain text. We can use up to **256 character**s per line (any next characters in line will be ignored by AS), each line can contain exactly one instruction. Format of the file is as follow:
[label[:]] <instruction>[.attribute] [parameter[,parameter..]] [;comment]

Colon after the label is not mandatory, but instructions can't be placed in the first column, that one is dedicated for labels. In our case (assembler Z80) attributes of instructions doesn't exist. **Comment** can be placed anywhere in the line.

We can set up some specific behavior of the compiler at the beginning of the source code. There is a lot of possibilities, but they are usually connected with concrete processors. For us setting "**cpu z80undoc**" is interesting, that will allow us to use undocumented (secret) instructions. Next setting is "**relaxed on**", that one will give us more possibilities how to write various numeration systems and for example people, who used to program in assembler **Prometheus** will welcome it. Writing of numeration systems can look like this:
XXXH - hex
XXXB - bin
XXXQ and XXXC - octal
XXX - dec
Using the switch relaxed on we can write the numeration systems as:
$XXX - hex
%XXX - bin
@XXX - octal

We can use pseudo-instructions **DEFW** and **DEFB**, forms **DB** and **DW** works too. We can also use pseudo-instructions **INCLUDE** for including source code from another file and **BINCLUDE** for include binary data from another file.

Syntax of the assembler come from official documentation and try to keep it as close as possible, so programming using official tables should be not any problem. Let's try to compile some example:

```
                cpu z80undoc
;we can use also undocumented instructions
                relaxed on
;convenient writing of numeration systems

                org      $8000
;favourite address for assembly
                ei       ;just to be sure
init            ld       hl,16384
                ld       de,16385
                ld       bc,6143
                xor      a
                ld       (hl),a
                ldir
;typical screen clear
                ret
;end of the program
```

We will save this program as **main.a80**. Open command line and move to the directory with the saved program. Compilation is very simple:

asl main.a80

Output should look like this:

```
macro assembler 1.42 Beta [Bld 93]
(x86_64-unknown-linux)
(C) 1992,2014 Alfred Arnold
Motorola MPC821 Additions (C) 2012
Marcin Cieslak
68RS08-Generator   (C)   2006  Andreas
Bolsch
Mitsubishi M16C-Generator also (C) 1999
RMS
XILINX KCPSM(Picoblaze)-Generator (C)
2003 Andreas Wassatsch
TMS320C2x-Generator   (C)   1994/96
Thomas Sailer
TMS320C5x-Generator   (C)   1995/96
Thomas Sailer

assembling main.a80
PASS 1
main.a80(65)
PASS 2
main.a80(65)

0.00 seconds assembly time

   65 lines source file
   2 passes
   0 errors
   0 warnings
```

We've got file **main.p** as a result. To be able to use it, we have to convert it for a binary, that's what utility **p2bin** is for, so we will write:

p2bin -r \$-\$ main.p

I will stop here for a moment. Utility **p2bin** allow us to write the **offset** of where the data will load. As we compiled the program to address where we want it to run, using **$-$** will tell it not to change any values. Back slashes are needed in **Bash** for the command to be executed properly. Output should look like this:

```
P2BIN/C V1.42 Beta [Bld 93]
(C) 1992,2014 Alfred Arnold
main.p==>>main.bin (95 Bytes)
```

We've got file **main.bin**. Now we can load it directly to address **32768** and run it or make a **TAP** file using **bin2tap** utility (**bin2tap -b main.bin**).

Here come the important feature of **AS**, it can't create files suitable for **ZX Spectrum**, so we will always need so many steps. Luckily, we can help ourselves and will do the process automatic.

We will create simple **Makefile** under Linux where we will put all the steps:

```
all: main.tap

main.p: main.a80
        asl -cpu z80undoc main.a80

main.bin: main.p
        p2bin -r \$$-\$$ main.p

main.tap: main.bin
        bin2tap -b main.bin

run:  main.tap
        fuse main.tap

clean:
        rm main.p main.bin main.tap
```

We need to place this file into same directory we use for source code. Each label is in fact a parameter of the command **make**, so we have life much easier.

We can test it right away. When we

AS
Installation and use

will use **make clean**, all files except **Makefile** and **main.a80** will be deleted. Now, when we will use **make**, compilation will start and we will get a **TAP** file. If we will use **make run**, **FUSE** will start together with our program.

Makefile can be replaced with **BAT** file under **MS-DOS** or **Windows**, where we will write all the steps in similar way, just without the labels as BAT files can't use them.

Macros

AS is **macro-assembler** and that mean we can use macros during writing of our programs. Macro is in principle a series of pseudo-instructions that can behave under some conditions. Probably most used type of macro is repeat, we will show it on example. Let's write following program as continuation of the previous one (original ret have to be deleted):

```
restart      ld      c,8
loop1        ld      hl,(adr1)
             ld      (adrtmp1),hl
             ld      de,24
             ld      a,8
draw1        ld      (count),a
             ld      b,8
             ld      a,255
             call    line
             halt
             halt
s21          ld      hl,(adrtmp1)
             ld      b,8
             xor     a
             call    line
             ld      hl,(adrtmp1)
             inc     h
             ld      (adrtmp1),hl
             ld      a,(count)
direction1           dec     a
             or      a
             jp      nz,draw1
             dec     c
             jp      nz,loop1
             jp      restart
line         ld      (hl),a
             inc     l
             rept    7
             ld      (hl),a
             inc     l
             endm
             add     hl,de
             djnz    line
             ret
count        defb    0
adr1         defw    16384
adrtmp1      defw    16384
```

There is macro in last routine (**line**). It begin with **rept 7**, that mean next code will repeat **7 times**. Which code it is exactly is defined with instruction **endm**, that ends the macro, so in our case a pair of instructions **ld (hl),a inc l** will repeat 7 times. Instructions will be normally expanded during the assembly, but we get a

little bit comfortable and readable source code as we don't have to write and also skip during listing the long sequences of the same instructions. There is much more possibilities of macros, I will recommend you the original documentation where they are detailed.

Assembly into memory pages

Martin Bórik has shown us on the forum **playground.darkbyte.sk** an elegant way how to compile code directly into memory pages of **Spectrum 128k**. It use the fact, that we can create the binaries from the bytecode using **-r** switch of **p2bin** utility if we prepare the compilation properly. Here is the principle:

As we know, output of the AS is **bytecode** file ***.p** that can contain just **65536** output bytes and can be used for extraction of the binaries using **p2bin**. So, if we will prepare our source code for example as this:

```
        cpu  z80undoc
        relaxed on

        org  0
; area from 49152 in slow bank 1 (17)
;------------------------------------------
        phase  $C000 ; original value of
org, where the code will run

; code

        ds  $4000-($-$C000) ; to fill up the
space to the end of the bank
        dephase

; area from 49152 in slow bank 3 (19)
;------------------------------------------
        phase  $C000

; code

        ds  $4000-($-$C000) ; bytecode
have to be filled exactly to 16k blocks
        dephase

; area from 49152 in fast bank 4 (20)
;------------------------------------------
        phase  $C000

; code

        ds  $4000-($-$C000)
        dephase

; area from 49152 in fast bank 6 (22)
;------------------------------------------
        phase  $C000

; binclude "hudba.bin" for example

        ds  $4000-($-$C000)
        dephase
```

Next we will extract output into binaries of each bank using parameter **-r** as **range**, parameter **-l** tell what to **fill** the

empty place with and **-k** at the end will **delete *.p** after it's use.

It will look something like this, in compilation Makefile:

```
%.bin: example128pages.p
    p2bin example128pages.p page1.bin -l 0
-r \$$0000-\$$3fff > /dev/null
    p2bin example128pages.p page3.bin -l 0
-r \$$4000-\$$7fff > /dev/null
    p2bin example128pages.p page4.bin -l 0
-r \$$8000-\$$bfff > /dev/null
    p2bin example128pages.p page6.bin -l 0
-r \$$c000-\$$ffff -k > /dev/null
```

Or compilation batch script:

```
p2bin example128pages.p page1.bin -l 0 -r
$0000-$3fff > /dev/null
p2bin example128pages.p page3.bin -l 0 -r
$4000-$7fff > /dev/null
p2bin example128pages.p page4.bin -l 0 -r
$8000-$bfff > /dev/null
p2bin example128pages.p page6.bin -l 0 -r
$c000-$ffff -k > /dev/null
```

Ending

AS is great cross-assembler that stay out of the way. I use it personally over two years for programming and I am fully satisfied with it. Although it doesn't support **ZX Spectrum** platform as such, easy solutions make work with it easy and one can concentrate fully on the programming itself.

Next people helped with the article: **mike/zeroteam - Makefile**, **Sweet - serie about assembler programming** on the **ci5.speccy.cz** website and **Martin Bórik - assembly into ram pages**. ■
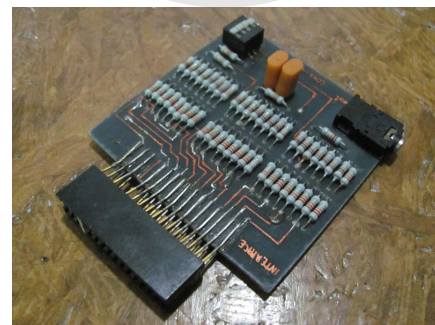
ellvis

Program:
                                    AS
Author:
                        Alfred Arnold

Links:

http://john.ccac.rwth-aachen.de:8000/as/
http://ci5.speccy.cz/category/assembler/

D/A converter from article on page 25

Beepola

BEEP music fast and easy

There is a lot of native music editors for the beeper. Some are well known as Wham! The Music Box, Orfeus The Music Assembler or The Music Studio or not that well known as The Music Synth, for example. Today, in the times of cross-platform applications we don't have to force this old programs and search for break-necking keyboard shortcuts for this or that function, if we don't have a good reason for it. That's because there is Beepola from Chris Cowley. Beepola is software for Windows, that work on tracker basis and allow to create and edit musics for the ZX Spectrum beeper. In the time of writing this article (February 2014) in latest version of Beepola 1.08.01 have a potential one bit composer possibility to choose from over of ten of sound engines:

Special FX (**Fuzz Click**) - engine of musics as in Firefly or Hyper Active from Jonathan Smith

The Music Box (**Wham!**) - very famous two channel and first multivoice engine for Spectrum in the history with drums and constant length of the tone from Mark Alexander

The Music Studio - two channel engine with drums from Saša Pušica also with constant length of the tone

Savage - two channel engine with drums and effects known from games Savage from Jason C. Brook

ROM Beep - classic ROM BEEP, that generate pseudo-two channel sound using arpeggio

Plip Plop - or one channel „Smith's" BEEP (again Joffa Smith) with the possibility of drums and glissando, used for example in games Cobra, Arkanoid 2, Hysteria, Ping Pong.

There are also some new engines from Shiru:

Huby, **Qchan**, **Tritone**, **Tritone** (equal volumes), **Phaser1** (Digital drums) and **Phaser1** (Synth drums) (especially Tritone is really excellent)

Edit is done in three basic windows and some next additional windows that are available depending on the chosen sound

Program:

Beepola

Autor:

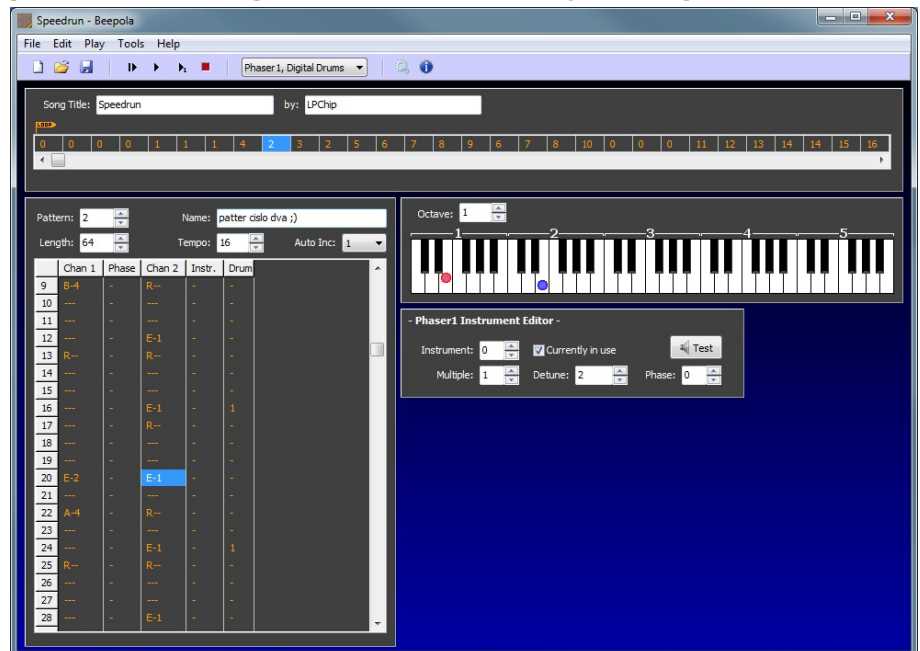**Chris Cowley**

Materials:

Beepola: Online manual
http://freestuff.grok.co.uk/beepola/
http://1bit.i-demo.pl
http://zxspectrum48.i-demo.pl/beeper_demos.html
http://worldofspectrum.org/faq/reference/48kreference.htm

engine. Upper long window is used for **song positions** and second one is for main **edit** of current pattern. **Name** of the song and **author** is to be written also in the song positions window. Each positions are to be

Beepola

written next to each other in the cells. Patterns are counted from zero. There is also third window that show **piano** and we can switch there the current **octave**.

In main editation window, we have to set up **number of current pattern** and a **number of it's lines** (default is **16** instead of **64** that use other trackers). Also we can name the pattern and set up it's tempo. Tempo differ between various engines, so for example value 14 using Special FX engine is different then value 14 using Savage engine. We can also change the engines during the edit and hear how the song will play using various engines. However all the song can use just one engine and they can't be combined together. The last part of the window is **pull down menu** with setting of the **automatic movement** during the input of the notes, default is 1 but some musicians prefer not to use it at all (value 0).

There is **main panel** for current pattern under those elements. Depending on the selected sound engine it contain particular number of channels together with possible effects or independent channel for drums.

Finished song can be saved as **source code** for Beepola in ***.bbsong** format. But what is it for an editor if it doesn't allow to export the song for the use in own programs. Beepola obviously allow that and it's done perfectly. In the menu **Tools - Compile song** will show us window where we can set up a lot of things. At first it is **address** for compilation. The colour of

the **BORDER** during the song play, the way to **export** (TAP, TAP without loader, assembler listing, clear BIN and raw data in TAP, BIN or ASM). Next we can set up if the song should repeat after it's finish or end and if the song can be interrupted by keypress or not. Last thing to set up is **interrupt vector** where 0xFE00 is the default value.

Up under the program menu are basic icons for control. Beside the usual **New**, **Open**, **Save** there is also Play from song beginning, Play from current position, Play pattern and Stop. There is also pull-down menu for choosing the sound engine, button for compilation and button for Song Information for detailed information about current song including the length of compiled song generated for all the engines for comparison.

In the menu of application can be also found export of the song into WAV, switching between decimal and hexadecimal patter lines in **Options** and turning on or off the beeper's I/O port contention.

All the engine behaviors are quite detailed described in the online help of the program, where we can find also information about history of the engines and their use in the Beepola. All at all, thanks to tracker's style of edit and easyness of use, the Beepola is the best and most easy to use cross-platform tool for creating the beep musics for Spectrum that was ever made. And if you don't have **Windows**, don't worry. Beepola run smoothly under **Linux** using **Wine** or **OS X** using **Darwine**. It doesn't need the installation. The latest version can be found at: http://freestuff.grok.co.uk/beepola/ ■

Factor6

Harlequin

Miniaturization rule the world and did not avoided also our hearty 8-bit platform, were it shown up in the shape of modern clones inside one or two FPGA or CPLD. That is the reason why currently most popular clone Harlequin goes against the flow, because it is build up completely from discrete logic and except EPROM there is not even one programmable circuit. Judging the reactions on this clone, new spectrum users (or better collectors) that came to the scene just recently don't understand that and say it is dead end. That's why we will take a look in this article what the Harlequin really is.

Person behind the Harlequin is **Chris Smith**. Or more precisely, his decision to clean up his attick. During that he found out his old electronic designs and that leaded him to the question: "How difficult is it to build up the clone of ZX Spectrum from the discrete logic?". After a short while he found out the answer in the form of **Speccy Bob** and **Chrome**, but it did not satisfied him because those projects hasn't described the way how they were build up into functional clones. Chris thought it can be interesting for more people so he started to do it by himself. That is the reason why I don't like all those people who go angry because discrete logic, because it is obvious that they haven't read the blog of Chris as there is this sentence right at the beginning "So this site is dedicated to the design of a ZX Spectrum Clone. In true research lab fashion this site will document the complete progress: the questions, the answers, the mistakes and the eureka moments. At the end of it we may even get a working ZX Spectrum clone...". And that is the true matter of the Harlequin.

But we will not stop the article here, of course, but we will take a closer look on the Harlequin itself. SpeccyBob and Chrome are working, but there is one small problem - they are not 100% functional copy of the ZX Spectrum. Chris wanted to have a clone that is 100% compatible with Speccy 48k including timing, VRAM contention and floating bus. That needed to dig deep into design of the original ZX Spectrum and to advance step by step. All those steps are described on his blog (www.zxdesign.info) and also in the book **The ZX Spectrum ULA / How To Design A Microcomputer**, that Chris wrote, because the amount of the information has overgrown the blog. But there are still the most important information on the blog, so it is fast accessible source of information about Harlequin, especially if we don't own the book.

Chris build up the Harlequin on the pin arrays and that allowed him to easily change the wrongly designed parts and step by step came to the functionality that truly copy the ZX Spectrum. It is all based on commonly available **TTL** parts from **74HC**, power supply is done using switched **DC-DC** regulator and display part

use **PAL/NTSC** coder **AD724**. As Harlequin came to the functional and debugged state, Chris started the works on the **CPLD** replacements of the **ULA** and also that project was successful as it can be read on his blog. From that point Chris signed off and it never came to the final product in shape of kit or complete clone.

That is probably what aroused a group of enthusiasts who designed and prototyped PCB, after the Chrises book, that fits into original case of the Spectrum. It also wasn't a walk through the rose garden and as evidence there is long thread on the World of Spectrum forum, where it's obvious how was the PCB revised and improved. At the end of this ambition was a kit, that was amazingly prepared by **Ingo Truppel** and so the Harlequin finally appeared in real shape. I personally bough this kit and build it up and I am impressed by it. It's made from the quality components and it took me about 6 hours to build it up by slow tempo. It was working on the first try.

You'll be probably interested in my experience with real use. When I build up the Harlequin, I've spent few days by playing various games and also by running various musical-graphical programs, that are pretty popular in the Speccy community. Harlequin handled it all perfectly and without any signs of instability. The only thing I've found is small difference in border timing. It show itself by flickering of the effects in the area above paper, in the areas next to paper and under the paper is everything ok. It is possible to see in demos **AMD1**, **EEL** or **NMI3**, but for example **SHOCK** run without any problems. It look like none tried to resolve that yet, but I am sure sooner or later someone will take a look on it (probably Ingo).

I've tried also some peripherals, of course. I have **divIDE**, **SIF**, **AY** from **Zaxon** and all of them work without problems. Combination of **AY+divIDE** connected together made some problems at first, but I've found out that it is because the AY itself so I connected both into bus splitter and all started to work correctly. Screen output is clear, without any disturbing elements, just the error of PAL itself show up (transition from magenta to green, for example), but that is problem of all devices using PAL output. You'll need good power supply **12V/2A**, because there is **GRAETZ** on the input that will take something and the original power supply from Sinclair is too soft and insufficient to power up the Harlequin, especially if you will connect some peripheral as divIDE or some other interface. It proved good for me to catch **speaker** to the PCB by small drop of glue, because when it was just freely there it had a tendency to resonate. It is good to catch up by the glue also the **EAR/MIC** jacks as they have very fine contacts that can break up from the PCB

after some time. Except those few minor things there are no issues and I consider Harlequin to be one of the best Spectrum clones.

What more to say? Maybe a small summary. Harlequin is wonderful example of potential, that is hidden in small communities of enthusiasts. From the clear curiosity, real product rise, that bring joy not just to it's authors but also all the bunch of people who never stopped to watch the happenings around the ZX Spectrum and mainly never stopped to use it. **Sir Clive Sinclair** surely never imagined that his minimalist computer design will survive till 2014 and even reincarnate into form that was maybe about to be produced if there wasn't ULA. Harlequin as a project is also exceptional because there will remain forever a great book that allowed a lot of people to understand the details how the ZX Spectrum works. And that is great, don't you think so? ∎

z00m

1x1 texture mapping

I wanted to create one more "pixel perfect" effect for our future Forever demo (which became Mission Highly Improbable) as I did before in Critical Error, Dizzzruptor, and New Wave 48K.

There were pixelwise texture mappers in old Amiga demos but none on ZX Spectrum, even on powerful models such as ATM Turbo or Pentagon 1024. You can't just draw in chunky screen and perform a sort of c2p for this because the screen won't even fit in 48K of memory. For example, 2x2 pixel tmap in Spirius was made directly in screen buffer, with 4 copies of the texture to speed up adding the pixels. But you can't do even this for 1x1 resolution! Not to say about the memory to hold 8 copies of each texture, processing so large an amount of pixels will take way too long.

Suddenly I found that I can utilize the strategy once used in "Wolfenstein" part of Critical Error: draw only the margins between colours (table zoom) then fill all the screen with XOR (EOR fill).

How it works for polygons (namely parallelograms)? Well, you must distort them.

Note, the distortion will use arbitrary pixel shifts. Not 0..7 pixels right, but 2..1 pixels left and 0..5 pixels right. That's faster. And you can't distort all the polygons at once. You should draw one polygon at a time, process it in the polygon buffer then paste it on screen buffer.

What size to draw? Take 3 vertices: 2 upper and the bottommost. Using the first two, detect the texture rotation. Using all

1x1 texture mapping
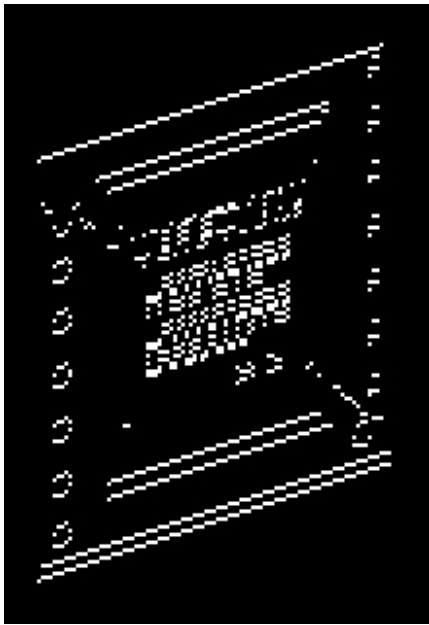
Pic. 1 - this is what we draw

three, detect "right" or "left" polygon ("right" if they are n+0,n+1,n+2'nd vertices of the polygon (clickwise), else "left" – n+0,n+1,n+3). If you detect the "rightness" wrong, your lines when you draw will be too wide, maybe wider than the screen itself!
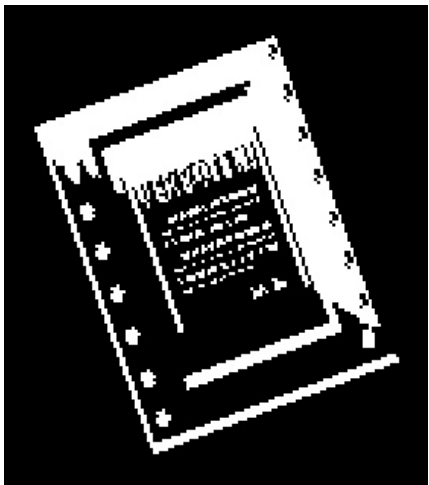
Pic. 2 - this is what we see

Math ($-tagged variables are measured in 8-pixel blocks):

L21 = X1-X2
L23 = X3-X2
H12 = Y2-Y1
H13 = Y3-Y1
H23 = Y3-Y2
dshift = L23/H23
scale = H23
sprhgt = H13
ymin = Y1
ymax = Y3 ;not seen

"Left" polygon (3 vertices on the left side)
pixwid = L21 + dshift*H12
dtexx = 64/pixwid
Y = H12
dY = -H12/pixwid

x = 2 ;for ZOOM
eorwid$ = (pixwid + 2 + 7 +1)/8 ;7 for rounding up ;1 for precision error in other calculations (maybe more)
maxwid$ = (pixwid + 7 + 7 +1)/8 ;maximum shift is 7 ;7 for rounding up ;1 for precision error in other calculations (maybe more)
shift = X3 - sprhgt*dshift
;when L23>0, there is not the 2nd vertex at the left boundary, but the continuation of line 23! Because we can't shift left
L23<0:
xmin$ = X3/8
xmax$ = X1/8 + 1 ;not seen
L23>0:
xmin$ = X2/8
xmax$ = (X3 + L21)/8 + 1 ;not seen

"Right" polygon (3 vertices on the right side)
pixwid = -(L21 + dshift*H12)
dtexx = 64/pixwid
Y = 0
dY = H12/pixwid
x = 2 ;for ZOOM
eorwid$ = (pixwid + 2 + 7 +1)/8 ;7 for rounding up ;1 for precision error in other calculations (maybe more)
maxwid$ = (pixwid + 7 + 7 +1)/8 ;maximum shift is 7 ;7 for rounding up ;1 for precision error in other calculations (maybe more)
shift = X1
L23<0:
xmin$ = (X3 + L21)/8
xmax$ = X2/8 + 1 ;not seen
L23>0:
xmin$ = X1/8
xmax$ = X3/8 + 1 ;not seen

Overall algorithm looks like this:

1. Clear the screen buffer.
2. For each polygon:
2.1. Clear the polygon buffer.
2.2. Draw margins between colours (zoom column after column).
2.3. EOR fill.
2.4. Distort.
2.5. Paste on screen buffer.
3. Show screen buffer.

So many stages, will it work smoothly? Let's count the t-states:

Clearing the screen buffer = min 5.5 t/byte.
Clearing the polygon buffer = min 5.5 t/byte.
Zooming the margins = 52 t/margin (ld h,(ix+):ld a,(hl):add a,b:ld e,a:ld a,(de):xor c:ld (de),a)
(42 t/byte if we suppose that there are 10 margins per column and the height is 100)
EOR fill = 18 t/byte (xor (hl):ld (hl),a:inc l)
Distort = average >27 t/byte (the slowest is 41 t/byte 3-pixel shift: rrd:inc h ... rl (hl):dec h)
Paste = 29 t/byte (ld a,(de):or (hl):ld (de),a:inc h:inc d)
Show = 16 t/byte (ldi) or 13 (pop hl:ld (),hl) if it is in fixed position
---
Sum = 144 t/byte or 18 t/pixel.

This was counted in the case of no overhead - which is impossible.
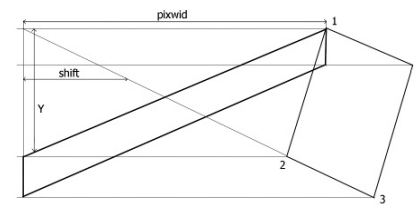
Pic. 3 - line is too wide

How to minimize the overhead?
1. When show and clear, use only a part of screen buffer where all the figure is.
2. When distort, paste and clear the polygons, use only a part of polygon buffer where the polygon is.
3. When EOR filling polygons, use even smaller part of polygon buffer where you draw the pixels for the margins.
4. Since you can't use pushing to clear a random sized area, combine show+clear and distort+paste+clear.
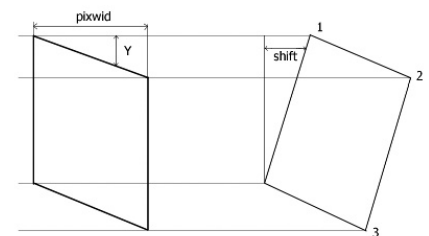
Pic. 4 - correct line

I posted the idea in Russian ZX Spectrum/demoscene channel #mhm (irc.forestnet.org), and nobody wanted to make an effect like this :)

The thing is, you can't just write it and run - it contains a lot of stages, and bugs can be anywhere. So, you should write it one part after another and make tests.

First of all, converting textures and drawing pixels. I already had this code but it was not usable: "Wolfenstein" code had constant y which is not the case. I made another loop and tested it on one of "Wolfenstein" textures. It worked with parameters typed by hand. But was the precision sufficient? I couldn't test this. If it wasn't, I could make my zooming table y'=f(y,scale) bigger (and leave less space for the textures). But I could make the texture resolution less than 64 (so, less y's) and reduce the table. Note that I always start drawing from x=0..7 but the initial y may be different for "left" and "right" polygons.

EOR filling a linear buffer (H=x, L=y) was the simplest part. Distortion part was very interesting because I never did anything like it before. It contains 8 procedures of line shift (for any number of pixels) which can be called for any line width. It does not need shifting bytes because the paste code is in it and it can paste with byte shift correction.

Then I wrote some math that converted vertex coordinates into drawing routine parameters. After some debugging (there were cases like "height 0" and "underflow while drawing up") it could

1x1 texture mapping

Classic Game Designer in practice

rotate a textured square.

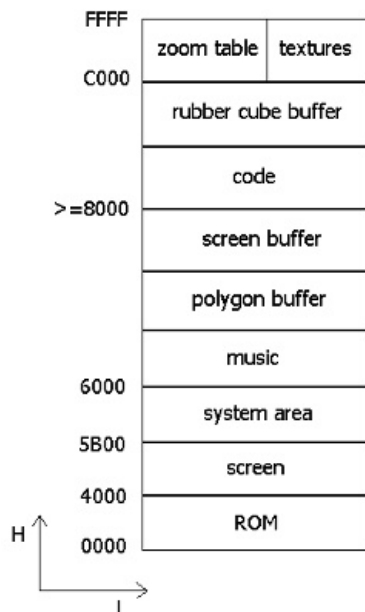Measured stats for single square, size 91 pixels, rotated 45 degrees:
zoom = 75000
EOR fill = 30000
distort+paste+clear = 120000
show+clear = 75000 (one for all polygons)
---
sum = 300000 (circa 36 t-states per pixel that's twice the predicted time but still faster than per-pixel draw)

Pic. 5 - memory map

Having this, I could finally add 3D rotation math and scripting. Some bugs were found only at scripting stage (like "X overflow while paste" and "clearing one pixel less than the actual width").

Adding more textures and extra FX was a bit hard in 48K of RAM. One texture is overlayed with "rubber cube" buffer, and the polygon buffer is just as big as the biggest figure in the demo, and I still have just 100 bytes free.

So far, nobody outside #mhm channel guessed the method :) I'll definitely release all the sources at Pouet as always.

What more one can do with this? With just parallelograms you can't draw figures out of arbitrary quadrilaterals, but you can with triangles. Triangle math is needed to minimize the processing area of the polygon buffer. With triangles, some sort of perspective correction is possible. The method is good for big polygons and slows down at smaller ones. But one can add a separate branch for this. One can also add lighting etc. ∎

Alone Coder
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CGD is editor for creating simple games, that although looking like they come from the beginning of 80's, they can rank among the newer games with playability. Also it's operation is really simple.

For a demonstration I came up with a simple game. We are on the playing area together with a ghost and a few items. Ghost is flying freely around the screen, but also have a tendency to run out of us. There is a cage in one corner where we have to drive the ghost. Problem is in fact that we can't touch the ghost, otherwise we lose a life. Another limitation is in the main playing area, there is a river which divide the screen into two halves and the only way over it is using the small bridge. We have also some boxes that can be moved and used to correct ghost's way.

After the load we are directly in the main menu. Each items are sorted in a logical way so we will go through them as we will use them.

1 - Design sprites

Here we define all game characters. First four sprites are our character (car, tortoise, what ever we want). They are not four because the animation (those will be not in the game at all), each represent walking to different direction. **Sprite 0** is direction **right**, **sprite 1** is direction **left**, **sprite 2** is direction **up** and **sprite 3** is direction **down**. Next 12 sprites are the enemies, those have just one position each, so they don't turn at all while moving. Let's describe the environment.

Left upper corner is editation zone, where we draw the sprites. Cursor is moved using **OPQASPACE**, **0** change colour of the ink, **9** change colour of the paper, **8** change the bright and **7** change flashing. Next to it we can see our sprite in life (real) height. The rest of the screen is filled up with information and keys explanation.

Editing the sprite number 0

Key **5** change the speed of sprite. Bigger the number is, faster the sprite move. Key **6** set up the way we control our sprite. We can choose from **4** possibilities: **Multiple key press**, that mean we can move also diagonally, **Pacman** style mean that the sprite is moving alone to the direction we pressed, **Single key** react on the pressing of just one key, so we go to just one direction at once so no diagonal

movement and the last one is **Turn based keys**, that mean nothing move in the game until we don't move. When we do a move, everything else will move and then it all wait for us again. We set up the speed and the way of movement of our sprite while sprite **0** is chosen. Choice **4** apply to enemies and mean what will happen when the enemy will collide with our character. We can choose from four possibilities: **do nothing**, nothing will happen, **kill player** will kill our character, **kill guardian** will kill our enemy and **dec counter 1** will decrease counter 1 for a 1.

Rest of the screen contain description of the control keys. Interesting function is under the keys **C** - copy current sprite and **V** - paste copied sprite into current position. At the bottom is the number of current sprite we edit and also content of the clipboard. If we are not very successful in drawing, key **G** will generate some random character for us. Surprisingly it really work and the result is quite good. Pressing key **E** will return us to the main menu.

Lets define few sprites. We will start with first four sprites that define our own character. Set up the speed of movement to **8** and the control for **Multiple key press**. Sprite on position **4** will be ghost, he will get speed **8** and effect will be **kill player**. The type of the enemy will be **runs away and wanders**. That is enough for now so let's move back to the main menu by pressing key **E**.

2 - Design blocks

Here we define what will the playing area consist of. We draw blocks of **8x8** pixels, but now we have **32** of them all together. Last block (number **31**) is special, it will be used in the intro screen. But it is also possible to use it as a regular sprite in the main game.

Blocks editor look the same as sprite editor, the controls are the same too. Different are the options for each block. Keys **5** and **6** define what will happen when the block will contact with player, keys **T** and **Y** define what will happen during contact with the enemy. There is really a lot of possibilities, I will write here just few of them:

do nothing - it is possible to walk through the block and nothing will happen
solid_block - it is not possible to walk through the block, except that nothing will happen
change baddy sprites - change the way how enemy sprite move. If it moved just to the concrete directions, it will start to move diagonally etc.
makespritedown/up/right/left/random - move sprite one cell to down/up/right/left/random
dec/inc counter - decrease or increase one of the three possible counters. Using this we can ensure that something will happen just after something other was done (end level after killing some amount of enemies

Classic Game Designer in practice

etc)

zero counter - zero one of the three possible counters

force down/up/left/right - will move sprite in relevant direction on the playfield

counter1/2/3=0, locked - if concrete counter is zero, block is solid (so no possible passthrough)

counter1/2/3<>0, locked - if concrete counter is not zero, block is solid (so no possible passthrough, this can be used for opening a door just after collecting objects etc)

counter123nzlocked - all 3 counters have to be zero to be possible to walk through the block

goto level - move the game to another level

complete game - the game will end by victory

kill sprite - kill the enemy

kill all baddies - kill all the enemies at once

kill player - kill the player obviously

extra life - will give a player extra life

gravity ON/OFF/toggle - turn on, turn off or change the gravity to the opposite one

We will not use even most of this possibilities and I wrote here maybe half of all of them.

I planed the blocks as this: **0** is **ground - do nothing**, **1** is **bridge over the river - do nothing**, **2** is **water - solid block**, **3** is **cage - do nothing** for player and **complete game** for enemy, **4** is **stone - solid block**, **5** is **box - push block** for player and **solid block** for enemies.

Because I am not anyhow good in drawing, I've used the blocks just as ordinary attributes. When we have all the blocks ready, pressing **E** will take us back to the main menu.

4 - Map Editor

We will draw the playing area here. Game can contain up to **9** screens. Those are aligned in three triplets. As we use just one screen, we will start drawing by pressing key **1**.

Editor filled the screen for us with block number **0**. We can choose actual block or sprite with keys **1** and **2** (it is shown down right on the screen) and using keys **QAOPSPACE** can place it on the screen. Small help in filling of bigger fields are keys **R** - fill the whole row and **F** - fill the whole column.
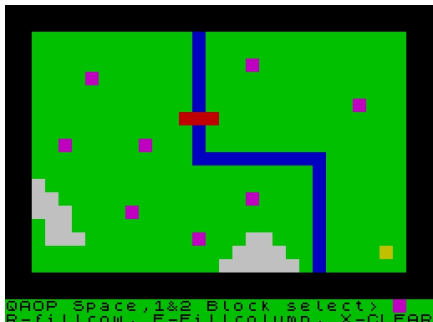
Editing the game map

My playing area is on the picture. First thing was to draw the river, that split the screen into two parts. Next I did the bridge, it is the only place to pass the river. White places are rocks, those are also solid blocks and there is small cave down left. It is there to make the game a little bit more complicated, because if ghost will go inside, it is not easy to force him to go out. Boxes are magenta. We can move them, but ghost can't go through them, so we can change his movement a bit. Important note is that we can't move boxes over the bridge. There are just 4 boxes on the right side of the river, it is to let the ghost a chance to escape even if we will block him around the cage, one box will be missing. It is some random number of the boxes on the left side of the river. They can be used for closing the cave or to make a corridor to the bridge, for example. There are black solid blocks all around the screen just to make the playing area smaller. When we have the map ready, using **E** will take us back to the main menu.

T - Test game

It is really so simple and we can try to play the game! We just need to press a key twice and there is our game. Nothing is happening until we will move for the first time. If we forget something or just wanted to cancel the game, key **Z** will move us to the next level. It is just **9** of them and then we are back in main menu.

For the final version it is needed to sort out texts printing, think up how many levels we want to have, number of lives, if we will put there some time limit and so on. We can also add some doors to the cage just after collecting some objects, it is just up on our own imagination. It is good idea to make the game a bit more complicated as now it is enough to wait and the ghost will eventually go to the cage itself.

Game test

I will finish the game for the next issue and we will go through it again in the editor, to see how it is made. And if someone feel inspired, I'd like to see your creations in future issues!

Classic Game Designer is not any game editor for third millennium that can be used for making legendary games. But it is also not any rocket science and simple and funny games can be created in a few minutes. And all of that without programming, what more to say? ∎

ellvis

C onnecting the sound from Speccy 48k to the amplifier and enjoying the music in better quality then through built-in speaker is not any problem. But the output is still mono and as that it need really good ears to enjoy the details of each melody while listening to multichannel musics. There is<> solution also for this.

I will return back to the half of the 90's for a while. Thanks to **the Sample Tracker**, simple resistive **D/A** converter started to spread between the people. It contained 3 channels, each one connected to own port and it was even possible to switch between **4** and **8**bit quality (8bit samples sounded really great and there wasn't much in the whole 8bit scene to beat that). Important feature of the D/A converter is stereo output.

I guess you start to get the point how this two things relate together. What if the music routine will be changed to use the channels of D/A converter instead of port **254**? That is exactly the principle and let's take a look how to do it.

I took a music from **Savage 2** for a demonstration. It is engine with two voices and a drums. To have things easier, I used altered version from program **Music Supercode 1**, where Softhouse prepared the routine for the use outside of the game.

Now some important information that we need. **D/A** converter have three channels, **channel A** is on **port 31**, **channel B** is on **port 63** and **channel C** is on **port 95**. The music use 3 outs, at the address **58108** is the out for first voice, at the address **58119** is the out for second voice and the drums have it's out at **59952**. In the principle it mean to replace all those three values **254** by corresponding value of each channel. According to output of D/A converter it will be probably the best combination to use channel A for first voice, channel C for second voice and channel B for drums. Before the main music play, we have to set up the **i8255** gate properly. All the gateways have to be set up for **output**, that will be done by value **128** sent to the port **127**.

There are some disadvantages coming from the connection of the D/A converter. Gate A collide with **Kempston joystick**, it will not work if the gate is switched for output. Also because the complete addressing of gate C, the D/A converter will not work on **Didaktik Gama**, because the memory switching is connected also to the gate C.

This way of playing the beep musics was invented by **Pol** back in 90's. He altered few musics and their quality went higher, the stereo is simply there. I really recommend to try it and favourite songs will become even more favourite. ∎

ellvis

Using the +3e /part 1/

I will not introduce the ZX Spectrum +3, that came as a last variation of Sinclair's 8bit computers - this time a little bit bastardized by Amstrad, who bough the brand after the company's bankrupt. Also I will not introduce project +3e, that was made by **Garry Lancaster**. All this information were written enough, for example in [1] and [2].

Let's take a look on this configuration from the point of user. How is it usable today and what can we do with it.
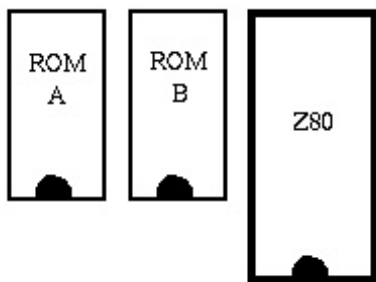
Identification of the computer ROMs

Let's start with the main rebuild of the computer. It is not really necessary, if we will stick up with original internal 3" drive and will connect some external **IDE** interface. What we have to do is to change internal **ROM** chips signed **Amstrad 40092** and **40093** for **EPROM**s with the content depending on IDE interface we will use. There is 12 various images available including **divIDE**, **ZXMMC** or **Pera Putnik** interfaces - **simple 8-bit**, **16-bit** and **CF** card in memory mode. User in our geographical location will probably use divIDE with CF or **SD/MMC** cards. For building up the IDE device directly into the computer, most simple is Pera Putnik's Compact Flash interface which contain just one chip and is connected directly to the bus signals somewhere inside of the computer. Also it is better to change internal disk drive for **3,5"** for better compatibility with outer world and for easier data transfer between **PC** and **+3e**.

If we assume that we have the correct **EPROM**s already, the main exchange of the chips in the computer is pretty straightforward. It is enough to open the computer, pick out the original **ROM**s signed **A** and **B** from the sockets and put there the new **27256** chips with the correct identification. In our case we would use files **diven3A.rom** and **diven3B.rom** from the **p3eroms.zip** archive [3] for **divIDE** interface.

Before we will connect divIDE itself, we have to take off the jumper **E**, to disable the mapping of the external flash memory.

That is for the hardware side of the installation. Now it is time to turn the computer on and start to use it. Philosophy of the +3DOS is a little bit different from usual use of divIDE with most wide spread systems (**FATware**, **esxdos**) supporting **FAT** file system. In this case we can easily create disk directly in the PC using **fdisk**, **format** or more precisely **mkdosfs**.

To use the medium in the +3DOS environment we will have to prepare it directly in the +3e itself. The number of partitions created on the medium depend on it's capacity. Recommended maximum capacity of one partition is **16MB** although documentation sometimes mention even **64MB**. We use usually smaller partitions, because **+3DOS** is not any record-breaker in the speed of disk access and directory list can take up quite a time. The bigger the partition is, the bigger allocation units or blocks it use - so few bytes long program can take up to **8** or **16KB** of the media capacity. For a start it is good to use something between **8** and **16MB** for each partition on the medium which is **32** or **128MB** big. That is for the theory, now for the practical use.

Command **FORMAT TO 0,16** create **16** partitions of not yet specified size on the media **0**. Medium 0 is master disk, analogously medium 1 is slave disk of your IDE device. In next examples the medium will be used exclusively for the +3e system. If we want to share it with PC environment, next steps will be needed in accordance to documentation in [4].

Now it's the right time to set up the partitions. +3e understand 2 types of it's partitions - **DATA** and **EXP**. DATA is usual data partition, where we can save our own files and programs. Command **NEW DATA "Progs",16** will create partition with the name "**Progs**" and with the size of **16MB**.

EXP partition is used just by the system, to have a place to save own settings, assignment of the drive chars to the partitions after the powering up the computer for example. It's size can be in the range from **1** to **4MB**. Command **NEW EXP "Swp",4** will create system partition named "**Swap**" with the size of **4MB**.

We can check if the creation process was successful by using command **CAT TAB** eventually **CAT TAB EXP** for detailed listing. In case when we need to send the output to another channel we have to write it's number right after the command CAT, for example **CAT #3 TAB** will print the list of the partitions on the printer.

During the partition creation we can specify the medium where they should be created before it's name. for example **NEW DATA "0>Images",16**.

Menu after computer start

For real use of the created partitions we have to set up their mapping to the characters of the drives. That is done by command **MOVE "x:" IN "Part_Name"**, where "x:" is a drive character and "Part_Name" is the name of the partition, that will be mapped to the drive. Using this way of mapping will unfortunately not survive the reset of the computer. That is why we created EXP partition and will use a modification of the **ASN** command. So, using command **MOVE "c:" IN "Progs" ASN** will set up permanent mapping of the drive to the selected partition. To cancel the mapping we will use **MOVE "c:" OUT**. During the mapping partitions to the drive letters we will find out that current version of the +3e ROM support just mapping of two partitions to the drive characters. Next enhancement of the command **MOVE** is mapping of other physical devices as **master (0>)** or **slave (1>)** of IDE device.

Graphic utility StrowSaw for +3e disk images management

Using the +3e /part 1/

Devices **2>**, **3>** and **4>** represent internal (2), external (3) disk drive and **RAMdisk** (4). Current mapping status can be seen using command **CAT ASN**.

Using ASN modifier we can change also permanent setting of default drive for commands **LOAD**, **SAVE**, **VERIFY** and **MERGE**. For example **LOAD "d:"** redirect all next demands for loading the files from medium to disk **D**. That is active just till the next reset. By command **LOAD "d:" ASN** the settings will be saved permanently.

The basic preparations are done in this step and we can start to save some meaningful content to our medium. The commands have the same syntax as standard +3 without modification - **SAVE "x:File"**, **LOAD "x:FILE"/CODE/SCREEN$**. For copying of all the content of one disk to another we will use **COPY "a:*.*" to "c:"**.

Sooner or later we will very likely come to the state where we have all the disks transferred to our prepared medium. And of course there will come the question "What next?". New game will be released on the WOS and how to transfer it into the +3e? For this purpose we will use utility pack for +3e [5].

First of them is **MSDOS v1.2** that allow transfer of the files from diskettes formatted for PC to +3/+3e. We have to format the diskette in standard way on PC to **720kB** (in **DOS** it is command **format a: /2** for usual HD drive) and copy files to it (ElStompo.tap for example) that we want to see on +3e. When we have the diskette in +3e drive, we have to **LOAD "msdos.bat"** at first and then select the drive (**A:** or **B:** - option 3), then open the disk - option 1, choose the files using cursor keys and mark them with ENTER. Then we have to use option **C - "Copy"** to copy them to the IDE medium.

```
MSDOS File Transfer Utility v1.2
(c) Garry Lancaster 1993,1998


    (1) Log on to disk
    (2) Check boot sector
    (3) MSDOS drive (B:)
    (4) Exit to BASIC



Enter Your Selection:
```
MSDOS v1.2 utility

Next step is to extract the content of **TAP** file to the files that +3DOS can use. We will use program **ZXTRACT** from **TAPROM utils** package. Program have to be run for each file in the TAP. After run it wait for the confirmation if it is the right header file we want to transfer. After positive answer it will copy selected block to the file with entered name and end. This conversion utilities for +3e works, but they are not very user friendly. Better situation is

```
3e v0.5alpha: A commandline utility for transferring files from/to a +3E
formatted disk or HDF disk image file.

Usage: 3e image_file command [args...]

image_file can be a HDF image file, a RAW image file, or a physicall device.
For the later, you must known by advance the block device file for your device.
(Use the scan command to find out detected block device files).

On Linux, block devices are named /dev/sda, /dev/sdb, etc. Issue a 'dmesg'
command right after inserting your memory card to find out which special file
the kernel assigns to your device. You must have read/write permissions on that
file.

On Windows, block devices for installed drives can be accessed using this
notation: \\.\D: where D: is the drive letter Windows assigns to your card
upon inserting it. Don't forget to CANCEL any attempt to format your memory
card, as Windows thinks it needs formatting. Remember, DON'T format.

Commands:
 scan [-backend [-sep:N]]. Scans disks looking for PLUSIDEDOS partition tables.
 showptable [-backend [-sep:N | -bare]. Shows PLUSIDEDOS partition table.
 showpentry part [-backend]. Shows details about partition "part"
         (only +3DOS filesystem supported.)
 dir part [-backend -sep:N | -bare]. Shows directory for partition "part"
         (only +3DOS filesystem supported.)
 get part:file [dest_path] . Gets a file from a +3DOS filesystem and
         copies it to the current directory on your PC.
         dest_path is optional path for destination file. Must end with /
 put file part:file . Writes a file from your PC to a file in
         the selected partition.
 putbin file part:file [start] . Writes a file from your PC to a file in
         the selected partition, and adds a +3DOS header.
 puttap tapfile part . Scans a TAP file and writes all files within it to the
         specified partition with the correct +3DOS header for each one.
         Headerless blocks are named after the original file name, and
         adding 1,2,.. as extension.
 putdsk dskfile part . Read the contents of a DSK image file (standard DSK)
         and transfers all its files to the selected partition.
 del part:file . Deletes a file in the selected partition.
```
3E is command line utility

on the **PC**. here we can choose from more programs with text or graphical interface (**3e**, **3eExplorer**, **hdfutils**, **drimg**).

Linux users are fine with one program from the **Fuse** emulator package and common commands of the operating system, that allow easy creation of the medium image, fill it in emulator and write it to the physical disk:

1.Creation of the medium - C/H/S parameters have to be set up in accordance of the physical medium:
createhdf 490 8 32 dummy.hdf
2. Creation of the HDF header:
split -b 128 dummy.hdf hdfheader
mv hdfheadera hdfheader.bin
rm hdfheader??
rm dummy.hdf
3. Reading the content of the media to the image file: **dd if=/dev/sdX of=cfcard.raw bs=512**
4. Adding the header for the emulator: **cat hdfheader.bin cfcard.raw > cfcard.hdf**
5. Writing the image back to the medium: **dd ibs=128 obs=512 skip=1 if=cfcard.hdf of=/dev/sdX**

Now we know how to prepare the medium correctly, how to map the drive letters to the partitions and how to save and read files to and from the computer. But **+3e ROM** contain more interesting extensions that we will take a look at in the

next issue. ∎

Ikon

[1] http://en.wikipedia.org/wiki/ZX_Spectrum#ZX_Spectrum_.2B3
[2] http://www.worldofspectrum.org/zxplus3e/
[3] http://www.worldofspectrum.org/zxplus3e/files/p3eroms.zip
[4] http://www.worldofspectrum.org/zxplus3e/sharingdisks.html
[5] http://www.worldofspectrum.org/zxplus3e/software.html
[6] http://nairam.sk/key.pdf - **Nairam cheat sheet +3/+3e**

Show-business

Effects in live broadcasting

First half of 2014 has passed and surely wasn't boring. I personally expected just about the half of the production that appeared on the scene at the end.

Demos

Already at the end of January, an invitation intro for **Multimatograf 10** appeared. It is timed for Pentagon, but it look good and have a nice tempo, it is nice demo for watching. Careful viewer will surely recognize some effects from other demos.
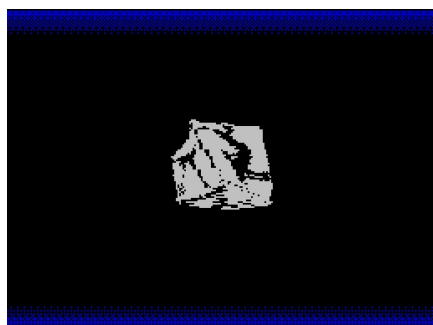

Mission Highly Impropable

There was **Soshi party 2014** in February. Four demos appeared there and worthy of note is first place named **Sosochi 2014**. It is short joke demo that make fun from neverending arguments what is and what is not Spectrum.
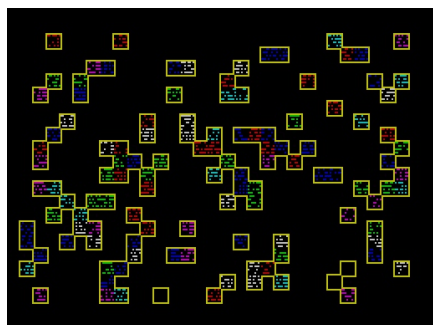

Crypto

In February also **Psb** released interesting thing. Intro is called **Hackme** and if we will enter correct password after the run, we will see sprite that is normally encrypted. And how will we find out the correct password? That's the point!
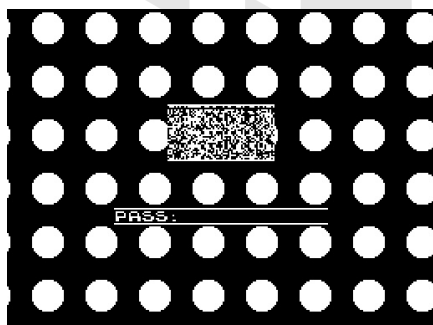

Hackme

There was another **Forever** in March and came up again with two demos. Second place took **Gemba Boys** with a demo named **Micro**. It last 128 seconds, impress with design and show good handled effects, it's worth to spend some time by watching it. First place this year took **Hooy-Program** with demo **Mission Highly Impropable**. Demo contain great effects that surprise and is realy worth to see. On the other side it suffer by it's length and the parts doesn't match to each other. But you should take a look at it anyway.
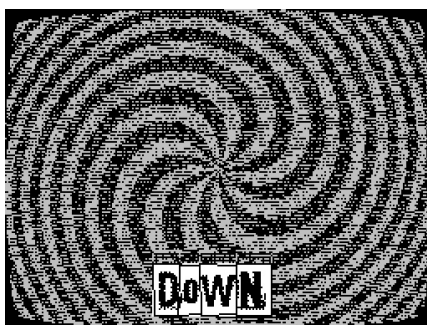
Down

Multimatograf 10 catched us in April. This year the competitions were on various 8 bit scenes, winning demo is for Russian computer Apogey BK01c, there was one intro for Atari and one for C64. For the Spectrum we've got **Dinvtro** on second place, that is invitation intro for **DiHalt 2014** and **Smilef** on third place, that is nice little attribute demo.
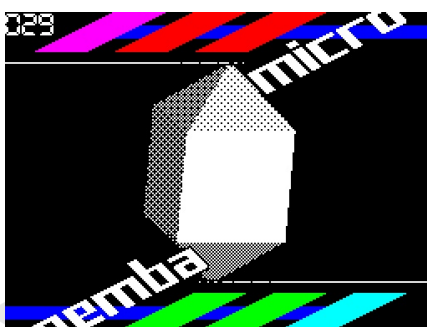

Micro

Definite surprise was this year's **Sundown**. Party was moved to June and bring four demos for the **Spectrum**. Interesting is fourth place, short political demo **EUA** (Ukraine is Europe) and second place with a long name **A brief history of vacuum cleaner nozzle attachments**, that was made by **Gasman** and it is his typical small funny demo. First place is big surprise from **Life on Mars** named **Down**. Although it is demo full of animations, it's overall execution is just great and it is really worth to watch!

Intros

There were 6 intros on **Forever** in 1k category, most interesting are first 3 places. **Balls of steel** is **Hellboj**'s chunky ball mapping to the sphere, it look a bit like a magnifying glass. Second place took **Busy** with his **Multicolour shadevision** (**Noro** made music for him) and it is again multicolour intro. I definitely recommend to watch it on b&w television/monitor, it doesn't look like a Spectrum. First place took **Serzh** with his **Irreality** and the name is right, that intro in unreal. It contain no sound, but it will show up about 12 different effects. I am sure that if this demo came out in Middle Ages, it will create new religion. Worth to see is also 1k intro from wild competition. It's named **Splash 1k** and it is exactly what **Sir Sinclair** tried to sell us back in 80's - fullscreen (including Border) math function on orange background.
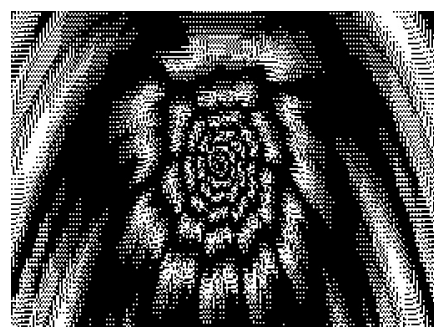
Irreality

Multimatograf came up with 9 intros in 256bytes competition. I'd like to choose for example 8th place named **Fake -** interesting waves, 5th place named **Dreamtro** - colourfull, moving fullscreen stripes, 2nd place named **Crypto -** colourfull squares and 1st place named **BB** - face hidden in the background.

Dreamtro

Another **Outline** happened in May with traditional **Gasman**'s presence and ended up on 4th place with his 128 bytes intro named **blöömerang**. It is some variation on famous **Busy**'s **Song in Lines**.

We just passed busy half of 2014. Besides well-known authors also some new faces came to the scene (**Slipstream**), old names (**Serzh**) and some tried something new (**Noby**). In few days the marathon of competitions continue with **DiHalt** and **3BM Open Air**, **Chaos Constructions** is waiting for us in August. Also traditional **JHCon** is in preparations. I think that this year will be not boring at all! ∎

Next issue

- reviews of new games

- programming serie

- next part of the article about Spectrum +3e

- finishing the game in CGD

- news from the demoscene

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