10/1999
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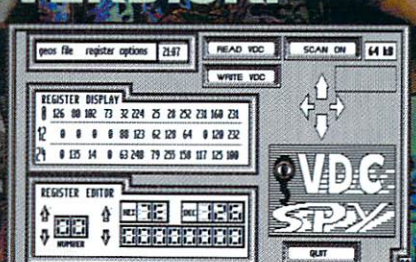

GAMES: MEAN STREETS - THE ADVENTURES OF TEX MURPHY
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INHALT

- October 1999 -

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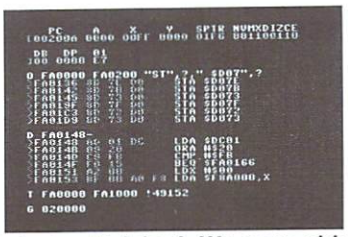
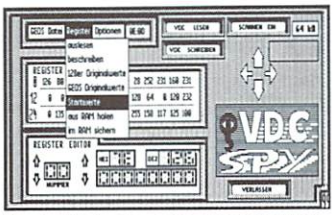
Dreamon



Land in sight! The ultimate tool for SCPU programmers is getting close to being finished. We were able to take an exclusive look at the nearly completed version of 'Dreamon'. Details starting on page 6!



9
The VDC-Spy

!ncluded on our cover disk, an exclusive full version of the 'VDC-Spy', a tool for GEOS 128 allowing unlimited manipulations and experiments with the VDC chip. Turn quickly to page 9!

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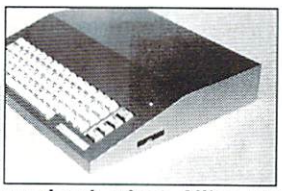
Cover story on graphics

This issue is all about graphics on the C64. We're starting a GoDot workshop on page 13, a graphics course on page 20, and this time's World Watch on page 7 takes an intense look at the different graphics formats.



Picture: Niko Malecki

24
The hip flask

People were quite surprised when Niko Malecki presented his laptop C64 on the 'Hobby & Elektronik 1998'. By popular request, he reveals his secret and lets you peek inside the casing of his machine. All this starting on page 24.

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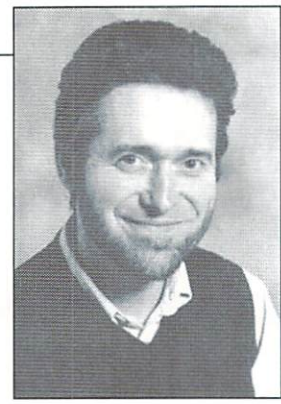
Dear GO64! readers and subscribers!



Have you heard? Computer museums are showcasing our machine, the C64, as the greatest ever success of a single computer produced by a single company. No other manufacturer managed to sell as many units as Commodore did with the 64. No other computer was, and is, so widespread throughout the world as ours, connecting people of all countries on Earth. On this machine, the first games and game ideas were developed that are still valid today and are but improved on today's computers with their modern hardware. The first commercially successful hardware accessories were offered for it. And why's that? Because it is ingenuity cast in silicon! The developers of the C64 conceived it in such a way that everything imaginable could be realized on it. And by far it's not a perfect machine - on the contrary! But it seems to be its imperfectness that forces intellectual and technical tilts from us, drives us to achieve new developments considered impossible before. May it stand in a museum! Our breadbox is alive!

Until recently, development has been taking place in the technical field, but now the software sector is trying to catch up. After "Wheels" by Maurice Randall and "MegaPatch 3" by Wolfgang Grimm and Markus Kanet, there's something that was considered absolutely impossible for a long time - reading and displaying pictures stored in JPG format! JPG images, compressed to an extremely small size with a sophisticated algorithm, were one reason for the large success of the World Wide Web, since interesting pictures do their part in attracting people to it. It allows transporting the most superb pictures through the Net using only a minimum of bandwidth.

Until now, it seemed our C64 was excluded from this development at the end of the 20th century, since decoding JPG files was regarded as impossible, even as senseless. Nobody could imagine a realistic way to handle the gigantic amounts of unpacked data obtained from a JPG file on a C64. But that's old hat now, nothing but out-of-date pessimism; Stephen L. Judd and Adrian Gonzalez have managed to read JPG images into a standard C64 and display them!

The barrier that separated us from the Internet world until now has been broken. I look calmly into the future. If Steve and Adrian make their code available to developers, I see PPP dialers and TCP/IP stacks coming, which are the basic requirements for comfortable access to the Internet. I hope this will be under a uniform user interface since that will automatically lead to new and better applications - as Bill Gates has impressingly proven with Windows. Let's take the same way!

Yours,

Arndt

News Flash

Old C64 Software on the Internet

We have another new and interesting Internet page for collectors: **http://www.bsdsoftware.com**. Here you can find a lot of nostalgic C64 software. *(st)*

Year 2000 patches for GEOS software

For 10 deutschmarks you can now directly order Werner Weicht's shareware patches which kill the year 2000 bug. Starting Nov. 1, 1999, you can order his patches on disk, postage included. You can reach him at: **Werner Weicht, Regensteigweg 24, D-38889 Blankenburg, Germany**, or for Internet users, at **wweicht@t-online.de** and **http://home.t-online.de/home/wweicht**. *(st)*

New GEOS upgrade

Megapatch 3, the latest GEOS upgrade, is now available in the USA for the C64 as well as for the C128. MP3, short for Megapatch 3, (of course, not to be mixed up with the music format) requires a C64 or C128, a RAM expander, and 2 disk drives. CMD devices - RAMLink, RAMDrive, HD, FD-2000 and FD-4000, and the SuperCPU - are supported. MP3 can also read and write PC-MSDOS formatted disks. If you want some more information in general or about the new MP3 functions, you can go to the homepage at **http://www.merlancia.com/mersoft.html** or by e-mail to **merlancia@aol.com**. *(st)*

Deja Vu II Party

At this year's DejaVu II Party in Bradford, England, July 9-11, there was a C64 demo competition, and TMR/Cosine won first place with his entry. The prize of more than 90 pounds was presented to Jason Kelk (TMR/Cosine), one of the editors of the magazine, "Commodore Zone". *(st)*

MP3 music on a C64

Right now Nate Dannenberg is developing a player card that will make it possible for C64 users to play MP3 audio files directly on a C64. You can get more information about this from **Nate Dannenberg, 410 E. Mulvane, Mulvane, KS 67110-1623, USA**, or by e-mail: **natedac@southwind.net**. *(st)*

SuperCPU-modified versions of C64 games

As time goes by, more and more commercial games for the C64 are modified for use with the SuperCPU. A quite extensive list can be found on the Internet at **http://come.to/supercpu** *(st)*

Taxim's hits in MP3 format

At the moment the Serbian scener, Nucleus/TempesT is busy turning old tracks of the well-known C64 composer, Taxim, into the MP3 music format. After being finished, the converted pieces will be available on theInternet. We have to say that the songs are not pure C64 music but conversions of Taxim's compositions that Nucleus/Tempest has mostly played on his own synthesizer. *(st)*

Animal Nitrate Party well done

For the first time, a C64 party took place from September 3-6 in Amberg, Munich, Germany. Seventeen C64 users visited the Animal Nitrate Party. JTR/B-Soft won the demo competition with his entry, "Eating Fish", while Exile claimed victory in the graphic competition with "Ritterbild" (Knight's picture), and Silverfox won in the music competition. After that, a game competition was held. *(st)*

Synthietrax 64 : New Address for Ordering

Unfortunately, an error crept into our Synthietrax 64 CD test; music master, Taxim, had moved in the meantime. Those of you who would like to order the CD should contact this address from now on:

Taxim
c/o A. Ney
Müller-Breslau-Str. 26
D-45130 Essen
Germany
Tel.: +49 (0) 201 / 2697590

The CD can be paid in advance for 29 DM (Germany 24 DM). *(vr)*

Attention: Proofread RUN Magazine tables of contents!

The yearly tables of contents from the years 1984 through 1986 of the German (!) RUN Magazine (1984-1988) are available as digital documents on the Internet (at home.t-online.de/home/05751957437, under "Service"). The OCR-scanned texts will be put into a database after OCR-related mistakes have been removed. As soon as this database is finished, all GO64! readers can search for articles from a time before GO64!. Any help is welcome and should be directed to Sven Friedrichs at:
05751957437@t-online.de. *(ad)*

ConGO 3.0

There's a brand new version of ConGo, the popular c64 image converter for PCs by Matthias Matting. ConGo is freely available from **http://www.8bit.com**
One of the next issues of GO64! will feature an in-depth review of ConGo. *(gb)*

VGA Cologne

Many years ago enthusiastic users of GEOS founded the VGA Cologne (United Users of GEOS) and up to the present date our main subject is GEOS. But today, other topics like telecommunications, hardware hacking, and converting to and from the PC are also on the list. The members are users from all throughout the region - Cologne - Aachen - Duesseldorf - Essen. We meet every fourth Saturday of the month from 2 to 5 p.m. in our meeting room in the 'Gertrudenhof', Subbelrather Str. 349, on the corner of Leyendecker Str. in Cologne-Ehrenfeld. Visitors and new members are welcome to join us. Please contact chairman Manfred Quabius before your first visit in case there should be any change of dates, etc. His telephone number is: **+49 2238-967726** *(ma)*

Account control

With an access fee of only 8 D-marks per month, T-Online (previously BTX, similar to AOL or Prodigy in the US) is a relatively cheap means of information and communication, at least in Germany. Not only does it provide the ability to exchange information and to communicate with other members of the T-Online network, but it also offers an access to the Internet, including personal e-mail services. Moreover, it's a very efficient way of maintaining your bank account.How does that work?

My topic for today is bank accounts, because many banks do not show a lot of mercy concerning their account keeping charges. In particular, withdrawls and check-writing can cost you dearly, especially when you have to pay postage charges to receive your statements. I had that problem a few years ago when my bank told me that they were only going to send one monthly statement for free, but were going to charge postage for all the others sent in between.That may be okay if you only have two to four debits per month, even though you're still not really informed about the current state of your account, e.g. after you've taken a few cash withdrawals or made credit card payments. Of course, you can get a statement of account at your bank but...

1) You have to drive to the bank
2) Parking's often not for free
3) It takes time you normally could use in a better way.

Users of T-Online who agreed with their bank to maintain their account via the Interent do not suffer these hardships. This is how it works:

1) What you need is a computer (e.g. a C64) and a modem (e.g. Commodore 1200) as well as the T-Online software (a decoder for BTX).

2) You have to register for access with T-Online (the monthly fee is 8 D-marks, which you pay along with your monthly telephone bill).

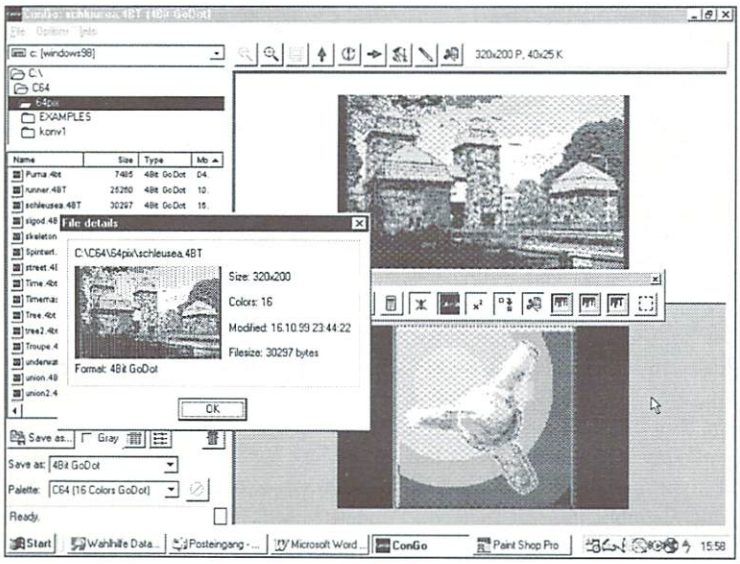
3) At the bank, you apply for maintaining your account via T-Online. The bank then sends you special access codes.

4) Now you can easily and comfortably organize all remittances, standing orders etc. at your desk at home and keep an eye on the state of your account any time you like. Statements of the account are just one press of a button away (if you have a printer).

At the same time you certainly keep the opportunity to make all of your deals at your bank counter like before, so now you have two possibilities.

As I have 10 to 15 debits every month, access via T-Online pays off easily, since I would have to pay at least 10 D-marks of postage for statements of my account in order to be up to date. Maintaining an account by means of the Internet certainly is cheaper, not to mention that I have better control (e.g. if anything goes wrong with one of my debits or deposits), and as a bonus I can also communicate with other members or suppliers of the BTX network. The telephone connection only costs the average charges for local calls depending on the time of the day, which is overall a very reasonable price.

These are my ideas for the CSW campaign under the title of "Modems and T-Online". I hope I've brought you some good hints at how to use these two resources, it really pays off. *(ma)*



ConGo 3.0

Close your eyes and Dreamon

CMD SuperCPU CORNER

One reason for the relative lack of software for the SCPU is certainly due to the less than satisfying situation with development tools. Intensive testing or debugging therefore turns out unnecessarily to be difficult or bothersome. But rescue is in sight!

by Wolfram Sang

Dreamon (written with only a single "m") is a machine language monitor especially for the SCPU. Although it is not quite finished yet, the version tested here is about 75% finished. You already get a great impression of all that will be possible. For right now, no SuperRAMCard is required for running it, although it is recommended, because Dreamon can be moved by banks so that you can always copy it to where it isn't in the way. The standard commands are implemented and run very reliably. During assembly and reassembly, the complete 65816 instruction set is recognized. Reading memory contents can be done in PETSCII as well as screen code. Working with RAM above the first 64KB is no problem either. The functions for comparing, transferring, and swapping (!) areas in the memory fulfill their duties without complaints.

It may be currently missing a function for computing simple mathematical expressions, but this will surely be provided later on. A command for changing number formats isn't really necessary for Dreamon, because you can employ any number system anywhere by using the appropriate prefixes, which is very useful.

The disk routines are there for the greater part. Loading, saving, verifying, and listing the directory not only work for 1541 disk drives but also for CMD devices as well. A command for changing the current disk drive is still lacking but will be included in the final version. So much for the "common" functions of a monitor; now it's time for the strengths of Dreamon.

Scroll Mode

At first Dreamon scrolls like any other monitor. If the cursor is at the upper or lower border, the screen can be scrolled in the appropriate direction using the cursor keys. However, there is also a scroll mode which is activated by entering a non-limited area, for instance via "D C000-". Now the following line of code or the preceding one is displayed (depending on which cursor key is pressed). In addition, you can change the type of screen output by pressing the related key ("D", "M", "N", "I", or "J"; see box) during display, just as if you had entered it at a prompt. This is quite handy, for example, if code and tables are strongly intertwined. Another practical feature is that you can change the output address by exactly 1 byte using "+" and "-", for instance, if you haven't hit the beginning of a table exactly.

A problem every disassembler has is the correct determination of the register width. Although Dreamon keeps track of the REP / SEP commands of the 65816 and acts accordingly, there are situations where this method returns incorrect results. A simple example: Two subroutines follow each other immediately. The first subroutine sets the registers to 16-bit shortly before exiting, whereas the second relies on 8-bit values in them when being called. A disassembler can't discern this, that a change should be necessary after routine 1 - there are no hints for that. In this case, Dreamon offers the user a practical hotkey. With CTRL+SHIFT+M or -X, the register width can be changed at any time, not only during scroll mode. A really very flexible solution!

(Wild) Patterns

Often used with fill and search functions, patterns are a very powerful ability of Dreamon. It offers the possibility to combine diverse parameters. This may not sound very spectacular, but it gives the user great freedom. Filling some memory with text? No problem..."F 040000 058000 'Hello!'". Some additional control bytes in the text maybe? Here: "F 040000 058000 $1234,'Also possible',%10101010,0". And you can also look for patterns the same way.

```
   PC     A     X     Y    SPTR NVMXDIZCE
[00200A 0000 00FF 0000 01F6 001100110

 DB  DP  01
]00 0000 E7

O FA0000 FA0200 "ST",?," $D07",?
>FA0136 8D 7E D0     STA $D07E
>FA0142 8D 7B D0     STA $D07B
>FA0145 8D 73 D0     STA $D073
>FA019F 8D 7F D0     STA $D07F
>FA01C3 8D 72 D0     STA $D072
>FA01D9 8D 73 D0     STA $D073

D FA0148-
>FA0148 AD 01 DC     LDA $DC01
>FA014B 09 20        ORA #$20
>FA014D C9 FB        CMP #$FB
>FA014F F0 15        BEQ $FA0166
>FA0151 A2 00        LDX #$00
>FA0153 BF 00 A0 F8  LDA $F8A000,X

T FA0000 FA1000 !49152

G 020000
```

This has great potential, but things even get better. With the search function, wildcards are added. Now you can also have it look for byte combinations containing unknowns or variables. If you want to find all places referring to the KERNAL vectors located at $031x, simply enter "H 0000 FFFF 1?,03". This is remarkable in itself, but this still isn't the end of it!

A problem with searching has so far been that you needed to know the respective opcodes for the assembly language commands. Here Dreamon comes to the rescue with the opcode-hunt. There the command to be looked for is simply entered as a string: "O C000 D000 'sta ($01,s),y'". Quite simple! And now things really get funny, because wild patterns are allowed here as well. You can really look for all and everything with them. With music, a "O 0000 FFFF 'st',?,'$d4',?,?" would certainly help.

Looks very cryptical, but you have to ignore the commas. Then there is "ST? $d4??". Using this, you really get all commands that write anything directly, even indexed, into the SID area. You can also have all the commands starting with "B" displayed, or...or...or... You simply have to try it once to get a hint about Dreamon's possibilities. Anyway, the patterns by themselves already speed things up, and debugging almost becomes fun.

Freeze Points

Something that every programmer working with the SCPU immediately, painfully misses is a program freezer like those offered by many multi-function cartridges. Well, there is no extra freeze button added to the SuperCPU with the Dreamon either, but there is the possibility to set points via software, where the monitor is immediately called. There will be many diverse options as well that allow the user to decide, for instance, by which vector the freezer should be initiated. More precise details cannot be given at this time, because programmer Christoph Thelen is still working on it, but you can expect something good. Features like freeze points, which are only effective after x runs, have been considered.

When and how?

Naturally, Dreamon is currently still only a beta version; this means you will be surprised here and there by minor bugs. The freeze points work only partially, and some functions are completely missing. But still, the majority has been accomplished. Maybe the first version could be released within two months, if the bugs don't turn out to be more severe than expected. It has not yet been determined how the Dreamon will then be distributed. Finishing it is the highest priority for the time being. But no matter what, SCPU developers may be already drooling for it.

Dreamon V0.5 Beta - Command reference:

a	[adr [opc]] Assemble
c	Range adr Compare
d	Range Disassemble
f	Range Pattern Fill
g	adr Go
h	Range WildPattern Hunt
i	Range Petscii Dump
j	Range Screen Dump
l	"name"[,dev[,adr]] Load
m	Range Memory Petscii Dump
n	Range Memory Screen Dump
o	Range WildPattern Opcode Hunt
p	[(B|C|J|L)[(0|1)]] Install Trap-Vector
r	Display Regs
s	"name",dev,adr0,adr1[,adr2] Save
t	Range adr Transfer
v	"name"[,dev[,adr]] Verify
w	Range adr Swap Memory
x	Exit

WORLD WATCH

by Rainer Buchty

This month's focus: Graphics formats

HELLO WORLD,

today we won't talk about hardware for once - at least not in particular - because we're going to take a closer look at the graphics formats of today, in keeping with the theme of this issue.

In the beginning, there was the bit

Graphics in the stone age of computers were all black-and-white and had the form of bitmaps in memory; every bit of memory represented one dot on the screen. Logically, this format was also used to store graphics in non-volatile memory (disks, hard disk). But even in the good old days, it was hard to tell exactly what a byte - commonly agreed as having a composition of 8 of those pixel bits - represented, because every system had a different definition of bytes.

Many computers generated their "high-resolution" graphics (back then, 256 by 192 really was high resolution) on the basis of the normal text mode, a procedure that included torturing the graphics processor in one way or the other. In the case of some computers (for instance, C64s), the result was that the bitmap file architecture was a little strange. Every 8 successive bytes defined the content of one pixel field which had the size of 8 times 8 pixels (one tile).

Coloring the world

It is hard to imagine, but there were times when 8 or (believe it or not) 16 colors seemed to be the top of the world. Why exactly 8 or 16 bits? It's common knowledge that the screen is composed of three basic colors, red, green, and blue. If one bit is used to control a share of each color, it is possible to create 8 different color shades; to control the brightness (half/full), another bit (the fourth one) allows 16 colors.

The True Color displays of today work on the same principle, but they use 8 bits for each color shade (all in all, 24 bits) which enable them to display 16.7 million colors.

Using bitmaps seems to be a good idea here, too, with one bitmap for each color level. But unfortunately, this isn't very effective; moreover, earlier modes for color graphics very seldom allow the use of all theoretically imaginable colors at the same time, which makes saving in the form of various bitmaps seem less sensible. Two examples of this are the C64 - its Hires mode (implemented on an 8 by 8 tile) makes using the complete range of colors impossible - and the old VGA adapters that are not able to display more than 256 colors at a time. These restrictions lead to a different form of bitmap graphics. Each byte now represents one pixel, the value of every byte is defined by the number of a color from a selectable but set color range - a bytemap, so to speak.

Vector graphics

One of the bitmap's major disadvantages is its inflexibility in changing the scale (enlarging and reducing the size) of a graphic. Anyone who ever tried to enlarge a pixel graphic surely has suffered the typical "Lego bricks" effect (besides, the pixel zoom was one of the first effects ever to be implemented in the hardware of graphics chips). Vector graphics try to prevent that effect by saving an abstract representation of the bitmap instead of the bitmap itself. Instead of saving every single pixel of a line, only the starting and ending point of it are saved along with a special control character that defines the line as a line, and not the center of a circle and its radius.

Vector graphic formats play an important role in the field of DTP (Desktop Publishing), for C64 users the best known format most probably being PostScript.

Formats of today

The formats used today do not depend on a certain kind of platform, i.e., they normally do not carry any "fingerprints" typically left by a special kind of hardware, which is the case with the C64's FLI graphics. Now let's take a look at the common formats:

(1) GIF

GIF means "Graphics Interchange Format" and is an LZW-packed graphics format created in 1987 by the Unisys company for CompuServe. It suffers from two serious disadvantages: first, its limitation to 256 colors; second, the fact that Unisys is trying to make money from the copyright on the format (royalties on programs that create GIFs). On the other hand, the format offers some advantages, e.g. a possibility to make animation strips requiring only a relatively small file size and an option to define a color as transparent, making a background visible if there is one. These two characteristics make the format very popular with web designers.

(2) PNG

"Portable Network Graphics" is designed as a freely available graphics format (meaning that no copyright rules protect it), and it is supposed to become the world wide web's standard in the next few years - but there's still a long way to go. Similar to GIF, its compression of graphic data comes with nearly no loss, and it offers a wide range of extras, e.g., True Color representation. Especially thought for network-based transmission, PNG has a very good error detection and correction system.

(3) JPEG (JPG)

"Joint Pictures Expert Group" (JPEG) is another compressed data format. It works with True Color representation, but unfortunately JPEG uses a so-called destructive compression, i.e., the compression results in a loss of graphic information. If the compression factor is too high, this can lead to the typical tile/Lego bricks effect (called JPEG artifacts). This deficiency - the loss of data during the graphics reduction process - always shows in such pictures.

(4) TIFF (TIF)

The "Tagged Image File Format" is used by true professionals in DTP. It has the ability to save graphic information in any desired color depth, but normally the information is not compressed, which is the reason why TIFF files sometimes reach gigantic dimensions. The cure to this problem is a special, compressed subformat (TIFF compressed) which packs graphic data with LZW algorithms in a style similar to GIF.

(5) Vector graphics

These formats are popular in the fields of DTP and CAD (Computer Aided Design) in particular and often have their origin in one of the various program packages. Some of the more famous representatives of these formats are DXF (from AutoCAD) and PDF (Adobe Acrobat); on the printer side, there is PostScript (the one and only language in professional printing - from Adobe as well) and PCL5 (Hewlett-Packard).

(6) Classic formats

True classics of graphics formats are BMP (Bitmap, PC) and PCX (Paintbrush, for PCs, too), but also IFF/ILBM (Interleaved Bitmap, Amiga/Mac) and IMG (GEM, Atari) still often can be found today. The classic C64 formats (Hi-Eddie, Koala, Doodle, GigaCAD...) have to be considered as being more or less dead. But GoDot offers a potent tool to transform these formats into formats used today (GIF).

Nothing out there for the C64?

There are in fact lots of modern graphics formats for C64s, thanks to the GoDot graphics toolkit and its little helpers (e.g. the ConGo program for PCs, designed by Matthias Matting). With a bit of knowledge, it is relatively easy to implement the graphics filters still missing, because GoDot offers an intelligent API and the opportunity to add extra modules.

What makes the whole thing a bit more difficult are the technical limitations of the C64's hardware. Even with the smartest programming tricks, it is not possible to get a resolution higher than 320 by 200 pixels and a maximum of 136 colors, which is miles from True Color at 1600 by 1200 pixels, 16.7 million colors - a quite usual number nowadays. Considering the memory capacity those images require, there's no way not having an REU at least or even a 16MB SuperRAM memory extension. If you're working with compressed graphics formats, a SCPU naturally is a big advantage that makes working with them go more smoothly.

Sources:

[1] libtiff Manpage
[2] png Manpage
[3] Wotsit's Format (**http://www.wotsit.org**)

There's a program called VDC-Spy which has been out there for four years now, and just for our readers, we'll take a special look at it.

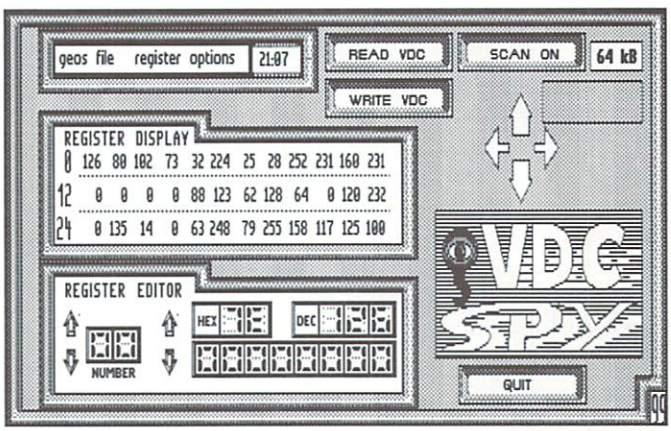
by Nikolaus Metz

If VDC-Spy could sing, we'd probably hear a very well-known song: 'Spies like us' - this program doesn't just spy, but can fulfill other needs as well.

A Review is Trump

The screen setup is easy to explain: on the top left is the menu list, which is normally visable, but is hidden in scan mode. In a window just below that you can see the current register values in decimal mode. In the editor field on the bottom left are the register contents, displayed in decimal, hexadecimal and binary by clicking on the arrow. These changes will be accepted immediately in the field, but they won't be saved in the memory, which can be done by choosing the menu option "Register/ description" or by a click on "VDC write". With this, you can save the new register values in three RAM saves or on a diskette.

VDC Spy



Quick Rescue

If your experimentation and screen setup aren't under control yet, don't worry. Just hit the 'ESC' key, and everything will be back to normal (works almost all the time), i.e. the registers will we be filled with standard values and the view on the screen will be refreshed. Carefull, though, as sometimes this will not work, i.e. the registers get filled with zeros - in this case you'll have to restart your computer.

Keyboard Shortcut

Just like with more modern programs, this one has some keyboard shortcuts. The key combo 'C=i' will produce the small Infobox, and with a 'C=q' you can quit the program. The values stored in RAM can be saved directly with the F1/F3/F5 keys.

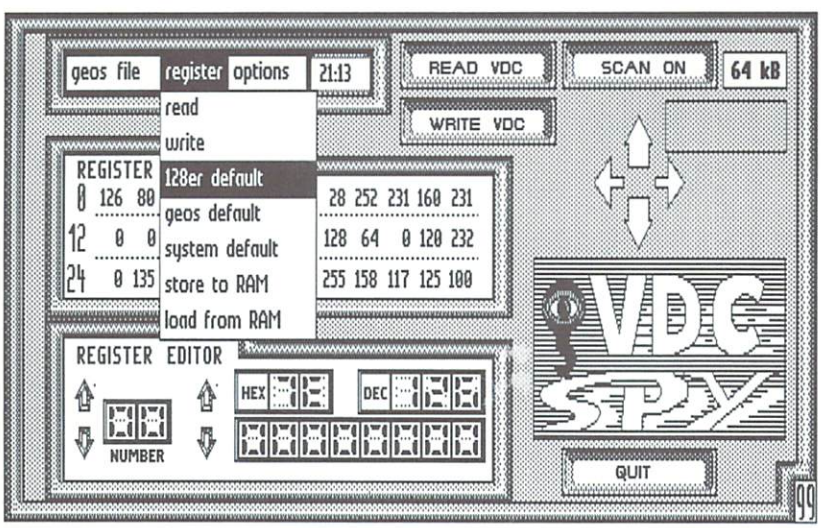
Scan-Mode

If the C128 being used has a current VDC-Save of 64kB RAM, it won't just be displayed on the upper right part of the screen; you can also search through the available memory. Just click on the icon 'Scan" and in the bottom third you'll get a readout, and with the arrows, which you can then search through.

Special Edition

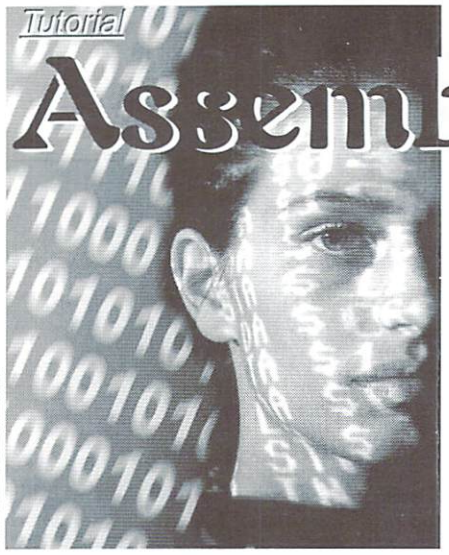
'VDC-Spy' is available in the full version V1.01 (German) and V1.31 (English). In addition, there is Mini-Spys V1.1 (application) and V1.2 (DeskAccessory), which reads the registers and saves the contents as a data file. As this is shareware, a registration fee is greatly appreciated, and needed for continuous updates. For subscribers of GO64!/Commodore World the fee is 10 German Marks (about $6 US); just send an email to: vdcspy@gedrean.de or a postcard to

Dr. Ingolf Ihrig,
Walter-Friedrich-Str. 57,
D-13125 Berlin,
Germany.



Tutorial

Assembly Language



Picture: Bernhard Pekoll/Günther Bauer

Hi! After the rather boring explanations of the addressing modes last time, we'll now turn to the more pleasant things in life. We've already learned how to program interrupts, and we know a little bit about the screen colors. Now let's start talking about graphics.

by Wanja Gayk

Part 7

The most important in graphics (at least for now) are character graphics. Normally the ROM already contains two sets of characters, one that contains a set of capital letters and block symbols, and another one with small and capital letters. You can switch between them by pressing the shift and the C= keys at the same time. Instead of using one of these, you can also load your own charset into the RAM and display it from there. However, there are some preconditions.

The near-sighted VIC

The VIC can only "see" a range of $4000 bytes of the memory (a "VIC bank"). Usually, that's the area between $0000 and $3fff, but you can also set the VIC bank to $4000-$7fff, $8000-$bfff, or $c000-$ffff. One consequence of this is that you also have to put the screen ram (video matrix) into one of these "vision fields" of the VIC. The principle behind this is quite easy.

Let's first look at VIC bank 3 ($0000-$3fff), which is usually enabled when you switch on the machine. The register $d018, which is responsible for the locations of the charset and the screen ram, has a default value of $15. We separate this value into the high- and low-nibbles, and so we get 1 for the high- and 5 for the low-nibble; that would $15 together. The size of a charset is $0800 bytes, and as you know, a screen ram is $03f8 bytes in size (let's round that up to $0400). The high nibble always contains the position of the screen ram, which we get by calculating:
VIC bank base address + $0400 * high nibble, that's $0000 + 1*$0400 = $0400. Et voila! We get the default location of the screen ram.

The same goes for the character generator: vic bank base address + $0400* low nibble; that's $0000 + 5* $0400 = $1400... huh? But isn't the charset located at $1000? Correct... $1400 seems a bit odd, but you have to know that it doesn't matter whether you set $d018 to $14 or $15, since a charset always has a size of $0800 bytes and is therefore located at an address which is a multiple of $0800, namely $0000, $0800, $1000, $1800, $2000, $2800, and so on.

However, there are some restrictions that apply to VIC bank 3 ($0000-$3fff). Because the zero page, the processor stack, and the system's vectors are stored at $0000, it's not recommended to put a character set there; it would mess up the whole system. A charset in the area between $1000 and $1fff wouldn't even be visible, because this memory range is overlaid by the character ROM which has priority over a charset in the RAM. These restrictions don't apply to VIC bank 2 ($4000-$7fff). At $9000 to $9fff in bank 1 ($8000-$bfff), we get the same problem we had at $1000 in bank 3. In bank 0, at $c000 and above, we don't have any of these problems.

Now how do we switch between banks? The two lowest bits (0 and 1) of register $dd00 are responsible for this (see image). In order to set and clear bits selectively, we use the AND and ORA commands, as shown in the image "and & or". Generally, if we AND a register with a mask byte, all those bits remain unchanged that correspond to a set bit in the same position of the mask byte. All other bits are cleared. The OR function works just the other way round; all bits that are set in the operand to the OR command will also be set in the resulting byte, while cleared bits don't change the result. Maybe we should have a look at some examples:

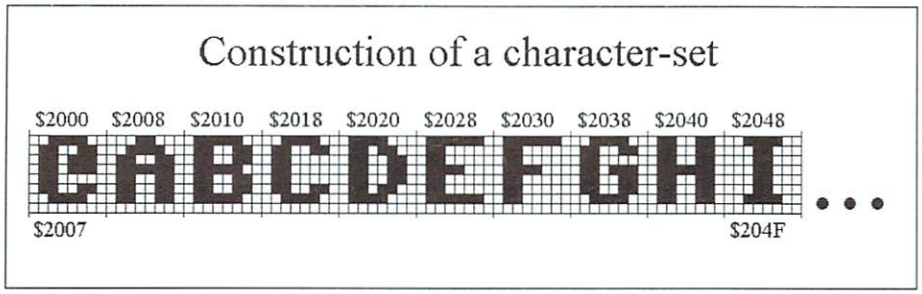
```
-- AND --
lda #$81 ;write the screen code for an
inverted "a" (binary %10000001)
sta $0400 ;into the screen ram
and #$7f ;AND accu with $7f (binary
%01111111)
sta $0401 ;write the resulting byte (hex
$01, binary %00000001)
 ;to the right of the inverted "a"
 ;$01 is the screencode of a normal "a"

-- OR --
lda #$01 ;write the screen code for a
normal "a" (binary %00000001)
sta $0400 ;into the screen ram
lda #$80 ;ORA accu with $80 (binary
%10000000), and write the
sta $0401 ;result (hex: $81, binary
%10000001) to the screen
 ;right to the normal "a"
 ;$81 is the screen code for an inverted
"a"
```

(If you own a very old C64, you probably won't see anything when you run these examples; in this case, try writing any two

The logic operations AND and OR

1 AND 1 = 1	1 OR 1 = 1
1 AND 0 = 0	1 OR 0 = 1
0 AND 1 = 0	0 OR 1 = 1
0 AND 0 = 0	0 OR 0 = 0

```
    01110000 ($70)        01110000 ($70)
AND 00101011 ($53)    OR 00101011 ($53)
  = 00100000 ($20)      = 01111011 ($7B)
```



characters into the top left corner of the screen before running the programs.)

Back to our problem at the beginning: let's assume we want to move the screen ram to $0c00 but leave the charset at its current location. We write a program that copies the current contents of the screen to $0c00 and displays the copy when we run it a second time. At this point, I'd like to introduce another novelty; because I'm too lazy to calculate all the addresses used in a program, I'll replace the addresses with labels from now on, as it's usually done when we enter a program using an assembler like Turbo-Ass rather than a machine language monitor. If you prefer entering the examples using a monitor program, just replace the labels (start, copy...) with the addresses the monitor printed at the left when you entered the corresponding commands. It doesn't matter at which address you enter the program, provided you don't put it below the ROM or into the the memory between $0c00 and $1000, which is where we're going to copy the screen ram to:

```
start LDA #$01 ; load accu with 1
 BEQ display ; if accu equals zero, jump
to the display routine
 LDX #$00 ; otherwise, change the LDA
#$01 to a LDA #$00;
 STX start + 1 ; using this trick we need
only a single entry
 address
 ; for both routines

copy LDA $0400,x ; copy the screen ram to
$0c00
 STA $0c00,x
 LDA $0500,x
 STA $0d00,x
 LDA $0600,x
 STA $0e00,x
 LDA $0700,x
 STA $0f00,x
 DEX
 BNE copy
 RTS ; end of the first subroutine

display LDA #$01 ; change the LDA #$00
back to a LDA #$01
 STA start +1
 LDA $d018 ; read the value of $d018
(default: $15)
 AND #$0f ; clear the 4 upper bits (the
high nibble)
 ORA #$30 ; put 3 ($0c00/$0400=3) into
the high nibble
 STA $d018 ; and write the result
(normally $35) to $d018.
 RTS
```

How does it work? When first called, the LDA command at the label "start" results to 1, so the BEQ doesn't branch. Now we change the LDA command to an LDA #$00 to make the program branch to "display" when we call it the second time. Now the first time, the current screen will be copied to $0c00, and the program ends.

We're now back in the BASIC editor, and so we can change the screen. When we start the program again, it will branch to "display", the LDA at "start" being a LDA #$00 that returns a zero result. Arriving at "display", we first change the command back to an LDA #$01; the program will later exit in its normal state, allowing us to repeat the procedure without rewriting the program. After that, we get the value of $d018 and use AND to clear the upper nibble holding the screen ram location. Then we OR the value with 3 and write the result to $d018. 3 is the result of the expression [(screen ram address minus VIC bank address) divided by $0400], [($0c00-$0000)/$0400]=3. After switching on the computer or pressing stop-restore, $d018's value is always set to $15. If we apply these operations to this value, we get $35 as a result.

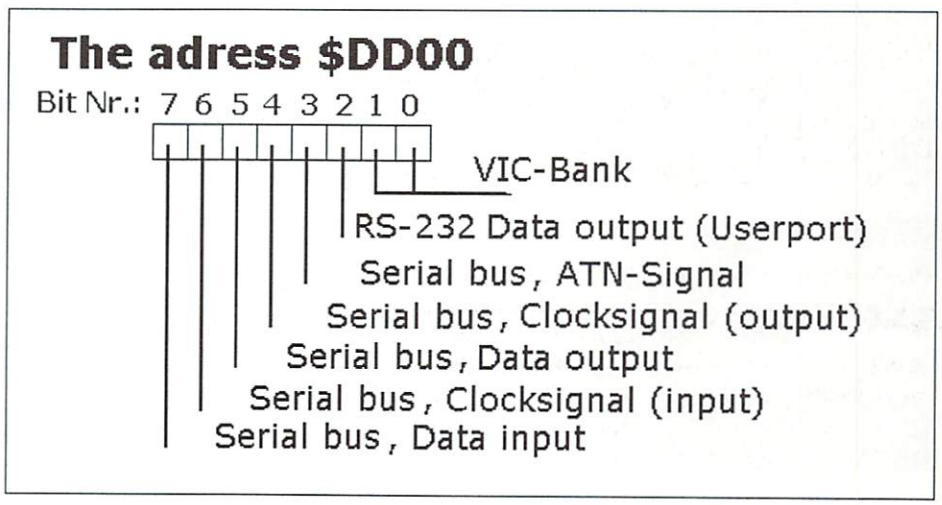
Usage: Write some stuff onto the screen and run the program; write something on the screen and run it again; you'll see the screen at $0c00. However, the cursor won't be visible, because the operating system still thinks the screen was located at $0400. We've told the VIC to display the screen ram at $0c00, but the system doesn't know about it.

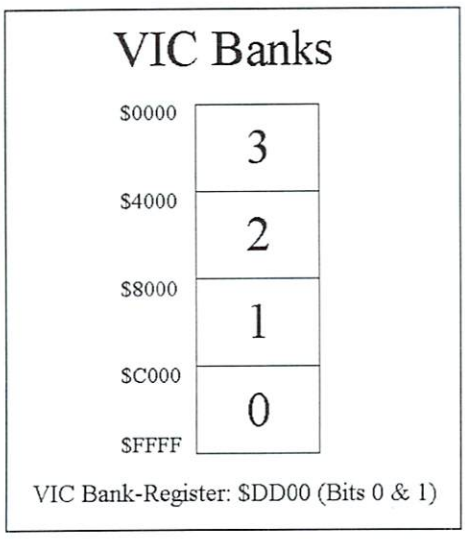
Charsets

As said before, we already have two ROM charsets. The image "how character sets are constructed" shows how these two and any other charsets are defined. A character consists of an 8 by 8 pixel field, each row of which is represented by a byte. This way the 8x8 pixel pattern of a character is stored as a series of 8 consequential bytes. The last of these 8 bytes is followed by the byte representing the first pixel row of the next charcter and so on. We have a total of 256 characters; thus, a charset has a total size of 8*256 bytes; that's 2048 bytes (=hex $0800).

Now, it would be quite a task to construct each character by hand (this reminds me of the time I spent with the Schneider CPC, designing each character on paper, calculating the corresponding bytes by hand, and finally including them as DATA statements into a BASIC program.). For this reason, there are so-called "charset editors" that allow you to paint and save character sets just like images. With such a tool, the only thing we have to care about is how to display them. As a matter of fact, I've already explained how to do this, but I'll repeat it in short:

You should begin by designing a charset using an editor. After you've finished, you load it into the memory to a location whose address is a multiple of $0800 , like $0800, $2000, $2800, $3000. Avoid the area at $1000! Now you calculate the appropriate $d018 value by dividing (load address minus





VIC bank address ($0000, $4000, $8000, $c000)) by $0400. When you write this to $d018 and you don't want to move the screen ram, remember to use AND and ORA to manipulate the register's value properly. In case you want to set the locations of both the screen ram and the charset, you may simply write the appropriate value to $d018. Now the only thing left to do is set the value of $dd00, which is used to select the VIC bank. Of course, you have to take care the screen ram and charset you want to display are both located in the same bank.

The following program illustrates how to display a charset at $4800-$4fff, with a screen ram at $4000-$43ff (which will be a copy of the current screen):

```
 ldx #$00
loop lda $0400,x ;copy the normal screen
to $4000
 sta $4000,x
 lda $0500,x
 sta $4100,x
 lda $0600,x
 sta $4200,x
 lda $0700,x
 sta $4300,x
 dex
 bne loop

 lda $dd00 ; read contents of $dd00
 and #$fc ; clear the two lowest bits
($fc=%11111100)
 ora #$01 ; replace them with the value
for VIC bank 2
 sta $dd00 ; and write the result to
$dd00
 lda #$02 ; screen ram at $4000, charset
at $4800
 sta $d018 ; write to $d018
 rts
```

Here's how we obtained the $02 value for $d018: the high nibble is a zero, resulting from the expression [$4000 (screen address) minus $4000 (base address of bank 2)] divided by $0400. The 2 in the low nibble is calculated like this: [$4800 (charset address) minus $4000 (bank address of bank 2)] divided by $0800.

Whew! Even if you're utterly confused by now, believe me it's not half as difficult as you may think. Just read this part of the course a few more times, and don't forget to relax a little. Nobody wants you to understand it all at once... Next issue, we'll go on with some graphics stuff. 'Til then, don't let the keys cool down!

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How to GoDot Screenmode-Conversions

The image processing and conversion software GoDot isn't all too intuitive for many users because of its innumerable variety of options. There are times when you plan to change or alter a picture in a certain way, can't come up with any clue how to do that and the ultimate way to solve your problem simply doesn't spring to mind. In such cases GoDot might offer the perfect tool to put your plan into practice. Or you've set yourself a task that you want to realize in GoDot, feeling sure that there is a solution to it but you simply can't find the right way to do it. We're here to change that by re-editing the old 'How to GoDot' series from the German 64'er mag.

by Arndt Dettke

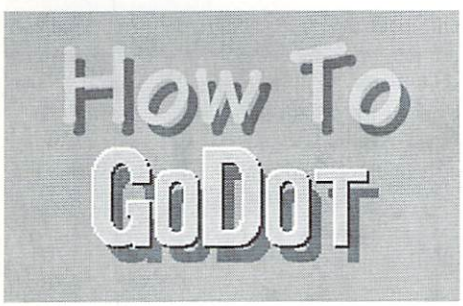
This is not going to be a repeat (as we don't have any copyrights on the texts of the original series) but a completely new edition with different subjects and it will hopefully offer more real-world, life-like problems and solutions than the old one. The new series attempts to make the manual more complete, as it has become a little outdated over the years anyway. For a start, we will take a look at the GoDot webpages (http://members.aol.com/howtogodot/welcome.htm) but we'll try to rejig them so GO64! offers information that is more extensive and of higher quality.

Necessary agreements

'How to GoDot' is supposed to operate on the principle of a workshop, meaning that we are going to define a problem, name the working conditions that go along with it and demonstrate how a solution to that specific kind of problem looks like in GoDot. One necessary prerequisite is that we proceed from identical starting situations each time. If feasible, you should have installed on your computer the latest version of GoDot (v1.27; you can check that using mod.SystemInfo or by clicking the 'GoDot!' button in the upper right corner of the main screen - the first four digits of the number you see indicate the version that is installed). Moreover you should use an unchanged version of GoDot's standard INI ('god.ini'). That's the one that installs ldr.4BitGoDot, svr.4BitGoDot and mod.ClipWorks. The final prerequisite is that you work with an REU. If you do not work with an REU every access to 'Undo' or 'Temp' has to be redirected either to the disc or hard drive with svr.4BitGoDot (and *only* with svr.4BitGoDot).

I've decided to use the same format that I used in the original series, as it uses a short but precise style to describe procedures used in GoDot:

Expression	What to do	Example
Command parameter	Execute command (click 'command' button and type/click parameter)	Load "DDdoodle" (load the picture entitled 'DDdoodle')
Gadget: setting	Set the button 'gadget' to the indicated value of 'setting'	Save: PCX-EGA (install svr.PCX-EGA)
Option: setting	Set the value of 'setting' in the GoDot function that is currently executed	SetClip: Left 160 (function 'SetClip' in svr.GIF, set 'left' display to 160)



GoDot supports all important graphics modes the C64 offers (Hires, Multicolor, MCI, FLI and IFLI). However, the program is only able to display modes that do not require any special manipulation of the screen timing (Hires and Multi). We made this limitation for compatibility, as we do not have the facilities to test NTSC-specific routines, we prefer leave these areas alone.

Each of these screenmodes has its pros and cons. Hires is able to display by single pixels but is restricted to two colors per tile. Multicolor works with three colors per tile and a fourth color for the whole screen, but only because every two pixels are combined to one. With FLI you can display all 16 colors in one card but it is extremely sensitive to timing so that the first 24 pixels on the left side cannot be displayed at all. IFLI combines the advantages of all three modes mentioned before and by means of an optical trick even manages to reach the number of 136 colors on the screen. The constant flickering makes your eyes ache, however, and IFLI is even more timing-sensitive than FLI. Moreover, it has all FLI's disadvantages and last but not least takes up gigantic masses of memory capacity (at least for C64 conditions).

From Hires to Multicolor

We'll take a look at the easiest yet most impressive conversion of modes first. If you ever tried to display a Hires picture in Multicolor you will have come to a similar result as the one you can see in our first picture. The shadings look impossibly bad or disappear completely, circumference lines show holes and details vanish into thin air.

Pictures in Hires are not worth a second look in Multicolor.

For pictures with black lines on a white background you should use the module mod.AverageColor in GoDot. In it, two neighboring pixels in Hires are transformed into one Multicolor pixel, their colors combined to a mixture of the original colors. Thus black and white result in middle gray. Here's an example:

```
Load: HiBitMap
Load Replace 'dirk.hbm'
(Screenmode:) Hires
Colors: 16
Display
```

The left side of our picture now shows an extract of the original. You can change the screenmode in GoDot in the 'Screen Controls' window in the lower left corner of the screen. By default the setting is 'Multi', and you can also find the 'Colors' setting there.

```
(Screenmode:) Multi
Display
```

Here's the middle part of our picture, the unserviceable Multicolor display.

```
Inst: AverageColor
Execute
Display
```

What you see now is the right side. It's all in gray but nearly all details are still clearly visible. And if you insist in black lines GoDot can also give you black lines. Let's go on:

```
Palette
(Pick:) black
(Set:) middle gray
Display
```

'Pick' means that you choose the first color in question in the upper palette bar (it will be displayed in the right corner) and in the following step ('set') you click the second color in the lower palette bar. This second color, middle gray, will now be replaced by the first one, black, and no longer appears anywhere in the display of the picture. Any picture you have reworked in that fashion is now ready for saving in one of the C64 Multicolor formats.

You should be aware of the fact that you haven't really changed any of GoDot's graphics data! If you set the palette back to 'Default' the picture returns to its previous state (mid gray instead of black). If you intend to make the change permanent so that it becomes valid in graphics formats other than the C64's there's still one last step to go (middle gray is still set to be replaced by black).

```
Inst: ApplyColors
Execute
Palette Default
Accept
Display
```

You need to reset the palette's default values manually. A future version of mod.ApplyColors will have this deficiency remedied. After this step however, the color mid gray will be eliminated from the picture completely.

Black-and-white pictures look great in multicolor, too!

Pictures that have white lines on a black background are treated much in the same way. The only difference is the fact that the gray color you get by conversion doesn't show very much on the black ground. You'll get the best effects if you replace gray by white or - what's even better - by light gray. Go ahead and try: First, load the picture 'dirk.hbm' once more but before reworking it invert it with mod.Negative (if you load it directly with ldr.PFoxSelect the graphics data will be inverted automatically during the process of loading).

```
Load Replace 'dirk.hbm'
Inst: Negative
Execute
```

or

```
Load: PFoxSelect
Load 'dirk.hbm'
Load Pic
```

Now proceed as before. You can also convert colored pictures from Hires into Multicolor although GoDot has some difficulty to find the appropriate color mixture. Colored lines on a black background often get lost, so you either have to rework the picture or you just accept it as it is.

Colored lines on colored background are less of a problem, as you can see from the second example. The conversion works as follows:

There's no way to improve the fine pattern on the right and left.

No problems here.

```
Load: Doodle
Load "ddceleg"
(Screenmode:) Hires
Display
Inst: AverageColor
Execute
(Screenmode:) Multi
Display
```

Now you have the first picture. If you load the file 'dd2desig' instead of 'ddceleag' you'll get the second one in which yellow and red result in the color mixture of light red, an acceptable conversion.

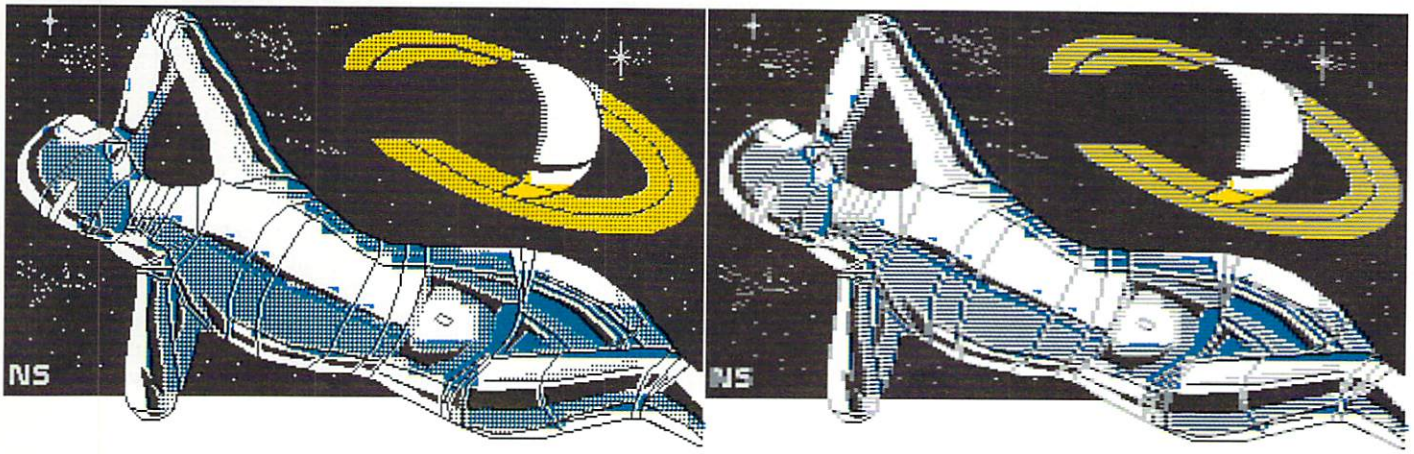
Let's come to an end for today. Next time I'm going to show you the inversion of the process: How to convert a graphic from Multicolor into Hires with reasonable results. Due to the limitations of Hires mode, this is more difficult than the problem we had today. But GoDot offers various alternatives to solve this problem, so next time we'll have many more modules at our disposal. In the third part of our workshop we'll take a look at conversions to FLI and IFLI.

In case you should have any questions or feel that something's been left out please contact either the editorial bureau or me personally:

go64@c64.org

or

GoD.ADettke@t-online.de.



Tutorial

A BASIC PROJECT

Part 3

About Searching in Linked Lists, Computing with Days, and the Year 2000 Problem

Last time I showed you how you adjust the program structure from the BASIC project 1 for new circumstances. This included how the screen of our current BASIC project is handled, and how you need to pass numbers and values to a calculation algorithm in a controlled manner, so that unforeseen crashes can't begin to develop. This final part of our project will explain the algorithm computing the day of the week and will explain how to find out the distance between two given days. It will also discuss if owners of CMD devices with built-in clocks should be concerned about the approaching change of the millenium.

by Arndt Dettke

Computing Weekdays

Do you still remember the end of part 1 of this BASIC project? We looked up the weekdays of some given example dates in the printed tables. You were asked to determine the weekday of your respective birthdays. To achieve this, we had to go through five of the tables in a specific order, remember intermediate results, and were finally able to read the weekday desired directly from the sixth table. At first glance it seemed quite complicated, but once the principle was understood, using the tables became more efficient.

In the same manner, the program can also find the weekday! We'll need to change the words used to describe the procedure (in the second to last paragraph) into program steps our C64 understands. Believe it or not - after the preparations described in the last part of the tutorial (declaration of the tables and entering the numbers looked for) we will need no more than 15 BASIC lines for calculating the weekday! By adding just three more lines we also get the Julian date.

Here:

```
5500 sj=(j/400)):
IF sj THEN 5515
5505 sj=(j/100)=(INT(j/100)):
IF sj THEN IF md=1 THEN sj= NOT sj:
GOTO 5515
5510 sj=(j/4))=(INT(j/4))
5515 i5=-(sj*12):
IF m>2 THEN i5=0
```

We already know these lines from part 1 in issue 8/99. Here we determine whether a given year J is a leap-year. If so, the program returns the value "-1" in SJ, if not, "0" is returned. Because all centuries (including those that can be divided by 400) are leap-years in the Julian calendar, this influences line 5505 (MD=1 means: "date according to the Gregorian calendar"). In leap-years, a different assignment applies to the months January and February (M<3), which explains the formula I5=-(SJ*12) in line 5515. Later on, we need I5 (in line 5525), in order to determine the desired column in table 2 (regarding leap years). Now for the day (T) wanted:

```
5520 r=INT((t/7-INT(t/7))*7+.5)-1:
IF r<0 THEN r=6
5525 i5=t1%(m+i5):
v1=t2%(r,i5):
...
```

Here in line 5520 the line in table 2 is computed from the value for the day. The table has seven columns, therefore we have to determine the value for the day via MODULO 7 to find the correct line in the table. Thus we get the remainder of the division of T and 7 in R. As the day of the week starts on Monday in Germany, we have to subtract 1 from the remainder R, and move Sunday (for which we would get "-1") to position 6.

Line 5525 determines which column of table 2 the desired month (M considering the leap-year I5) should be, and stores the value again to I5, whose old value has now served its purpose. Now we have both the column and line for table 2. We can simply read out the things we find there. The computer stores the number in V1. This is the first intermediate result from part 1 of the BASIC project we

had to keep in mind, in order to find the right day of the week later on.

```
5525 ...
i6=VAL(RIGHT$(j$,2)):
i5=INT(i6/6)
```

Now for the year (J$). At first we need the last two digits of the year, in effect the year in the century, which is stored in I6. Unfortunately, the respective table (table 3) is not uniformly structured. Although the values in it are increasing from the left to the right, there are jumps in it, empty spaces. One thing remains the same in all lines: if you integer divide the value from a given table cell by 6, you either get the column where this number resides, or the column before it! This is the reason for the I5 formula, as it homes in on the desired column in the table. We can use I5 again as its old value has fulfilled its duty. We still need to search table 3, and this is how it's done:

```
5530 FOR i9=0 TO 6:
FOR i4=i5 TO i5+1:
IF i6=t3%(i9,i4) THEN i6=i9:
i9=6:
i4=i5+1
5535 NEXT:
NEXT :
...
```

We are looking for the last two digits in the columns I5 or I5+1 (second FOR), and we do this in all rows (first FOR). When we have located the value, we store it to I6. In order to speed up the program we immediately set the counter variables to their maximal values, which instantly ends the two FOR-NEXT-loops. Now that we have the value for the line in table 5, later we will be able to determine the second intermediate result in I6.

Next we take care of the century desired, the first two digits in the year:

```
5535 ...
i5=VAL(LEFT$(j$,2)):
IF i5<15 THEN md=0:
GOSUB 5260
```

We store the century once more in I5. If the century is less than 1500, it is certainly a date from the Julian calendar, which we take care of with the IF-statement (MD=0 means: "Julian calendar"). In line 5260, we adjust the status display accordingly.

```
5536 IF md THEN 5545
5540 i5=i5-INT(i5/7)*7:
GOTO 5560
```

If we are dealing with a Julian date (MD=0), we calculate the required column from table 5 in line 5540 using I5 MODULO 7. This calculates the remainder of the century's value integer divided by 7 (table 5 has seven columns). If there's no Gregorian date, the following loop (where we have to search table 4) is skipped by jumping to line 5560.

```
5545 FOR i9=0 TO 6:
FOR i4=0 TO 4
5550 IF t4%(i4,i9)=i5 THEN i5=i9:
i9=6:
i4=4
5555 NEXT:
NEXT
```

In this table (the lower, "Gregorian" part of table 4 in issue 8/99) no order can be discerned from the values. So we need to search all cells for the century value. Once it's found, we store the respective table column in I5 and wrap up the loops as before.

```
5560 v2=t5%(i6,i5):
i4=v1+v2:
r=INT((i4/7-INT(i4/7))*7+.5)-1:
IF r<0 THEN r=6
5565 wt$=wt$(r)
```

We have our second intermediate value, V2! Now we can find the line of the weekday desired in the table of weekdays by adding the first value (V1) and doing another Modulo calculation. As with line 5520 above, we adjust for German weekdays. Now we have the weekday that matches our initial date (WT$ in line 5565). And in only 15 BASIC lines!

Distance between two days

How can you compute the distance between two different days in a simple fashion? You may be able to calculate within a year easily enough but after this, things get a bit murky for a quick (and accurate) result. The months all have a different length, not to mention leap-years! Especially in astronomy and astronautics, you need a universal counting of days, valid for every point on earth at the same time, so that observations can be brought into relation immediately without major conversions (and related errors).

Therefore the "Julian period" was invented in the year 1581. A given day was determined as starting point (January 1st, 4713 BC), and all average solar days are counted from this day on. Thus there are no years, not even daytime or hours, only a number of days. In order to get to the respective day in our calendar, we employ a relatively complicated formula. We have on hand an especially approriate instrument in the form of the Julian date, due to the counting of single days. Here is the formula, in BASIC:

```
5570 v1=0:
i4=j:
i5=m:
IF m<3 THEN i4=j-1:
i5=m+12
5575 IF md=1 THEN v2=VAL(LEFT$(j$,2)):
v1=2-v2+INT(v2/4)
5580
jd=365.25*(i4+4716))+(INT(30.6001*(i5+1)))+
t+v1-1524.5
5590 RETURN
```

If you follow the formula, you may soon discover the variables for the year (J), Month (M), and day (T). Some other values will also be familiar, such as 365.25 (the length of a tropical year). The numbers used always lead to the correct result anyway, though it's a floating point number which will later be simplified to an integer to match our purposes. The Julian date has some similarity to the star date from the television series Star Trek. It is returned in the variable JD.

If you wish to know the distance between two given days, you subtract the Julian dates of the two days, one from the other. Our program does this in the subroutine between lines 5300 and 5335. After having the two days entered (5300-5315) these lines follow:

```
5320 v1=jd(1,3):
v2=jd(0,3):
IF v1>v2 THEN v2=v1:
v1=jd(0,3)
```

The value of the two Julian dates are read from the array JD(..) and stored in V1 and V2. Because the distance can't be negative, the two values are exchanged if needed, so that V2 always contains the greater of the two numbers.

```
5325 z1=0:
sp=16:
GOSUB 1710:
en$="":
lg=10:
GOSUB 1800
```

This line deletes ten chars in the display up to the right (in screen line 0, column 16, which is where the Julian date resides).

```
5330 i9=INT(v2-v1+.5):
st$=STR$(i)+" d":
zl=0:
sp=16:
GOSUB 1710:
i8=6
5335 RETURN
```

And here the subtraction is executed, rounded to a whole number and displayed at the location just cleared. The added "d" stands for "days".

Reading the CMD-Clocks

Many CMD products such as hard drives, RAMLinks and other peripherals contain built-in real time clocks (RTCs). These clocks can be read, if you know how. Our program can read the RTC, and I'd like to show how the entire process can be handled. The simple thing about RTCs is, that they can be addressed like a disk drive: you send a command to it, and the device sends an answer string that must be fetched. The problem is that it is never precisely determined which CMD device has the built-in clock. Yes, they can even change their addresses during runtime. The clock routine is located in the BASIC lines 6100 to 6195. After some cosmetics with frames and messages, it looks like:

```
6110 zl=zl+2:
GOSUB 1200:
PRINT "U: ":
st$="":
sp=sp+2
```

For displaying the current drive, the message "U: " (for "unit") is shown. The following lines check each device from 8 through 16.

```
6115 FOR i8=8 TO 16:
POKE 144,0:
POKE 780,i8:
SYS 60684:
POKE 780,0:
SYS 60857:
IF st THEN 6135
```

The first POKE clears the internal status variable ST (address $90). The device address (I8) is given in the accumulator, and the ROM-routine LISTEN ($ed0c) is called. With the second SYS, the appropriate secondary address (0) is sent via $edb9. If the device returns an error (ST not equal to 0), searching this device is stopped.

```
6120 GOSUB 1200:
 PRINT i8:
 ...
```

Otherwise, the device number is displayed (after "U: ") and an effort is made to address the clock:

```
6120 ...
OPEN 1,i8,15:
PRINT#1,"t-ra"
6125 GET #1, en$:
st$=st$+en$:
IF st<>64 THEN 6125
6130 CLOSE 1:
...
```

Two things can happen after addressing the clock with "T-RA":

a) There's no clock to begin with, then the device answers with an error message; all error messages begin with an error number.
b) The clock sends its date; in this case the message starts with the string for the current weekday ("A" in "T-RA" stands for "ASCII").

```
6130 ...
IF VAL(st$)=0 THEN dr$(i8-8)=st$:
sp=sp+3:
i7=i7+1
6135 st$="":
GOSUB 1200:
PRINT " ";:
NEXT
```

Therefore, if the string received starts with anything other than a number, it's probably a date. This is stored in the array DR$(..). The number of clocks found is stored in I7. Afterwards, the drive number displayed is deleted from the screen and things continue with the next drive.

```
6140 zl=zl+2:
 sp=6:
 GOSUB 1200
 6145 IF i7=0 THEN PRINT "No clock
found.";:
 lg=1:
 GOSUB 1400:
 GOTO 6195
```

If no clock is found (I7=0), a message is given, and confirmed with the GOSUB routine starting at line 1400. The remainder of the routine is skipped. On the other hand, if the search was successful, the program displays the times found one after the other, and prompts whether you want to use this date in the calendar program.

```
6150 FOR i8=0 TO 8:
st$=dr$(i8):
IF st$="" THEN 6190
6155 zl=9:
sp=6:
lg=27:
en$=" ";
GOSUB 1200:
GOSUB 1800:
GOSUB 1200:
lg=1
6160 PRINT st$:
zl=13
6165 GOSUB 1200:
PRINT "Copy time? (y/n) ";
6170 GOSUB 1400:
IF en$<>"y" AND en$<>"n" THEN 6165
6175 IF en$="n" THEN 6190
```

If the prompt was answered with "y", the relevant parts of the date are copied (month and year), and the loop is ended.

```
6180 i8=8:
m=VAL(MID$(st$,6,2)):
j=VAL(MID$(st$,12,2)):
...
```

And now for the year 2000 problem! The clocks used in CMD RTC devices return the year as a two-digit number. The century is ignored! However, as the turn of the century is at hand, we can ensure that the date continues to be correct within our program. To do this, we add 100 to all data less than the current year (99). This way, we meet the Y2K problem only in the year 2099. Don't forget to prepare your great-grandchildren in time!

```
6180 ...
IF j<99 THEN j=j+100
6185 j=1900+j:
GOSUB 5500
6190 NEXT
6195 zl=8:
sp=5:
br=29:
ho=5:
GOSUB 1300:
RETURN
```

In line 6185 you can see our Year 2000 patch: The number 1900 (or 2000) is added to the year. There's nothing more to it! A little lack of foresight may cause terrifying results, don't you agree? Fortunately, no vital functions depend on C64-programs - or are there nuclear power plants using C64 controls anywhere out there?
You are bid a fond farewell by a thoughtful

Arndt

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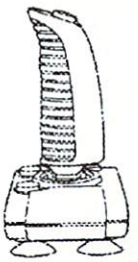

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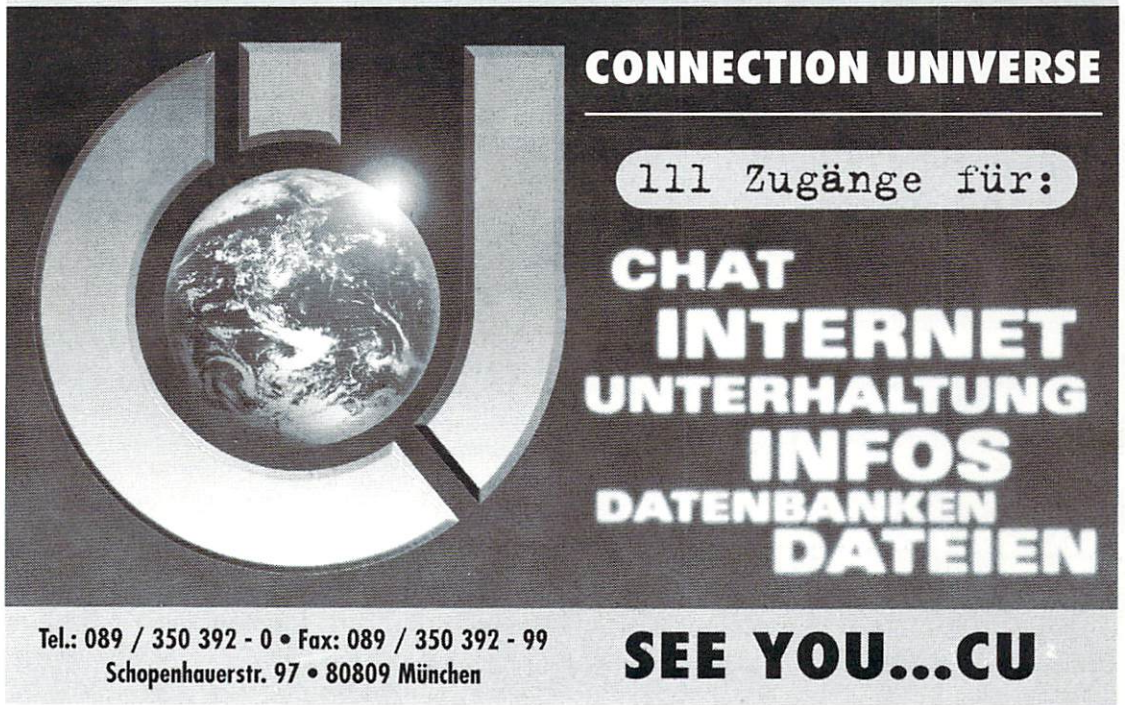

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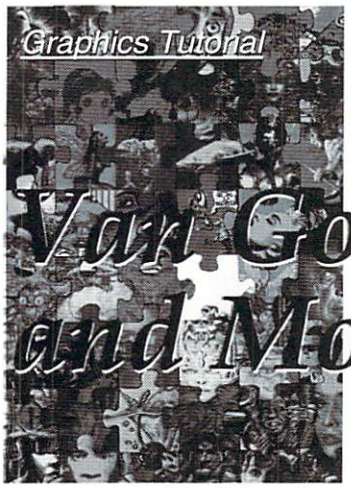


Van Gogh, Picasso and Monet...

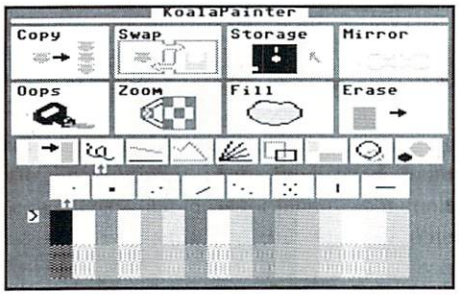
...were unable to make use of modern computer technology and employ the virtual paintbrush when creating their masterpieces. How are you supposed to create masterpieces on a graphically-obsolete machine with just 16 colors on the hardware side and with extremely low resolution? Is it possible at all? In the next, few issues we will prove that it is possible through use of our graphics course.

by Alexander "Mr. Quark" Teufel and Volker Rust

One thing has to be said in advance: without any talent, even with our course you can't become a top graphics designer. Yet, many talented designers just have difficulties getting their hand-painted pictures into the computer; on the other hand, some people have good ideas for pictures but don't feel destined to be computer graphic designers due to their more or less bad proficiency at painting. Our course is directed at those two groups, because neither of them are "hopeless" cases. Both cases show the main requisites: motivation and imagination.

The Graphic Formats

At first, we will turn towards the different graphics formats and the differences between them, which are mainly in the resolution and the number of colors. Before you start pixeling a picture, you should choose the optimal format which seems to be most suited for getting across the idea of the picture.



The main menu of the classic Koala Painter

The Multicolor Mode

The normal multicolor bitmap is still the most used format, which means 160x200 pixels and 16 colors. However, you can't use these 16 colors absolutely at will. You can only use them with the limitation of three freely-chosen colors per 4x8 pixel block plus one background color (which is the same for the entire bitmap). The advantage of the multicolor mode is that due to the relatively rough resolution, you get results faster, since fewer dots means less work when drawing pixel by pixel. On the downside, you have to accept stepped edges and rough pixels, which can only be evened out using clever drawing techniques. You can see a simple example of the rough edges when trying to draw a circle. Hi-res mode (which we will discuss later on) offers quite obvious advantages on this particular topic.

Multicolor Painting Programs

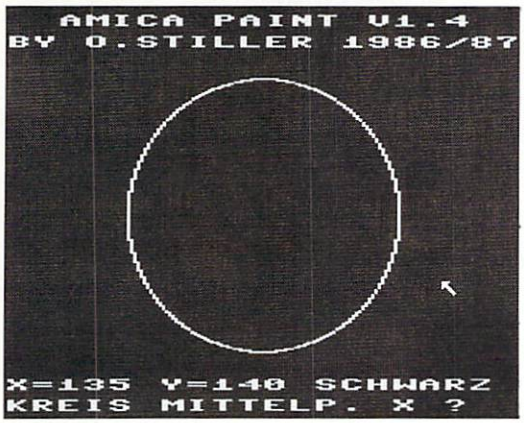
There is a wide choice of graphic programs for this format; the most important ones will now be discussed. One of the oldest and most famous drawing programs is "Koala Painter", which isn't used much today though. In spite of an appealing design and a graphical environment, the program's handling (switching between screens, peculiar screen to save/load pictures, inverted spade character in the front of filenames) in effect is too troublesome and complex. But still, the Koala picture format of 40 blocks turns out to be the most practical one and has remained the standard format for multicolor bitmaps even today.

Rival programs, like Artist 64, Paint Magic, or Blazing Paddles, were not able to really gain favor. Finally in 1987, Oliver Stiller created the milestone, "Amica Paint", the most used C64 drawing program. To this day, it remains unbeaten, due to its clear menu handling through use of windows, its expandability, mouse support, and many practical functions which make it comfortable to use with a little practice. Amica Paint offers the right tool for every project, for example, two graphics screens, a zoom mode with direct access to the colors, saving picture scraps, filling with individual patterns, moving, and copying. Other functions have never been seen in any other C64 painting program, like stretching, toppling, or infinitely variable enlarging and reducing. In addition, Amica Paint is able to

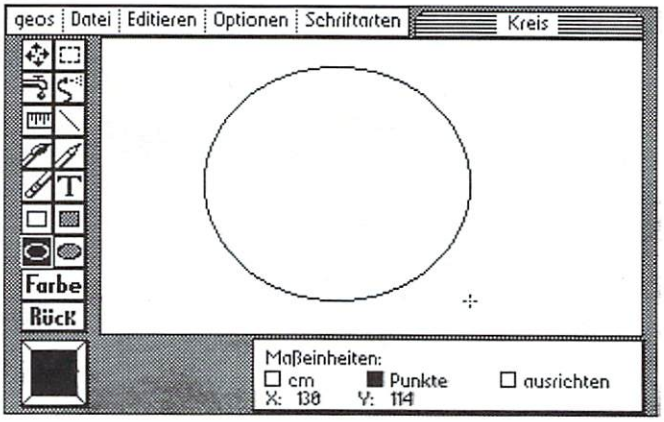
Easy overview: Menu handling with Amica Paint

manage the Koala format without a problem and introduces a compact format of its own. Several scene programmers have regularly distributed updated versions of Amica Paint, which remove smaller flaws of the original and improve its usability even further.

Later graphics programs could not challenge the giant Amica Paint, and therefore, they tried different angles instead. With "Zoomatic" by Panoramic Designs, you can - among other things - comfortably draw by keyboard, a true blessing for all those having a hard time with exact joystick acrobatics. Two different zoom modes are integrated, and you have an ideal view on all the colors you (currently) are able to use. The most important drawing functions are present, although not as many as with Amica Paint by far. "Interpaint" and "Facepainter" also present new angles. While you are able to control the latter by means of a pulldown menu, Interpaint offers a nice menu bar which is overlayed over the area of the screen currently not worked on. In addition, Interpaint can be controlled by an Amiga



Quite edgy: A circle in multicolor mode (Amica Paint)



The hi-res circle handles things more smoothly (GeoPaint)

mouse and can handle hi-res mode as well. "Color-X" by Hoogo is more likely to be a match to Amica Paint. Nearly all functions of the rival can be found there, only with the difference that Color-X executes them up to four times faster. That can save quite some time, for example, when filling a screen. In addition, there are definable clash modes. "Clashes" (tile-sized, ugly color squares) always appear when you have already used all of the three colors and the background color in a 4x8 pixels field and would like to introduce a fifth color. With Color-X, you can define what should be done in such a case.

With a little bit of dexterity, pixel miracles can also come true in the Koala format.

The Hi-res Mode

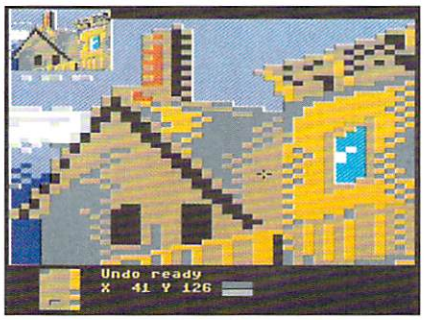
Hi-res has a resolution of 320x200 pixels, thus twice as many as multicolor mode. All 16 colors may be used but only 2 per 8x8 pixels field (foreground and background color). This enormously reduces color flexibility, of course. For instance, GEOS uses this mode for its graphical environment where a higher resolution is of more use than a large number of colors. When drawing technical graphs, there is no way to avoid hi-res as well. For hobby artists, hi-res is ideal for hardcopies with GeoPaint or Hi-Eddi, probably the two most reknown hi-res editors. In the scene, this mode is preferred for two-colored logos or graphics in demos in shades of grey or blue or black and white. In older games, like "Die Erbschaft" (Inheritance), all the graphics were done in hi-res, which can be very colorful in spite of the limited options when the color borders are cleverly used.

The graphics in the game, "Die Erbschaft", has been drawn completely in hi-res.

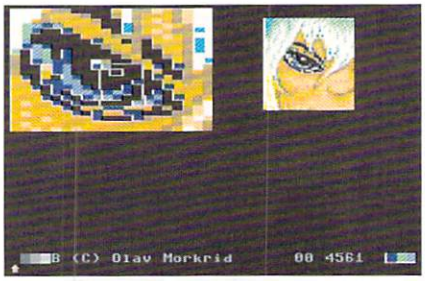
These are the graphic modes as Commodore gave them to us.

Multicolor Interlace Mode

But the scene was not content with the normal graphic status quo and developed the interlace mode. Here, hi-res resolution in the multicolor mode (!) is realized by fast switching back and forth between two graphic screens in alignment with the bitmap and with the raster beam responsible for creating the screen. Because of this, the graphic flickers a bit, something which is outweighed by the advantages. If you have trouble seeing such graphics, you can use sunglasses to diminish the flickering. In reality, this mode is mainly employed by the demo scene; commercial programs mostly



Picture inside a picture: A good overview in the zoom mode of Color-X



Two pictures, one of the two zoom modes of Zoomatic

resort to the common graphic modes. One of the few, good exceptions is the game, "Soul Crystal", whose entire intro is designed in multicolor interlace. By the way, "True Paint", an editor for this mode is free on our current coverdisk.

FLI Mode

Another development is FLI mode (Flexible Line Interpretation). In multicolor resolution, the video chip is given new color data every raster line via the raster interrupt. This means that horizontally for every eight pixels, there can be two different, freely chooseable colors plus a background color for the entire raster line, and a fourth color that can only be changed from tile (4x8 pixels block) to tile. For color flexibility, this is a true blessing, of course, and very quickly FLI has become a standard. "FLI Designer" and "FLI Profi" are two good editors; the same goes for "FLIP", which is designed to mimic Amica Paint.

IFLI

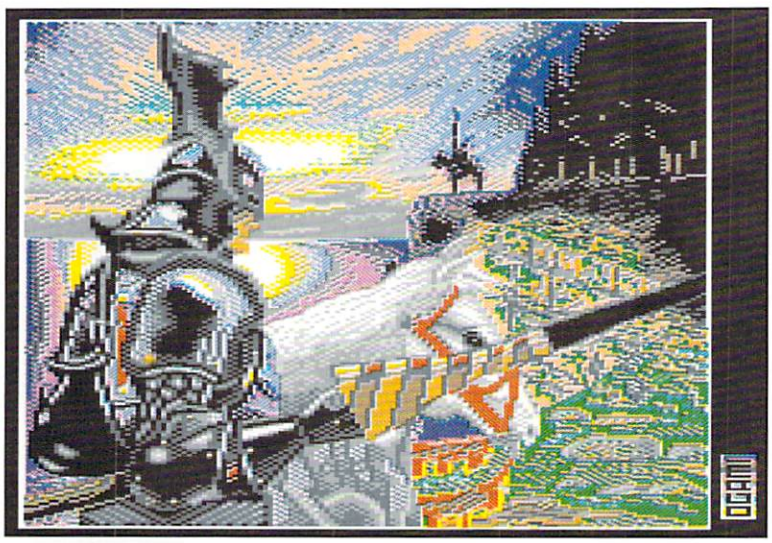
The "pinnacle" is a combination of FLI and interlace, which unites the advantages of both modes. By now, IFLI has established itself as a "modern" graphic format. Graphic competitions without IFLI pictures are nowadays unthinkable. "Gunpaint" and "Funpaint II" are the most reknown IFLI editors. Unfortunately, the editors lose out on ease-of-use, due to the amount of memory an IFLI graphic requires. Therefore, a user needs more patience and endurance in order to do some useful work with these editors.

Special Formats

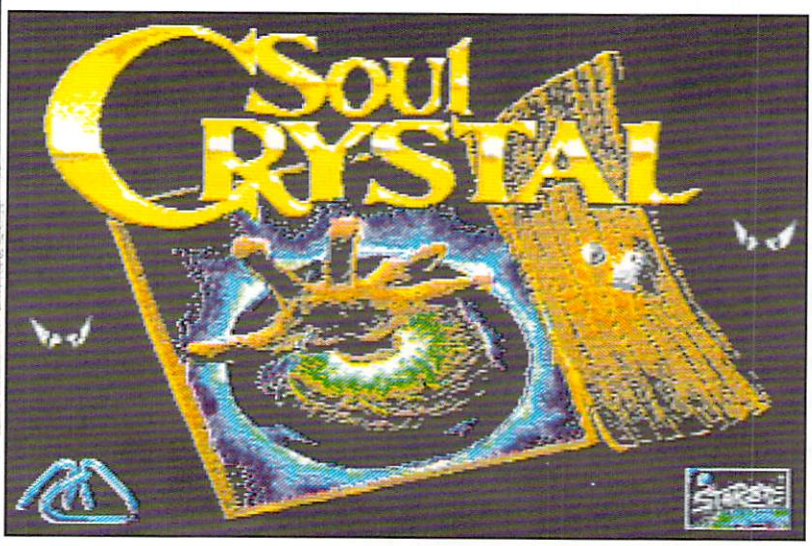
During the development of new graphic formats, some special formats were created as well, for instance, UFLI, AFLI, or as of late, the SHIF format (Super Hi-res Interlace FLI). In these extended resolutions, bigger color palettes were created with different tricks. We will go into closer detail with these special cases in a later part of the graphic course.

Theory Never Teaches How Things Work

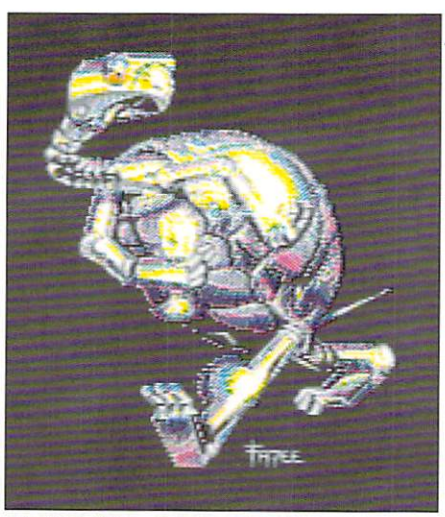
FLI graphic from Fairlight's demo, "Legoland"



After these rather theoretical basics, we will finally start to practice drawing in the next issue and try to realize a true picture project. 'Til then, it is advisable to have a look at some graphic programs. Only by doing so can you find your personal favorite, and then next time you can really get things going right away.



Soul Crystal: The entire intro in multicolor interlace



Not by Alan Parson: IFLI Robot

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HARDWARE

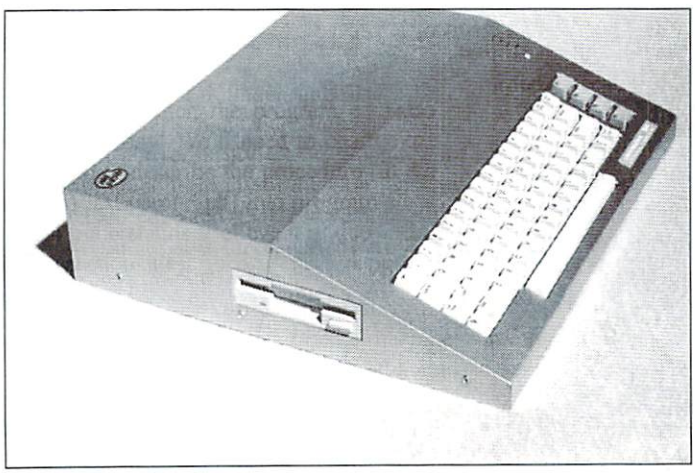
The hip flask...

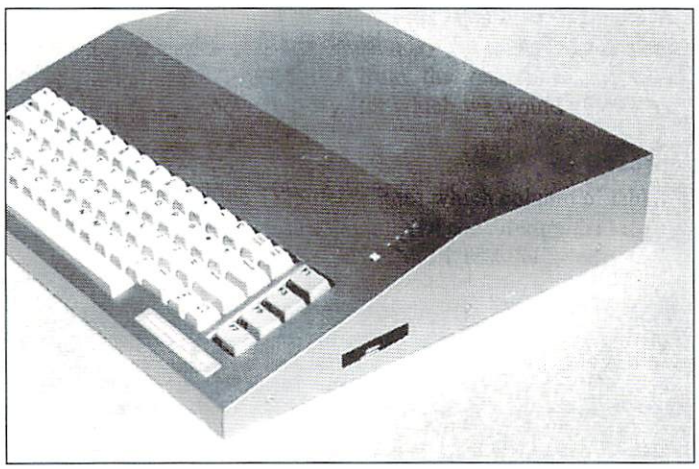
...is a commonly known kind of bottle used for liqueurs and booze, typically used by vagabonds and secret (or sinister) admirers of alcohol abuse.The most commonly used hiding-place for hip flasks is the inside of pockets. - Er... where was I? Actually, I wanted to write about a totally different matter. Ah, well, trying again...

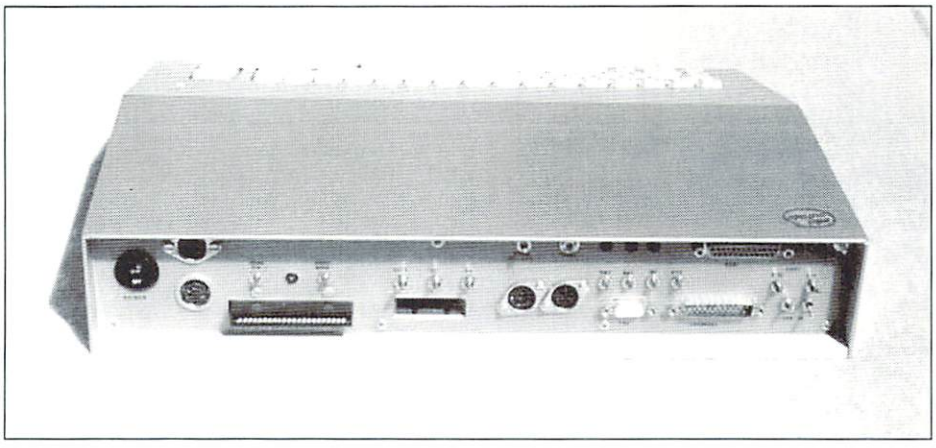
by Niko Malecki

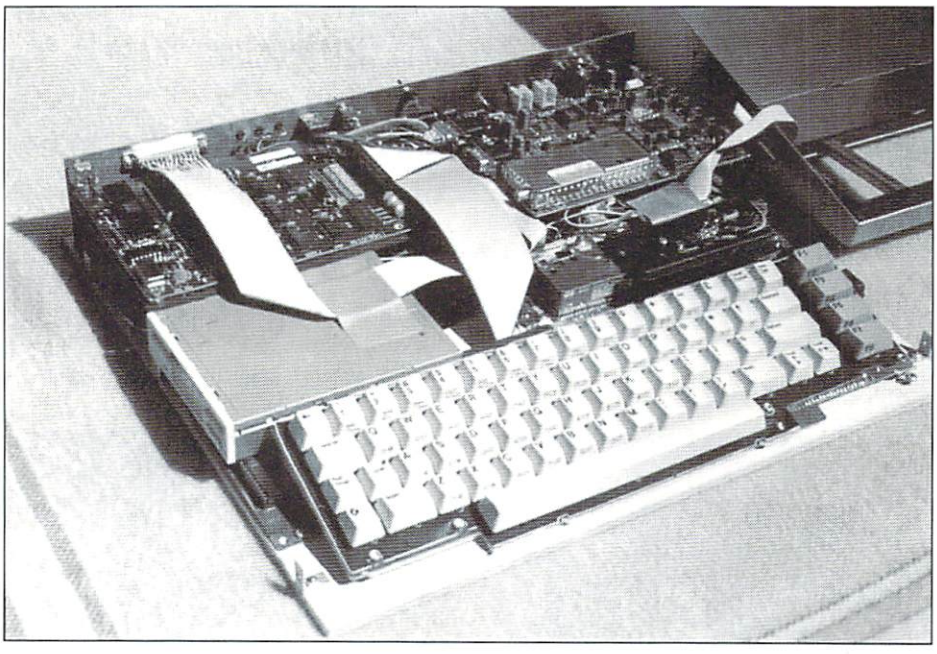
Not as flat as a flounder, and also a little bit thicker than the liqueur bottle mentioned above, is my C64 laptop, which I'm writing about. Many of the C64 fans out there have requested that I reveal the big secret (or at least a large part of it). Even though the computer is not as small as a laptop PC, it's still very compact according to our standards, and the complete machine, including the LCD flat-panel display, fits into one of a supermarket bag (see photo). That's why I like taking this computer with me when I visit a meeting: with one hand, I carry the the laptop, and with the other, a bag with different utensils like the power supply, a trackball and some software. No more than two or three disks with new stuff etc., since all other software is stored on the hard disk.

Pictures (2): Nikolaus Malecki









Picture: Günther Bauer

expensive... The VGA converter I chose was a "Pro View" by Conrad Electronic. On the upper side of the casing I've installed the 1MHz/20MHz switch for the SuperCPU, along with the most important status LEDs, so they're easily visible.

There's a variety of other switches and keys that aren't needed as frequently, therefore the whole switching board has been put to the back edge of the laptop. There we also find the different in- and outputs, like the expansion and user port, the serial port for additional floppies, the HD's SCSI port (e.g. to connect a CD ROM drive), and an A/V socket for another (normal) external monitor.

Naturally, all of this equipment needs to be powered, which requires a high-performance power supply. Here I used the universal power supply as described in issue 10/9, which powers all parts of the laptop, including the LCD monitor. The power plug of the PSU has a screw-joint with handles at the end to prevent it from accidentally slipping out of its socket.

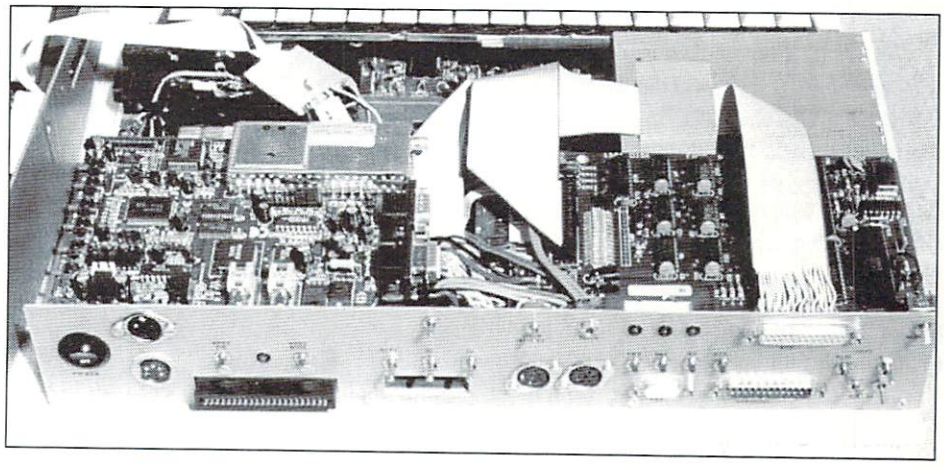
I hope you can roughly recognize how it's done from the photos, since it's impossible to give an exact description of the construction

And this leads us right to the insides - as you'd expect from a modern machine from the year 1999, this laptop contains the following components (among others):

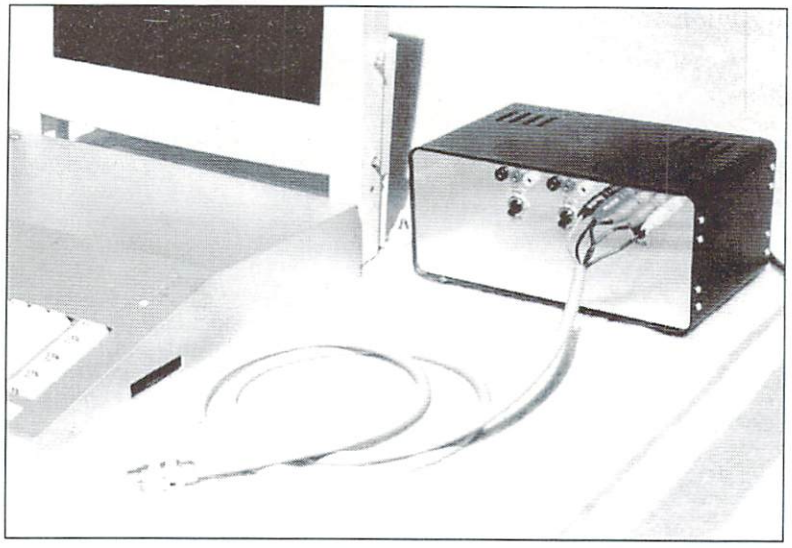
C64 II main board
CMD hard disk
CMD SuperCPU
CMD REU with 2 Megs
1581 floppy
video to VGA converter (to operate the LCD screen)

All this fits into a flat console measuring 41x36x6 cm (width, depth, height), which levels off towards the front end, where I installed an SX 64 keyboard. The components are positioned exactly to the millimeter, leading to a very packed space inside. Although this can only be guessed from the photo, everything is fit into a densely packed sandwich architecture. This arrangement doesn't make much trouble, since most of the parts are rather flat once their original housings have been removed. We just have to remove the port sockets from the controller boards of the HD and the 1581, which makes those pretty flat, too.

The converter turns the 64's video signal into a VGA signal which is accepted by most PC monitors, as well as the 15" flat panel LCD screen (a TFT-style display) I used. By the way, this is by far the most expensive part of the whole machine, it's also this part that causes the high prices of PC laptops. Ah well, if it's good and valuable, it's got to be



of a device like this, as you'll surely understand. However, everyone who's already had some hand-crafting experience will finish such a conversion without too many difficulties. At first sight, the casing looks as if it were metal, but in fact it's put together from cut epoxy boards available as raw material for printed circuit boards. These boards have a copper coating on one side, which is turned inwards, and the boards are soldered together at the adjoining edges.



After that, the self-tailored casing is covered with a metallic DCFix foil - et voila.

This ends my little report. And now, I'm curious whether my laptop will meet a "brother" on one of the next scene meetings!

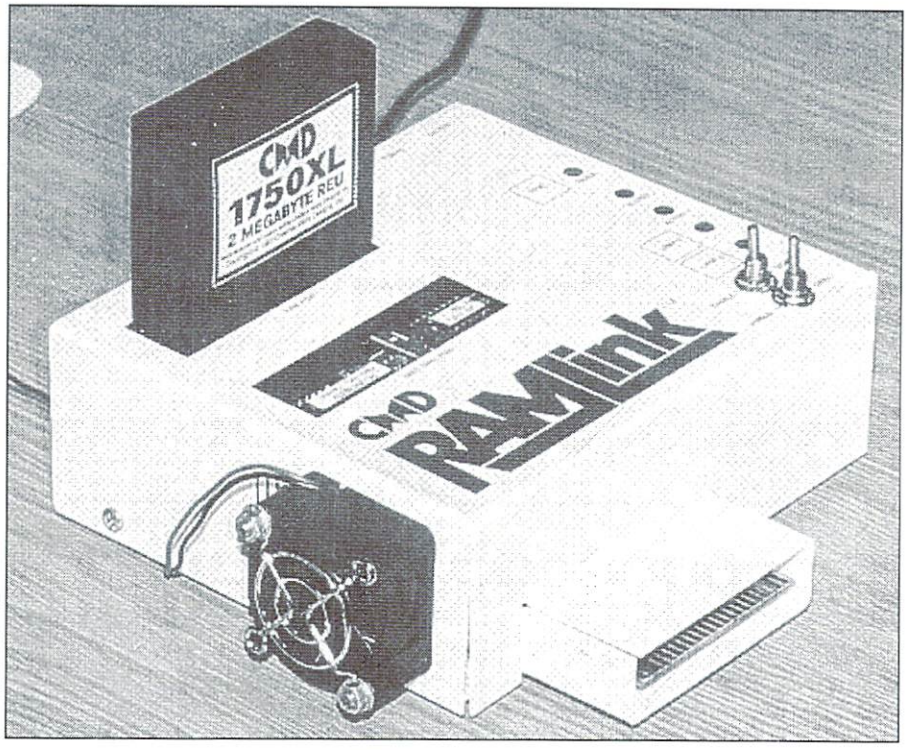
Yours, Niko

Hardware

A breeze of fresh air for your RAMLink

The latest Hack I have done is to fit a small fan onto the left hand side of my RamLink (viewed from the front) WHY! I hear you ask...

by Colin J. Thomson



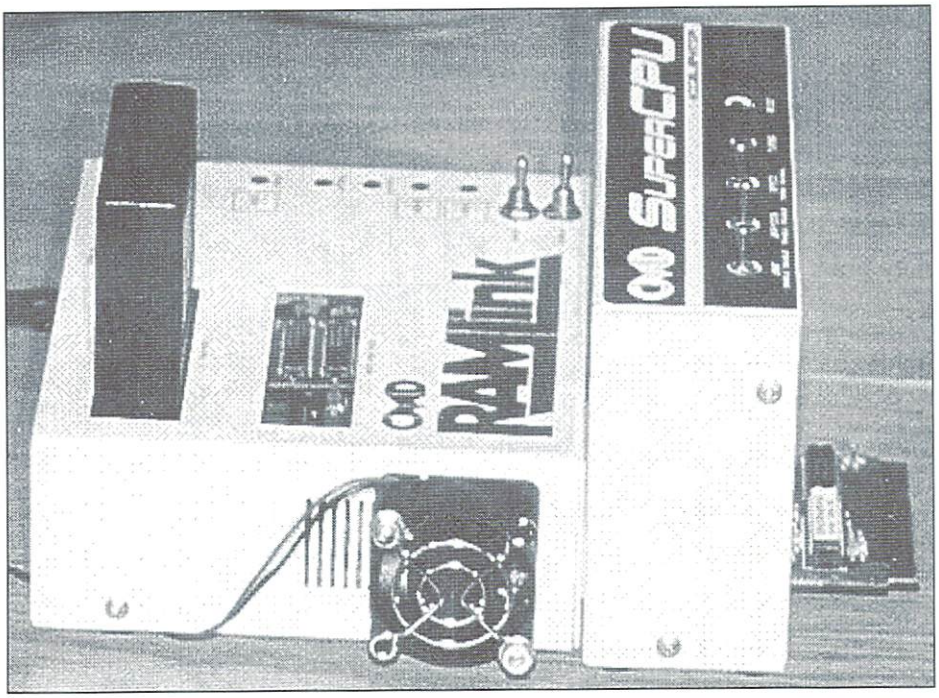
Pictures (): Colin J. Thomson

Well during these hot spells the case's (and the components inside) of my SCPU128/RamLink get really Hot! The average temp in my computer room has been around 90 degrees! As a result, my system (and those of other people I know) has started to play up. Not having air conditioning like some of our US friends, something had to be done.

I choose to fit the fan onto the RL as there is a grill there, so it was easier to cut out and this means less work. If you only have a SCPU there is plenty of room to fit a Fan to that either on the side or back of the unit and there are Hole Punches available from various places.

My plan was that enough Air Flow is also there to cool the SCPU128 as well, and it works!. You could have the option of switching it on/off when needed if you so wish.

The Fan I used was a small 40mm Axial type (like the Fan on some 128D PSU's) and its about the size of a match box, 40*40*12mm. It is fixed onto the outside of the Ramlink with 2 counter sunk bolts. I used a 12v Fan and the power for this can be taken from my HD or 1541-II PSU. I believe there is a point inside the 128 which supplies 12v which may be worth looking into. You could use a 5v Fan and take the power from the User or Cassette port if you are using a very strong PSU (only in this case!).



Remember! Backup everything First! and observe the usual Static precautions!

Ok once you have switched off your computer, removed all the Power to the RL and the Cartridges you can now unplug it from the computer and remove the lid. The lid is held on with 4 screws, basically its what you do to add some Simm's.

Once that is done you will see a Ribbon cable which connects the switches (Swap 8/9, Reset, etc.) to the Main Board. Mark this connector so you know which way it goes and unplug it.

Now you have the lid in your hand you must remove the small board with the switches on. This is held on with 3 nuts inside the lid and on the top or outside there are 2 more nuts which hold the Toggle Switches which must be removed, its all very straightforward.

Once the board is removed I would recommend that you cover the "windows" where the LED's shine through and the "swap" switches are, to keep debris off of the sticky surfaces on the backside.

I found the best place to mount the fan is the left hand side of the RL as you look at it and there is a grill there which you can use. You will have to cut out most of the grill and carefully mark out where you will have to drill the 2 holes for mounting the fan.

Counter sink the holes inside the lid so the heads of the bolts are flush (the nuts are on the outside). This way you can cut them down once the Fan and Grill is fitted before its all put back together. I found only 2 bolts are needed, placed at opposite corners of the fan.

You will have to enlarge the opening a little, after you have cut out part of the Grill with some snips. You can then file out the opening so its nearly round and this is easily done with a half round file and some care! Check if the opening is big enough and then you can fasten the fan and grill (optional) and cut down the bolts after..

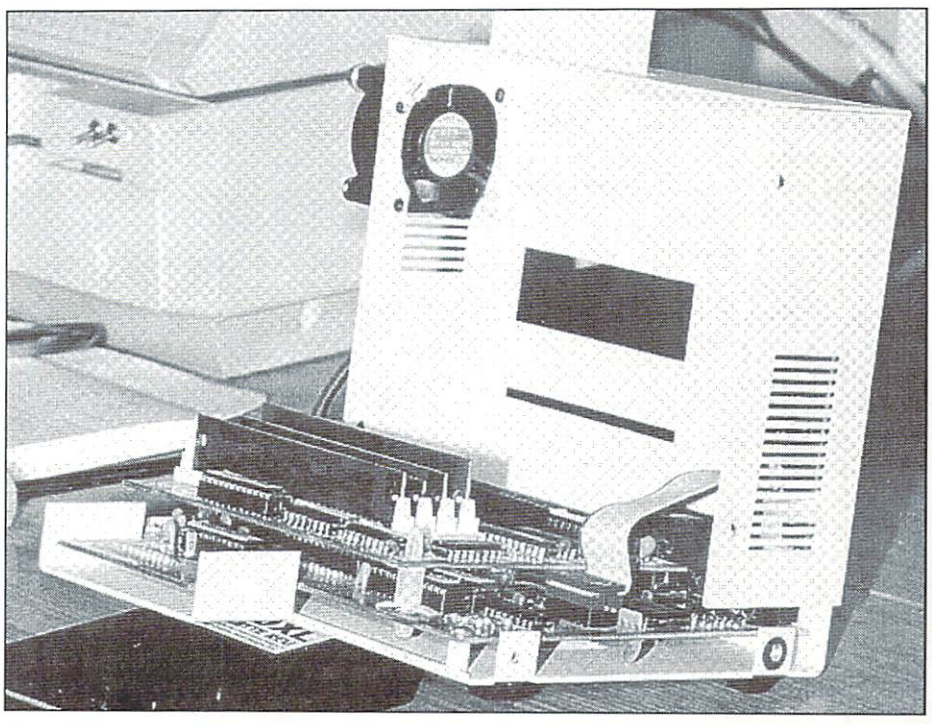
And there you have it, follow the instructions above for re-assembling it, (remember the heads of the 2 countersunk mounting bolts are inside the RL). Be very carefull not to over tighten the 3 nuts which hold the small PCB when you re-fit it. I did this and the Re-set button was locked down..panic stations when the RL did not work! but I soon found the problem. This could of course happen to the Swap Switches as well.

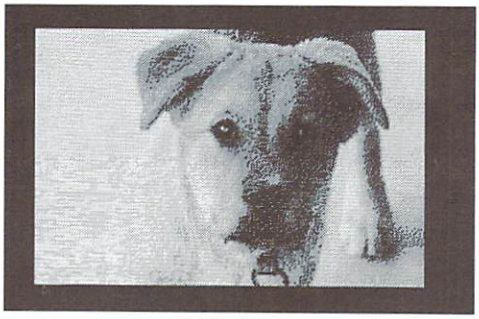
Also note that where I mounted the Fan only 3 of the 4 screws could be put back, but this is not a problem.

Now you can decide where to get the power from to run the Fan, depending on what voltage fan you have used.

Where the Fan is mounted it blows right across the Simms and enough air gets round to cool the Voltage Regulators (which always run hot) and also enough blows out of the expansion port end of the RL to blow into the SCPU and keep that cool.. and it works!

I have been running my system for a few weeks now in this Heatwave! and the cases of both units run very cool with no more problems!





JPX - Another taboo broken

A current graphic format available on PC's is the JPEG (JPG for short) format, a format which is very useful due to it's exceptional compression rates. Due to the extensive algorithms involved, many thought that a C64 version wouldn't be possible. This, of course, isn't true.

by Wolfram Sang

Stephen L. Judd and Adrian Gonzales have programmed "JPX", the JPEG picture decoder and displayer (in black and white and greyscales). The current version is still in it's early stages, and will be published to prove that it's still being developed! You can't expect more than that at the moment.

The functioning is very rudimentary, and the program can't read all JPEG's correctly. Why? JPEG is an open format, and different programs display different versions of the same picture. It takes a bit of time to create a perfect version of the program, because it is a difficult and lengthy process. The pictures which can be read at the moment can be viewed with JPX in Hires format and with JPX-LACE in Multicolor Interlace format (only greyscales are used, though). There are versions of this program specifically for the stock C64 as well as a SuperCPU-Version. If you have a floppy accelerator (JiffyDOS for example), a hard drive, or RAM-Link, the processing goes lightning fast! The first JPEG viewers for the PC were not this fast.

In the future the programmers want to deal primarily with the SCPU version, because there are certain things that are still very difficult to do with a stock machine. They'd like to make a program to convert JPEG's to GeoPaint files, as well as additional formats, and also use color in IFLI mode (examples of IFLI pictures can be found on the internet). The main goal is to make the JPEG routines more powerful and efficient. As soon as the official version is available, we'll take a closer look at it.

As for the use of the program, there's not much to say. After loading and starting, you are asked for the filename of the picture, and decoding begins. When the program is finished, press the spacebar to exit to BASIC (most of the time it works). To restart the program, just type "SYS 4096". The dog in the sample picture is Ginger ("pup.jpg").

GFX Tools

The following graphic tools from this issue's disc were kindly put at our disposal by Glenn Rune Gallefloss/ SHAPE. They are Public Domain and may freely be copied.

Fonted V3.0 - An extra-class font editor. It masters fonts in 1x1 as well as in 1x2, 2x1, 2x2, 2x3, 3x2, 4x2 and 3x3. If you want to find out the combination of the big fonts, it is best to simply load the normal C64-ROM-Charset into the editor. You get more information about the program's controls if you press the "?" within the editor. The editor is an advanced version of a program from Cellux/Faces.

Shaper 1.0 - This is a font editor, too, but specificially for 1x1 fonts. You can use it to mark whole blocks of characters and copy, invert or delete them. To load the complete original font into the editor (to modify it) you only have to press Commodore-R. Single characters can be collected from the ROM with Shift-R. More functions are explained within the editor by pressing "?".

Graphcreator 2 - This program is the last word in Sprite editors. You can use it to draw animations as well as objects composed of several sprites, which can also be animated. It is hardly possible to describe all of the functions with words: Filling sprites with patterns (patternfill), exchanging pairs of Bits (and thus the colours), symmetry and so on. You receive help if you press F5. The program was developed by DPL/SHAPE .

SOC V2.0 - Behind the term "SOC" there's hidden the principle of how the graphics prepared with the help of this editor are composed: Sprite on Char. A Hires-Sprite is placed upon a Hires-font and makes possible three-coloured background graphics in the size of the sprite (background, colour of the character, colour of the sprite). Like in a normal editor we're able to prepare a number of objects that can be used for an animation.

The homepage of the group S.H.A.P.E. (Supreme Headquarters Allied Programmers Europe) can be found at:

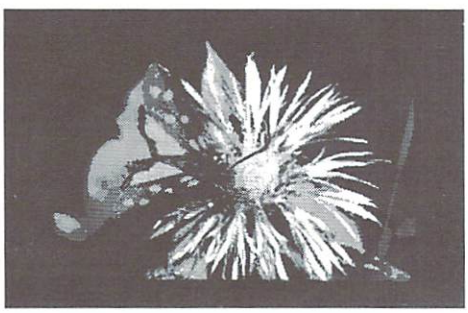
http://www.define.no/shape/

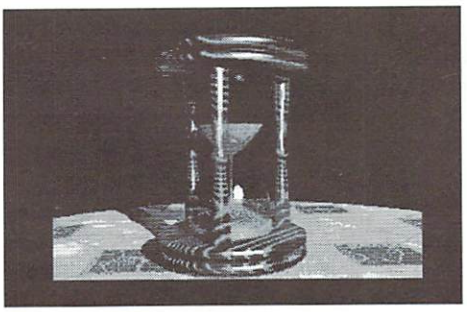
True Paint I

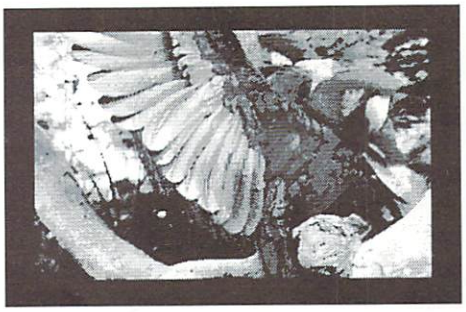
An advanced painting program for graphic artists and those who are willing to become one.

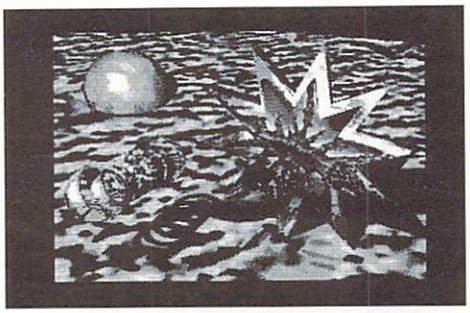
by Robert Grabowski and Wolfram Sang

There are a number of different graphics modes on the C64, each one having its own advantages and disadvantages (see main article). TruePaint uses the multicolor interlace mode. That means the pictures will









flicker a little and use more memory, but in return you will get easy handling, higher resolution and more colors. And with some exercise the flickering can be reduced by a clever utilization of similar colors. The example pictures on the disk give a good impression of the abilities of TruePaint. Using this program is rather easy and intuitive and will be explained as follows.

General functions

Use a joystick in port 2 to move the cursor and use the firebutton to set a pixel. With the cursor keys you can move around the picture more quickly. Furthermore the following keys are available:

<+/<- : Increment/Decrement color
<1..<8/SHIFT+<1..<8 : Set color
<£/SHIFT+<£ : Increment/Decrement paper color
<↑/SHIFT+<↑: Increment/Decrement cursor speed
<K : Toggle Cursor Block
<HOME : Go to upper left corner of the picture
<F2,<F4,<F6,<F8 : Set marks
<F1,<F3,<F5,<F7 : Jump to marks
<RUN/STOP : Back to previous menu

Full screen mode

In full screen mode you always see the whole picture. All operations that affect a large area are initiated here. In this mode, you can use these additional features:

<CLR : Clear picture, you have to confirm your decision
<U : Undo
SHIFT+<U: Change Undo Mode between Undo, Redo (redo undo) and off (no undo, operations are slightly faster)
<* : Change resolution of the status lines
<SPACE : Go to Zoom Editor

To select one of the drawing tools press:

<P : Points
<L : Lines
SHIFT+<L: Continuous line, exit with double fire or <←
<B : Boxes, you have to set two opposite corners
<T : Triangle
<C : Circle
<F : Fill, escape with <←

Window operations

When in full screen mode you can use these helpful functions. You have to set the window area just like drawing boxes, i.e. give two opposite corners:

SHIFT+<Q : Clear window
SHIFT+<C : Copy window, exit with <←
SHIFT+<M : Merge window
SHIFT+<X/
SHIFT+<Y : Mirror X/Y
SHIFT+<Z : Change colors in window. This is done by a small requester with the following keys:

<CRSR : Select color to be changed
<+/<- : Increment/Decrement destination color
<1..<8/
SHIFT+<1..<8: Set destination color
<F1..<F8 : Select example palettes
<RETURN : Exchange colors
<← : Escape

Zoom Editor

In the zoom editor you have a part of the picture in original size in the upper half of the screen and enlarged in the lower. So you can comfortably give your pictures the finishing touch. These functions will help you:

<SPACE : Reset Point
<* : Toggle grid
<@/SHIFT+<@: Increment/Decrement grid color
<= : Get pixel color
<C= : View picture
<← : Go to full screen editor

These operations affect a whole 8x8 pixel block:

<RETURN : Change pixel color
<R/<W : Read/Write Block
<X/<Y : Mirror X/Y
SHIFT+<X/
SHIFT+<Y : Scroll in X/Y

Disc Menu

This program uses its own fastloader, so load and save are significantly faster. In detail you

have the following options:

Directory : Shows the content of a disk
Load Picture : The following formats are accepted: Hires Bitmap, Art Studio (you have to specify a background color after loading), Advanced Art Studio, MCI packed/unpacked (its own format).
Save Picture : Picture will be saved in packed or unpacked MCI format (see under "Packer"). For more information about the structure of an unpacked picture, please refer to the chart.
View Picture : Shows a picture from disk without destroying the picture in memory.
Merge Pics : Loads a picture and merges it to the picture in memory.
Scratch File : Deletes a file using a comfortable file requester.
Command : Sends a command string (prompts for it) to the floppy drive.
Packer : Here you can select, if a picture should be saved compressed or raw/ uncompressed.
Device : Change the current disk device.
Back : Go to main menu (you can also use RUN/STOP).

Open Door System

The open door system gives you the possibility to create your own extensions for TruePaint. Your program should reside in memory from $2000 - $6000 (careful: this area is also used for buffers!) It must contain a PETSCII string "TP1" at $2000 and the executable code must start at $2003 and end with an RTS. Save your extension with a filename that is 16 characters in length an is enclosed in %-signs, e.g. "%PACKAGE1%". It will be loaded and executed right after starting TruePaint. You find an example for this on our coverdisk.

SuperCPU

Although TruePaint doesn't support the SCPU directly, it works fine with it. Of particular note are the scrolling of the zoom editor and filling areas, both of which profit from this extra power. However, you must be careful with disk operations. Before loading, saving, merging and viewing you have to go back to 1Mhz via the switch on the front panel! Also keep in mind that all optimization modes have to be turned off. Normally this is the default, but if you are not sure you can force it by typing "POKE 53374,0:POKE 53367,0:POKE
53375,0" right before starting the program. Owners of a SuperCPU V2 can even get more speed by disabling the mirroring of the zeropage. You have to accept some flaws though, e.g. the status line won't work perfectly. But if that does not bother you, try "POKE 53374,0:POKE 53427,197:POKE 53375,0:", again right before starting TruePaint. For more information about optimization modes please refer to issues #6 and #7/99 of GO64!'s SuperCPU corner and of course the instruction manual of your SCPU.

And that is all, I hope you enjoy this program and create tremendous graphics with it. We of GO64! would be highly pleased to see demonstrations of your skills or perhaps extensions using the open door system. Finally I want to mention the programmer's postcard wish. If you like the program, why not send him a nice postcard of your region, he will be happy about it. The address is given inside the program, check "About".

"Structure of an unpacked MCI picture"

Start address may be $1C00 or $9C00 depending on the editor. Relative to that are:

$0000 - $03E8: Screen-RAM 1
$03E8 : Background color
$0400 - $2340: Bitmap 1
$2400 - $4340: Bitmap 2
$4400 - $47E8: Screen-RAM 2
$4800 - $4BE8: Color-RAM

TruePaint sometimes stores some internal data in the area between $2340 - $2400, just ignore that. All other bytes are unused and may be cleared.

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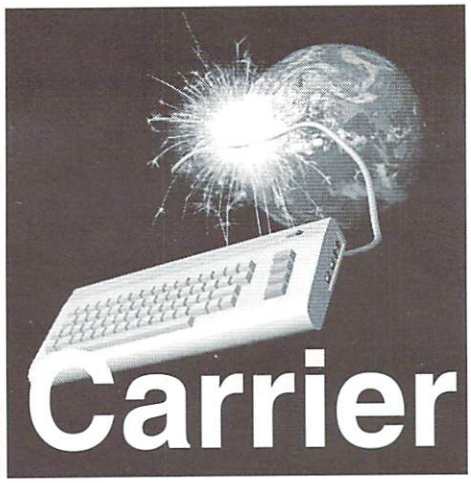


Picture: Sebastian Bach

CarrierDetect

by Gaelyne R. Gasson

Instant Messaging

The Internet is full of ways to communicate with people. For instance, you can communicate with lots of people by having a web page. Email is great for sending messages whether a person is online or not, but it's not usually very instant, as even when two people are online at the same time Email between them can be delayed by mail servers in between them. IRC (Internet Relay Chat) can be used as it allows conversations in "real time", but it can sometimes seem very daunting to use and not always easy to find a common meeting "channel" for conversing with others.

ICQ is a personal means of communication that allows you to have individual conversations. It was designed (for Windows and Mac users) to be used whenever online. When others who also use the utility get online, it shows their online status. This way, you'd know Uncle Bob is online even when you may be thousands of miles away. And of course you can have a nice chat with him and find out how the family is, share recipes, commiserate about the weather and have any other type conversation you'd have with him, except that you'd be typing your responses rather than speaking.

The ability to have quick one-to-one conversations is very useful. My brother-in-law used it recently to let us know he and his family arrived home (in another state) safely after visiting us. Another relative uses it to check if we're home before popping in for a visit. If I have a quick question to ask someone and I know they have ICQ, I'll usually ask while they're online rather than asking in Email and plowing through a mountain of junk mail before finding their response.

How can we use ICQ? If you have a shell account, you too can make use of it and use it as a means of contact when you're online. There are quite a few Unix based ICQ clones, but the majority are for those using Xwindows (a graphical interface similar to Wheels or GEOS). One of the best text based programs is called "Micq" for 'Matt's ICQ Clone'. It has the majority of useful features found in Mirabilis' ICQ program and it should compile on nearly any Unix or Win32 platform. You may find Micq already installed on your ISP. To see if it's online, from the command line, type: 'which micq'. If you get a response similar to "/usr/local/bin/micq" appears, you're in luck. If it doesn't, you can ask your system administrator to install it, or because it is a very basic program, you may be able to compile and install it in your home directory for your personal use. The current version can be downloaded from

ftp://micq.chatzone.org/pub/micq/
(ad)

To install yourself, Micq can be found at: or give the information to your system administrator and ask them to install it on the system for you.

ICQ related Acronyms:

icq	Pronounced 'I Seek You'. Some people refer to messages as "icq's".
msg	Message
uin	Universal Internet Number (or User ID Number)
nick	User Nick name
na	Not Available
occ	Occupied
ffc	Free for Chat
inv	Invisible
online	online (you can only receive msgs if online)
away	Away from the keyboard
auth	Authorise a user to contact you
url	Universal Resource Locator (geek for Web page address)

Help Commands:

help	Get a list of help topics (client, message, user account)
help client	Lists micq related commands such as quit, or clear screen.
help message	Commands relating to sending ICQ messages.
help user	Commands such as adding, authorising or ignoring users.
help account	Commands for your ICQ account, password, and basic information.

Password Commands:

pass <text>	Changes your password.
reg <password>	Creates a new UIN with the given password.

User Commands:

search <Emailadresse>	sSearch for an ICQ user with the given address.
update	Prompts you for information such as your real name and Email address.
add <uin>	Add's user to your contact list.
auth <uin>	Authorise user to contact you.
w	Displays current status of everyone in contact list.
e	Displays status of everyone in your list that's online.
info <uin>	Displays general information about the user.
togig <nick>	Toggles ignore status for the nick name specified.
i	Lists ignored users.
togvis <nick>	Toggles whether the user can see you as online or not.

Status Commands:

change	Lists numbers for ICQ status (online, away, invisible, etc)
change #	Changes status to the number specified (# represents a number).
Online	Online
away	Away (useful when you go grab a coffee)
na	Not Available
occ	Occupied
dnd	Do Not Disturb
ffc	Free For Chat
inv	Invisible

Client Commands:

clear	Clears the screen.
auto	Shows your auto reply status
auto <on/off>	Toggles auto reply status on or off.
auto <status> <msg>	Sets auto reply message sent for that particular status.
Example:	auto dnd Please, I'm trying to get some work done.
q	Quits program.
quit	Quits program.

Message Commands:

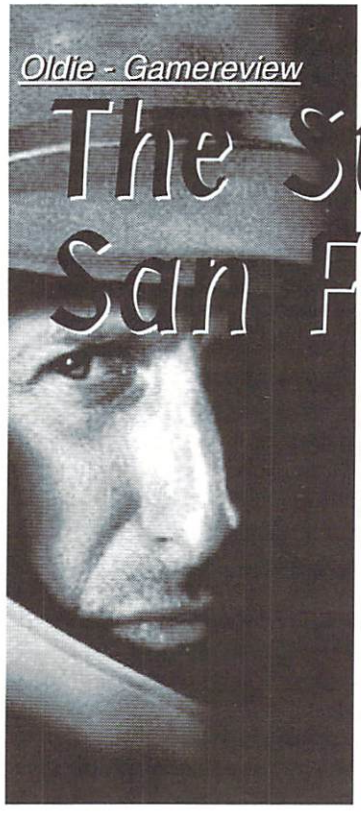
Note 'UIN' and 'NICKNAME' are inter-changeable with these commands.

msg nick/msg	Send a message to the user specified.
Example:	msg Gaelyne/Hi what's new?
r msg	Reply to the last message you've received.
a msg	Sends a new msg to the last person that send you a msg.
msga	Sends a msg to everyone in your contact list. (But don't, it's annoying).

Multi-line Message mode:

This lets you send a message that's more than one line long and is preferable for conversations.

msg <nick> <return>	Starts Multi-line mode.
.	A "." on a line by itself sends the message.
#	A "#" on a line by itself cancels the message.
Example:	msg Gaelyne
	msg> This is the message I'm sending you.
	msg> Pretty neat, huh?
	msg> .



Oldie - Gamereview

The Streets of San Francisco...

TEX MURPHY

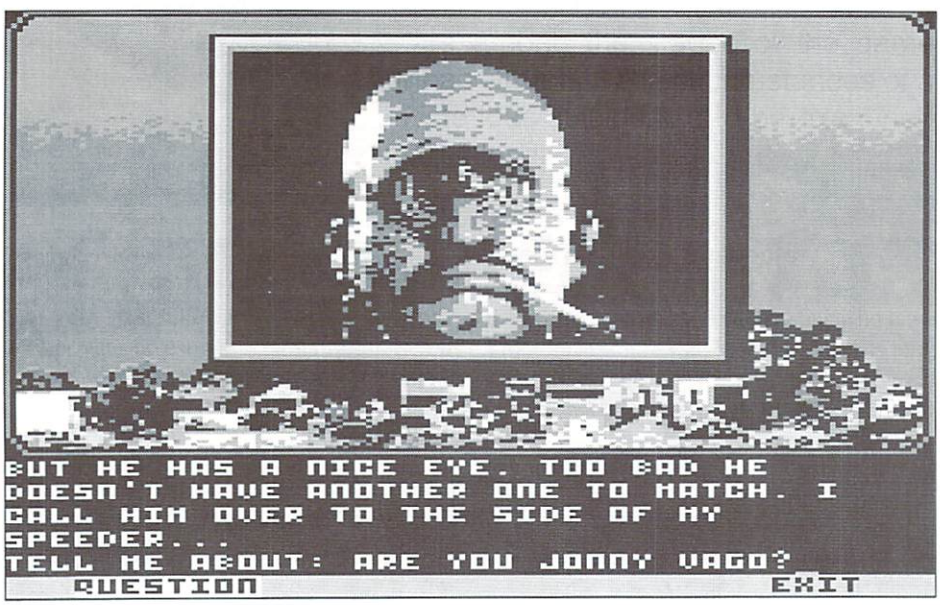
...are among the stages of the game "Mean Streets". The circumstances of a mysterious suicide are to be examined more closely.

by Volker Rust

A day just like any day: Tex Murphy, private investigator in San Francisco of the year 2033, waits for new assignments in his office, when suddenly the attractive Sylvia Linsky enters his detective agency. Miss Linsky's father, a reknowned university professor and researcher has, according to the police, jumped from the Golden Gate Bridge a few days ago. But Sylvia can't accept her father's so-called suicide and hires Tex to investigate this mysterious death.

Suspects upon Suspects

Early on, you meet several persons who have a motive for murdering Carl Linsky: His long standing partner Delores Lightbody, a real virago, who could have done it out of jealousy (he was deeply involved with a far younger woman, Sandra Larsen). A fellow scientist is also suspected, with his possible motive driven by a deep hate for Linsky after a long-gone love affair. Other suspects include student Blaze Wiener, whose bad grades given by professor Linsky could be a trigger for the capital crime. And last, but not least, Sylvia Linsky also has a convincing motive: just a few months ago, her father had effected a life insurance policy, to be paid to her upon his death.



Ron "Oneeye" Meat has the complete perspective

Integrated Flight Simulation

"Mean Streets" offers the players a quite broad spectrum of activities: with his Lotus Speeder, a kind of flying compact car, Tex comfortably moves from place to place. You may either steer it yourself, or, in order to be able to consider things, activate the auto pilot. You see the flight scenes from the cockpit in 3d graphics, a feature rather uncommon for an adventure. From the speeder, Tex can also contact his beautiful secretary Vanessa by videophone, who can do research for him. The same goes for his informant Lee Chin, only that she wants to see cash for her services right away. The two ladies' faces are animated in detail, and are displayed nearly lip synchronously on the telephone's screen, giving this sequence a high authenticity.

And if you don't talk, I'll have to use force!

When the Speeder reaches its destination, you can talk with people there who seem to be involved in the case, and by doing so collect valuable information. This way you keep learning locations and addresses, and possibly new suspects, which you should write down right away, there being some 30 persons and 20 further places as destinations the speeder may visit. While we are at it, writing down information of any kind is really advisable, because this gives you one or more passwords for the computer terminals, for example. Should the conversation with someone be hitting a dead end, you can try to bribe your opposition, or threaten him with violence, which may unfortunately also lead to a counter strike. Here, caution is adviseable, and saving your game position is also a smart idea.

Action and Suspense

At some locations, Tex gets into shoot-outs, which can lead to a fatality, and end the game very quickly. But don't worry: Access has also considered the pure adventure gamers here, who would rather evade action sequences, the shoot-outs' difficulty can be set by the player himself in main menu. The game offers the highest suspense, when you can enter rooms directly. Here you control Tex on the screen personally and may turn the room completely upside down. The controls are based on the Lucasfilm-adventures' SCUM system, although there isn't quite as

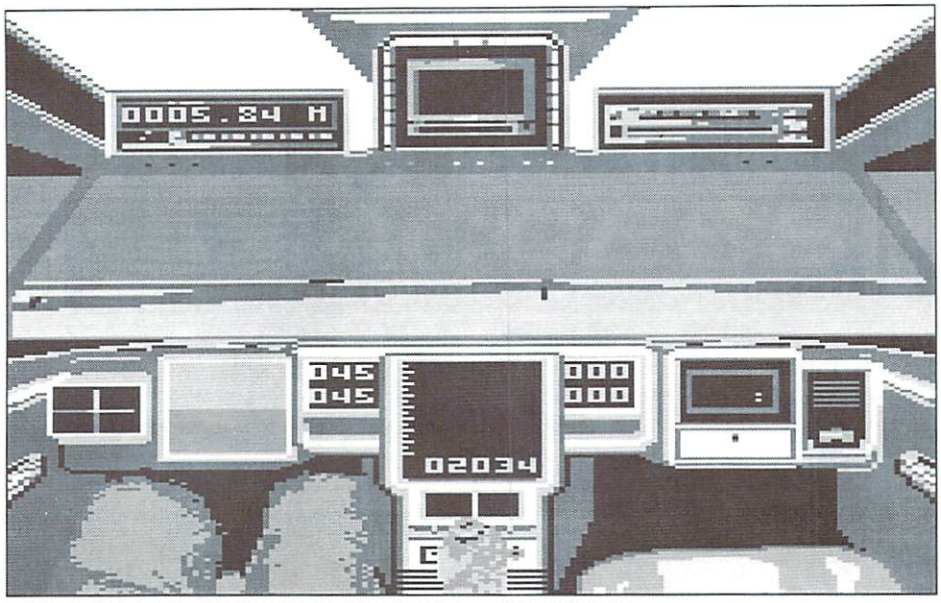
Has Linsky deliberately jumped off the Golden Gate Bridge?

Tex Murphy: No Dayfly

Only on the C64, "Mean Streets" stayed a one-shot affair: on PC, the adventures of Tex Murphy have already had several sequals (see the following list). While doing this, Access Software has been able to set new standards with new technical highlights time after time. Quite interesting also, is the fact that different characters from "Mean Streets" reappear in the later games, having special relations to the hero then. More information about these games can be found on the internet on the company homepage at
http://www.unofficialtexmurphy.com

Martian Memorandum (1992?)
Under a Killing Moon (1994)
The Pandora Directive (1996)
Tex Murphy: Overseer (1998)

Oddity: "Under a Killing Moon" and "The Pandora Directive" have also been published as detective novels. The book "Polarity", announced for a release in spring 2000, is rumored to be the basis of another Tex Murphy adventure.

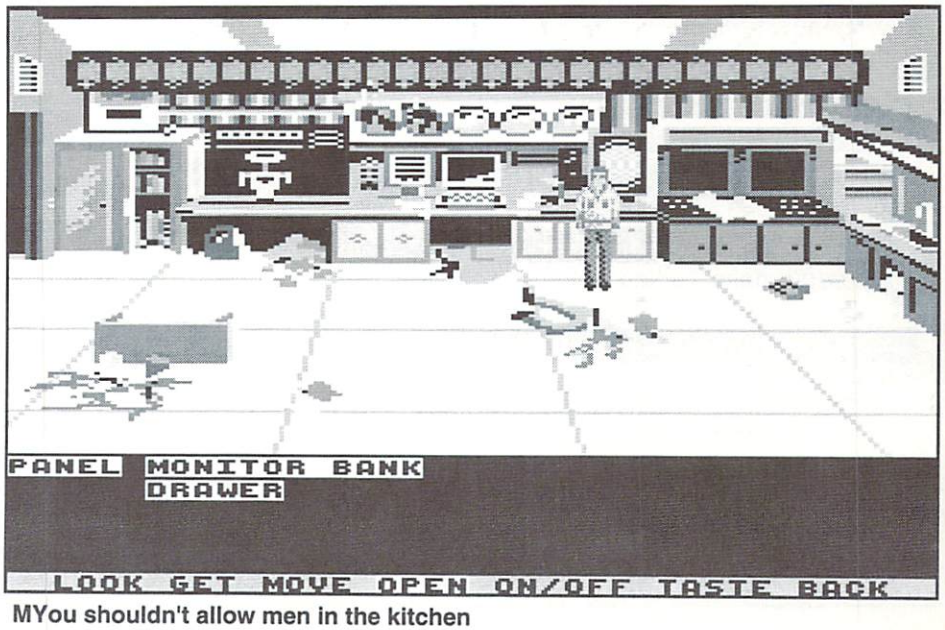


Anno 2033: the mode of transport, that's a bit different

much freedom of movement. But you should still be wary: sometimes traps are installed in the rooms, which may very easily turn out to be death traps. Some objects in the rooms are secured and will trigger an alarm when manipulated, which will cause the doors to be automatically locked. In such cases, a display appears, showing the time until the police arrive. The player has no choice but to hastily look for a way out - otherwise he, and not the criminal, will end up in jail.

Story and Realization

This eye-for-detail detective story is based on classic elements, and quickly enchants the player. Illogical situations are looked for in vain, and of course there are many well-done humorous incidents (in 'Star Trek' style) which are not obstructive for the slowly growing suspense. Alas, the graphics can't live up to those high standards: Although they weren't misers about pictures, a large number of pictures have been converted. Since the pictures were refined only when it was most urgently needed, the graphical design unfortunately sinks down to mediocre



MYou shouldn't allow men in the kitchen

In Lola Lovetoy's neighborhood, money is also made this way

and rarely shows off the C64's capabilities. On the musical side, you can't expect any sensation either: in addition to the title song well suited for the game, only some sound effects are to be heard, which mainly serve as supporting effects. The controls are a bit too unexact at some places, especially when searching the rooms.

Delays

Alas, the built-in fast loader seems to be quite sensative, which means you should test your disk drive's compatibility first. If you deactivate it, extremely long pauses are experienced, which are just as adversive to the game flow, as is the frequent disk-swapping. Those who can't resort to a cartridge fast loader, should at least set up a coffee machine next to their computer. Something similar is also the rule for the longer flights with the speeder: here you may also spend those few minutes doing something else.

Summary

In spite of the technical flaws, "Mean Streets" is a fascinating detective adventure, whose style is unique on the c64. Access Software has not just simply resorted to a well-proven concept, but has rather dared to mix genres whose parts fit together quite well, despite the differences between them. The difficulty is appropriate, the riddles are not too tough and are also suitable for beginners. The introduction in the manual should also be mentioned, as it answers many important questions and neatly fits into the atmosphere. For Non-Engish users, at least a medium proficiency in English is a must, to realaly enjoy the game. Therefore, "Mean Streets" can be recommended to passionate adventure gamers and beginners interested in this field. The game promises many hours of enjoyment.

Product Name:	Mean Streets
Producer	Access Software Inc.
Year of Publication:	1990
Genre	Adventure
Language:	English
Test configuration:	C64 C, 1541 II, Action Replay MK5 Pro, Competition Pro
Version tested:	PAL

Minus ...

- graphics converted and only moderately fixed for the most part
- sensative fast load
- frequent disk swapping
- controls too unprecise sometimes

... and Plusses

- classic detective story with atmosphere
- manifold, comprehensive possibilities for action with considerable freedom of action
- solid linking between different game elements
- high tension: By investigating, you keep finding bits of new information
- surprising, funny interludes
- graphics have been designed generously: all persons with different facial expressions, many background designs and locations
- well-done manual

100 — **79%** — 0

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Shatter the 1 MHz Barrier

SuperCPU

20 MHz Accelerators for the Commodore 64 & 128

- Breathes New Life into your Commodore 64 or 128
- Increases System Performance by up to 22 Times
- Makes Sluggish Old Programs Quick and Useful

Take Your Commodore Into The Next Millenium!

Programs will suddenly spring to life, screens and menus pop up instantly, scrolling becomes fluid, and graphics fly. A Commodore equipped with a SuperCPU is like having a Volkswagon with a V-8. There's one small difference: the SuperCPU rides much smoother. And while the SuperCPU provides your computer with a radical increase in horsepower (up to 22 times faster), its operating system makes that power easy to use by maintaining compatibility with most existing programs and by making itself virtually transparent to the user and the computer.

Looking to the future, the powerful 65816 microprocessor gives programmers vast new resources to create powerful and sophisticated software. With its 16-bit registers, up to 16 Megabytes of system memory and an enhanced instruction set based on the 6502 core, the SuperCPU makes it easy to enhance existing software while providing the muscle needed to create a whole new generation of Commodore programs integrating more extensive graphics, sound and animation.

To get the most from your existing programs and to get ready for the future with just one puchase, get a SuperCPU. You'll wonder why you waited this long!

SuperCPU 64 $179.00*
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Features:

- High-speed microprocessor, 128K or 256K of fast RAM, advanced hardware logic, and up to 512K ROM enable you to run all types of existing commercial software at speeds up to 22 times faster than stock machines.
- BASIC programs, including most Bulletin Board Systems, seem to run as fast as machine language, and compiled BASIC programs run faster than ever!
- Commercial machine language programs (databases, spreadsheets, word processors, telecommunications, graphics, etc.) run so fast that you'll think you're running them on a completely different computer!
- GEOS comes alive—No typing or scrolling delays, graphic operations happen instantly, plus faster printing and disk access! Includes an enhanced GEOS setup utility!
- Easy-to-use: Plug it into your cartridge port** and start working—no special adjustments needed.
- Built-in JiffyDOS Kernal boosts disk access speed up to 15 times faster with JiffyDOS-equipped drives.
- Pass-thru port provides compatibility with RAMLink, SwiftLink, Turbo-23 2, REUs and other cartridges.
- Unit Enable/Disable, JiffyDOS On/Off, Normal/Turbo, and Reset switches make using the SuperCPU a snap!

**Additional MMU SuperAdapter installation required for 128 version.

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