



Tech 2000

Commodore
scene
C64 - C128 - C64 EMULATORS

It doesn't get any better
than this for your
Commodore

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CSTech2000

DISK CONTENTS

BACK UP YOUR DISKS PRIOR TO USING THEM

DISK 1 / Side 1 - 5.25" Commodore disk

ModPlay64
LYNX
LYNX 3
ZIP Utilities
File Master
CMD Directory Editor

DISK 1 / Side 2 - 5.25" Commodore disk

Directory Editor
Wraptor
Wraptor 3
Unzip 64
Unzip 128
Head Alignment
Performance Test
SuperCPU Backup
Byteboiler Cruncher
Jamaica Monitor 3
El Cheapo Assembler
Leemon Monitor

DISK 2 / Side 1 - 5.25" Commodore disk

Juddpeg for C64 only
Juddpeg for SuperCPU

(The following files are JPG images that you can view using the above JPEG viewers)

pup.jpg, maurice2, cs, sjudd--1 & babybob

DISK 2 / Side 2 - 5.25" Commodore/GEOS disk

Calculator
Toolbox 64
Input Drivers
Dashboard 64
Dashboard 128
GEOconvert 98
Finder

DISK 3 - 3.5" Commodore disk

All the above files from the first two disks are on this single 3.5" disk. PLUS - these additional JPEG images for you to look at and enjoy with the JPEG viewer !

jb-cc--1, 2025, filth03, sidebob-1

DISK 4 - 3.5" PC 1.44Mb HD disk

El Cheapo Document
Jammon 3 Document
Pkunzip
Star Commander (early version)
Star Commander
Teledisk

SEE PAGES 66 & 67 FOR FULL PROGRAM DETAILS

CREDITS

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Technical help & articles Colin J Thompson

Further thanks are hereby given to all those other authors who's names appear along side their respective work within this special issue. Full credit is given to them for their insight and knowledge in this great world that is Commodore. **We thank you all.**

MATERIAL SOURCES

Commodore Scene (UK)
Creative Micro Designs (USA)
Commodore World (USA)
geoClub (UK)

CREATIVE MICRO DESIGNS

Without a shadow of a doubt, Creative Micro Designs are the last, best hope for the future of the Commodore 64 and 128. Without their support over the last few years the Commodore would have been condemned to history forever. Thankyou.

Technical
EXPERT
Knowledge

DO NOT even think about trying this procedure if you are in any doubts about your ability what-so-ever !

Technical
DIFFICULT
Knowledge

This is difficult but if you are fairly competent with a soldering iron then this procedure should not cause you any concern.

Technical
MODERATE
Knowledge

Most people could complete this operation and it requires little or no technical knowledge at all. If in doubt - don't do it !

Technical
EASY
Knowledge

Everybody should be able to do this ! Very basic (or no) DIY skills are needed and this type of procedure should be easy to complete. This article may even be just a text article

ON THE COVER DISK !

There is a program on the cover-disk that relates to this article.

Well, it's here at last !

After many failed deadlines, head scratching, organising, updating articles and also having to completely redo over three quarters of this issue (twice), it has eventually made it into your sweaty palms. So please, put the kettle on, make yourself a nice cup of tea, sit back, relax and enjoy this special edition from Commodore Scene.

What you have here is a piece of Commodore history. At the time of writing this text there have been only 22 orders for it, that means that I will be printing 25 at most. So what you have in your hands is a very rare and yet very important publication, treasure it.

Throughout Commodore's long life many things have changed and many innovations have been made. Also, with the passage of time, many very good articles have been written in various publications. More recently there has been a vast surge in the amount of highly technical articles written by third party authors and I thought that it was about time to reprint and group some of the more relevant articles together to form this special edition. With hindsight, had I known what I was letting myself in for with the vast scope of this issue then I don't think that I would have bothered ! But we are here now and that is the main thing.

Within this issue you will find many technical articles about most aspects of the Commodore. Many of the articles are reprints from earlier issues of Commodore Scene which have been updated, some are copies of articles from other Commodore publications and some are brand new articles completely. I make no secret of the fact that some articles are reprints and I feel quite justified in doing so as nearly everybody who has ordered this issue will never have seen over 90% of this issue in any shape or form what-so-ever. Indeed, only a handful of people were ever lucky enough to receive CMD's Commodore World when it was still going, geoCLUB (UK) and even early issues of Commodore Scene. Where an article is not original to Commodore Scene then an acknowledgment has been made to the original source.

Some of the articles may well have prices or \$'s stated with the parts* named, some may even offer services and the like. In such instances where it was not possible to remove such information then I would suggest that you pay no heed to that particular information as it will probably be void. Another aspect of these articles is that they have (where possible) been left in their original format. This serves two purposes, (1) it gives you a unique insight into the authors original article and (2) it also lets you sift out the information that you may need and could not find in another article. A classic example of this is with the X1541 cable articles. There are several X1541 articles in this issue and some are similar. What I hoped to achieve by keeping them in their entirety is that you can cross reference the articles so as to gain the best information possible on any given topic.



Many articles in that I wanted to include in here unfortunately did not make it, this was due to many reasons - not enough text, not enough pictures, not enough space, irrelevant text, irrelevant pictures, etc. Some articles didn't even make any sense when I re-read them so they had to be pulled out all together. I hope the ones that are left help you out in some small way, even if there is 'one' article that helps you then it will have all been worth while.

A word of warning to you all. Some of the articles in this issue detail very complicated and intricate procedures that will mean you opening up and taking a soldering iron to your computer or peripherals. **You do this at your own risk.**

I, nor Commodore Scene, nor any of the authors will take no responsibility if it all goes wrong. If you follow any of the procedures in this issue then you on your own head be it ! If you don't feel confident - **then don't do it !**

I can not stress this point enough, so be very careful about what you attempt.

So please enjoy this issue, I know that it took a while to arrive but believe me when I say that it was harder to compile it than it is for you to read it !

Don't forget that Commodore Scene is the UK's premier magazine for the C64, C128 and emulators. Full details can be found at the web site or from the editorial address.

<http://www.commodorescene.org.uk/>

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* Up to date prices on components, parts and full products are carried in the current issue of Commodore Scene.

128D Modification to 128D/81

**Technical
DIFFICULT
knowledge**

Go on, you know you want it !

The 128D computer (European plastic version) that we are familiar with in the UK, differs quite a lot from the one produced for the USA. The USA version came with the disk drive controller board incorporated within the main board. Whereas the UK version is a 128 board with a piggy back control board. Although the 1571 is a very good drive, the 71 drive board in the 128D is a cost cutter and not as reliable as the original 71 board. Hence my decision to remove it and fit a 1581 in its place. Mine has now been installed for over a month and working fine with no problems. If you decide to follow my rantings and attempt this mod yourself, then I will accept no liability if things go wrong and you vapourise your 128D. I tried it and it worked for me.

WORKSPACE

Give yourself plenty of room for working.

TOOLS

Various screwdrivers,
side cutters or pliers,
soldering iron,
voltmeter (highly recommended),
wire stripper (optional),
junior and standard hacksaw blades,
a good file (various - optional),
128 programmers reference guide (recommended),
tinsnips,
wire strippers.

COMPONENTS

2 x single pole switches (optional),
data transmitting cable (optional for device switches),
mains wire - (I used some old wire from a table lamp),
7 pin female connector
- (6 pin will also work—preferably with cable attached),
normal disk drive serial cable,
4 pin female connector
- (if no connectors available the originals can be used),
34 way ribbon cable
- (this is a must have-to replace original).

128D

Remove all cables connected to the 128D, remove 4 x screws holding the top and bottom halves together, separate

the two halves and remove the main power supply connection from the top half of the cover, (2 x screws). Place top half out of harms reach. You will now see the inner workings of your computer. Disconnect the following cables, POWER ON (left side of the main power supply), 71 DRIVE LIGHT (centre of computer), MAIN POWER to 71 DRIVE BOARD (near drive light plug), all plugs from the DISK DRIVE to the CONTROLLER BOARD, INTERNAL 7 PIN serial connector. You can now remove the disk drive controller board, 2 x screws (the board will have to be moved towards the on off switch to free it from the support bracket). If you have fitted device switches or they have been fitted, remove them. Put the controller board out of harms reach. Remove the latching arm from the disk drive (a gentle leverage with a screwdriver will remove it). Now remove all the screws holding the disk drive in place, place drive to one side, the base plate will be needed later on. Remove the 3 screws holding the front cover to the computer (the cover with the Commodore logo on). That is the first stage completed.

1581 DRIVE

Remove the 2 screws holding the top and bottom halves together. Remove the screw from the POWER and DRIVE LIGHTS and remove from the front cover. If device switches have been fitted, remove them also. Before removing the disk drive mechanism, notice where the ribbon cable comes through the metal cover, this end bit of the metal cover has to be cut off later, it is no longer needed. Remove the RIBBON CABLE and MAIN POWER connectors from the drive mechanism, remove the screws securing the drive, remove the drive, remove the screws securing the CONTROLLER BOARD to the bottom half of the casing, store until needed or leave in position until needed.

128D FRONT COVER—81 FRONT COVER

Please proceed with EXTREME CARE with this part, you only get one chance. The 71 drive slot in the 128D is identical to the length of the 81 front cover. Place the 81 cover over the 71 drive slot, leaving about 1/4" gap from the top of the 128D and draw around the 81 front cover. You now have a template to work to, I used 2 broken hacksaw blades to cut out the opening for the 81 cover, leaving about 1/8" around the mark. I then SLOWLY filed out the opening until the 81 cover fitted with a gentle tap, (place on a flat piece of nections. You can now check how much ribbon cable you require, about 8" to 10" should be enough to replace the

wood to get a nice flush finish with the 128 cover). Once satisfied, I then removed the 81 cover, and superglued and refitted..

81 DRIVE MECHANISM FITTING

Remove the original 71 drive from the main baseplate that held it to the 128D, 4 x screws. Refit the baseplate where it came from, securing with 2 x screws. Next refit the 128D front cover in the correct position and again use the original screws to temporary fix in position. Remove the 81 fixing plate and cut off the end as previously mentioned using tin snips or a hacksaw. Refit 81 mechanism and secure when done.

Next fit the 81 mechanism on to the baseplate. Line up the drive with the front cover, making sure that the disk removal button slides into its original slot. Temporary hold in position, test that it is lined up by fitting a disk a few times and that the disk freely goes in and comes out of the 81 mechanism. Mark the position that the drive fits onto the old 71 baseplate. Remove and drill the 4 holes you marked, I used a 1/8" drill. Since you have the original screws, re-use to secure the new drive to the old 71 baseplate 4 x self tapping screws. You can now secure the new drive to the old 71 baseplate, but leave the front cover in its temporary state.

81 CONTROLLER BOARD

Before fitting the board, decide if you are going to fit device switches to replace the dip switches (not recommended for the novice solderer, one slip up and the board will be kaput). Next you must insulate the bottom of the board. I used the original insulation from the drive, using insulation tape to secure them together. Before fitting, wrap insulation tape over the old metal post that used to hold the old 71 drive board in position. Just an extra precaution. This next step is a bit hard to explain, the new board will fit on the end of the baseplate just like the old 71 used to with the metal post acting as a support. You can only access 2 screw holes and only 1 will line up. The left hand one, near the on/off switch. Fit a self tapper into this hole, do not secure just yet. Examine the other end of the board. You will see that the holes fail to line up by about 1/2". I used a piece of plastic about 1" long and 1/4" wide, drill 2 x 1/8" holes after measuring their position, using self tappers, secure the plastic to the board and base plate, secure all screws, not too tightly, they only have to hold the board in position. Although the board is precariously perched, once all is finished it will never be moved—hopefully again. You can refit the Power/Drive Activity LED to the front cover of the 81 and secure, once you are satisfied that the board is OK.

ELECTRICS

The 128D power supply, has 3 leads coming from it. One supplies the main computer board, one the fan and the other the old 71 drive board. I recommend that you write down your findings for reference and any future projects. There are four wires that used to supply power to the 71, one YELLOW, two BLACKS and a RED (which are hopefully standard through out this range of computer).. Using my voltage

tester I found the following:

YELLOW - 9 volts
RED - 5 volts
BLACK - negative/return

Cut off the old plug and strip about 1/2" of the insulation, I then tinned the wires (which means to slightly solder each wire). Next, measure how much wire you need to reach the 81 board, (the plug that supplies the drive mechanism with power). Probably about 8" is suffice. Again strip back the insulation around 1/2" and tin. Do this twice so that you will have 8 wires. The wire I used came from an old interior lamp and is about 1.5mm wire or around 1/8" in diameter, not quite as thick as the original you will be joining it to but it will do the job. Since this is part of the conversion could result in vapourising your computer, it should be done with great attention. Since we will be connecting wires that are not colour coded, a record of which wire is which is vital. My new wire came in three colours, brown, blue and green/yellow. I connected the two BROWNS to the YELLOW - (9 volts), twisted together and then soldered. two BROWNS to the RED - (5 volts), 2 of each BLACK to the GREEN/YELLOW - (negative). Once all soldered, I insulated all connections with insulation tape. You now have the power cables to go to the 81 board and the drive mechanism.

If you did not manage to get any new plugs then the old can be used. The original cable that connected the 81 board to the drive mechanism can be cut in half and used. Again I hope the colour coding is universal.

I tested the voltage and found the following:

RED - 9 volts
BROWN - 5 volts
BLACK - negative/return

Now we have a nice mixture of colours to keep our eye on. Strip back the insulation on the wires you now have and tin like before. Now to join up. Using one end of the plug for the 81 drive board we connect as follows.

YELLOW to BLUE to RED - 9 volt supply

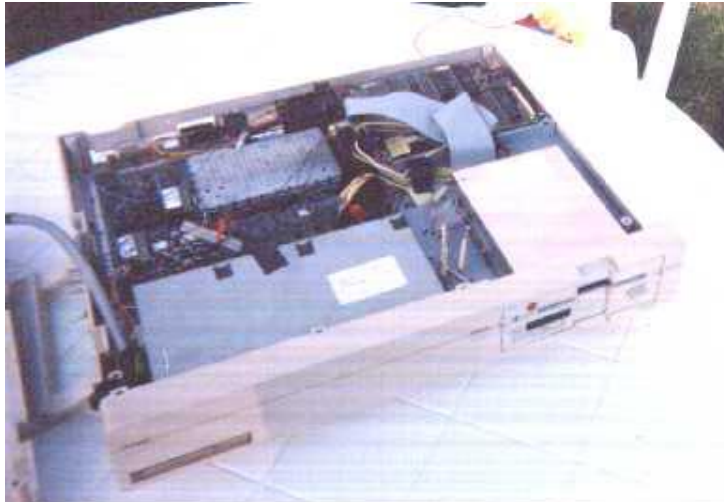
RED to BROWN to BROWN - 5 volt supply

BLACK to GREEN/YELLOW to BLACK - negative/return

Repeat the procedure for the other plug and when finished you should have one set of wires coming from the power supply with 2 wires of the same colour coming from them.

If satisfied that all is correct and insulated, you can connect the plugs. One to the board and the other to the drive mechanism. The plugs will only fit in correctly one way but to be on the safe side—looking from the front of the computer, the BROWN on the plug should be the farthest away when connected to the board and the nearest when looking at the drive mechanism from the joystick port side. You can now test. Switch on and the power light LED should light up on the 81 front panel.. If not switch off and re-check all con-

original which is far too short now. You can take your original to your local computer man and have one made (recommended) or if you have the ribbon cable, strip the connectors from the old, notice that one plug faces DOWN whilst the other faces UP. The red line on the ribbon cable is called the key line, so long as you get this red line on the first notch all should be well. I used my fingers to partly grip the cable into the plug and then finished off in my vice. When complete connect to drive mechanism and control board. If you had been taking notes when you removed the old ribbon cable, you should have noticed that the key line—RED was to the left on both connectors, using the on/off switch as the left side. The on/off switch can be ignored, it is being bypassed but just to be safe—leave in the OFF position.



SERIAL PORT

From the schematics in the programmers reference guide, the internal drive is connected to the serial bus via CN7 and CN6 a seven pin post connector. Although the descriptions are correct and clearly visible, connections made to the schematics DO NOT WORK. Now that the controller board is in position, you can see how much cable you require to run from the serial connection on the board to CN7. Around about 7". Cut an original serial cable, which will hopefully have the same colours that I had (if not you will have to bell out each pin to find which colour it is connected to). Strip back the outer sheaf approximately 2" and connect to a 7 or 6 pin female inline plug. If you could not get hold of a new plug you can, (just like the drive board) cut the original in half and use that or solder the wires from the cable directly to CN7. All these methods will work, if the board has to be removed for some reason simply disconnect from the serial socket, just like you would do to remove a cable from an external drive. In the programmers reference guide is a good drawing of the serial port socket and the pin numbers and what each pin does.

The 6 pin din serial connector plug

The above colours are what I found when I belled out each pin on the cable I cut. To be on the safe side and just in case I have made a mistake please check out your cable.

CN7 serial post connector

From the schematics in the programmers ref guide, you will notice that the key post has moved from the bottom position, number 6 and moved to the top, position 0. It is not used nor connected. That is why you can use a 7 pin or 6 pin connector. The connections are as follows.

0 Not Connected
1 (SRQ) to 1 - BROWN
5 (DATA) to 5 - GREEN
4 (CLK) to 4 - YELLOW
3 (ATN) to 3 - ORANGE
7 (DRESET) to 2 - RED
6 Not Connected.

The observant amongst you will notice that the Blue wire on the cable is not included in the above. Although the above connections will work fine, there will be no reset to the new drive. To enable the reset you have to connect the BLUE wire from the serial cable to a reset on the main computer. The nearest reset to connect to is on the USER PORT (CN9) at position number 3. Behind the main user port is a pass through hole, this maybe open or filled with solder. Simply solder the BLUE wire to this point and you have DRIVE RESET.

SETTING THE DEVICE NUMBER

Finally, decide what device number to set the drive to (that is if you have not fitted external device switches). Alternately you could refit the top cover and use the carry handle to keep in place, then you can quickly remove and change the dip switches if you want to.



DISABLING THE DRIVE

There is one more modification that you could do whilst the computer is open. You can disable the new 1581 drive (or the original 1571 for that matter) - completely, so that when you turn on the computer the drive will not be seen on the serial port bus. Fit a single pole switch between the ATN (attention) cable. Coloured ORANGE and marked 3 on the schematic.

That's all there is to it, should take about 3-4 hours solid, take plenty of breaks and record what you have done.

One final point, you now have a spare 71 drive mechanism and controller board. Do not dispose of it because someone with a 1571 or 128D may need one, the 81 may break down or you could fit it into a 1570 case like I did but that is another story.



**** 1581 TIP ****

If you get any 1581 drive mechanism problems - just fit one from an Amiga - it is identical. You will have to twist the ribbon cable 180 degrees as there are no UP and DOWN plugs on the Amiga connectors !

Happy Computing, Dave Elliott

**Technical
EXPERT
knowledge**



Upgrading your C128 & C128D to 64k VDC

Converting a standard C-128 to 64K of video ram is a fairly straight forward task, providing you are used to soldering and can at least read a P.C. Board. If you do not know how to open up your computer or the thought of opening up your gives you the colly wobbles then this project is not for you. These instructions for want of a better word should enable any computer repairer to do the job for you.

I have also made up a sketch to accompany this file which should clarify the position that the 2 chips to be changed are located.

Tools required

Philips Screwdriver
Soldering iron
Small pair side cutters.
Long nose Pliers
Plenty of Patience
Pair of Tweezers
Solder
Flux

Give yourself plenty of workspace. Do not be afraid to take a break.

Components

2x Chips 4464 - 18 pin
(maplins number - UH93B)
2x Sockets 18 pin
(maplins number FJ66W)

STEP 1

Remove the six screws holding the two halves of the 128 together. Part the two halves. Remove the screw that secures the grounding wire on the bottom half of the 128. Next remove the keyboard plug. (on my 128 this plug needed levering with a small screwdriver) You should have two separate halves. Place the top half in a safe location. It is no longer needed until the new chips are installed. Remove all the screws securing the P.C. board and the shielding to the

bottom half. The P.C. board should now come out of it's plastic case. To remove the shielding simply bend back all the securing lugs, the shielding should now come away from the board, plus the bottom cover can also be removed.

Try not to hold the board by any of it's chips unless you are wearing an antistatic device of somekind.

Although I have handled many chips without antistatic precautions without any problems, you may not be so lucky. If you do not have an antistatic device then ground yourself on a central heating or cold water pipe before hand. You should now have the P.C. board in it's naked state with the chips on one side and a load of soldered joints on the other.

STEP 2

On the board is a square tin box like structure with a lid on it. This is where the 2 chips are located. Remove the cover, use a smallish screwdriver to gently lift the cover off if it is tight.

Under this cover are 2 compartments, the left hand side is where we shall be concentrating. To be absolutely sure check the drawing. Locate the chips, they are the only 18 pin chips in this compartment. An expert solderer could probably remove the chips quite easily but if you are like myself competent but not a expert then I suggest you follow the instructions. The 2 chips are situated near the bottom left and are marked left chip-U25, right chip-U23. You should also notice that there is not a lot of room to manouver. Since you do not need the original chips, using your side cutters, cut out the chips. With a decent pair of side cutters this should pose no problems. Make sure you cut the chips as close to the top of the chip as possible. Once this is done turn the board over and locate the soldered parts of the chips. Using a solder sucker remove as much solder from the connections as possible. You now need to access both sides of the board, a board holder would be ideal but since we probably don't have one, hold the board between your knees. Starting at whatever position you choose, place your tweezers on the end of what is left of the leg of the chip (hence the cutting at the top of the chip to give maximum hold of the leg). Gently place your soldering iron on the corresponding leg on the solder side of the board. Once the leg heats up the remains of the leg should simply (without any force) pop out being held by your tweezers. Using this method should practically guarantee that you will not damage the tracking on the board. Repeat this until all the remaining leg bits have been removed. To check if you have done it properly simply hold the board up to the light and you should be able to see the light reflecting through the hole. Alternatively a magnifying glass can be used. This operation needs patience, if the tracking is damaged then you will probably loose the use of 80 columns. At this point I recommend a short break.

STEP 3

Next tin all the legs on the sockets, this will help the solder to run along the legs. Although not important try to fit the sockets the correct way. I.E. the notch like the chip notch to the bottom of the box.

Insert the new sockets into the board making sure that they are fitted correctly and are flush in position. (just before inserting coat each leg with a little bit of flux). Solder the sockets. Because commodore boards are double sided the solder needs to hopefully run to both sides. With this done the hard work is over. Check over what you have done thoroughly. Make sure you do not over solder the legs of the sockets.

STEP 4

Taking anti-static precautions fit the new chips, again with the notch facing down (see drawing if unsure). It is possible that the legs of the new chips may be splayed out. Simply hold the chip against a flat surface and bend one side of the chips inwards - being VERY gentle. Hopefully this operation may not have to be performed or maybe just once. With the new chips fitted, test the board. Making sure there is nothing under the board that could cause a short, connect up temporary the power supply, monitor/television and keyboard. Switch for 80 columns and power up. If all is OK then you should have 80 columns. If not then check over all you have done, especially make sure that all the chip legs have fitted correctly into the sockets. You cannot of course tell if you now have 64K of video ram.

Disconnect the power etc, and re-assemble your computer. Boot up a program that uses 80-columns, Geos128 and if you have it, geoCanvas128, which uses the 64K in the colour mode. There you have it a C128 with 64K of Video Ram.

(Don't rely on programs such as 'Maverick's 64k VDC checker' to do the check for you because it doesn't work! - ED)

WARNING

Please remember you try the above modification at your own risk. It is far easier with these instructions to let a professional do the work for you, it may cost a little bit extra but that is far better than trying it yourself, damaging the board and losing the 16K you had before.

Dave Elliot

A note from the editor

As this issue was being compiled a '64k VDC Upgrade Kit' was being put together. This was to contain all the new components that you will need to complete this procedure, and it was also have the most current instructions (with pictures) to help you out. Unfortunately, due to fluctuations in 'chip' prices, the kit has had to be shelved. See the current issue of Commodore Scene for current details and prices.



IDENTIFYING C128D MODELS

Confusion has arisen regarding the specifications and 'bugs' in the two models of the 128D produced by Commodore. What follows here is how to identify the two models.

Original 128D

This was optimistically called a 'Portable Model' by Commodore. The identifying features of this model are :

- a. A carrying handle on the left-hand side, looking from the front.
- b. Plastic cased.
- c. On/Off switch on left-hand side, looking from the front.
- d. Noisy fan.
- e. Keyboard clips into a special recess underneath the computer.

Bugs

1. The infamous 'Caps Q'.

This shows itself when you select 'Caps Lock' on the top left of keyboard and press 'Q' which should show and print as an upper case 'Q' but in fact always shows and prints as a lower case 'q'.

2. There is no extra 64k Video Ram - not exactly a bug - but see later comments on the second production model 128D.

Last Model 128D

- a. No carrying handle.
- b. Metal cased.
- c. On/Off switch at rear left hand side looking from the front.
- d. Noiseless fan.
- e. No facility for keyboard to clip into the base.

Bugs Eliminated & Extra Benefits

1. Caps Q bug eliminated.
2. Extra 64k Video Ram now fitted.

Note : A conversion was available to replace certain chips in the original 128D to eliminate the Caps 'Q' bug and to provide extra 64k Video Ram, so some models offered for sale may have this conversion fitted. Testing is by selecting Caps Lock and then pressing 'Q'. If it produces an upper case 'Q' on the screen then it has the conversion chips fitted. Another test is to use MAVERICK, selecting Fast File Copy and proceed to copy a disk. If the 64k Video Ram is present, you will be informed on the screen.

George Potter

*Rest in peace George - you will be missed.
A true Commodorian.*

**Technical
EXPERT
Knowledge**



CONVERTING BETWEEN NTSC & PAL

A few issues back, we mentioned that we may present information on converting the C64 computer between the NTSC/PAL standards. We recently received a letter from one of our subscribers in Europe, asking us to follow through on publishing that information. We're pleased to do so in this issue, and hope that it will assist users who need to convert their machines.

There are any of a number of reasons you may need to convert your C64 to a different video standard. You may have moved to a different country, or maybe you just want a second machine to try out games or demo programs that came from overseas. While the conversion is a reasonably simple process, you'll need some skills in using a soldering iron. Naturally, we do not recommend this process for anyone who lacks experience with removing components from circuit boards.

Assuming you have the required parts (see table below), the first step is to open the computer case and remove the circuit board. Depending on the version of 64 you have (and which way the wind was blowing in West Chester), you may have to remove a shield from the board, or desolder and bend away tabs that hold the board in place.

Once you have the board out, you need to try and determine what version it is. There are five different versions of the C64 motherboard, Revisions A through E (Revision E is sometimes marked as Rev. 4—apparently Commodore started at zero). Usually you can find the revision number printed in white letters on the board, with two exceptions: 1) Revision A boards had the version number etched on the board near the front-center, and 2) Revision C & D boards were often unmarked as such, but usually have a copyright date of 1984 or later stamped on them.

Everything we need to change is part of the video circuit, and located in the same general area. If you have a Rev. E (or 4) board, this circuitry is located at the center of the board near the front edge; on Revisions A through D you'll find it to the right of center, about an inch or so back from the front edge. Rev. A through D were also designed to have a metal box around the video-circuit (don't confuse this with the RF modulator, which is the metal box at the rear), but these weren't always installed. Also, some that have the box may have a cover over it; remove it if yours has one. Check

the layout against the diagrams to the right to verify that you have found it, and have the correct revision.

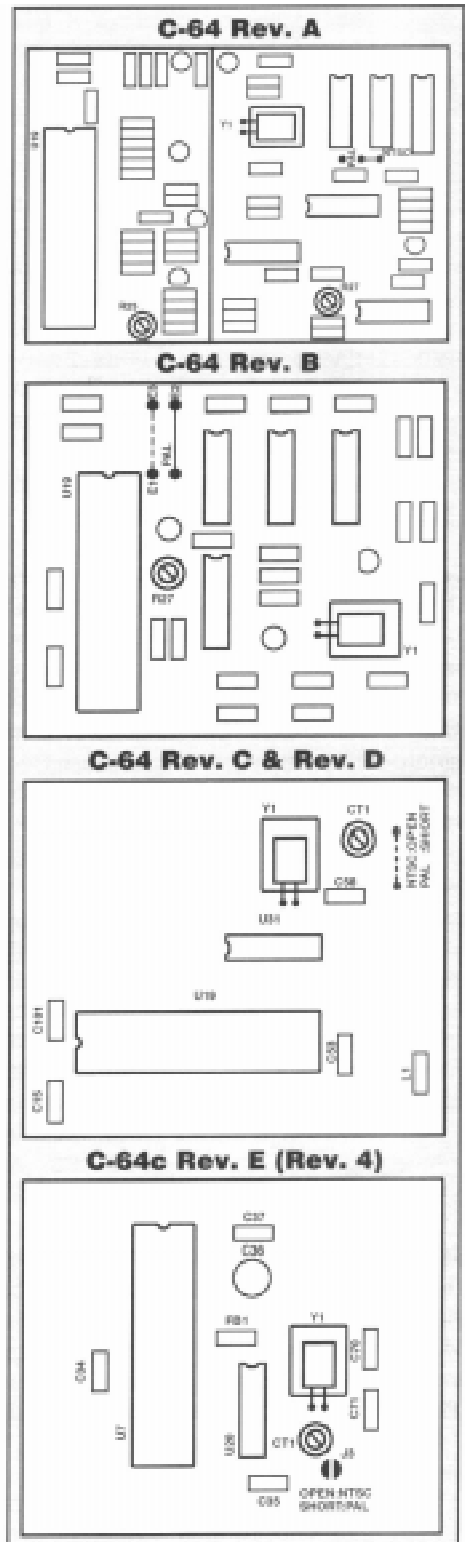
Now locate the VIC chip (U7 on Rev. E, U19 on all others). If it is socketed, your job will be easier; just remove it from the socket. If it is soldered in, we suggest you use a small pair of sidecutters to carefully clip each pin close to the body of the chip, then desolder each of the legs individually. (We suggest this method because if you try to desolder and remove the entire chip at once without special tools you may pull some traces off the board and ruin your computer!) After desoldering and removing the legs, we suggest you clean the holes out with a solder-sucker (Radio Shack has these), and install a 40-pin socket so that you'll be able to plug in your new VIC chip easily. However, don't install your new VIC chip just yet.

Next, locate and desolder the clock crystal, component Y1. This should be pretty easy, as there are only two leads (some crystals may also have a wire soldered to the case as well, which should be desoldered). Replace the crystal with a new one matching the frequency given in the table below.

Finally, change the jumper configuration. On Rev. E boards this is a pair of half-moon shaped traces labelled J3, join the two halves for PAL, or break any connection between them for NTSC. On Rev. A there are three solder pads with NTSC and PAL printed nearby; connect the center to the right for NTSC, or the center to the left for PAL (make sure you break the other connection). Rev. B has four pads labelled E1, E2, E3 and PAL; short E1 to E3 for NTSC, or E2 to PAL for PAL (and break the other connection). Rev. C & D have two pads with a broken line printed between them; solder a wire between them for PAL, or break the connection for NTSC.

Now you can install the new VIC chip in the socket, and place the C64 board back into the bottom half of the case. Before you put the cover back on, hook it up and make sure it is working. You may need to adjust the variable capacitor CT1 (Rev. C, D & E) or the variable resistor R27 (Rev. A or B) in order to get the color working correctly.

Also note that there is another jumper on the C64 board to switch between PAL-G and PAL-I standards (G is the default, and most commonly used standard). This jumper controls the RF modulator. However, you can ignore this if you convert a machine, as this module will no longer function. That's right—no TV output unless you get the correct RF modulator unit and replace the one you have.

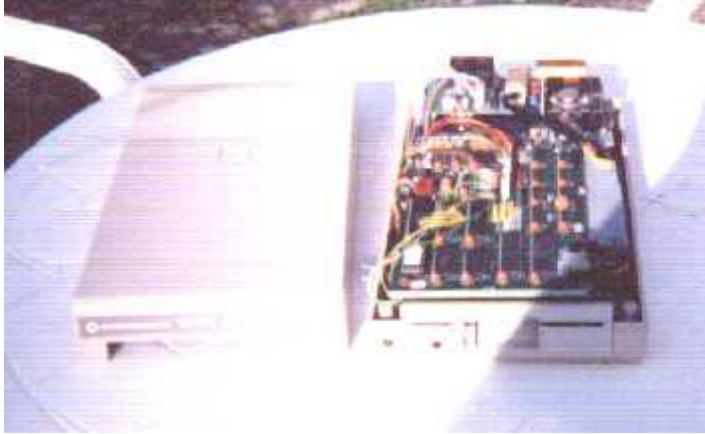


PARTS LIST		
	Crystal	VIC
NTSC	14.31818 MHz	6567
PAL	17.73447 MHz	6569

1570 Device Switches

Technical
DIFFICULT
Knowledge

When a friend first mentioned that she had acquired a 1570 from a car-boot and was very pleased with its performance but dis-pleased with the inability to change device numbers I suggested that she open up the drive to see what was inside. CBM in their wisdom, sometimes fitted dip switches or in this case had all the connections connected to send the Device 8 signal. Not wishing to get too technical and to keep the alteration as simple as possible for the non technically minded I explained what was needed to change from Device 8 to any of the other device numbers.



The device switches in this case had not been fitted, but half moon shape wires had been soldered in the dip switch position. With a closed circuit, Device 8 is present. Looking from the front the first half moon piece of wire can be cut and will give Device 9, the farthest when cut will give Device 10, both cut will give Device 11. Whatever you choose, can be reversed by simply closing the half moons together and re-soldering. Better still fit external switches.

To fit device switches is fairly straight forward. All you need is 2 single pole switches, a length of Data wire, any colour. Simply cut the half moons and separate. Connect 2 wires by soldering to each switch and then connect to the half moons. See drawings. Drill two 3/16 " or two 1/4" holes depending on what type of switch you bought. Location is not too much of a problem, simply choose a clear spot that will not interfere with the internal workings. I would suggest that you fit the switches to the bottom part of the casing. This will ensure that if you need to remove the top casing for any reason then you will not have to worry about the switches and their wires. For the expert there is just enough room to fit the switches on the right hand side of the bottom casing, looking at the drive from the front. For the non expert then the rear panel on the bottom casing provides ample room. Before boxing up test out your new switches. Load the directory or use Control-D if you have JiffyDOS installed to see what device the unit is set to. Once drive 8 is established fit and secure the switches and box up. If it doesn't work then it should only be a bad solder joint. Re-check your connections, re-solder if necessary. Very doubtful if your new switches would fail but it could happen. A simple

test with a mutimeter should prove if the switches are working. If, like me, your memory is not like it should be then the UI (utterly useless information) from a Video Cassette could come in handy.

UI (utterly useless information)

The 1570 was brought out by CBM when they started to market the 128 in Europe. It was not released in the States and contained a 1541 drive mechanism with a 1571 board. The board was modified to send signals as a 41 but use the speed of a 71. Since I have a couple of these drives I have found out a couple of things. Please bare in mind I use a 128 and JiffyDOS. I also believe that GEOS is faster with JiffyDOS than without. By fitting a 1571 JiffyDOS chip, GEOS will recognise the drive as a 71 and not a 41. Thus you gain the speed advantage, obviously you cannot write

to it as a 71 but no more messages saying DOUBLE SIDED DISK IN 1541 or words to that effect if you accidently put a 71 disk in the drive.(assuming that you have a 71) CMD's excellent disk utilities do not recognise the drive at all. For source or destination when a 1570 is on line a question mark will appear.

In my humble opinion it is a grossly underrated drive and unfortunately not to many around now.

HAPPY COMPUTING

Dave Elliott



Technical
DIFFICULT
Knowledge

1541 DISK DRIVE MODIFICATIONS (& fitting device switches)

One of the most often asked questions we get is how to change device numbers on disk drives. While the 1541-II and 1571 drives were created with DIP switches for convenient device number configuration, Commodore left this convenience out of previous 1541 drives, and the 128D. They did, however, at least make such changes possible directly on the circuit boards. Yes, you've got to get under the hood to change the device number.

Commodore also provided information in the 1541 User's Manual on making device number changes. Unfortunately, the instructions were wrong in some editions, and often didn't match the revision of the 1541 circuit board in the drive that the manual came supplied with.

So, after a little prodding, we've put together this illustrated guide to changing device numbers on each of the older 1541 models, as well as on the 128D. In addition, we've covered installing switches that will let you make device number changes whenever you like.

Tools & Other Required Goods

As a bare minimum, you'll need the following items in order to change your 1541's hardware device number:

- A Phillips-head Screwdriver (#2 should work nicely)
- An Exacto Knife (or other precision utility knife or blade)

In addition to these items, I'd also suggest a magnifying lens of some type (for the close work), and a good light source. If you want to install switches, you'll also need the following:

- One or two SPST Miniature Toggle Switches (SPDT will work as well)
- A Soldering Iron or Pencil
- Solder (electronic circuit variety)
- Hookup Wire (28 gauge stranded)
- A small pair of Diagonal Cutters (Wire Strippers would be handy, too)
- A Drill and Drill Bit (to provide the hole for mounting the switches)

Here we go....

We'll start off with disassembly. Start by removing the screws that hold the case together (these are located in recessed holes in the bottom half of the case on the 1541 models, and on the back of the 128D case). After you have

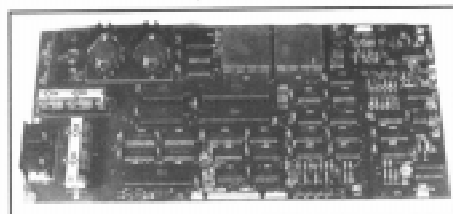


Figure 1. 1540/1541 Long Board

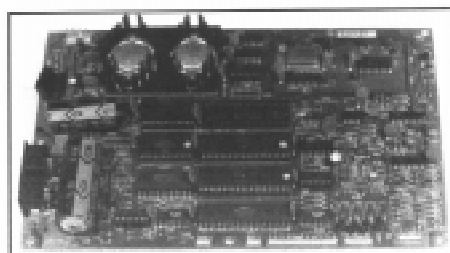


Figure 2. 1541 Short Board

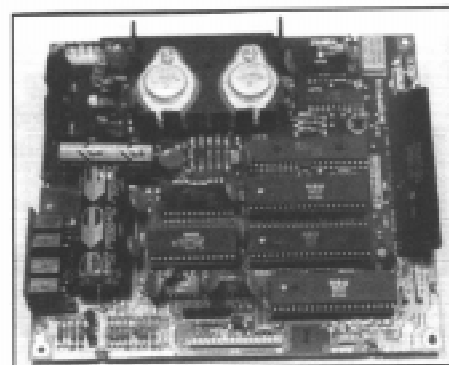


Figure 3. 1541C Board

DISCLAIMER

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the screws removed (and safely tucked away where you won't lose them), remove the upper half of the case. If you're disassembling a 1541, you'll need to remove the metal shield that covers the circuit board (there are two screws located on one side). Those of you with 128D's will have to remove the drive itself by removing the three screws that hold it in place (one on the left side, two on the right), pulling the lever off the front, and sliding the mechanism backwards into the case.

The next step for 1541 users is to determine which revision of the circuit board you have. There are three main types to be concerned with, and these are shown in Figures 1, 2 and 3. If your drive (like most) has the "short" board (Fig. 2), then check around the edge of the board for the revision level (A, B or C).

Now check Figures 6 through 10 to locate the Jumper Pads used to program the device number for your unit. Jumper Pads look like two silvery circles, each having a split down the middle, except at the very center where a trace bridges the two halves of each circle together (see Figure 4 for a closer view). To change the device number, we need to cut away the bridge on one or both of these Jumper Pads (this is detailed in Figure 5). Which pads do what? The chart below shows you. Note that the pads have numbers by them, either a 1 and 2 or J1 and J2 (there are two exceptions where the pads aren't marked—the 1541 Rev. C short board,

Jumper Pad Device Number Programming

Device Number	8	9	10	11
Jumper 1 or J1	Closed	Open	Closed	Open
Jumper 2 or J2	Closed	Closed	Open	Open

and the 128D—so we've added numbers to the pictures that show the pad locations).

Note the terminology used in the chart: "Open" indicates that the bridge trace has been cut, while "Closed" indicates that it has not (or that the two pad halves are connected by other means, like a switch or solder bridge).

If you're making a permanent change (and not installing switches), pick the device number you want and cut the appropriate traces (see Figure 5) with an Exacto knife. If you're installing two switches, cut both; if you're installing one switch, decide what device numbers you want available by referring to the chart, and cut one or both pads accordingly. (There are a lot of possible device number combinations that can be achieved using a single switch, but most users usually just cut J1, or Jumper 1, and install a switch on it to provide switching between devices 8 and 9.)

Be sure to examine your work to make certain the cuts completely separate the pad halves. If you're not installing switches, reassemble and test your unit. If you're installing switches, continue on.

Select a location to mount the switch(es), and drill the appropriate mounting hole(s). Now prepare two wires for each switch, long enough to reach from the Jumper Pad locations to the switch mounting hole(s) with a couple of extra inches of extra slack. Strip off an eighth of an inch of insulation from both ends of each wire.

Solder two wires to each switch; one to the center terminal, and the other to the outside terminal. (If you're using SPDT switches, use either of the outside terminals and ignore the other.) Now solder the other ends of the wires to the two halves of the pads, one wire to each pad. Make sure that you don't short the pads together with your solder, and cut away any excess wire. Also be sure that the wires from each switch go to the same number Jumper Pad.

Once you've finished, examine your work carefully, and after you're certain that all is correct, reassemble and test your unit.

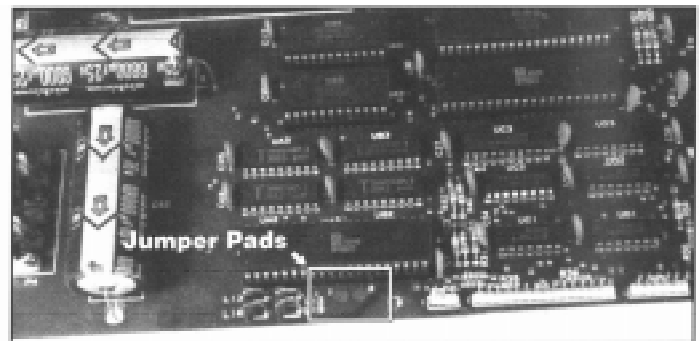


Figure 7. 1540/1541 Rev. A Long Board Jumper Pad Location

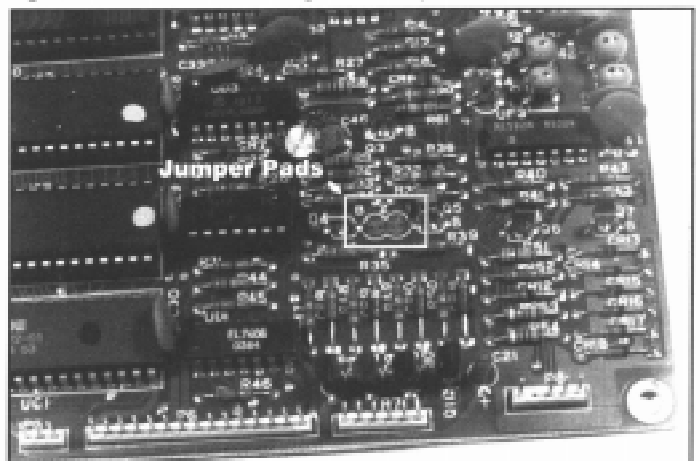


Figure 8. 1541 Rev. A/Rev. B Short Board Jumper Pad Location

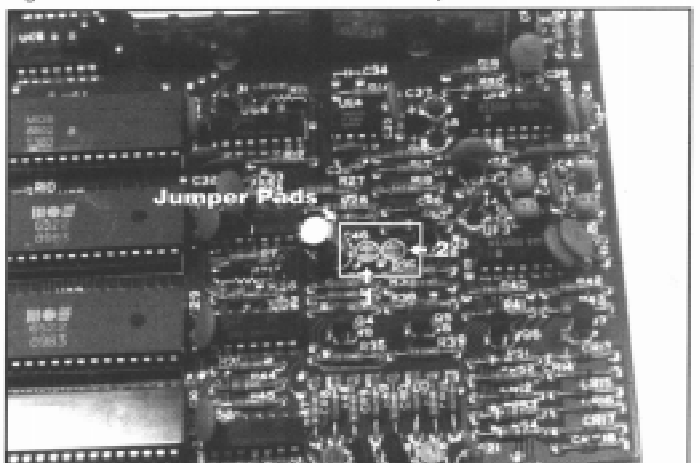


Figure 9. 1541 Rev. C Short Board Jumper Pad Location

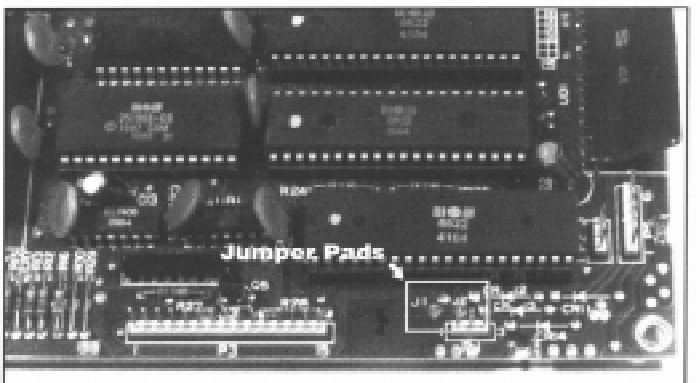


Figure 10. 1541C Rev. A Jumper Pad Location

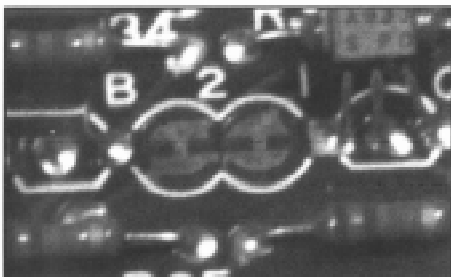


Figure 4. Closeup View of Jumper Pads

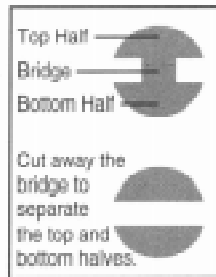


Figure 5.

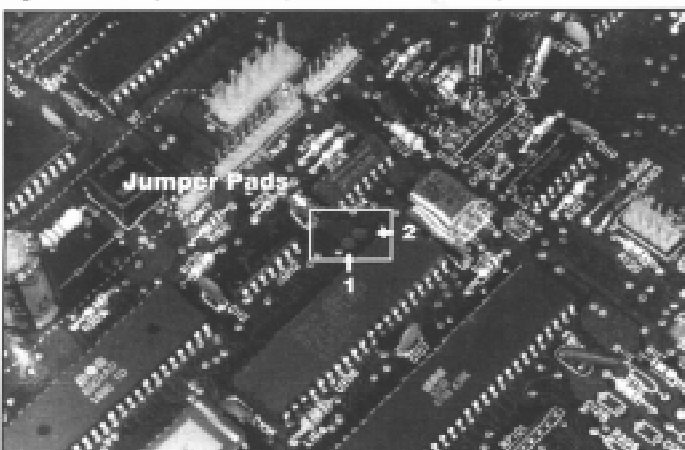


Figure 6. C-128D Jumper Pad Location

INSTALLING DEVICE NUMBER SWITCHES ON THE COMMODORE 128D

Technical
DIFFICULT
knowledge

THIS ARTICLE ORIGINALLY APPEARED IN COMMODORE WORLD ISSUE 6. CREDIT IS HEARBY GIVEN TO ITS AUTHOR MIKE EGLESTONE.

Greetings hardware hackers! This is SMS MIKE (Mike Egglestone), SysOp of DiamondBack BBS. The topic for today (by request from my many dieHard Readers) is the installation of external device switches on the front panel of the C128-D.

Before we get started, some advice from the expert: If you can't solder small connections, in tight areas on a circuit board, this is not a modification you want to attempt. Get someone else to do it for you or take this article (and your 128-D) to a computer dealer/repair center.

You 128-D owners know that the built in 1571 drive answers to device (8) at power-up. Up to now, you had to "Software Switch" the device number to use any other drive you might have available as device (8). Real pain in the, er, butt, and that's putting it mildly!

Those days are gone folks. Here's the procedure for installing external device switches on the front panel of the 128-D case.

Parts required for this job:

- 25 to 40 watt soldering pencil
- High grade electronic solder (fine)
- Two, Micro mini switches SPST (on/off) (Radio Shack)
- Approximately 30 inches of very fine stranded electronics wire.
- A drill and drill bit to install the switches on the front panel.

First, remove the case cover from the main unit. Three screws in the back, and two smaller ones on the bottom front of each side. Slide the case cover back about 1/2 inch, and pull the front straight UP. The cover will turn loose of the bottom with ease.

Next, remove the built in 1571 drive unit. Don't let this throw you, it's very simple and easy to do. Disconnect the Rear (read/write) head connection, then unplug the three power plugs. HINT: Note the color of the wire on the FRONT of each plug. This will let you relocate them in the proper position when it comes time to plug them back in. It's darn near idiot proof, but I have screwed it up myself.

Remove the screws on the SIDE of the drive. Some have three, and some have four. Pull off the latch lever from the front, and slide the unit out of the mount. Set it aside for now.

Under the drive, Front Facing Rear, on the left hand side, you will notice a chip called (65C22 or 609-0371923) This is the device number control unit, among other things. Directly behind that chip, you will see a Crystal can. A metal can with a piece of wire wrapped around it which is soldered to the circuit board. Keep this "can" in mind, we will use it later...

On the left REAR side of the 65C22 chip, you will notice two small silver dots, just to the left of the 4th and 5th pins (counting rear to front).

These small silver dots are on the circuit board, and are really two half moon shaped dots with a very small connection between the half moon sections. Look very close, and use a magnifying glass if necessary. These are the pads we will be dealing with when we add the device number switches.

Take a very sharp Exacto knife, or a razor blade, and scrape the small trace between the pads off the circuit board, the drive will now answer to device (11). Both circuits are now open, and the device number is (11). Those pads are nothing more than Circuit grounding points. The side closest to the chip is the switch side, and the other side is a circuit ground. The trace in the middle makes the connection.

The next step is to install a wire to the chip side of the pad half.

Using very fine stranded wire, about 10 inches long, strip back about 1/4 inch of plastic cover. Using a 25 to 40 watt soldering pencil, pre-tin the end (melt some solder into the wires and make it stiff).

When the wire has cooled, bend the pre-tinned end to a 90 degree angle in the middle of the tinned area. This will give you 1/2 inch up and 1/8 inch on a 90 degree angle.

Don't try to place solder directly on the circuit board pad. Use the solder on your pre-tinned wire only. Using care, position the 90 degree angle on top of the pad, and apply heat to the wire with the soldering pencil while pressing down. When the solder flows, remove the heat and hold the wire very steady until it cools down. Do exactly the same thing to the other pad.

You MAY drill a very small hole (#50 drill bit) in the pad half and insert the wire 1/8 inch into that hole and then solder the connection, but it's not necessary if you're careful. This is NOT a

structural connection, and care must be taken at all times. If you mess up, and overheat the small pad half, it will separate from the circuit board and come OFF. If this happens, the pins on the chip itself must be used, and they are on the Opposite Side of the chip. Rear counting towards the front, pins 5 and 6 on the Right hand side can be used as direct connections. (Check them with a VOM to make sure first).

All right, let's assume you made it, and you have the two wires attached to the pad halves properly. Next, you remove the front plastic panel on the case itself. Three screws at the top, spaced about evenly across. Tilt the panel slightly forward and slide it up and out.

Drill two holes just left of the drive activity light, and slightly lower. Watch your clearance between the switches, but mount them side by side with minimum spacing between them. The switches should be mounted so that UP is ON and DOWN is OFF.

Using the large hole to the left of the drive mount, feed both your wires through and out the front. Connect/solder the front pad wire to the upper connection on the LEFT switch, and the rear pad wire to the upper connection on the RIGHT switch. Using the Third 10 inch piece of wire, bridge the lower connections between both switches. Strip back about an inch of plastic cover, solder both lower connections to this single wire. This is your circuit ground, and is common to both switches.

Next, feed your third wire back through the large hole, and solder the other end to the "Silver Can" mounting strap. Remember I told you to keep this "Can" in mind. It's a perfect circuit ground point.

Okay, that's the end of the job. Reinstall the front panel and the drive unit. You may test this setup with the case cover removed. It will work out like this. Both switches UP, drive is device 8. Left switch down, device 9, Left up, Right down, device 10, both down, device 11. Just don't forget that you MUST reset the drive or the computer after each switch movement.

The drive has a separate reset switch right next to the Computer reset switch on the right hand side towards the rear. I opened up the hole for this drive reset switch, and put a plastic extension on the button. Those little vacuum caps that are sold in most automotive stores make perfect extensions for the reset switches.

Questions, Comments, Panic? I can be reached at 305-257-5700 at most any time during the afternoon, and my BBS (DiamondBack) is 305-258-5039.

- Mike Egglestone (SMS MIKE)

**Technical
MODERATE
Knowledge**

DISABLING THE DRIVE IN YOUR COMMODORE 128D

This article first appeared in Commodore World issue 10. Full credit is hereby given to the original author Al Anger

Okay, so you've installed device switches for the 1571 in your C 128D. Maybe you've also installed a momentary on switch to reset the drive after changing the device number (to replace the hard to use drive reset switch that comes with the D). What if you're lucky enough to have a RAMLink, a CMDHard Drive, a CMDFD-4000, and a C 1581, and you'd like to use them with Geos which has a limited number of drives allowed? What if you'd like to not have internal drive recognized by your computer? With the faster, larger drives and RAM devices available, the 1571 in your 128D might need to be disabled now and then. Well folks, here's the answer.

Legal Mumbo Jumbo

Before we get started, a word of caution and a disclaimer. Inside your C 128D are voltages which can harm you. Also, you can have static charges in your body which can harm your 128D. If your unsure if you can complete this short project, get help from a friend, or go to a computer dealer/repair center. Neither Creative Micro Designs, Inc. nor the author of this article shall be responsible for the use or misuse of information in this article. The information provided has been tested and is believed to be correct. Now on to the fun stuff.

One More Switch

Here's the procedure for installing a drive disable switch on the front panel of the C 128D. Parts required for this job are:

- Soldering pencil
- Fine electronic solder
- 1 Miniature Toggle Switch (spdt)
- 1 resistor, 10K Ohm 1/4W
- 3 ft. (approx.) of 28 gauge stranded hookup wire
- A drill and bit to provide the hole to mount the switch in
- A small pair of diagonal cutters (nippers)
- An Exacto Knife

Lets get started. Open the 128 D. Remove the screws from the rear and bottom of the unit. Slide the cover back, and remove it. Next, remove the 1571 drive unit. Remember the orientation of the connectors and remove them. Remove the drive mount screws and slide off the latch lever. Slide the drive unit out, and set it aside. If you've installed device selection switches before, all of this will be easy. If not, take your time and make notes.

One of the six lines in Commodore's famous (or infamous) serial bus is labeled ATN for "attention". This line is used to get the attention of all devices on the serial bus. The host computer brings this line low, which in turn generates an interrupt on the drive controller board. The ATN signal is followed by a device number. It works a little like a roll call. The computer calls all the serial devices to attention and looks for the device requested. If the device doesn't respond, the computer assumes it isn't there. You can switch the ATN line in and out for any serial device. I use a couple of rotary switches to allow me to select from a 1541, a 1571, and a 1581 as device 8, and the same for device 9. These rotary switches allow me to bring the ATN

line to the drive of my choice. Our goal is to switch out the ATN line for the internal 1571 so it doesn't answer the roll call.

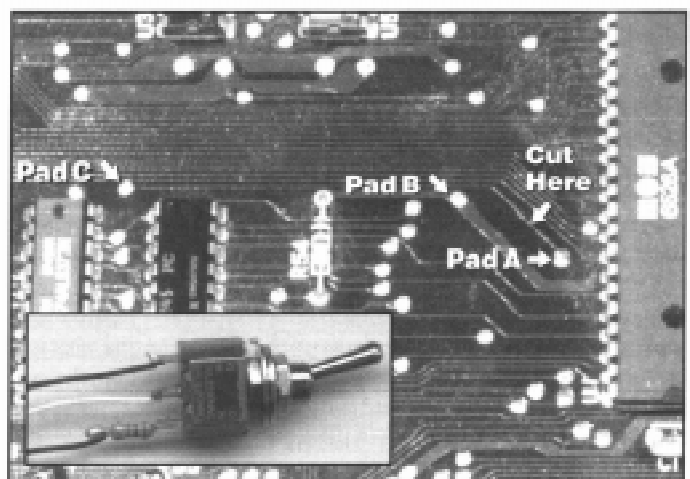
Enough theory, let's solder something! First, solder the resistor to one of the outside terminals on the switch. Next, cut the hookup wire into three equal sections of approximately 1 ft. each, strip the ends back about 1/16th of an inch, and solder one end of two of the wires to the two remaining terminals on the switch. Solder one end of the remaining wire to the open end of the resistor. Cut away any excess leads or wires so that your switch and resistor assembly look like the one in the inset picture below.

Now refer to the picture and locate IC U1 on your 128D motherboard. This is a large (40 pin) 6526 chip near the right center of the board (shown at the far right in Figure 2). Using IC U1 as a reference point, locate the three through-hole solder pads identified as Pads A, B and C in the picture. Notice that a trace runs between Pads A and C. Using an Exacto knife, cut this trace somewhere near Pad A (there's a little more clearance at that end of the trace). Make sure your cut creates a good solid break in the trace (you can verify this with an ohm-meter or continuity-checker if you have one). Now solder the wire connected to the center terminal of the switch to Pad A; solder the wire connected to the resistor to Pad B; finally, solder the remaining wire to Pad C.

Locate an appropriate location for mounting the switch on the front panel of your 128D, drill a hole, and mount the switch (you can feed the switch through one of the large holes in the metal frame of the 128D).

Reinstall the drive, and front panel if you removed it, and test your work. Then close up the 128D. If you close up the 128D before testing, something will be wrong and you'll need to reopen it (Murphy's Law being what it is.)

If you have questions or comments, or would like this or some other 'hack' done to your computer for no charge (you pay shipping, insurance, and parts), I can be reached at (305) 233-4689 between 4 p.m. and 8 p.m. ONLY (eastern standard time). I can also be reached on GEnie (A.Anger1) or A.Anger1@genic.geis.com or on DiamondBack BBS at (305) 258-5039 as Wile E. Coyote.



1541 Modification - Reading both sides of the disk without turning it over!

by Dave Elliot

Technical
MODERATE
knowledge

Most C64 users who own 1541 disk drives will also be using both sides of their disks. Either using a disk notcher or by cutting a notch by other means. I myself think that a disk looks more professional with only one notch or no notches.

There is a way to trick the drive into letting you write to an un-notched side. It is not hard to do and all that is required are a few tools and inexpensive parts.

WHAT'S NEEDED

2x lengths of computer/data cable (approx 9" in length)
1x toggle on/off switch (available from Maplins)
1x resistor 3.6k 1/8th watt at 1% (I bought mine from R.S.Components stock no-164-340) - it is possible that Maplins will do an alternative.

TOOL'S REQUIRED

A stanley knife/or any very sharp knife
A small soldering iron
A philips screwdriver
A 3/16-5mm drill
A roll of insulation tape

WHAT TO DO

First disconnect your drive and all cables. next insert a disk to protect your read/write head. turn the drive over and remove the 4 screws holding the two covers together. keeping a firm grip turn drive over to it's normal position. remove top cover. with the drive to the front you will be able to see the PCB board. on the left side you will see 5 sets of connectors. No. 1 is your read/write head and should be coloured black. the connector we want is No. 3 which also happens to be the longest. of the 15 pins only 6 are used. the pins to be modified are No's 3 and 4. they should be coloured purple and orange. if the colours are not the same then counting from the front end of drive locate the 3/4 pins.

You can do the next step in two different ways.

- (1) Solder your new wires to pins 3 and 4
- (2) Join the wires by just tying them together.

I used step 2 because I found that it was very easy and when finished the wires were still pliable and could be joined together to be taped for insulation purposes. if you start approx a good inch from the end of the connector then if you accidentally cut through the wire all is not lost.(see below)

You can choose to start with any pin but to keep things in a nice orderly way. do No. 3 pin the purple wire. carefully cut

away the outer insulation sheaving until you have enough of the inner wire visible to be able to join the new cable to it (1./8 should be enough). Next strip both ends of your new cable (1/2 should do). Now join the two wires together making a good tight connection. Join the wires and tape together.

For pin No. 4 repeat the above and when complete cut the new wire to give a length of approx 2 inches. solder one end of your resistor to this wire and the other end to your remaining wire. Next solder both wires to the connections on the switch (it does not matter to which connection the wires are soldered to).

All that remains to be done is to drill the top casing to accommodate our new switch. looking at the Commodore logo (REST IN PEACE) drill the hole approx 5/8" directly under the logo. all that remains to be done is to fit and secure the switch (the switch should be marked with on/off : fit to your desired preference)

Re-fit the two covers together checking that the new wires will not be trapped. Gently pushed them into the gap between the inner mechanism and the outer bottom casing. re-fit and secure the 4 screws.

If you should accidentally cut through the wires then all you have to do is join them all together and insulate. (this could be done in the first instance)

TESTING

After re-connecting your system place an un-notched disk in your drive and try to format it. One of two things will happen.

- (1) The drive error light will come on (boo !)
- (2) The disk will format (yippee !)

Condition (2) may occur depending on which way you set your new switch up/on or off/down if the drive error light flashes then just flick the switch and re-format you will now be able to write to the reverse side of your disk without having to notch and with the switch turned off it will also act to protect data on that side.

If after your modifications the test is no good then check all your connections. I used video tape letters to mark the switch.

PLEASE NOTE : IF YOU DO ATTEMPT TO MODIFY YOUR DRIVE THEN IT IS DONE ENTIRELY AT YOUR OWN RISK !

This article first appeared in geoClub (UK) issue 42



Flakey 1571

Technical
MODERATE
knowledge

Well here's a tale that might amuse you, if not save you a trip to your local repair shop.

About 4 months ago my 1571 in my 128D, started acting a little flaky. It seemed to be getting a little persnickety towards what brand of diskettes I bought for use when in CP/M mode. You may or may not use this capability at all, although the problem I am going to describe can still pop up to baffle and confuse the living daylight out of you.

What was happening was that when I tried to format a Kaypro IV type diskette (thats an extended format of approx 400K in MFM format) I would start getting an error generated towards the upper tracks on side 1 (top). This wouldn't happen all the time, just every once in a while. Change a diskette and she'd be happy. Well as time went on It got to the point that I couldn't even copy from previously formatted diskettes into the REU. This only happened on the files which were on side 1, towards the end of the upper tracks. What really puzzled me was that I never had a problem when running anything in Native 128 or 64 mode. GEOS ran fine, Copy protected programs loaded without a hitch, Superbase128 never burped or complained, Fast-Hackem kept on hacking. Nothing in GCR format ever failed.

Well the day finally came, She bit the DUST. Everything still worked fine as long as I didn't try to use an Extended format MFM disk. Forget about using CP/M with Commodores format, its just too slow, And CP/M is just as disk intensive as GEOS is if not more so. I went down to the local Discount store and bought a couple of different brands of diskettes, convinced that I was still having a diskette problem, 24 disks format failures later I decided that I had a hardware problem. I didn't know where to start, since Commodore did so much optimization on the 128D, the schematics I had for the 1571 (stand alone unit) weren't much use. Now I really put this piece of equipment through its paces, I keep a 1670 modem and a 1764 REU (expanded to 512K) and a 1370 mouse plugged into this thing at all times. Also added a fan to keep things cool. Figured that maybe I might be pulling down the power supply, so I unhooked everything, popped the hood and tried once again to format a 400k floppy. Nope, didn't work, next checked all the connectors for corrosion or looseness, no problem there. Took the Disk drive out of its cradle and popped the drive ROM and re-seated it in its socket. Reassembled the beast and tried again.

Nothing worked !

Well I was about to get frantic. Where to turn next? Out came the diagnostics for the 1571. Ran logic check and kept coming up with a u2 failure (drive ROM), Well thats normal for this machine, they changed the ROM, and don't have a Western Digital chip in the 1571 on the 128D like they do on the stand alone unit. Next on to the read-write tests. GCR format went like a song., but she would burp on any burst



mode MFM read. Confirmed trouble, but still no cause. Yes I know that your thinking Alignment problem, but I had dismissed that as I keep the alignment checked at certain intervals, and that I didn't have a problem when in GCR mode. But I still checked it, and there wasn't a problem that is to say on drive 0. Now I had purchased an alignment program that would check both sides of a 1571, but It hadn't got here yet. All I had was one that would check a 1541 single sided and that always checked out fine. I had really concluded that I had an electronic problem either with the drive controller or the ROM chip or possibly the drive Ram. So I ran a program to check the drive ram no problem. Knowing that the decode tables for all the MFM burst reads are in the drive ROM I concluded that (hopefully) there was where the problem lied.

So I packed it away and slept on it.

The next day I went down to the shop to see about how much the chip would cost and how long it would take to get it. Well the ROM wasn't even listed (lucky for me) and they weren't about to call Commodore for a 15.00 or 20.00 chip. I was told to double check my ROM number and get back with them. Later on that Day when I got home UPS had delivered my Alignment program. Finally get to tackle that old 1571 which has a problem (different drive, different story). First thing I did was run the thing on the 128D. Yep, there was a problem on head 1, it was a couple of thousandths of an inch off on track 36 and 70. But I had decided to go on and fix the other 1571 first. Well during my trials and tribulations on it I noticed that during the alignment of the top head that depending on where you set it you got different readings, adding two and two together I concluded that maybe I could fix the 128D in a matter of minutes. Boy I was Brainstorming Now. I've heard stories about the 128D having drive problems and I sure didn't want to have to take mine to the shop or really spend any money on it, so here's the cure.

Seems that when Commodore built the 128D it was for economical purposes and that they can save a few cents by selling the 128D instead of a flat 128 and a 1571. Well the people who build the drives for the 128D look like they cut a few corners too. In the following example you can see a the spot I marked where it says this is the point of trouble. Well by not keeping a disk or support in the drive when its not in use seems that the head has a tendency to lean towards the unsupported side, (see figure 3) the weight of the read/write head coupled with the spring push the head towards it

unsupported side causing misalignment. Not really a radial misalignment but one which can cause mysterious things to happen, because the upper read write head isn't parallel to the disk media, causing bad syncs, poor headers and so forth.

Hopefully you can see what I am talking about, this may apply towards any newer 1571 also. The fix is relatively simple, simply use a screwdriver and pry up the read/write head using the clamp brace as a fulcrum. Don't apply too much pressure and keep the screwdriver off the metal spring or flex plate, keep it on the side of the plastic part of the head. !When you think that you have it right look at it and see if the head is pretty close to horizontal to the clamp bars see the next example.

So as not to confuse anybody and to try to make myself perfectly clear, the point is to pry the head from the side not the front by the read/write head, sort of in a counterclockwise motion. DO NOT GET CARRIED AWAY about 1/4 to 3/8 of an inch will do. Knowing that you do this at your own risk, please be careful. Prying the head too far up may cause different problems that you may or may not be able to fix. Do not by any means loosen adjust or mess with the screws that hold the head assembly to the stepper mechanism. It might be tempting to think that this adjustment could be made by these screws, but they don't!!!!!! These screws should only be loosened by someone who has a scope and a true analog alignment diskette and the skills to go along with it. Usually if this head is out of adjustment (other than by what I've been talking about) the disk drive is junked. Its just plain cheaper to replace it than try to fix it. Believe me it takes a lot of patience to set the upper head by hand. See example.

Now I hope that all of this is clear. If not please Email me and I will try to answer any questions that you might have.

Also I've included for your convenience a program which will format a Kaypro IV disk in 128 mode (*this program is not available from this CSTech2000 special issue, sorry!*). What good might this do you, well for two minutes of your time you can check out any 1571 and see if its got a problem or not. Periodically check your drive to see if its developing a sloping head. Even if you don't use CP/M the problem can get bad enough to start causing problems whenever you use both sides of your disk drive. I've left word of this on the Commodore hotline over in CIN, and as of yet have not received a reply back from them. I've asked them if this was a known problem or if there was some kind of upgrade that might be made available. If not either of these I've asked for a replacement manufacturer that could supply a drive body that would rest in the cradle, and accommodate the C= architecture. Besides a drive is a drive is a drive as long as everything gets hooked up correctly and has close to the same specs. The only reason I asked for a replacement was I know that repeated bending of the flex plate will cause the head to get farther and farther out of alignment, and I don't want to spend three or four hours guessing and getting it positioned close to use one of the commercial alignment programs available. Speaking of which If you buy one of these (either Cardinal or Free Spirit) let me warn you that neither one of these use a true alignment diskette. They use

a standard diskette which has been formatted in some odd balled manner and written with a code that the program can read and determine approx where the head is at. This isn't at all bad, but you can get misleading results and even then your not supposed to use the program to align your drive, you guesstimate from the data that the program gives you. Then rerun the program to check you results. A true alignment diskette costs in the neighborhood of \$50.00 by itself, and that doesn't include any program that checks it. (Dysan mfg.). All in all the programs are probably worth the 25 or 30 bucks if your inclined to do it this way. You can align close to specs, but don't expect miracles.

The Format program is included for your convenience. I did not write it, and it is available in the Applications section under Drive utilities 128. Sorry I don't know who wrote it or I would give them the credit they rightly deserve, its a fine program and works flawlessly.

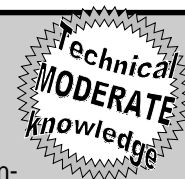
Hey let me know what you discover under your C= monster machine.

Kevin Schmidt
(Q-link aka KevinS28)

P.S. A damn good alignment program is available called Multialign 1.6 its on Q-link over in the 64 drive utilities and various other places. (it doesn't like any drive other than # 8 on a 128D) supports up to 4 drives and runs under 64 mode, will only check a 1571 on side 0 or in 1541 mode !!

Drive Rename

by ERIC PICKUP



Now that you have two disk drives connected to your computer, it is time to rename the second drive as "Device 9". The following step by step instructions will enable you to quickly and easily get the system up and running. Firstly remove the four cross head screws from the under side of the 1541. Once removed turn the drive over and carefully remove the top cover. Look at the drawing of the drive locate the two circular jumper pads. Cutting jumper 1 will add 1 to the device number ie 8+1=9. By cutting jumper 2 only you will add two to the device number ie 8+2=10. For those who want to go a step further and add a third drive then you would need to cut both jumpers 1 and 2. Which will then give a device number of 11. ie 8+1+2=11. It is also an easy addition to connect a small switch that can be fitted in the rear panel of the drive this will allow you to change the drive device number from 8 to 9 at the flick of a switch. To connect a switch simply cut the appropriate jumper and with a fine tipped soldering iron connect two wires, one from each half of the jumper pad . These two wires are then connected to a single pole switch fitted in the back panel. Once completed replace the lid and refit the four screws.

Select the device number if you have fitted the switch and then away you go. Should your new drive be a 1570 then it's the same procedure as the 1541. If however you have the 1571 Double Sided disk drive or the 1581 3.5inch double sided drive then the task is much easier. On the back of both machines are 2 switches for the device number change. Fig 2 shows you which combination the switches need to be in to set to the various numbers. It is also possible to set the device number within software but as it is unlikely to be of much interest to the average GEOS user and so it has not been included in this short article.

When the lights - - go out... !

I'm writing this as an advisory piece from personal experience. Amongst my collection of C64 hardware I have four Commodore disk drives, a 1541, 1541-C, 1541 MKII and a 1571. The latter three are permanently connected alongside a CMD HD, FD and Ramlink. As you can imagine the Commodore drives don't see too much action as the CMD devices offer superior access speeds and storage capacity. I do however still value the presence of the Commodore drives, so when I noticed that my 1541 MKII was not lit up as usual one evening I was concerned. This was my first disk drive and I'm quite partial to it.



Late one night noticed that the power light was not on (it is often obscured by other things which clutter the space in front of it) and this may have been the case for a long while. I found that the drive motor was running continuously but the drive would not respond further. Obviously the power pack was supplying power to the drive otherwise the motor would not run. Next morning (it was too late to start work on it then) I took the drive apart and checked the power socket and its solder joints on the main board. I also re-soldered the solder joints for the power switch. I have suffered problems with my C128 power switch which is all but identical to the switch fitted to 1541 MKII disk drive drives. Putting the drive back into its box to avoid the possibility of anything shorting out, I tried the drive again, no luck. I then decided to just double-check the supply, I didn't fancy my chances if there was a problem in the chips on the main circuit board of the drive.

I will say this now, as it is VERY important. The connectors for many Commodore devices have metal surrounds around the pins, these are connected to the earth pin and therefore making contact with either the pin or the surround and any live pins will short the supply out - be careful. Some power supplies like those for the C128 are screwed together and it is easier to test inside rather than at the end of the lead. Other supplies like those for the C64 and 1541 MKII are sealed so you will probably want to test before cracking them open. If you open any supply you are exposing yourself to the mains, make no mistake, YOU MUST KNOW WHAT YOU ARE DOING! Also ensure everyone knows, don't leave the supply unattended even if unplugged, someone else may accidentally connect it. If you don't know what you're doing, leave well alone, you only make one mistake and it will be your last. If you don't have an RCCB (Residual Current Circuit Breaker) in your mains distribution board get an RCD (Residual Current Device) adapter and use it, it could save your life. As I'm sure Alan will second, you do any of the following at your own risk, neither CS, Allan or I take any responsibility for your actions or their consequences.

The best way to test the sealed supplies is it to insulate the metal surround on the inside surface (that which faces the pins) and make the test meter's negative connection on the outside. Use the other test meter lead to make contact to each pin in turn. The 1541 MKII has 2 supplies, 12V for the motor and 5V for the brains. I could not get a 5V reading, instead about 2-3V. I decided that this could be the cause of my problems so I decided to open the supply. To do this I tapped a thin flat bladed screwdriver into the join around the power pack using the handle of a larger screwdriver. This is a slow and delicate job, don't hammer too hard and start on the sides since the ends and corners are well glued. There is no need to prize the bottom off, you'll only break it, instead break the seal all the way round. Inside the transformer and board are buried in a solid mass of potting compound. The compound is mixed, poured into the case and sets, insulating the whole supply and preventing anything moving. This material also conducts heat well so no air vents are needed. This compound will just cover the board making it difficult to get a connection with the wires and joints inside. You can melt the compound with a soldering iron to get a fresh connection on the output wires (keep the workspace well vented during this procedure). Having done this myself I was able to get 5V once but most of the time I couldn't get a reading. When I did get 5V, it was lost as soon as the drive was switched on and took a while to build up from mains switch on with the drive off. If you take a reading as you switch the mains on, the meter should reach either 12 or 5 volts instantly. This supply, being buried in compound keeps the mains safely away from reach but the secondary connections are accessible, although at lower voltage, high current is possible so care is paramount.

The fact that there was a reading, although low and unreliable, led me to believe that a 'dry solder joint' was the problem. To rectify this problem I needed to re-solder the connections on the board. The only problem is that it has a thin coat of this compound over it. This can be chipped away using a thin flat bladed screw driver in a chisel like fashion being hit gently with another screw driver handle or small hammer. I was very gentle and kept the screwdriver horizontal, I don't want to damage the board by driving the tip through the tracks. Once the board is cleared the soldering rectified the problem bringing my drive back to life. The base of the pack can be re-secured with glue and the drive can be used again. If a problem was to develop with the components on the board you would need to extract the board from the compound, a very difficult task though probably not impossible. The compound is brittle and responds to chipping so it should be possible though I'm not going to try until I need to!

My main point is that you should always look for faults starting with the basics, check the power supply first, it's too easy to assume that they are fine just because something works. The fact is that power supplies often supply several different voltages, all of which must be present, and fully healthy for normal operation, low current supply also poses a problem hence the need for more powerful C128 supplies etc. Of course I hope no one needs this information, its best that things keep working, for a very long time.

Mark Vowles



COMMODORE & CD ROM

Technical
EASY
Knowledge

Although we 8 bitters are often laughed at, sometimes ridiculed, there is no forgetting how much we have progressed since the heyday of CBM. Thanks to CMD we have some of the finest hardware to add to our system. We have also gained over a short period of time new operating systems (WHEELS and MP3), plus new programs. Now the ultimate, connect your Commodore to a CD-Player. The program I have, comes from Allan via Dale Sidebottom in the States (who I believe is the authorised supplier for that country). The programmer and I hope I have got this correct is ACHIM TAEGET from Dueseldorf in Germany (e-mail to achim.taebet@t-online.de). No price available at the moment but I am sure Allan will include it in CS when it is known. (e-mailed Achim, awaiting reply).



Please see a current issue of Commodore Scene for details.

WHAT'S NEEDED

CMD HARD-DRIVE SCSI-2 (trying to find out if SCSI-1 is compatible)

CD-ROM DRIVE-SCSI-2 (obviously external)

CD-ROM COMMANDER 128 (80 columns only & 64K video ram required)

Cables - Hard-drive bare, no units scuzzied : 25pin DBS plug to a 50 pin plug. (RS number 218-302 - Maplins will more than likely do one)

Hard-drive scuzzied to other hard-drives : 50 pin to 50 pin plug.

The external PC CD that I have, would not work when I

tried it out. It only had a jumper for Master or Slave, when device switches are really required. All is not lost though, step in that other old CBM stalwart that is still going—the Amiga. The one I have connected works just fine, although it is only a 2 speed model, it has everything that we require.

- 1) SCSI 1 and 2 compatible.
- 2) A 50 pin socket.
- 3) Set to device 3 with termination built in. (jumpers to switch device numbers—mine is set to 5)

Although the model I have is probably obsolete and superseded, the newer versions will most likely still be the same if the drive is to be connected to the Amiga PMCIA port. Mine was purchased from :

Hisoft Systems
The Old School
Greenfield
Bedford
MK45 5DE
Tel:- 01525 718181

All you have to be certain of is the following:

1. Is it SCSI-2 compatible
2. Does it have a 50 pin socket.
3. What is the device number and can it be altered.
4. Is the unit terminated.

I will be doing a article for Allan and CS, on this program but I can tell you that at this time (18-11-99), I have read Amiga and PC CD's. Transferred files from both to my C128.

Happy Computing
Dave Elliott

It is now possible to get a fully Commodore compatible external CD-ROM drive (see picture on left), the software to run it and the CMD HD (below) directly from Commodore Scene. Please see a current issue for availability, prices and details.

Commodore Scene. Please see a current issue for availability, prices and details.



RAMLink

Technical
EXPERT
knowledge



** ADAPTATIONS **

- if you dare !!!

DISCLAIMER: Information in this column is presented for education purposes only. In no event will Commodore World or Creative Micro Designs, Inc. be liable for any direct, indirect or consequential damages resulting from the use or misuse of this information.

Since CMD's RAMLink was designed to allow either a Commodore REU or a GEORAM to be installed in the RAM Port, and because these two devices use different I/O pages, it was necessary to disable those I/O pages on the Pass-Thru port whenever DIRECT access to the RAM Port was selected to ensure against memory conflicts. Unfortunately, this means that you can't use a

SwiftLink in the Pass-Thru port while maintaining direct access to an REU in the RAM Port.

The modifications in the pictures below show how you can maintain operation of the \$DExx I/O space on the Pass-Thru port while using a Commodore REU in the RAM Port in DIRECT mode. In lay terms, that means you can download to your REU directly while using a SwiftLink and RAMLink together. The 'down side' is that your RAMLink will no longer be compatible with a GEORAM, BBGRam, or RAMDrive.

To perform the modifications, you'll need a soldering iron, some solder, a utility knife, wire strippers, and some hookup wire (preferably solid wire-wrap type).

Since there are two versions of RAMLink, two sets of instructions are given. The revision number

on the bottom of RAMLink determines the version; revisions beginning with a "2" are version 2. You'll have to disassemble your RAMLink and remove the main circuit board, since the modifications are done on the back of that board in the lower left quarter. Simply make the trace cuts shown in Detail 1, then install the jumper wires shown in Detail 1 and 2. Now reassemble your RAMLink. The DIRECT switch will no longer disable a SwiftLink (set for the factory default).

If you don't have the necessary skills to perform the modifications, CMD can supply a simple replacement chip (P/N: RLDIRECT) that does the same trick for \$15.00 plus shipping. This chip will only work if your RAMLink is a version 2, or Revision 1 (version 1).

RAMLink Version 1 Modifications

1. Cut these two traces, then
2. Attach the two jumper wires.

RAMLink Version 2 Modifications

1. Cut these two traces, then
2. Attach the two jumper wires.

RAMLink

- Fitting a Fan to the RamLink/SCPU Combo By Colin J Thomson
E-mail colinjt@dircon.co.uk or colinjt@videocam.net.au

FITTING A COOLING FAN

Technical
MODERATE
knowledge

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



I choose to fit it 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 an 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 the 128D PSU's) and its about the size of a match box, 40*40*12mm. It is fixed onto the side of the Ramlink with 2 counter sunk bolts. I used a 12v Fan and the power for this was taken from my HD or 1541-II PSU. I believe there is a point inside the

128 which supplies 12v which maybe worth looking into. You could use a 5v Fan and take the power from the User or Cassette port or the Back up battery. ****Remember! Backup everything First!**** and observe the usual Static precautions!

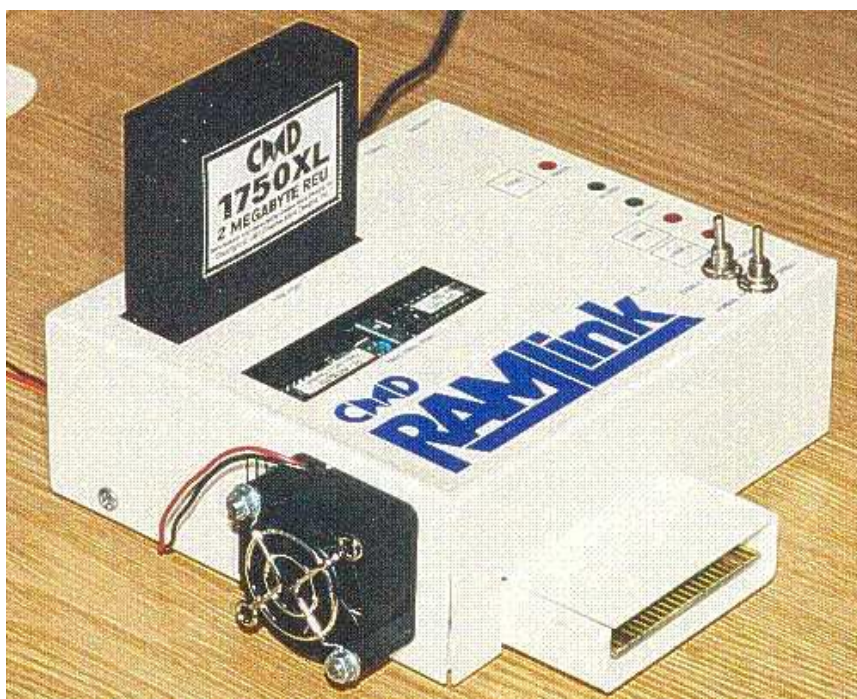
Ok once you have switched off your computer, removed all the Power to the RL and the Cartridges you can now unplug it from the computer and remove the lid. The lid is held on with 4 screws, basically its what you do to add some Simm's.

Once that is done you will see a Ribbon cable which connects the switches swap/reset etc to the Main Board. Mark this connector so you know which way round 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 straight forward.

Once the board is removed I would recommend that you cover the "windows" where the LED's shine through and the "swap" switches are, so no swarf can get on them as they are a little "sticky" and the "Filings" may get stuck to them.

I found the best place 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





REU

Technical
EASY
knowledge

UPGRADE ADVICE

*Raymond J. Day 9601 Morton Taylor Road
Belleville MI, 48111-1328*

Hi, I have been wanting to make up a file and send to people so they can do the job them selves, if you can. Because a lot of the letters I get from geoWorld ask for more info and they just don't want to send there REU to me. I have got very many orders from Q-Link! All most 50! They can E-mail others to see how they liked the job I did. I got 1 REU from GeoWorld and the person did not send me a letter first, just his REU to do it to 1 meg. I got one letter saying they would be sending there REU in a week, but that was all most 2 mouth ago. So this is why this is taking me so long for some of you to answer. I am very discouraged by not getting any REU's. Some have sent me SASE's thank you! One person sent me a \$1, thank you! I have check good and found out I have 3 people who did send me letters from GeoWorld. But I did not know that till after I did this letter. Well I will try to answer all the questions in all the letters in this one letter. My prices as of 1-31-91 are: 128k to 512k \$40 \$36 256k to 512k \$25 \$22.50 256k to 1 meg \$75 \$67.50 256k to 1.5 megs \$110 \$99 256k to 2 megs \$145 \$130.50 512k to 1 meg \$60 \$54 512k to 1.5 megs \$95 \$85.50 512k to 2 megs \$130 \$117 The prices on the right are 10% off for Users Groups. They have put me in there news letters a lot, so to return the favor I will give a 10% discount ty person that sends their REU to be upgraded, but the check must be from a users group. I warranty my work for 90 days and my prices include shipping and handling. I have done Roger ledbetters REU to 2 megs and Peter Hughes to 2 megs. In the next geoWorld I think they will talk about how they are. I do a very very good job and at very good prices! just check out how much it will cost you for the parts and it all most = what I charge. I get a lot of ram chips at a time for a good price. And No I don't want to sell kits. This is a kit right here on a disk that I am sending you all. All the info to do it is on this disk. With some other Geos goddies. You can send your Ram Expansion Unit by mail so I have to sign for it if you like. I will send it back the same way you sent your REU to me. Most all the time I do the upgrad the day I get them or the next. You should not be with out it for more then a week. If you like send \$10 more and I will send back next day air mail. I will put on this disk in a SEQ

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 one in each "opposite corner".

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 fix on 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 "contact" 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!

Parts required :- 5v or 12v Axial Fan, a Grill to cover the Fan (Optional) 2 suitable long bolts (countersunk) nuts and washers..

The fan is available from Farnell Electronics, telephone (0113) 263 6311.

Part N.o's 12v Fan 926-127, 5v Fan 224-364 and a Grill to cover the Fan 735-954. 2 suitable long bolts, nuts and washers..

Colin J Thompson

format the comments I got from people on Q-Link. I started doing this because I seen how much other people are charging. I hat it that they make a LOT of money for this work. Because I think they are taking advantage of people. So I started telling people I would do it. Because my REU works so good! It is super to have a RAM 1581 in GEOS! I know I did a good job on mine and I thought if people could see it they would like it. With 2 megs you can have 2 RAM 1581's and a Shadowed 1541. You can only have 3 drives with Geos and 1 has to be a real drive and on exiting configure the real drive can not be drive "C" You need Configure 2.1 to use the meg or megs of RAM. The 64 and 128 versions of configure 2.1 are on this disk. You can put Configure on your boot disk now. You will not see any different unless you have more ram. To do it take your boot disk and drag the old configure 2.0 to the boarder then delete it. Than copy configure 2.1 to your boot disk. Melvin Montgomery on Q-Link really put me down. But I don't think it get him more orders. He said he was sorry after. He side I use tape and work flipping hamburgers, That my REU work would not last long. He never seen a REU that I did that I know of. If he did, I am sure he would not of said things like this. I do work at McDonald's. But I can do a good job expanding REU's. I will leave the file (of what Melvin said) in SEQ format on this disk. It is named "fixer still" Yes the 1764 can be a 1750 The switch I put in puts your REU back to 1750 mode if some software will not work with it. But most do. Doing your 1764 to 512k is just like the 1750 clone! even better because I put the ram chips right in the board not in sockets. I have upgraded 3 1750 clones all ready. All software test too see if your REU is 256k or 512k. So if you have a 1764 256k REU, all software will still work with it in 512k mode. A lot will work in over 512k mode but not use the over 512k memory if it was not programed to use it. 128's basic will work up to 1 meg all ready! The Fetch, Stash, and swap commands. The last number don't have to be 0-7, it can be 0-15 with a 1 meg REU. You can be sure you will get your unit back by sending it so I have to signe for it. I am telling you this so you can trust me. Becuae most people will not send there REU's who are not on Q-Link. I guess because they can talk to me back and forth with E-Mail and see other peoples comments and E-Mail them. I would like to be paid with a money order but a check is ok. I have to trust you too. All the info is on this disk so you can do the job your self. I even put a geos paint file on here that I did to help as much as I can! But if you still don't think you can do it I will, and I really do a very good job! One person did have a problem with the upgrades I did. It was avter the 90 days. But I fixed it for him for free. It was my fault, one pin was not solder on good. I would warranty them for over 90 days but Commodore only warrants there REU's for 90 days. This is out of over 70 REU's I have did all ready. So if any thing goes wrong after the 90 days just call me. If I can I will fix it for free if it is my fault. But I am sure this is very rare. 1 out of over 70 is very good for a job like this. I know some of you are from Canada. I never did do a REU from Canada. I think It my cost more to send over here. If some one does it I will send a letter to every one else in Canada that sent me a letter telling how to do it and how much it will cost. I will just add the cost for going over to Canada. But some one has to do it first. I don't think it would be a problem. Yes the upgrade will work on a 128 as well as a 64. If you have a very old 128 tell me and I will put a 390 resistor in R4. I guess that is what it is for. One person called me and said his 1764 don't work on his 128 but does on a friends. He never let me know if he got it working, but the R4 resistor is the only difference between a 1764 and 1750, and the 8 ram chips. But this is super rare only some very old 128's have this happin. With just 1 meg you can have a RAM 1581. If you have put your 1764 to 512k your self. I can still do them up to 2 megs. With the "512kalt.sfx" file you do not need a circuit board! All the wires that come off the 3 stacked chips go to the REU board. If you made a circuit board to fit the 3 IC's the same wires would come off. So I think the 3 stacked chips are easier and better! I use them now. I have had no problems of mailing the REU's. Just pack them up good and you should ensure them. At the very most I would have a REU about a week. This is if I run out of RAM chips and have to order more. But I try to order them when it looks like I am getting low. Most times I get them done the same day I receive them in the mail. Some times the day after. If you do send next day mail it gets here about noon and that is what time I get home from work. So It gives me enough time to get one done by the time the post office closes. If you don't have a REU for your 128 or 64 get the 1764. You can find them at Tenex for \$114.95 they still had a lot last time I checked. call 1-800-PROMPT-1. The 1764 comes with a very good power supply. It can handle the 2 megs super easy! If you have a flat 128 let me know and I can make a cord if you like for just \$3 more so you can use your new power supply on your 128. It comes with a 64 plug and I can make a cord to plug in that plug and in to your 128. I would need your old cord that plugs in to your 128 so I could use the end connector. That's only if you have a bad power supply. A 128D is good too. Roger Ledbetter has one and a 2 meg REU. So do others and they have no problems. You could all so sell the power supply for about \$30 or more if you have a 128 and don't need one. My 128 with all I have on it, 2 megs, 512k + 64k + 64k Video ram, a 2nd SID chips for stereo, a battery backup clock, a mouse and modem, My color memory is 8 bits wide not just 4. It uses 3 amps at 5 volts. The power supply that comes with the 1764 and 128 is a super good one at 4.3 amp. It don't even get hot with my computer. I put the 512k in my 128 by the Transactor magazine, August 1989 volume 9, issue 6 there last one. But I did it on my 128. I like the REU a lot better. But that is another story, the internal 512k. The switch makes your REU 100% compatible with all software. In expanded mode it will work with all most all software but will not take advantage of the more ram. Super Snapshot V5 works 100% with a 2 meg REU. Ralink will work with a expanded REU when it comes out. 128's basic works with a 1 meg REU! Getting the memory in your REU is cheaper then getting it in RAM link. You can use your

REU with other things too. RAM link should be out by February 1991. It will come with a new better GEOS! That is another story too. It is by the same people who make Jiffy DOS. The switch will put the REU to 512k mode not 256k mode. But 512k mode and a 256k 1764 both work the same only the 1750 has more memory. You do not need a switch, Software will take care of it. You do not need a 1581 drive to use an expanded REU. You can file copy the files with geos to a RAM 1581. Ok, GEORam: Recently Melvin Montgomery has been putting GEORAMs to 1 and 2 megs. I think he is doing this job for a good price! I don't think I would do it for any cheaper. So if you have a GEORam yes it can be upgraded. GeoREP jim on Q-Link made the Configure file work with an expanded GeoRAM too. I will put that file on this disk in SEQ format right from Q-Link that tells about it. He is working on getting it battery back uped. I don't have a GeoRam so I don't know too much about this. So I will put the file about it on this disk. I think they will have that in the next geoWorld too. I have looked at all the letters and it looks like I have answered all the questions. but if you have more please call me. It takes a lot of time to do this. On the phone would be easier. But I think I have answered all of you.

Sorry it took so long for some, but I have not been getting any REUs from people who I sent out letters too. Most people want to try it themselves, it looks like. I have tried to help as much as I can. It all so takes a lot of time to do this. If you like could you please send me at least a \$1 for this disk? But you don't have too if you don't want.

I hope you do well expanding your REU's! I promise I will do a fast and very good job if you can not do it yourself!

Raymond J. Day January 31, 1991 - RaymondD2 on Q-link

UPGRADING A 512k REU to 1 meg.

It is important to realise that this is
NOT an instruction on how to do it,
but a report on how I chose to do it.

Technical
DIFFICULT
knowledge

I have had no training in electronics, so perhaps my timid approach may help others who are reluctant to start this project.



The GeoPaint and GeoWrite files having the logos shown left, are the USA ones that Frank sent me. My approach was based on these. Believe them utterly!

My own records are on files with logos bearing their page numbers.

I used a 15 watt soldering iron with a firm bit, a miniature electric drill and a fretsaw with a fine metal cutting blade.

Like our American friend said, be very CAREFUL and NEAT. Mistakes can be expensive, so get someone to check your work or do so many times yourself.

As is normal, alterations that you make are made entirely at your own risk, and neither the authors or publishers of this report can accept responsibility for any consequences of your actions.

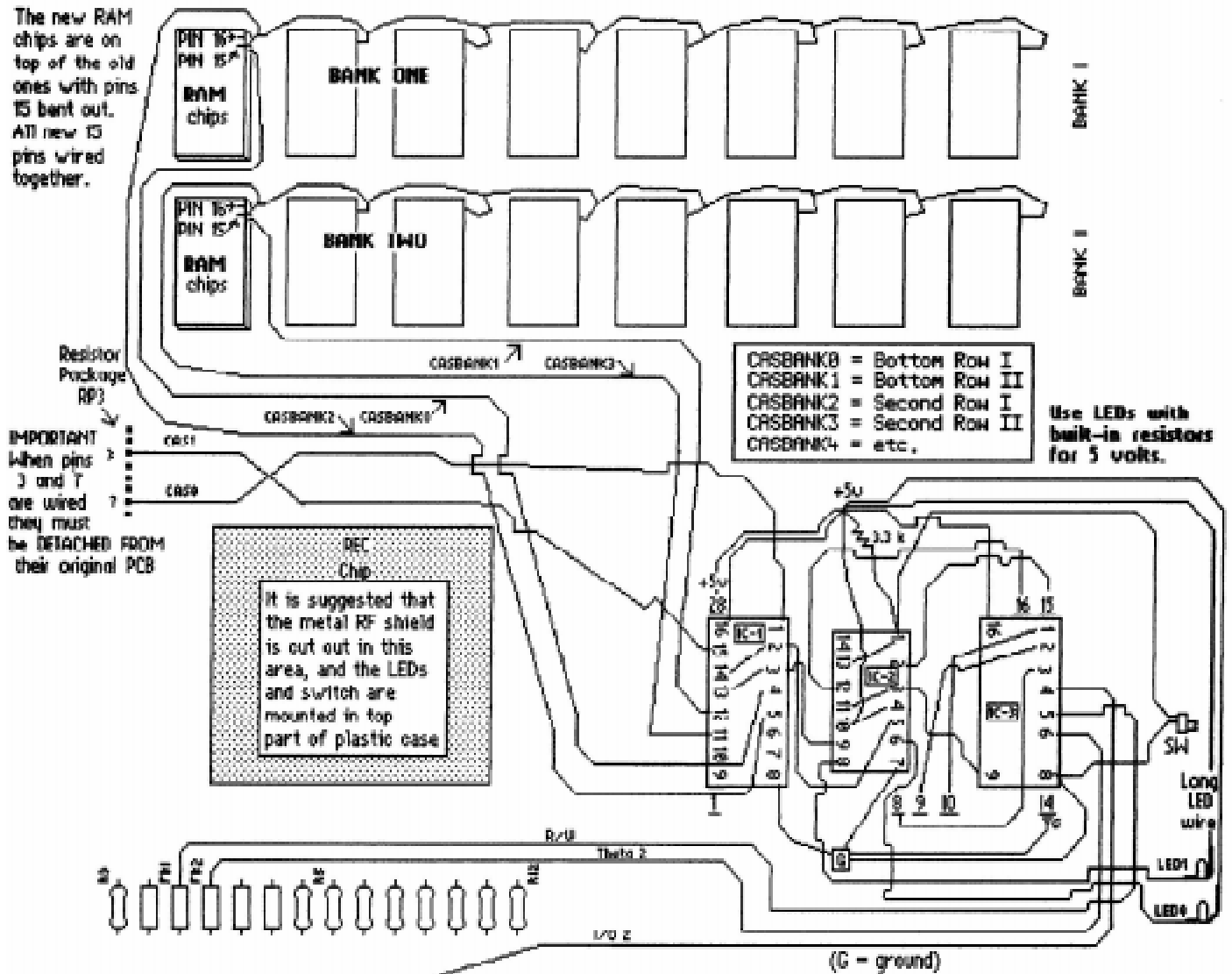
Stan Bréhaut
Eastleigh.

For Continuity Testing:

Pins 1, 3, 5 to 13, & 16 common to both banks & all DRAMs.

Pin 4 common to its own bank only! Pins 2 & 14 common to same DRAM in other bank. (For example: U2 & U10)

The new RAM chips are on top of the old ones with pins 15 bent out. All new 15 pins wired together.



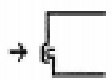
In the interest of clarity, the unused pins in IC3 and U18 (except for pin 1) have not been drawn. Pin 14 of U18 provides the ground, while it's pin 20 gives +5v. All possible connections are direct to these points except that the switch ground is pin 8 IC3. The cathode (-) of the LEDs go to pins 6 and 8 on IC2.

If the extra pieces makes for a too tight fit, then cut down the lugs on the back pegs - like this:



This way your board can go down a little more in the back and the REU can close all the way. Then bend the top part of the RF shield on the outside like this:-

Section of side of metal shield showing new fit of Top outside of bottom. (Opposite to original).



This is a version of both the US Geopaint files, in which I have attempted to condense and simplify all the data.

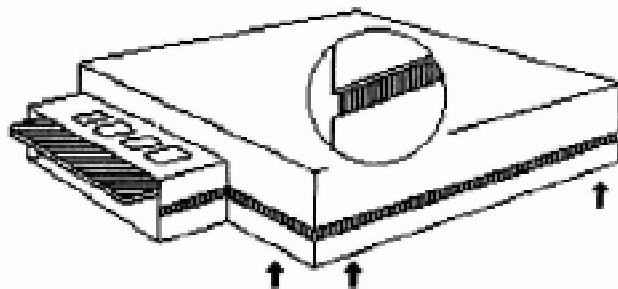
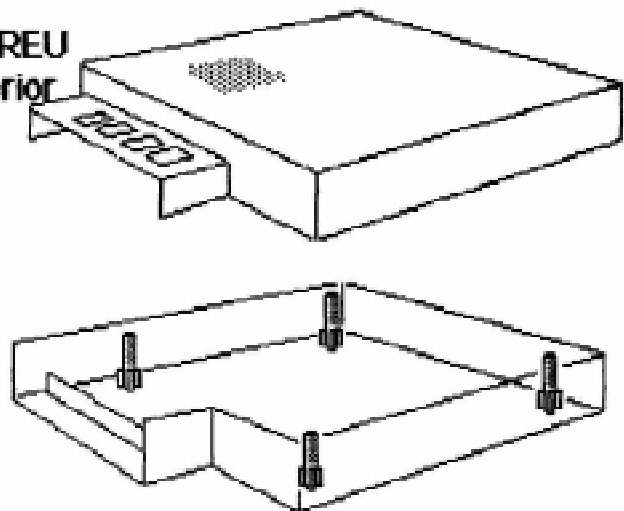
VERY IMPORTANT
 ← That this square prints 1x1 inches if you use PCB pattern.

Before doing anything constructive, I thought I would open up my 1750 clone REU and make a GeoPaint sketch of it's interior

At first sight, there seems no easy way in, until you discover that the REU is merely contained in a plastic box, held together with tight fitting pins.

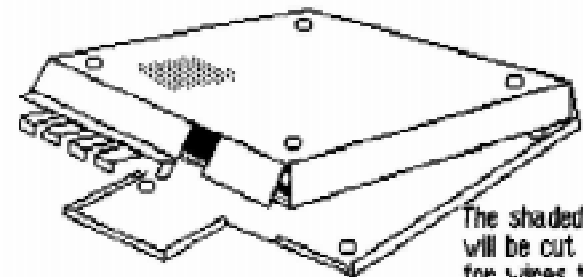
The printed circuit board has a hole in each corner and is contained within a tin 'book-fold' box with matching holes in the corners. This in turn, is contained in an outer plastic tray and lid, located by plastic pins (part of the bottom tray) which pass through the holes in both the tin box and the board.

The shaded area is where the switch and the two LEDs will be.



The way I gained entry was to put the blade of a medium sized screwdriver into the channel between the top and bottom parts of the plastic outer case, and rotate it SLIGHTLY at a point near the corner, indicated above by an arrow. This operation had to be repeated, in turn, on each side of each corner, so that the top was GRADUALLY prised away from the bottom.

The tin inner box, containing the printed circuit board, is then revealed and has to be carefully lifted out of the bottom.



The shaded area will be cut out for wires to go to the switch and two LEDs.

The next operation needs delicate handling. The printed circuit board needs to be slid out like a drawer, from the top part of the tin container. First, the top and bottom halves of the two long sides and the short front section have to be gently released from each other. Now the top and bottom can be slightly opened up like the covers of a book and I had reached the stage illustrated above.

Next, I had to further bend upwards the two front flaps, the short one and the one with four fingers, until the printed circuit board had clearance to be slid out.

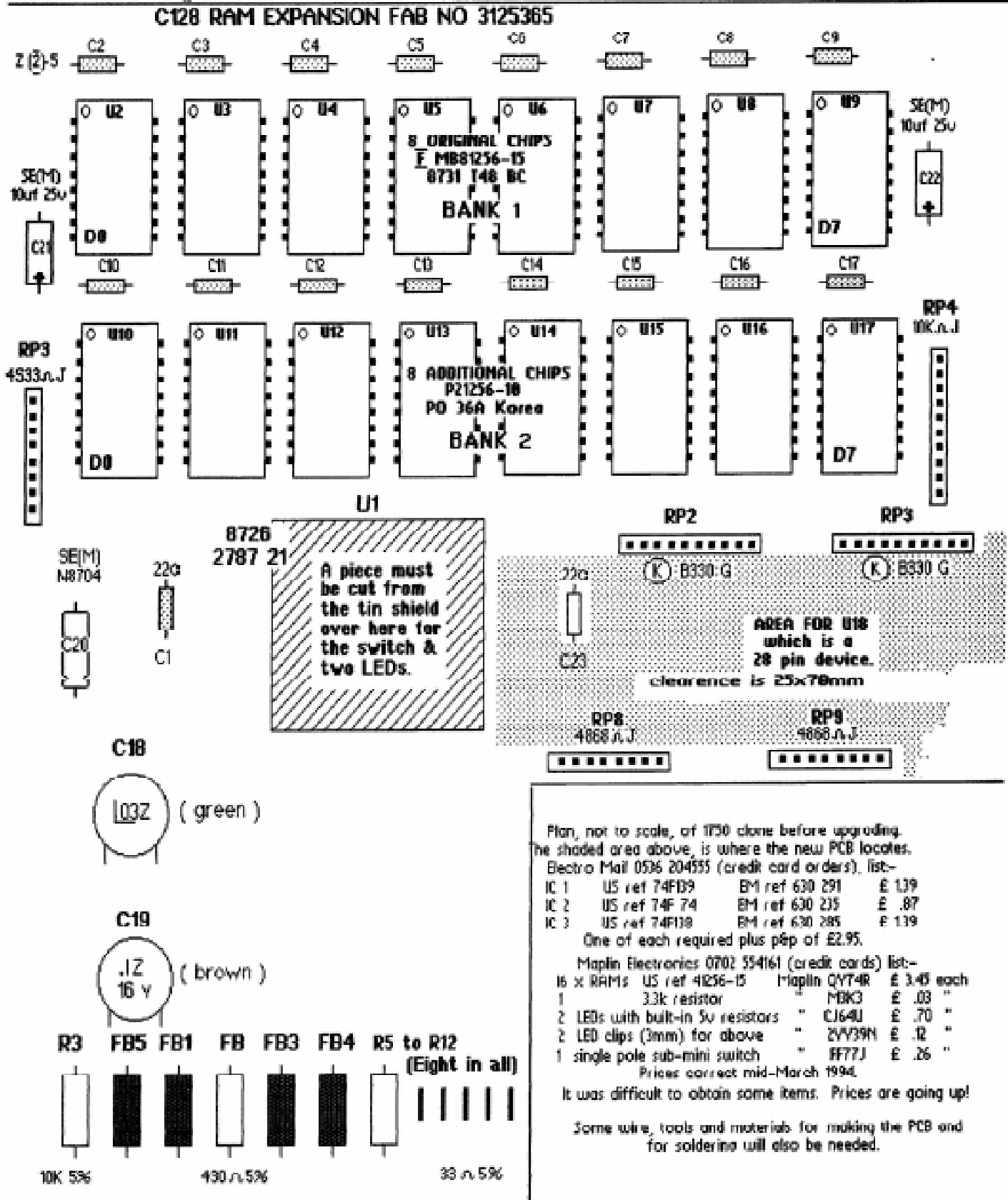
This was the first hurdle, and I then put the REU into my C64 to do a quick nervous check (the first of many) to make sure that it was still working!

The next task was to draw the REU and decide how the job would be done. I didn't much like the USA idea where the chips were superglued on their backs, nor did I like desoldering RP3 to avoid wires going under the board

What I decided was to pass wires through the REU board, and etch another small PCB to firmly locate the three new chips in a small area which was clear and big enough to house it.

The layout of my 1750 clone.

Before any alterations.

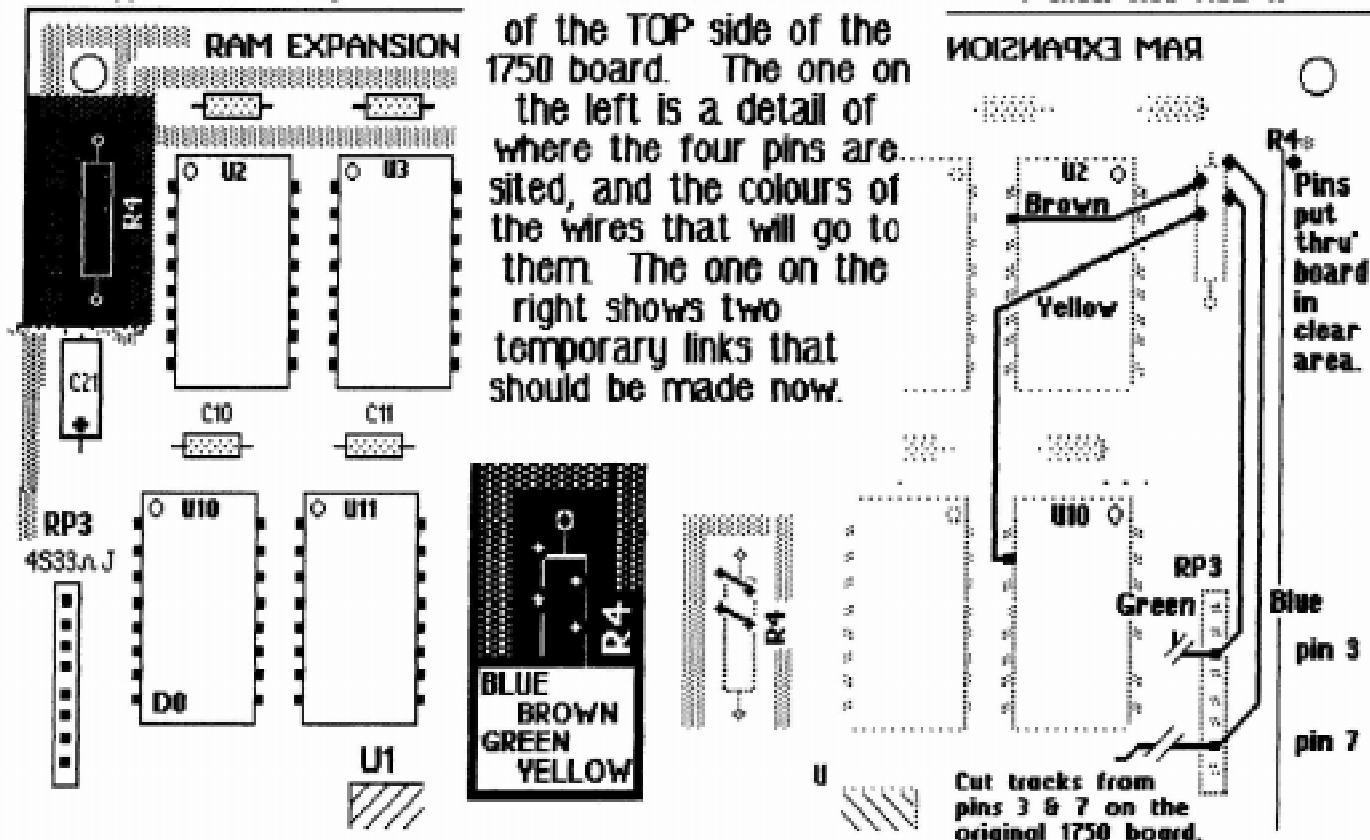


In order to make the wiring easier to follow, I bought 1 metre of 10 core ribbon cable and from here on, these are the colours that I used.

FOUR 1mm PCB pins were inserted through the board in area clear of copper tracks. (top side view)

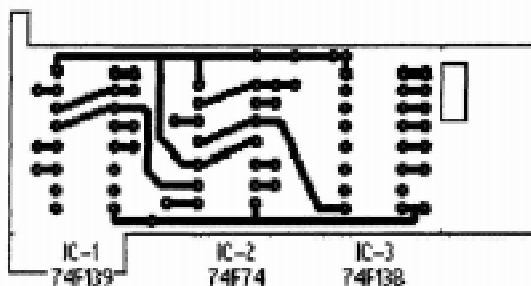
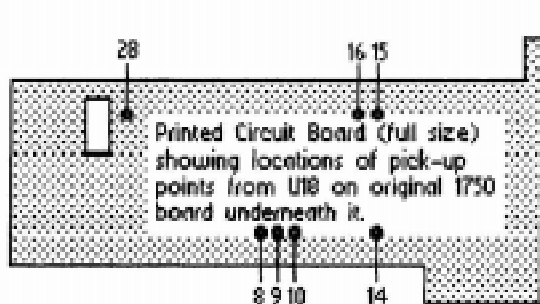
Below are two sketches of the TOP side of the 1750 board. The one on the left is a detail of where the four pins are sited, and the colours of the wires that will go to them. The one on the right shows two temporary links that should be made now.

ADDITIONAL WIRING ON THE UNDERSIDE OF THE ORIGINAL 1750 CIRCUIT BOARD. (under side view).



Having completed the above I then put the board back into the C64 to check that it was still working.

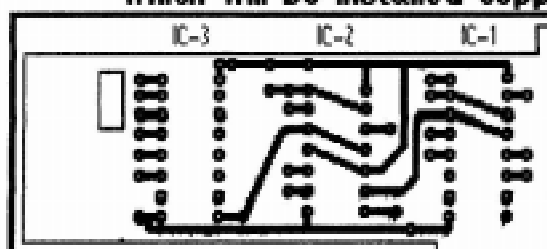
I decided to mount my three 74 series chips onto a small board installed component side up in the location marked for U18 on the 1750 board. Below are the full size patterns for an insulated sheet and the new board.



Copper side of new printed circuit board which will be installed copper side down.

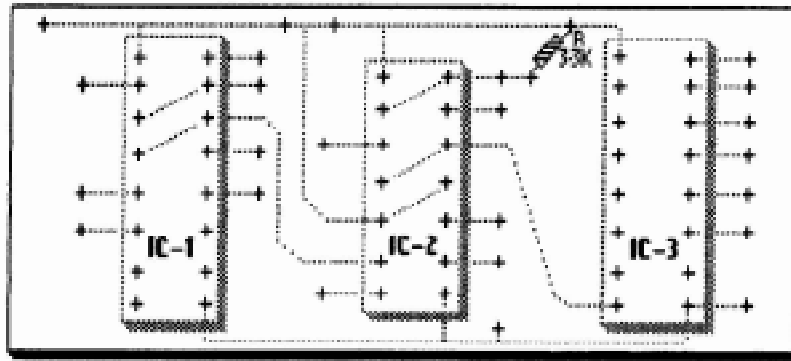
Thin insulation sheet, showing the pick-up points for wires from U18.

This may need the edges notched to allow wires to clear bordering components.



Use this template ONLY IF YOU ARE INSTALLING THE BOARD COPPER SIDE UP

These plans show the wiring scheme and should be read with reference to the printed circuit board.

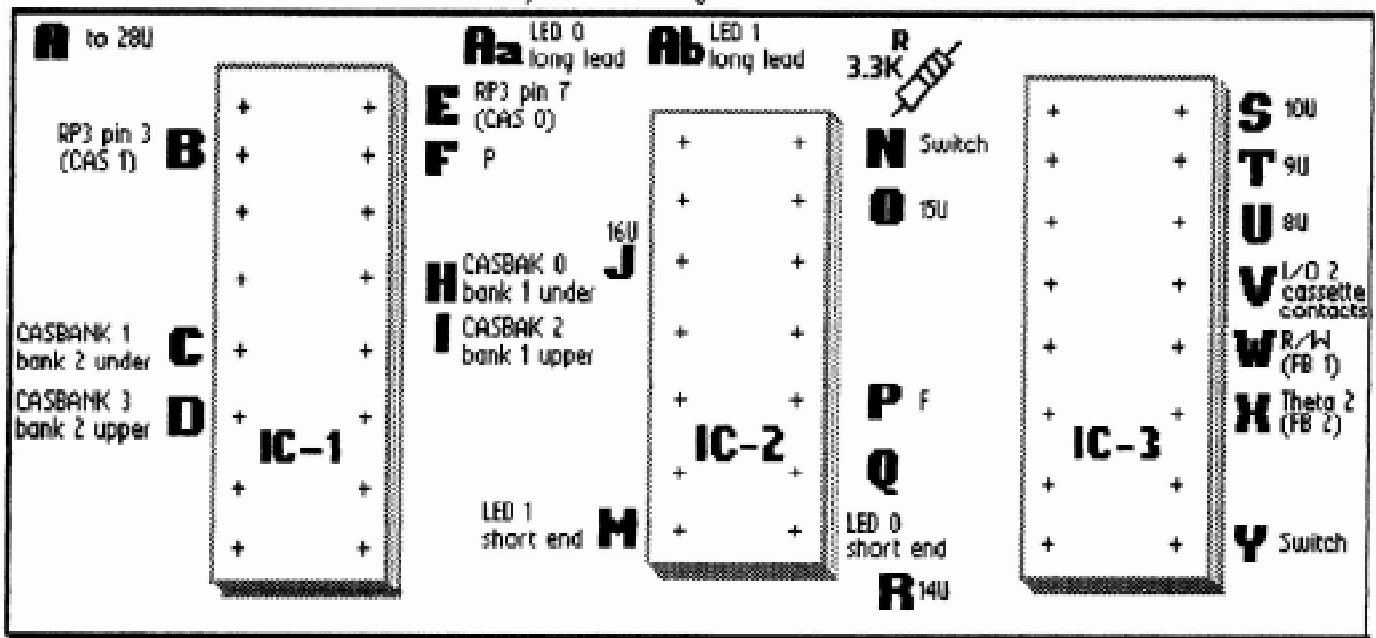


GENERAL VIEW OF BOARD to show copper tracks relative to the ICs that are pins up, underneath.

- IC-1 = 74F139
- IC-2 = 74F74
- IC-3 = 74F138

THIS IS AS SEEN FROM THE PRINTED CIRCUIT (COPPER) SIDE OF THE BOARD.

to A **28U** These codings are the pin numbers from the site of the U18 location (on the 1750 PCB below this extra board) followed by U. to J **16U** to D **15U**



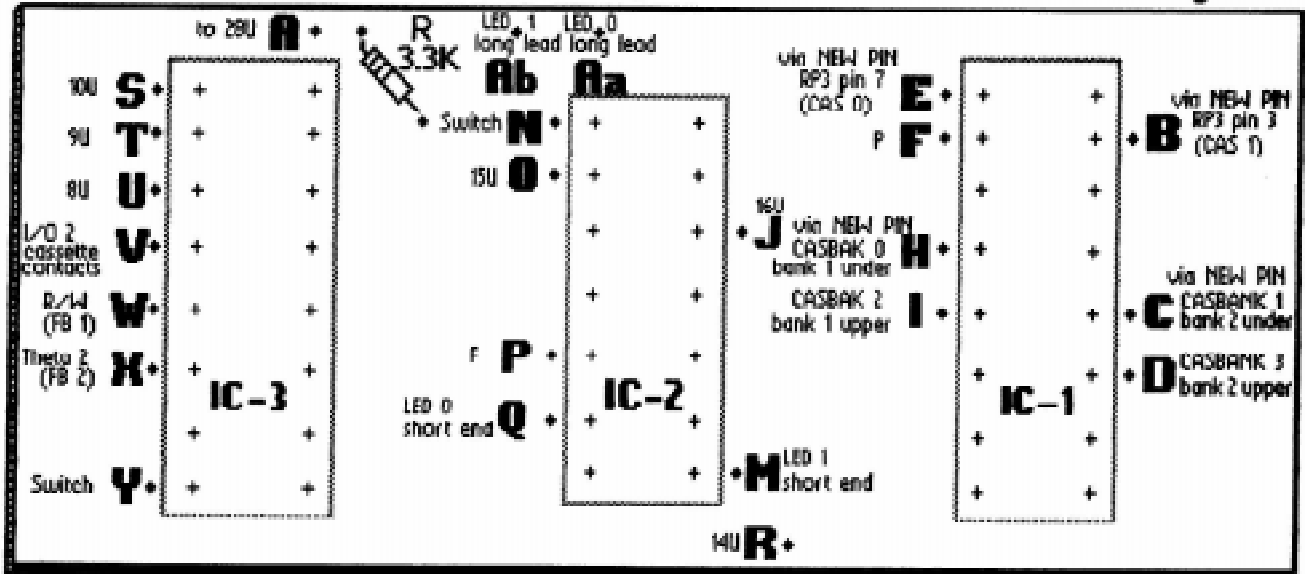
8U **9U** **10U** **14U**

WIRING POINTS AS SEEN FROM THE PRINTED CIRCUIT (COPPER) SIDE.

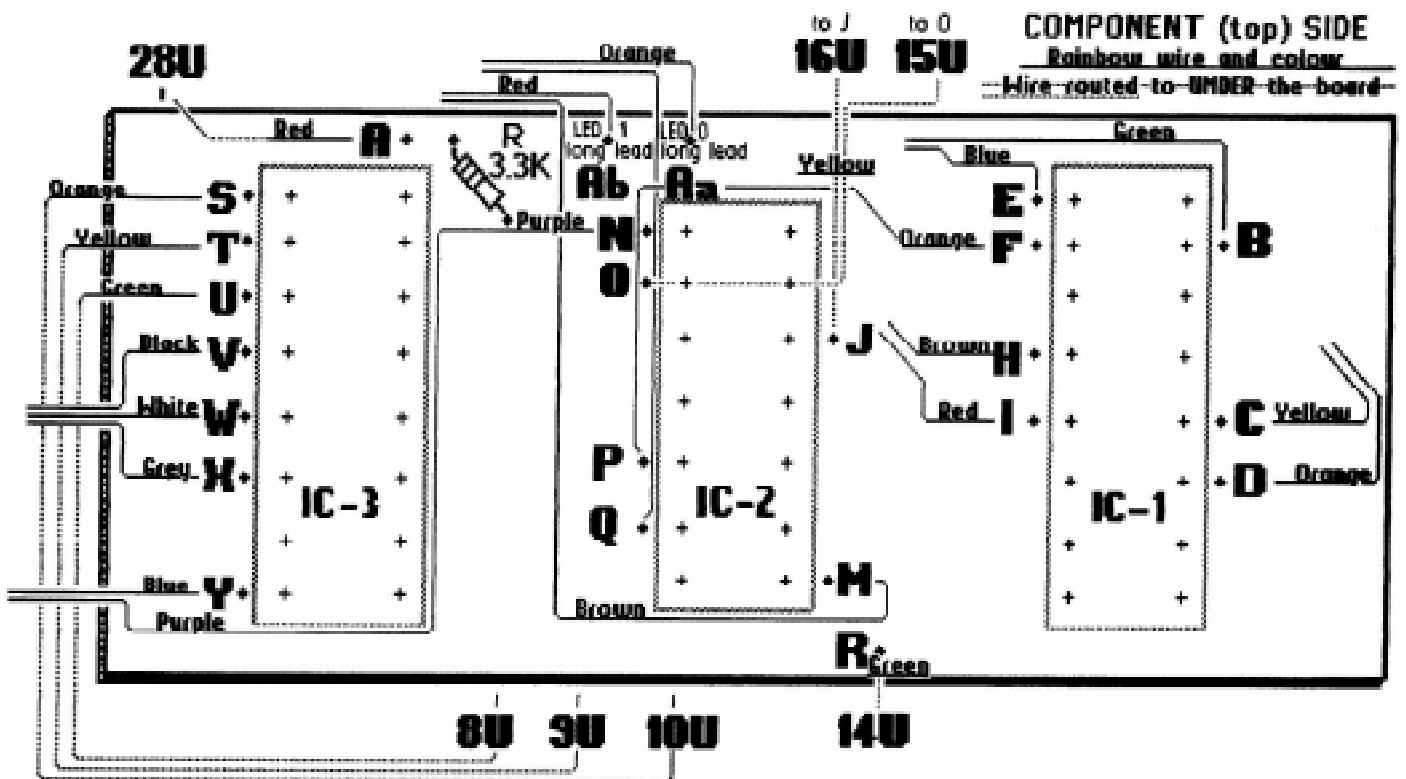


WIRING SCHEME, as seen from the TOP (COMPONENT) SIDE.

to A **28U** These codings are the pin numbers from the site of the U18 location (on the 1750 PCB below this extra board) followed by U. **to J 16U** **to D 15U** **COMPONENT (top) SIDE of board.**
 * = Hole through.



8U U **9U T** **10U S** **14U R**



1 COMPLETED THE WIRING TO THE NEW BOARD AS ABOVE, AND FITTED THREE LOW PROFILE SOCKETS TO TAKE THE NEW CHIPS.

FINAL ASSEMBLY.

There are two previous pages that will help you. The pins shown on page 6 will be referred to by the colours of their wires. The original RAM chips shown on page 5 will be referred to by their circuit numbers, U2 to U17.

To save money, I bought 16 used 41256 RAM chips but I needed to know that they were sound before soldering them in. I bent out the number 15 pins on eight 16pin DIL sockets, soldering 25amp fuse wire to those pins to connect them together. I pushed those sockets down on chips U2 to U9 without fixing them. I wired pin 15 of the socket over U2 to the BLUE pin, having removed the link between the blue and brown pins. Now I could push my RAM chips into the sockets, eight at a time, and use the REU's test program until all 16 had been checked. I removed the sockets and all the links between the four coloured wire pins.

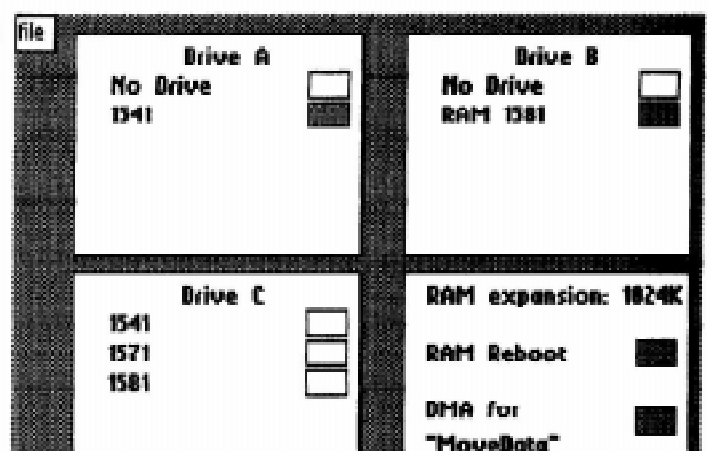
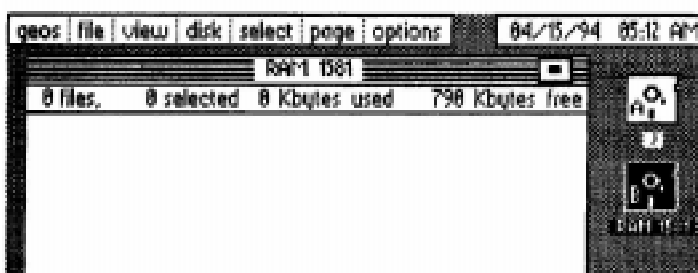
The number 15 pins on all 16 RAM chips were bent out, and one by one, they were pressed onto chips U17 to U2, and soldered, in that order. Each chip had its other 15 pins soldered to those beneath it. The number 15 pins were then linked to each other all along U2 to U9, and similarly U10 to U17 by insulated (not fuse) wire. The number 15 pins on U2 and U10 were temporarily connected to the BLUE and GREEN pins respectively, and the unit

tested as a 512k REU. When all was well, those two links to the pins were removed.

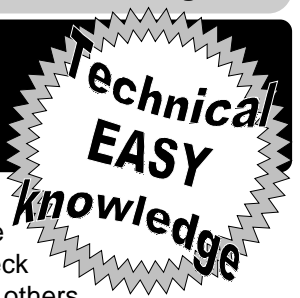
That was the end of the difficult work for me. It was easy to fix the insulation sheet (page 6) to the bottom of the new board with double sided sticky pads. Then the I drilled through the centres of pin locations 8, 9, 10, 14, 15, 16 and 28 of U18 on the original board (pages 5 and 8) with a tiny drill and soldered the connecting wires from the new board through TO BOTH SIDES of the old board.

A couple more sticky pads held the old and new boards together, and the rest of the wiring was connected as in the drawings on the previous pages.

A square needed to be cut out of the tin box (page 4) and the edges and both surfaces of this 'lid' were covered in insulation tape, (except for the ventilation holes), to stop any short circuits. Above this hole, the plastic top cover of the cartridge was drilled and cut to accept the switch and two LEDs. Remember that the Configure file needs to match the mode that you are using. The switch selects either 512k or 1 meg. Because I had used sockets for the three 74 series chips, my board was too thick for the casing to close completely, but it was secure and I had gained a little extra ventilation as well as a lot of extra memory!



REU HELP & ADVICE



The following are some observations I made while doing the 2-meg REU expansion by Recursion. For those of you who, like myself, are not experts, this should give you some help.

1) There is no EASY way; NO SHORTCUTS. Either use Recursion's layout, or use the printed circuit board plans uploaded by Wesley Wiese. Don't try to mess around with sockets or other schemes. I tried just about everything, and the easiest to build and trouble-shoot is Recursion's original idea. (Of course, if you have someone who can etch the Wiese circuit, do it!)

2) You don't have to be a great solderer! Lord knows I'm not! You DO have to be CAREFUL and NEAT!

3) For most of the IC connections I looped the end of the wire and crimped it with a small needle nose before soldering.

4) Use 30 gauge wire as suggested. Even 28 gauge was too cumbersome for me. I confess that I strip the wire with my teeth, not having a 30 gauge wire stripper.

5) You can do as little as 768k if you want; I only went to 1.25 megs (1280k).

6) DON'T trust GEOS alone to check your memory. I found that it often told me I had one amount of memory, when in fact I had less...i.e. BAD RAM. There is a REU test program somewhere on Q-Link (Hardware library?) that tests the ram. However, run it two or three times. Don't accept its first answer; it isn't always right. In fact, it's almost always wrong. I modified the program to repeatedly run itself. (Maybe my modification is what makes the first run always wrong.) After two or three runs, if it repeatedly shows the same! and CORRECT amount of ram, it's right.



7) If you have to use GEOS to test it, several ways are available: a) To test a RAMdisk, fill it up with files and then do a VALIDATE; b) To test a shadowed drive or shadowed directory, try changing to View By Date, Size, etc. If it doesn't crash and everything looks okay when you return to View By Icons, you're probably okay.

8) I had Configure 2.1 showing I had 1280K and allowing me to configure accordingly, when in fact all that was working right was 512K. This is NOT Configure's fault! ,(So young Jim C. doesn't get blamed!)

9) If things are wrong, check all of your connections with

a continuity tester or a meter. CHECK again. In addition to the connections Recursion says to check on the DRAMS, there are some others which may or may not matter:

- a) The #2 and #14 pins can be checked across banks. #2 and #14 are NOT common within their own banks.
- b) The rest of the pins, except #2, #4, #14, & #15 are common to ALL of the DRAMS, in either bank.
- c) #4 is only common to its own bank.

10) Do a dis-continuity check also. That is, make sure you haven't created a solder bridge between two adjacent pins. (Testing pins #15 and #16 might produce a slight reaction; if it's strong, make sure they aren't bridged.) Also make sure the "daisy-chain" from the #15 pins aren't touching the ones above or below.

11) If you leave the RF shield on, make sure that it doesn't cut and short out the four wires coming from the bottom side of the board.

12) I didn't mess with the lights or even the switch until I was sure everything else work. By the way, the cathode (-) of the LEDs is what attaches to pins #6 or #8 of IC2. To show how little I know about electronics, I had to buy a BOOK to find that out!

13) Back to the test program. I got a lot of 12032K results followed by a BAD RAM notice. This does not mean the DRAM is necessarily bad. In fact, even after killing my first batch of ICs by a stupid short, none of my DRAMs were bad. What is usually wrong is a bad solder joint!

14) Don't be stupid by trying to trouble shoot while there is power to the unit! I was! Oops. I was lucky. It only cost me \$5 and 40 hours of labor!

15) I used a lot of solder wick to clean up mistakes! 16) In addition to Recursion's connections, you need to put +5V to pin #16 of IC1 and IC3. Also, ground pin #8 of IC1 and IC3 and pin #7 of IC2. Of course, the other end of the switch is also grounded. Pin #14 of IC2 does NOT need +5V. 17) You may find two files which I uploaded. They are a geoPaint file of tie layout. The first one, dated 6/5/90 has an error. Download the more recent one. It should have the same date as this and will be called, "ok 2-meg plan".

Good Luck, Dave Ferguson DiBieF

WARNING: Don't just go by my stuff! There might still be errors. Download Recursion's "beyond 512k" file! And if you can get someone to etch a circuit board for you, download Wes Wiese's PC plans!

REVIVING YOUR OLD POWER SUPPLY UNIT

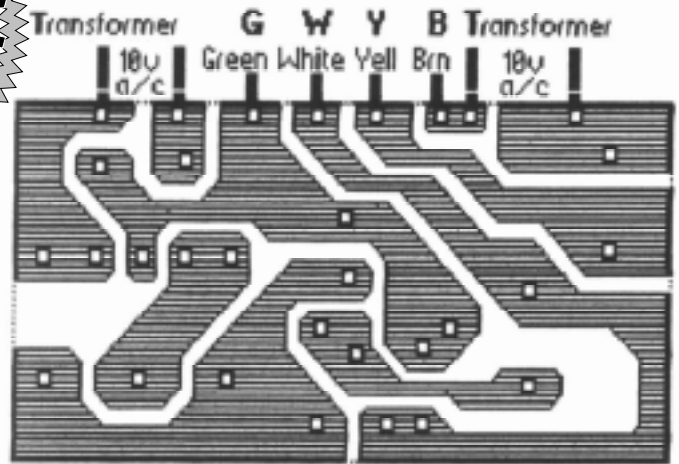
Technical DIFFICULT Knowledge

Well, I'm a new boy as far as the club is concerned but an old boy in all other respects. I'm totally unable to throw anything away, so when I retired as a photographer / cameraman in 1985, I decided to try to revive my C64 power supply unit that had died several years earlier. I have no electronic training, but I have optimism.

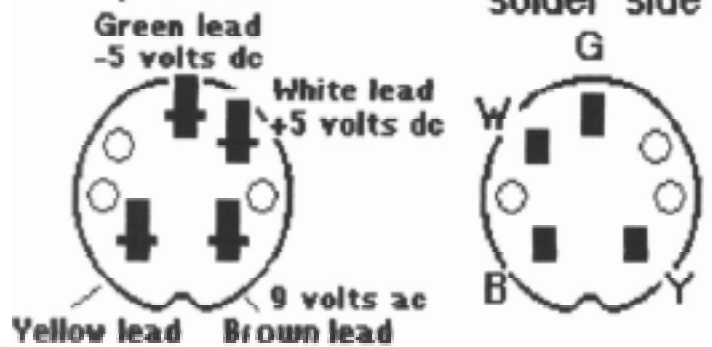
First, I had to remove the PSU's outer casing, a real demolition job with hacksaw and chisels.

A quick check with a meter showed that the transformer was still working, so the other components, which were em-

DESIGN FOR A PRINTED CIRCUIT BOARD SEEN FROM THE COPPER SIDE



THE LEAD TO THE COMPUTER



bedded in some sort of indestructable goo, had to go.

I noted all the values, then chose replacements from a catalogue, but all with higher ratings.

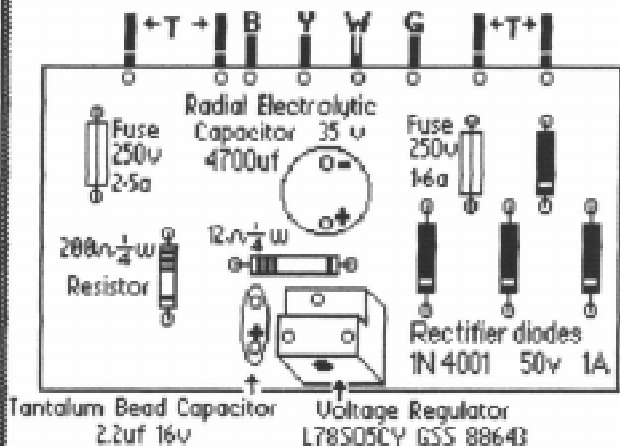
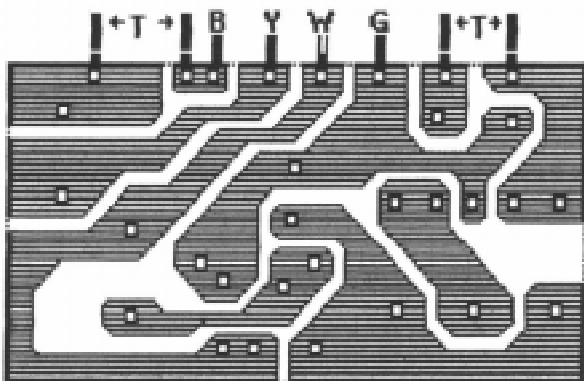
I drew a printed circuit board in GeoPaint, then traced it onto a copper board and etched it.

I made a box to house the unit and fitted a fan which was ducted to cool my disk drives as well. I was lucky. It was a total success. Frank Cassidy suggested that there may be someone else who would like to try this, but please be very careful and find an expert to check what you are doing. I have no idea if the parts are still available, but I suppose there are alternatives.

Good Luck, Stan Br'haut, Eastleigh

This article first appeared in geoClub (UK) issue 41.

LAYOUT AS SEEN FROM THE COMPONENT SIDE.



I built this in the late 1980s with the above parts costing less than £8. It has run well ever since.

PSU's AND YOUR C128D

Technical
DIFFICULT
knowledge

*Power Supply (PSU) tips for the European 128D + SCPU/
RamLink/REU Combo.*

*By Colin J Thomson E-mail colinjt@dircon.co.uk or
colinjt@videocam.net.au*

I have read in the pages of "Commodore Scene" and various Discussion groups on the Internet about many people having problems with their SCPU's. Well, a few months back I did have problems with "Screen Artifacts" (Odd Characters) appearing in the 64 mode and also very unreliable operation (in all modes) as well. It became more apparent after adding a 2 meg REU to the system!. Which does put even more "load" on my 128D's power Supply! After no help at all from CMD :(I thought I better take a look.

I know there are solutions for the C=64 and C=128's which have "external" PSU's (In an early GO64! there is a Excellent article using a PC PSU) and also changing the power switch can make all the difference. But! what about us 128D users with "Internal PS U's". Well read on...

After some investigating I found out that my 128D (Plastic Case Version) was low on volts and not by a lot! The initial reading was around 4.93v, ok so its near the 5v CMD recommend but its not near enough.

A Hardware Specialist from Germany recommends that it should be between 4.95v to 5.00v (the closer to 5v the better) measured at the Userport, pin 2 (+5v) and pin 1 (ground) with everything connected! Measuring it this way the PSU is "under load" and gives a more realistic reading. Measuring the PSU with "no load" for example disconnected from the computer, is no good at all and may even give a reading above 5v.

PLEASE NOTE Remember that all your measurements must be made with a "Digital Test Meter" for accuracy with everything connected SCPU/RL/REU etc. I would suggest that you should measure the volts before the modification and after modification so you can compare your results.

After some E-mail's we came up with a solution to bring up the PSU to the magic 5v. The components to change are some of the Electrolytic Capacitors around the " 5v output side" of the PSU. There are five in all, 3 - 2200uf 25v, 1 - 1000uf 16v and 1 - 470uf 25v, (uf = micro farad). I replaced the old Capacitors with High Temperature Radial types. Our model of 128D (European, Plastic Case) has a "Switch Mode" power supply and they loose Volts over the years as do all PSU's.

Its very easy to remove the PSU in the 128D (as you remove the Lid of the 128D it is the metal box in the Bottom left corner). Remove the Front panel which is fixed by 3 small screws and pull off the "drive lever". Then you can remove the PSU which is held in by 4 small screws and

unplug the connectors. Remember to take note of the connections when you unplug the connectors...Although you cant really go wrong.

After removing the PSU and taking off the lid, you will see on the "5v output" side of the power supply the 5 Large Electrolytic Capacitors. These tend to go "leaky" over the years and can and do drag down the voltage slightly.

To replace these Capacitors you will have to remove the PCB (Printed Circuit Board) from the box but again its very easy, its only fixed in the box with some screws and is easily removed from the box. Or you could take the PSU to a repair shop and ask the m to change the offending parts. The parts are very cheap and are easily available from any Electronics Shop but Make sure you buy Good Quality Capacitors.

PLEASE NOTE. These Capacitors are "polarized" ie they have a "Positive" and a "Negative" terminal, so before you take out the old ones make a note of which way they go and mark the PCB accordingly. The best way is to replace one at a time. I would also recomend that you check for "Dry or Dull Joints" and resolder them where necessary while you have the PCB out of its case.

Double check your work and then reassemble your 128D and check all is well. Now you can connect up Everything else RL/SCPU/REU etc and check the volts. On my system the volts went up from around 4.93v to 4.98v it does not sound a lot, but it has made all the difference..

I cannot guarantee this modification will work for you, but it has cured all my RL/SCPU/REU problems I have had over the last few months, so why not give it ago.

Note for 128DCR users. The same can be done to the US version (metal case) 128DCR, but as I have not seen one I cant help. I believe it does not use a "Switch mode" PSU just the "normal" type PSU, but its still worth finding the large Electrolytic Capacitors that "Smooth" the 5 v line and replace them....Even standard PSU's loose volts with age! Remember we are talking small amounts.

Thanks must go to Raymond Carlsen for advice/tips and to Werner Weicht for passing on the information to me for the best place is to measure the 5 volts.

Since this modification I have fitted a Fan to cool the RL/SCPU Combo and also left the "Timing" clip permanently connected. I have also found from time to time the "Ramcard" or SIMM became loose so check that these are "seated" correctly and the Ramcard is screwed down tight. And all of this seems to have fixed all my problems now....at long last!

Technical
MODERATE
knowledge

MODIFY YOUR MOUSE TO INCLUDE A RESET SWITCH

Switch - 1351 - Mouse

by Paul Milner

Online Switching, between the Mouse and Joystick modes without pulling the plug. Introduction. According to the 1351 handbook the 1351-Mouse has two operating modes : 1) Joystick mode 2) Proportional mode I Quote "In joystick mode, the mouse emulates a joystick and can be used with all joystick-compatible software. In this mode, the left button is the fire button and the right button is usually ignored. In proportional mode, the mouse uses a new technique to communicate mouse movement to the controlling application software. That requires the software to know the mouse is there and how to read it. For example, the GEOS operating system can use many different input drivers. One of them is the Commodore-Mouse driver, which can be used with the 1351 in proportional mode. The 1351 provides a proportional mode so that applications can have a fast, responsive pointer that moves easily on the screen. Joystick mode acts as a fallback for those applications that don't have installable device drivers. You can therefore use the mouse as a joystick for older software, and take advantage of the benefits provided by proportional mode with newer applications. The mouse automatically powers up in proportional mode. To choose joystick mode, plug the mouse into either joystick port on the side of the computer and hold down the right button as the computer is powered up" End Quote.

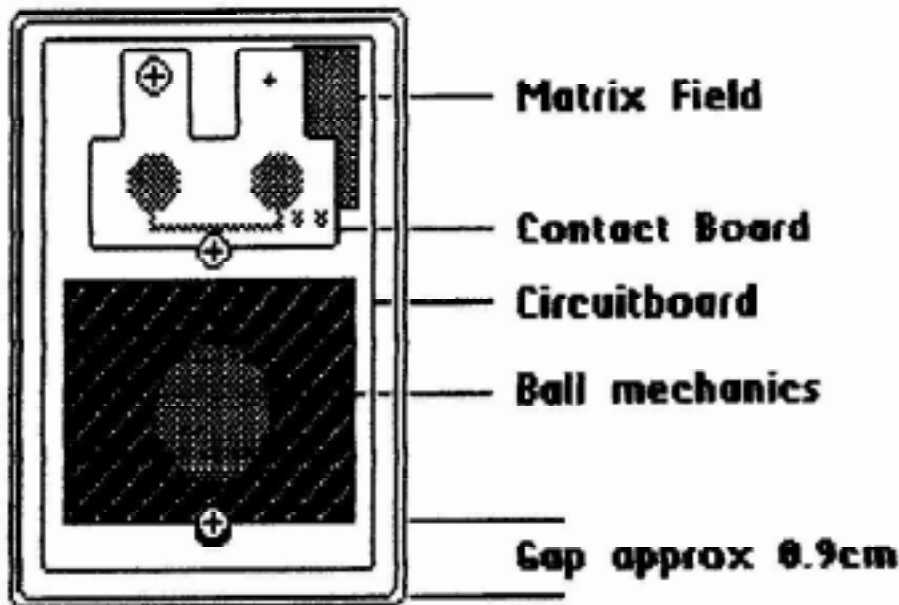
So much for the handbook, there are two other methods with which we can change the operative mode : 1) We can pull the mouse plug out of the computer and then stick it back in, at the same time holding the right hand button down - the mouse is now in joystick mode. We can pull the mouse plug out of the computer and then stick it back in, but this time we don't touch the mouse button - the mouse is now in the (startup) proportional mode. 2) We can change the mode using a hardware procedure. This is the method that I am going to describe here. It is a simple hardware conversion, will does not take longer than half an hour to complete, it is very simple and can be carried out by anyone you have

ever done any plastic model building, and who can use a soldering iron. You will need : 1 1351-Mouse where the guarantee has run out. 1 small push button switch, this must be an "OPENER", about 25 cm single core wire, straight out of the model railway junk box !

Theory : The mouse is provided with +5 Volt DC through Pin 7 of the joystick port, this must be switched off in order to change the mouse mode. Normally this is achieved by removing the mouse plug and then putting it back in, however I don't use a six pound hammer to put panel pins in ! We are going to achieve the same reaction, and prolong the life of the computer, using a simple switch.

The switch :

For this conversion we need an OPENER, this is a switch which doesn't, as usual, complete an electrical circuit. Quite the opposite, we need a switch that breaks the circuit - opens it. For this it is best to use a push button switch, as small as you can find. Later we shall see that the available space is very limited. You can purchase a switch such as this from all the usual Radio/



Electronic-Hobby outlets eg. Tandy or Radio Shack.

The dissection : Lets have a close look at the 1351-mouse, first switch off the computer and remove the mouse plug. Now we turn the mouse over onto its back - at the front end, left and right from the cable outlet we see two small Phillips screws, remove these and place them in a safe place. Now we open the mouse, lift up the upper part of the casing - from the front to the rear. At the rear of the casing are two clip in hinges - be careful with these, they are very fragile. The upper casing should now be placed in a safe place. We are now looking at fig 1 It is us now perfectly clear that we are not going to have a lot of space in which to build in the new switch, so it would be better now to work out and see if our switch is going to fit in the casing. The best bet is down at the bottom end, there we have a gap of about 0.9 cm, between the 'Ball mechanics' + the casing which we can use. If you are plan-

ning to use a cylindrical switch this will probably best fit in with the length of the switch along the bottom of the casing, with the push button sticking out of the side of the mouse. If you are lucky enough to have one of the tiny square micro switches, like me (lucky devil), these can be fitted in the gap, with the button sticking out of the rear of the mouse, this is the most elegant method, however there is not much room and it is a very tight fit. After we have made sure that our switch will fit we can carry on with the rest of the dissection. Next we remove the 'Contact Board', to do this we must remove two small Phillips screws - place these in the same safe place as the other bits ! (All the screws are identical). Now we carefully remove the 'Ball mechanics' (another screw), watch it ! the 'Tracking Ball' will fall into your hand. After we have done this the 'Circuitboard' can be removed from the body of the 1351-mouse. We have to be very careful that we don't damage or break any of the very small wires.

Putting in the switch : Now we come to the exciting bit, the insertion of the new switch. In order to insert the switch we are going to either have to drill a hole or have a bash with the razor saw, before we start chopping up the casing it is as well to make extra sure that the switch really is going to fit in the mouse after the casing has been closed - (Once bitten twice shy). Once we have made sure of this we can solder the thin wire to the switch contacts, and then re-insert the switch into the mouse - again making sure that everything will fit afterwards.

Electrics : Lets have a look at the 'Circuitboard', in the top right hand corner there is an area that I have called the 'Matrix Field'. This is a printed area where a great pile of wires descend onto a number of soldered contacts, see fig 2 The numbered contact boxes have the same definitions as the mouse plug contacts, now that's dandy. We need the contact No.7, dead easy it's the last in line. A PURPLE wire goes into contact No.7, de-solder this wire. Take one of the wires from the new switch and solder it to contact No.7. The other wire from the switch should be soldered to the PURPLE wire which we have removed from contact No.7, wind a bit of insulating tape around this joint. That's it, finished, all we need to do now is to put the mouse back together again - no problem because we know that everything fits, 'cos we've tried it before !

Operating test : To try out the converted 1351-mouse we will need to start any old "shoot-em-up", plug the mouse in - away we go. Ey up it don't work mister ! Course not silly boy, we need a joystick. So we press our new switch, at the same time holding the right hand button down, let go of the new switch first. Hey Presto the mouse is now playing at being a joystick !! To return to the proportional mode (mouse) simply press the new switch - OK

Conclusions : This is a very long description of a very simple conversion. I have deliberately gone into a lot of detail so that 'soldering-iron-beginners' wouldn't be frightened off.

This was an original idea from my mate Dirk Berghoefer - Germany I've only put it into words.

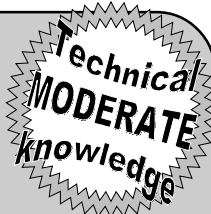
If anyone has any questions feel free :

Paul Milner Oberhain 13 W-3509 Spangenberg Germany

This article first appeared in geoClub (UK) issue 12.

USER CABLE

(for connecting a modern printer to your Commodore)



Without a doubt, the most often asked question that I get is "What sort of printers can I get to work with my Commodore ?". Well the answer is simple, you can attach ANY modern printer that your heart desires. There are limitations and some of the more obscure printers will require some programming knowledge. On the whole though, any printer which has a good Epsom emulation will work just fine (Canon are known to be good for this).

The question that usually follows this is "How do I attach it to my Commodore ?". Again, the answer is quite simple, you will need a User Port cable (commonly known as a geoCable).

These cables can be purchased from CMD via CS or you could make one yourself. The later option is now not possible in the UK as the parts are no longer available.

But for those of you that may have access to the parts then below is the diagram that is known* to work correctly.

* There are other versions of this cable but they have faults and are limited in operation. The description given here is the same as in the current GEOS/Perfect Print manual.

USER PORT	CENTRONICS
A	16
B	11
C	2
D	3
E	4
F	5
H	6
J	7
K	8
L	9
M	1

There you go, thats all there is to it.

I can personally guarantee that this version will work as I have used it on many occasions and I have even altered temperamental cables to this configuration.

I hope that in the future I will again be able to offer the Commodore Scene version of this cable if I can ever get the parts that I need.

Allan Bairstow

MOUSE MODIFICATIONS TO CREATIVE MICRO DESIGNS

'SMARTMOUSE'

Technical
MODERATE
knowledge

Rodent Slang

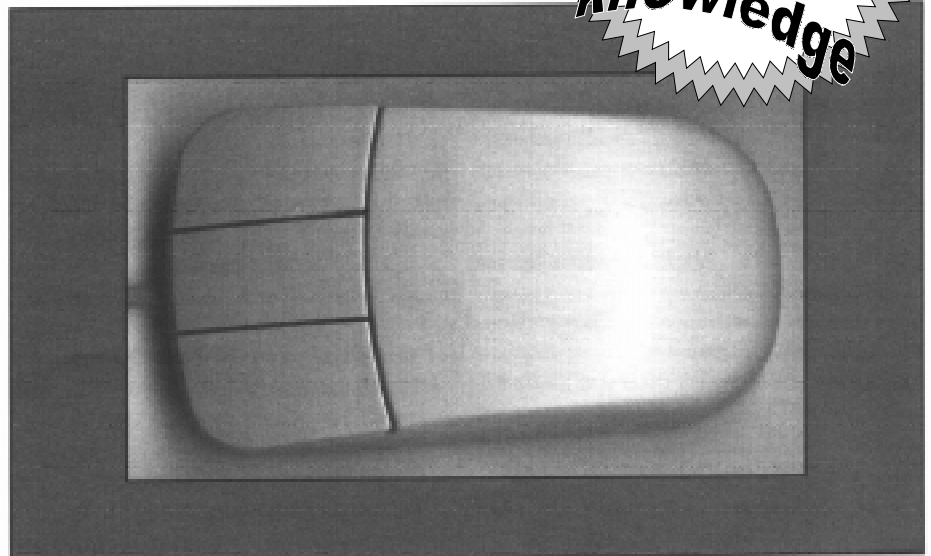
Shortly after I bought GEOS in the spring of 1988, I upgraded to a 1351 mouse and a 1764 REU (now with 512K), allowing me to showcase the abilities of the C64 by using GeoPublish to create half of our club newsletter, with output going to the same Laser Printer the Amiga half used. In the July 1988 issue, I ran a definition created by our club president. This new word had been posted on the club BBS and had to be shared with the non-modem equipped members. As with most computer terms, it must be used for some time before really becoming accepted and, eventually, making an appearance in the dictionary. Here is, at the ripe old age of 8 years, what could become the newest computer slang.

Rodentiate: (from Rodent (n.) + late (v. suf.)) (v. intrans.) 1 To move a pointer by use of a mouse device; use with "TO" and "FROM" (e.g. To pull down the menu, rodentiate to the top of the screen, and press the left button) (My 1351 mouse is great for rodentiating!)

Care and Handling

To keep my 1351 working properly I take a few precautions. First and foremost, I always use a mouse pad. A quality mouse pad makes using the mouse much easier. The top surface is smooth; most feature a cloth cover on a foam rubber backing. A pad provides a stable environment for your mouse to move on, and as with stables for larger animals, you'll want to keep this one clean, too. Every week or so you should brush off the surface, keeping it free of dirt and dust buildup.

To keep your mouse truly happy, the above precautionary process alone isn't enough. About every two months, it is a good idea to flip your



mouse over and remove the ball. The ball allows your mouse to "feel" how far it has moved across your mouse pad so it can tell the computer how far to move your pointer/sprite. The ball is usually held inside the mouse by a small plate that rotates or slides to a position where the ball can be removed by turning the mouse right side up. Don't forget to catch it, as losing the ball is the easiest way to ruin a mouse!

Inside the mouse, you'll see three small rollers. They rub against the ball and translate the movement into signals which are sent to the computer. It is necessary to check these over very carefully. If your mouse pad or surface is not completely clean, it's likely the rollers are dirty. The best way to clean them is with a dry cotton swab, or one wet with rubbing alcohol. A small hobby knife can be used to scrape stubborn lumps off. The axles the rollers spin on are a favorite spot for dust or hair to collect, and should also be

cleaned (a pair of tweezers works best).

Many people forget to check the connector that plugs into the computer from the mouse. If you have to unplug the mouse, make sure you unplug it from the gripping area and not by pulling the cord. Carefully work the plug until it comes out. Be equally careful when inserting it back into the connector. I recently bought a used 128D that had one pin bent over in the joystick port. Luckily, I was able to carefully straighten it out, but if you break a pin off, be prepared for a lot of work to replace the connector. I solved part of this problem by setting up a second system with two joysticks for my children to use for games, eliminating the need to unplug my mouse.

Lastly, keep your mouse covered when not in use. There are lots of cute little covers a person can buy, but they aren't necessary. Just a small dish cloth will do to keep the dust from settling on the mouse when not in use.

Program Patches

When using a mouse, as with almost anything else, problems invariably arise. One such problem was with RUN Paint (the graphics program published by RUN Magazine). In the November 1989 issue, a 'cure' was provided modifying RUN Paint to work with a mouse in only Port 1. The question of mouse trouble with RUN Paint again surfaced when CMD introduced their SmartMouse to the market. In Issue #2 of "Commodore World (CW)" magazine a fix was published in the TOP TIPS column. Apparently the problem had nothing to do with the mouse in use, but with a required internal delay for reading Port 2. With this CW patch the program works as originally intended with a mouse in Port 2. Contact CMD for a copy of this issue if you regularly use RUN Paint with a mouse.

Adding a Reset Switch

When CMD came out with their SmartMouse, I was impressed with the addition of a third button ('turbo' feature in GEOS) and a built-in clock. CMD has a reputation for improving on previous ideas and building quality products, but one thing that was missing was a reset button. My mice have both been modified with a reset switch. That's right, a reset switch! Everyone has probably installed one on their C-64 by now, and you'll be happy to know they also work wonders on a mouse.

Commodore wisely designed their 1351 mouse with a true proportional mode as well as a joystick mode. Proportional mode is the default with joystick mode selected by holding the right button down when you power up. The 1351 manual describes this feature as allowing the mouse to be used as a joystick in the event the software doesn't support the proportional mouse mode. This is all fine and dandy if you remember to hold the right button down when you turn on your system, but isn't much help if you forget, usually resulting in shutting down and physically connecting a joystick or powering up while holding the button and then reloading the

"My mice have both been modified with a reset switch. Everyone has probably installed one on their C64 by now, and you'll be happy to know they also work wonders on a mouse."

program. Not a very efficient way to do things.

While I haven't seen the insides of the SmartMouse, or the popular M3 mouse, I believe it should be just as easy to install the switch in these units as in the 1351. The amount of space inside the case will determine the size of the switch needed, and the mounting location. On my 1351, the switch fits nicely on the left side of the cord on the front of the case. For left-handers, it may just as easily be installed on the right side. You will need a Normally Closed mini-switch (Radio Shack #275-1548), and a short length of wire. After you have taken your mouse apart and determined the best location for the switch, you will need to drill a hole for it. The plastic case is soft, and you should be able to use the bit in your hand or, if needed, turn it with a pair of pliers. The switches are installed on the seam of the case, and the nut is tightened after assembly.

To start your mouse, you need to patch into the Ground line or the +5V line. Due to differences in internal construction between my Japanese and Hong Kong models, and to make installation easier I imagine, one is wired into pin 8 (ground) and one is wired into pin 7 (+5V). Locate the wire to pin 8 (preferably), and remove it from the circuit board. Solder this wire to a pin on your switch and solder the length of the wire from the other pin back onto the circuit board. My circuit board was marked, but you may want to verify the wire with a multi-tester. The Japanese model has a plug-in connector attaching the wires to the circuit board. The wire to pin 8 (marked on the connector) was cut and a wire run from each end of this to each pin on the switch. After completing the installation of

the wires, close up your case and tighten the nut on the switch.

My Japanese model had the installation almost 7 years ago; the other mouse came with a used system I got 3 years ago, and the switch was already installed. Neither has given me any trouble. To use your new reset switch to select joystick mode, all you have to do is hold the right button and click the reset button. You'll never have to shut down if you forget to power up in joystick mode again. Pressing the switch without holding the button will 'start' the mouse in proportional mode.

The switch is very beneficial with GEOS. Have you ever wanted to use a joystick in geoPaint? With a Change Input DA and the mouse reset button, you can easily swap drivers and modes on the fly. Another use came to light when I set up a system in my daughter's room. I don't have enough mice, so she has to use GEOS with a joystick (uggghh). When she needs to print her work she brings it into the office and uses one of the 2 systems there. Since her boot disk is set for a joystick it is easier to change mouse modes with the button than select the mouse driver and have to change back to the joystick driver when she returns to her room.

As with all of the hardware modifications in this magazine, if you undertake this project you are on your own as far as responsibility goes. If you aren't comfortable with this type of project find a friend, or the hardware guru at your user group, who is willing to do the job for you. All in all, following these tips will let you get more enjoyment out of your rodentiating!

This article first appeared in Commodore World issue 17 and full credit is hereby given to its original author - Bruce Thomas.

Creative Micro Designs 'SmartMouse' along with all their other hardware and software is available through Commodore Scene. Please see a current issue of Commodore Scene for prices and details.



BUILDING A 'SEGA' GAME PAD ADAPTOR

Article by Doug Cotton, Circuit Design by Mark Fellows

In the last issue of *Commodore World*, we printed a letter from one of our subscribers who wondered why 'game pad' controllers weren't available for the Commodore 64 and 128. We stated then that we'd tried such a controller (intended for the Sega Genesis), but that there were some slight differences that would need to be addressed.

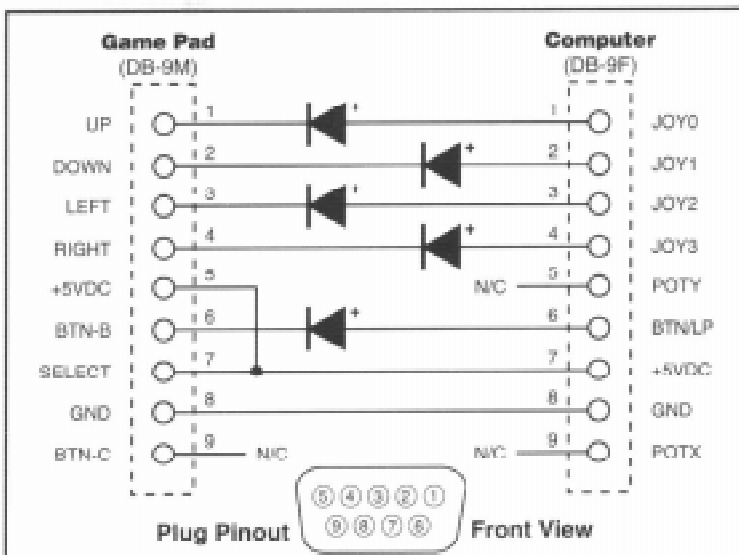
I'm pleased to say that we've come up with a very simple adapter that should allow any 3 or 6 button Sega Genesis controller to work on your computer without any possible conflicts or damage to your machine. The design requires five diodes, and depending on how you decide to implement the adaptation, may also require some additional connectors, cables and/or mounting box. You'll also need a soldering iron, solder, wire cutters, a little hookup wire, and a multimeter.

For the diodes, use 1N34A Germanium, or an equivalent. You can get a 10 pack of these at your local Radio Shack (#276-1123) for the paltry sum of \$1.19.

As I alluded to above, there are several ways to go about this project. The least expensive route would be to open the game pad (carefully—there are parts that can come loose and get lost—so hold the game pad face down while opening it) and use your multimeter to chart out which color wire goes to each of the pins on the cable's plug. Now de-solder the wires leading to pins 1, 2, 3, 4 and 6; solder the negative leads of the diodes (the ends with the lines) into the holes you removed the wires from; then solder the wires (correctly!) to the positive ends of the diodes. Be sure to disconnect the wires that lead to pins 5 and 9 on the plug, and solder a jumper on the board from the point where the wire from pin 5 was to the point where the wire from pin 7 connects. Re-assemble the game pad and you're all set. The 'B' button acts as the fire button—the other buttons have no function.

Alternative construction of the project would be to use a Sega controller extension cable, and splice a small project box into the middle of the cable with the diodes and other connections.

Finally, if you don't want to bother making your own, you can buy a converted game pad/controller direct from CMD; see advertisements in this issue for details.



This article first appeared in *Commodore World* issue 5 and full credit is given to its authors.

X1541

Pros & Cons

The plain and simple facts about the X1541 cable and the Star Commander software that is needed to run it is this - "It is not easy !".

True, the X1541 cable can transfer files and even entire disks to and from your PC and a 1541 drive in a matter of seconds.

Also true is the fact that the Star Commander software is 'the' software that is needed to use this superb cable correctly.

Unfortunately there are drawbacks, the main one (which I tell everybody) is that this cable and software are not for the complete novice. Having said that, I personally was a complete novice myself and I had to learn the hard way to use - by trial and error ! This is no mean feat and it took me about three weeks to understand the software correctly. This was made even harder as I had built my own cable from scratch and I was not 100% certain whether the cable or the program was at fault.

The problem of a non working cable is not a problem if you purchase one from Commodore Scene as I will build and test it for you - that way at least that is one less headache for you to worry about !

The other major problem is the PC itself. As most of you will already know, not all PC's are the same (that has to be the understatement of the century !), and because of this the software will react differently and the cable may need altering slightly.

Having said that, the main problems are not having the Star Commander set up correctly for your specific type of PC. The software is quite versatile and can tolerate a great many variables, so please, don't assume that when you connect the cable for the first time that it simply 'doesn't work' as it is most likely to be something simple that can be altered.

Please read on and glean as much information as you can from the following articles on the subject - most of the answers are here !

Allan Bairstow

THE OFFICIAL CS X1541 CABLE



This article first appeared in Commodore Scene way back in issue 24 - it has since been brought up to date for this special edition.

Do you want to transfer files from your PC to a Commodore disk drive and vice versa? Then you'll need this!

This is a description of the X1541 adapter cable which is required for connecting your Commodore disk drive (C=1541, C=1571 and any drive that uses the serial bus) to a PC. The cable connects the PC's parallel printer port (LPT) and the usual serial port of the Commodore drive.

Building the cable

You will need a soldering iron, some solder and the following parts:

- 1 x DB25 plug, male (for your parallel printer port)
- 1 x case for the DB25 plug.
- 1 x 6 pin DIN plug, male (for your C= disk drive).
- 1 x case for the DIN plug.

1 x cable with 5 wires. If you buy a shielded cable (somewhat more expensive but helps to minimize interference), it just needs 4 wires (because the shielding is used for the GROUND-line, see below). Don't make your cable too long, 1-2m (or 40-80") should do.

Soldering together

Now you just have to solder the right pins together, following the schematic below (pin 3 of the Commodore plug goes to pin 1 of the parallel port plug and so on...).

Some important hints

Don't forget to connect the pins 2 and 15 of the parallel port plug.

Yes, pin 1 of the Commodore plug is not used.

Use the shielding for the GROUND line (pin 2 of the Commodore plug) - if you have a shielded cable!

The schematic shows the inside (solder

side) of both plugs!

Another important hint

Never connect PC and Floppy while they're turned on! Always first switch off, then put the cable in. You'd better not use an on-board parallel port, you should use a separate, cheap IO card instead.

The software

You can now connect the disk drive to the PC (first turn off the devices, see above!) and start using your favourite software. I

recommend 'Star Commander'.

It doesn't work ?

If something doesn't work, verify that your cable's pinout complies to the schematic and that it's not too long. There are some other possibilities as well.

The drive motor always spins and the red LED is on

Cut the reset line. Most programs work fine without it !

Errors during transfer / blinking red LED

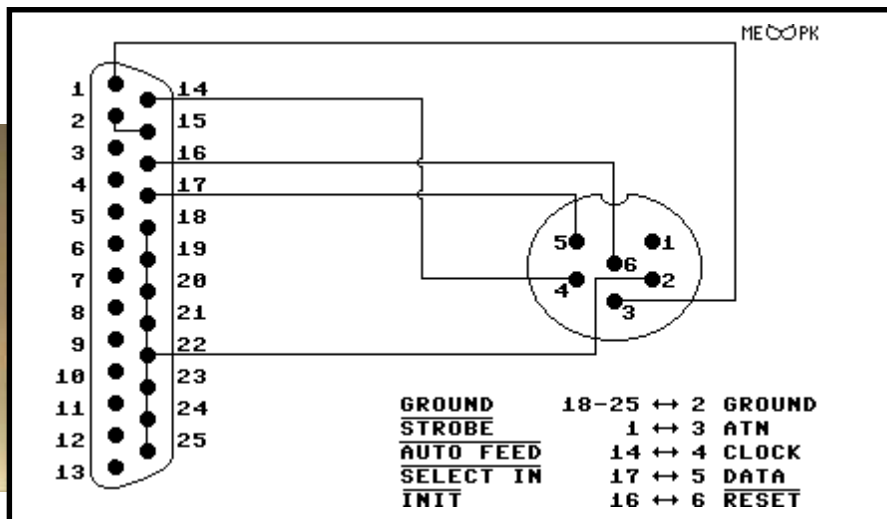
Make sure your software is correctly configured and your disk drive is OK. Maybe the distance to a monitor (or to another device) is too small (better get a shielded cable). Or the cable is too long (mine is about 1,1m long and works fine).

It doesn't work at all !

Does your parallel port work? Eventually try a new (cheap) I/O card with parallel port. In the BIOS set-up of newer PC main boards there's a possibility to choose several other parallel port modes besides the 'SPP' mode (which is suitable for the X1541 cable). There you should turn off 'EPP', 'ECP' or 'Enhanced'. You should turn on one of the options 'SPP', 'Compatible', 'Normal', 'Standard' or 'PS/2' instead.

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NOTE : This schematic (below) is the one that the X1541 cables from Commodore Scene are made up from. I have currently made and tested over twelve cables with no problems at all. If you would prefer me to make the cable for you then please refer to a current issue of Commodore Scene for details.



THE IDIOTS GUIDE TO THE X1541



This article is here to help those of us out there who have NO IDEA about transferring games between a PC and the Commodore 64. It's called the idiot's guide because even an idiot is supposed to be able to do it! This includes myself as I was once an idiot in regards to the X1541....

What's .zip, .lha, .d64, .lnx, .z64 and 1! all about?

For those of you who have nearly no knowledge of file archiving, seeing **.zip** at the end of a downloaded file will not make much sense to you. You'll see files all over the net with a **.zip** extension, including my page. To the uninitiated, a **.zip** file is usually a compressed file (or files) that are compacted into one file and placed on the web or sent in emails so that connection time is kept short and so that the files take up little space.

Another well known compressor is **lha** (a.k.a. **lzh**). This can be opened with recent versions of **lha**. If you're looking for help on using these compressors, go to this site. It's mostly a case of placing the compressor in your DOS folder on your C drive and following the instructions contained within the file itself. So, if you need a unzipper, PKUNZIP is probably the most standard one to get - and if you need it or any other archival programs, this site gives you the most complete treatment of archival programs to download that I know of. If you're using Windows, then Winzip is really the only way to go. It handles long filenames, whereas PKUNZIP can't handle them and refuses to extract them. Some zips on the C64 FTP sites contain long filenames (unfortunately) that can't be extracted under PKUNZIP. Why Microsoft initially had the 8.3 filename convention in the first place really baffles me.

.d64 file extensions are disk image extensions. The files

are images of a Commodore 1541 disk, and contain all the code that a 1541 disk side would. These files are loaded by most C64 emulators and are treated like a 1541 disk. This is usually the result after transferring C64 1541 disk sides to the PC.

.lnx files are LYNXed files, usually done with a program called "Ultimate Lynx" or "Ultimate Lynx 3" which is a C64 program that packs several files into a single file. The Star Commander can open these and the files contained in it can be copied into disk images. However, the latest release of the Star Commander has difficulty with some lynx files created with Ultimate Lynx 3. Star Commander tends to operate well only with the standard lynx format. In this case, the lynxed file itself can be copied into a disk image and unpacked with Ultimate Lynx 3 from a C64 or an emulator. The Star Commander makes it a lot easier, however, but occasionally it will report that the lynx file is "corrupt" when really it can't understand the format. Should you need Ultimate Lynx 3, they are on one of the disks accompanying this issue.

Another file type that can be found in many C64 archives are Zip-coded disks (not to be confused with **.zip** files!). They appear as **1!example**, **2!example**, **3!example**, and **4!example**. These are packed files that constitute all tracks and sectors of a 1541 disk side. Some wise-guys have even decided to give them a **.z64** extension, even though they are recognised by their "1!" style prefixes. These **.z64** files should be treated as Zip-coded disks (although I personally disapprove that they should be called **.z64** files).

Zip-coded files appear as **x!example**, **a!example**, **b!example**, etc. They are simply packed files. Both Zip-coded disks and files can be depacked with a PC program called 64Copy, or on the 64 with Zip-Code utilities. They are rare, but if you find them copy them into a **.d64** image and run them through the Zip-code utilities. When unpacking Zip-coded disks, beware of the "Zip-DOS read" option. With many zip-coded disks, leaving this on YES while unpacking can corrupt the data on the final product.

The Best Way

Although there is more than one way, the best way to transfer programs cross-platform between a PC and C64 is to use a Commodore 64 disk drive (The 1541) connected to a IBM compatible PC. You connect a cable (called the X1541 cable) from the serial port on the 1541 and connect it to the LPT parallel printer port on your PC. From there you use a transfer program (I recommend the Star Commander although there are several other transfer utilities available on the net. After that it's simple.

The reason why this is the best method is because the 5.25" drives on IBM machines are MFM format drives while the 1541 is a GCR format drive. These formats are incompatible. Not only that, but 1541 drives are "smart" because they contain the necessary on board electronics and disk operating firmware, whereas IBM drives don't necessarily. Hooking a 1541 up to an IBM is much simpler. Text files can be transferred with a 1571 and a program called the "Big Blue Reader" if you want. The 1571 can read both MFM and GCR. Transferring by this method is very slow though, so forget it unless you want to convert C64 word processor files to an IBM wordprocessor.

So where do I get the X1541 cable from?

Ahhh... The PC is easy to get. If you don't have a 1541 disk drive (Or your old drive is broken) you can order a new one from CMD but beware the \$ factor. The X1541 cable, however.... you'll have to build yourself or order it from Commodore Scene. Also, the author of the Star Commander has a team that builds quality cables at very reasonable prices.

But I don't know how to make one!

I personally had no idea about soldering a cable together when I first thought about building a X1541 cable. I did some reading on the topic and after some practice I found myself building a fully working cable ! If you don't know where to start when soldering or you can't understand the X1541 diagrams, I'll explain. I'm no electrician, but I can point you in the right direction. You don't need talent to build a cable or even to solder. An hour or so of practice is all you need.

There is another way to create a crude X1541 cable without having to solder, see page 45.

So what will I need?

Go down to your local electronic parts/hobby shop and buy the following:

Soldering iron - A cheap one will do. Preferably one with a narrow tip. It will be touching small surfaces.

Resin flux solder - Preferably with the smallest diameter wire possible. I use 0.7mm. Remember it must be RESIN FLUX solder. Resin flux is used for electronic soldering.

Wire - It doesn't matter what type of wire, as long as they're not bare wires and have some plastic shielding. I used copper wire. Try to get different coloured wires so that you can tell them apart.

Wire stripper - To get the plastic cover off the wire!

Steel wool - To polish surfaces before soldering.

Shrink tubing - To keep all the wires together to make the cable. I used a tubing 5.0mm in diameter. The diameter of the shrink tubing will usually depend on the diameter of the wire you're using. You may have to use your good judgment in deciding which ones to get.

Male 6 pin din plug - This bit goes into your 1541 serial port.

Male D25 solder plug - This bit goes into your PC's LPT port. It's called a D25 plug in electronic supplies stores. Make sure it's the solder variety. You'll notice it has catchment sockets to collect solder on the other side of the pins.

Male D25 casing - To cover the D25 plug! I prefer using a plastic casing as opposed to a metal casing

Sticky tape / Blu tak - to hold things in place while you solder.

A copy of the X1541 specifications - If you choose to work without one I hope you know what you're doing! You must have a good memory ! See page 41.

Remember this:

A male plug has pins on it that stick out. A female plug has holes that these pins go in. So if you've got a dirty mind, sexual innuendo such as this will help you remember!! The X1541 cable has two male plugs, so they'll both have pins sticking out! These are the ones you get!

It may be helpful for those who have never soldered before to buy several plugs before building the cable to prac-

tice on first. This way, if you mess up your plug you have a spare to work on.

Step 1

Firstly, we're going to create the cable part. If you notice the specifications of the X1541, you can't make the cable more than a metre long. I recommend the cable to be about 40-50cm long. Cut your wires to about 20cm longer than the length you wish to make the cable. This is so you have some room for error should you mess up and have to cut the wire some more.

Next, we're going to get those wires down the shrink tubing. This may require some patience depending on how large the diameter of the shrink tubing is and the wires you have. If you do have difficulty putting the wires down the tubing, look at the diagram and all your wires. Hopefully you'll have different coloured wires. Now decide which coloured wire will be for each connection. I decided like this:

COLOUR - CBM - IBM

=====

RED - Ground - Ground

BLACK - Reset - Init

BLUE - Clock - AutoFeed

BROWN - Atn - Strobe

GREEN - Data - Select In

YELLOW - Autodetect connection (optional)

Now, notice where the wires are on the CBM serial diagram you have? Well In my case, the Black reset wire and Green Data wire are above the other three wires on the diagram. What I did was to push the wires down the shrink tube in this arrangement so that they came out untangled and in this arrangement by the time they came out the other end. The longer your shrink tube is, however, the harder this may be. If the wires tangle inside the shrink tube, they will have trouble going down. Try not to let this happen for your sanity's sake! It would be great if the wires inside didn't tangle because eventually when you shrink the tubing it will look professional, because there will be no bumps in the cable because of tangled wires. Eventually you will have five wires running through the shrink tube. Now we're ready to solder!!

Step 2

OK, now that we've done the easy bit, it's time for the harder bits.

Pull the wires through the tube so that they have even length on both ends of the tube. Plug in your soldering iron and allow it to heat up. Soldering is not too difficult, but there are a few things to remember:

* Don't burn yourself! It can get real hot. Try to have a place to rest your soldering iron when not using it. A soldering iron stand is obviously the best thing for this, but still you may not want to get one, and you don't have to either. I have been burnt before by a soldering iron and it's not funny!

* Use steel wool to clean surfaces that you solder before soldering. This is so the solder has no trouble rolling off the tip of the soldering iron instead of bubbling up on the tip.

* Heat up the surface with the iron you wish to solder before you solder (In this case our soldering catchment sockets at the back of both plugs). Try not to overdo this be-

cause the plastic around the pins (especially the 6 pin din) has melted on me before and the pin I was working on fell out! (it was fixed again by heating up the pin and pushing it back into place, where it cooled back into position). Heating the surface is necessary because if the surface isn't warm enough for long enough you'll do a bad solder which can be easily pulled apart.

Soldering itself is straightforward. There are many techniques, but I simply placed the wire in the pocket for soldering, lay the solder wire on top of that, and then applied the soldering iron until the solder melted, filling the socket and welding into the surface. I pushed more solder into the connection as needed. Try not to add too much solder though. More solder doesn't necessarily mean a stronger connection. Firstly, let's do the D25 plug. You can do the 6 pin din first if you want, but the D25 plug is harder in my opinion, especially if you mess up. So if you do mess the D25 up after you do the 6 pin, too bad. I suggest you practice soldering first before you work on the cable proper. Use some spare wire and some extra plugs.

The sticky tape and blu tak comes in handy when you try to keep the wire in position and the plug in place while you hold the solder in the socket, the wire under the solder, and the soldering iron. Unless you're an octopus, you'll soon realize that soldering isn't quite that easy and that the plug won't stay still. The wire keeps moving out of the plug's soldering socket etc. BE PATIENT! Once everything is in place, make the solder. Once it's been soldered and the solder has dried and become hard, check to make sure that the connection has been soldered properly. This can be done by pulling the wire fairly hard (but NOT TOO HARD!), to see if the soldering has worked well (If it hasn't the solder will break off the socket, or the wire will snap - effectively forcing you to do a better job next time!). Remember: allow the solder to dry before testing the connection! Also, check to make sure that the solder hasn't connected any other sockets next to the one you are working on. Check to make sure that the wires will not cross either. This is very important.

The Ground connection on the D25 plug is not difficult to do as the diagram may suggest. Simply strip the wire you intend to use for the ground connection so that the exposed wire can cover across all the ground sockets on the back of the D25. After this, it is simply a matter of soldering the wire to all the sockets. Easy.

Should you want to, you can add the Autodetect connection into the D25 plug on pins 2 and 15 (Yes, the 2 and 15 pins on the D25 are wired together!). This is not necessary when using the Star Commander, but if you decide to use the X1541 cable with the original X1541 transfer program, then I suggest you make it. Heck, why not do it, as you have your soldering iron out at the moment. I made it on my plug anyway. It makes it a true X1541 cable.

Make sure you solder the right wire in the right socket! Check your X1541 specifications. The D25 plug you have may even have the correct numbers for each individual pin on it. Remember that the X1541 specifications show the female plugs of the LPT port in the PC and the serial port in the 1541. To help you remember which pin is which, place the plug with the solder sockets facing up next to the diagram. Now it should be easy to see which pins are which. Some plugs you may buy may be even so helpful as to have the numbers of the pins next to them.

If you mess up, you can always "unsolder" a connection by applying the soldering iron to the connection, and then pulling the wire out. Same goes if you accidentally add more solder than you should to a socket, and it spills onto another socket connecting them. This, however, leaves the socket in a bit of a mess. Don't let this worry you though. Keep trying! In most cases, your mess-ups are salvageable. If you mess up on the D25 plug, saving your work can be harder. Only just recently I soldered two connections together accidentally. When I tried to unsolder, the solder got stuck all over the plastic part of the plug. Getting the solder off then was impossible, as I melted the plastic part with my soldering iron trying to get the solder off! It ended up as a complete mess.

With any luck, you'll have managed to solder all the connections correctly on the D25 plug! Well Done! Now you can get the D25 backcover and cover the D25 plug with it. There's no instructions that come with assembling the backcover, and there are lots of different backcover models around for the D25 plug. You may just have to examine the backcover you have and experiment a bit. The type that I have also has a place inside the backcover where a metallic gripper can be screwed in place around the cable. This can be implemented to reduce pressure on the soldered connections should the cable be pulled hard.

Step 3

Right! Now that you're feeling a bit more confident about soldering, it should be much easier to solder the 6 pin din to your cable. Firstly, you'll notice that the 6 pin din plug you have should have a plastic or rubber casing around it. Pull this casing off, and push it onto the X1541 cable that we're building. Make sure you put this on the right way so that when you're finished soldering, it can be pulled back over the plug! DON'T FORGET to do this step or you may find that you'll have to unsolder your connections on the 6 pin din plug in order to put the cover back on the plug! (I admit to having done this!). Be careful with the other parts of the din plug as not to lose them. You'll notice that there is the main plug which carries the pins, and two metal coverings that hook over the main plug. One of the metal coverings has a long claw-like hook. You'll notice that the sockets for the din plug are hollow so that you can place the wires down the sockets before soldering. Unfortunately, this doesn't make your life too easy!

Now, shorten the wires coming from the other end of the X1541 cable you're building. Not too short, but so that the metal backing with the long claw-like cradle on it can wrap itself around the shrink tubing on the cable. Soldering the wires to the din pins is not that easy. Try to get the solder both in the sockets and outside the sockets so that they cover the wire and socket completely. When you thrust the wires down the shrink tubing in the arrangement according to the X1541 plans, arranging the wires now SHOULD be easier. It still may not be, but persevere! Firstly, I suggest doing the Reset plug because if you soldered all the outer sockets first, you would have a lot of trouble doing the inner Reset socket. Once this is done, complete soldering all the other sockets with their correct wire. Yet again, be careful which socket they are going into. The din plug I bought even had small numbers of the corresponding pins on the main plug. As with the D25 plug, check all the wires to make sure

they are soldered correctly and do not cross over. Also make sure they are in close (But not touching) and away from the metal covering when you place that back over the main plug once you have finished soldering. Blu Tack or something sticky comes in handy in keeping the main din plug still while you solder. It tends to roll around a bit on the table.

Once this has all been done, replace the metal coverings on the main plug and try to wrap the metal claw-like hook on the metal covering around the cable. Once you are sure everything is correct, slide the din plug plastic cover down the cable and back over the din plug.

The shrink tubing around the cable can be shrunk (as its name suggests) to fit snugly around the wires in the cable. Do this on a heat source, NOT a naked flame. You want to shrink the cable, not burn it. You can use a hot light globe, electric heater, or a jug or bowl of hot water. There are specialist heat-shrink tools to do this professionally, but since they are so expensive you're better off not using them for just one cable! Using a bowl of hot water is probably the easiest and best method, as it gives an even finish to the cable. Just make sure that the shrink tubing has no punctures, and you don't accidentally drop the ends of the cable into the hot water! The reasons for this are quite obvious I think, as you will be plugging this cable into your PC! Boiling water may bubble as you place the cable in, but don't worry as this is because you are displacing air pockets in the water that are escaping, as steam!

That's it ! You've made an X1541 cable!

So that's it? But I'm still stuck!

Still having trouble making the cable? The parts you bought don't match the description that I gave? Can't solder the connections?

If you have no time to build one or can't be bothered building one, you may like to order a ready made and fully tested cable directly from Commodore Scene.

Remember to check all the connections you made on your X1541 cable. If you are sure that they are correct, yet the cable doesn't work on a transfer program, then you'll have to contact the author(s) of that program to find out what the problem is.

Who knows? you may have enjoyed building the cable and would like to put your soldering iron to other uses! It could become a new hobby!

Disclaimer

My instructions for building a X1541 cable is simply advice from me to you, whether you accept it or not is your choice. I have built several X1541 cables before using this method. I will not be held responsible if you damage your PC by building a bad cable, or doing something stupid like permanently soldering electronic parts to your PC printer port (which is not what I'm endorsing) because you misunderstood me. If that happens, it's YOUR fault! I doubt very much that disaster will befall you though. One of my cables had a loose reset cable once and all that did was cause Star Commander to experience trouble transferring things as the reset wire bounced around connecting other wires. Still, you won't have any trouble at all if you loosely follow my advice and take care in your work!

Author unknown

X1541

Technical
EASY
Knowledge

The non solder method

I have also heard of alternative ways of building a crude X1541 cable with a standard PC printer cable and a serial cable. Please note that I have never tried building such a cable, but I have heard that this method works. It may be useful for those who simply want a quick-fix solution to transferring disks onto the PC, or who are too scared (what's there to be scared of?) of soldering irons. This method also has the added advantage of being cheaper to build, as long as you don't mind chopping up a perfectly good PC printer cable or C64 serial cable. Another problem is that the cable could be a bit bulky and has the electrical tape exposed, as well as the individual wires connected. Finally, this kind of cable will not work with the original X1541 program, as it requires the autodetect connection which on a standard PC printer cable doesn't exist, and can't be fixed with this method. Fortunately the Star Commander doesn't need this autodetect connection.

The theory involved is quite a simple one. Both the serial cable and the printer cable are chopped in half to expose the wires within. These wires are then connected with electric tape to the corresponding wire in the other plug. The problem lies in finding out which wire is from which pin in the cable it's from.

Finding out which wire is from where can be done by making a simple wire tester. This can be built from a AA size battery or smaller (Try a AAA battery, like the ones in Pocket Gameboys!). One of the pins from a simple L.E.D. (Light Emitting Diode) is then connected to one of the battery's terminals (+ or -). Next, a wire is taped to the other pin of the L.E.D. and another wire is taped to the other battery terminal. Care must be taken, depending on the power of the battery you are using and the amount of power that the L.E.D. can accept. If the battery is too powerful for the L.E.D. you risk blowing the light. This can be avoided if you don't maintain the connection for very long - putting stress on the L.E.D. Once you have built this tester, try it out to make sure it works.

With this tester, you should be able to find out which wire belongs to what pin. Place one end of the tester onto the pin you wish to test, and the other end of the tester on one of the wires from that part of the cable. If the L.E.D. doesn't light, that wire doesn't belong to that pin. If the L.E.D. does light up, you've found the wire that belongs to the pin you're testing. With this kind of knowledge, you can use electrical tape to connect wires between the two halves of the cable you're making after you've found out where all the necessary wires are. Again, check the X1541 specifications to ensure you have connected the right wires. Also check to make sure that your wire tester works, or you may never find what wire belongs where!

And that's it really !

Author Unknown

Technical
EASY
Knowledge

STAR COMMANDER PROGRAM AND ITS X1541 CABLE VARIANTS

XE1541 - XH1541 - XP1541 - XH1571 - XP1571

1. Introduction
2. Copyright and legal issues
3. System requirements
4. Installation
5. Advantages of the Commander
6. Connecting a Commodore drive to your PC
7. The X1541 interfaces
8. Technical background information
9. Troubleshooting
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1. Introduction

What follows is a very much edited version of the main file that comes with Star Commander v0.81. I hope that it can answer many of your questions.

2. Copyright and legal issues

The Commander is giftware. You may use the unregistered version as long as you wish and you may spread it to anyone provided that it's in the original, unmodified archive. The Commander is provided "as is", without a warranty of any kind. You are using it at your own risk. The author is not liable for any damage or data loss caused by the program (especially now, that the Commander is still under development).

3. System requirements

You must have an IBM or compatible PC with an 80286 processor or higher with MS-DOS 3.20 or above installed on it and about 470 KBytes of free conventional memory. You may also try running the Commander under the DOS emulator of OS/2 after enabling the HW_TIMER option in the DOS settings. The DOS emulator of Linux will not work because the kernel steals too much time, making the data transfer from and to the Commodore drive impossible. In addition, the DOS emulator of Linux doesn't like the overlaid structure of the Commander for some unknown reason. Remember that, although the Commander may run under multi-tasking systems, it is not supposed to.

4. Installation

You can install the Commander simply by decompressing the distribution package using PKZIP 2.xx. You don't need all the files to run the Commander, most of them are only for your comfort.

For an absolute minimum installation, you need SCMAIN.EXE. (required)

If you want to have much more memory in the DOS shell,

keep SC.EXE and launch that instead of the main executable. With SCSETUP.EXE, you can change all settings of the Commander. (highly recommended)

You can enable the online help by extracting SC.HLP. SCVIEW.EXE displays and SCEDIT.EXE edits DOS files and Commodore files inside image files and uncompressed archive files. (recommended)

There are some sample menu (*.MNU) and extension files (*.EXT) to help you with handling PC and Commodore archives and formatting PC disks.

The archive PALETTES.ZIP contains some predefined color palettes. You can run PRINTHLP.EXE to extract the online help into a text file or to print it out. If you want to use the Commander under OS/2, Windows, Windows '95 or Windows NT then SC.ICO and SC.PIF are just for you. (optional) The archive SC_ARC.ZIP contains the external utilities that help you with mass-converting Commodore archive formats. The Star Utilities consists of the following programs:

- Star ARC lists the contents of Commodore ARC archives and Self-Dissolving (SDA) archives and extracts them into disk images
- Star Arkive creates Arkive archives out of disk images, lists their contents and extracts them into disk images
- Star LHA creates Commodore LHA archives and Self-Extracting (SFX) archives out of disk images, lists their contents and extracts them into disk images
- Star Library creates Library archives out of disk images, lists their contents and extracts them into disk images
- Star List lists the contents of image and archive files into a text file or onto the screen
- Star Lynx creates Lynx archives out of multiple DOS files or the contents of disk images, lists the contents of Lynx archives and extracts them into multiple DOS files or into disk images
- Star Tape collects multiple PC64 file images into tape images
- Star Zip creates diskpacked or filepacked ZipCode archives out of disk images, lists filepacked archives, tests diskpacked archives and extracts both types into disk images.

5. Advantages of the Commander

It is comfortable to use the well-known environment of The Norton Commander. There is no need to learn sequences of weird key combinations, only press some familiar ones. You can always clearly see what's happening on the screen.

Hopefully you remember Disk-Demon, the great C64 disk editor, written by G. Brandt and A. Wellie in 1986/87. A similar disk editor is built into the Commander so that you can modify data in disk images and disks on Commodore drives

directly.

Several configuration options make the use of the Commander easy and quite comfortable.

The Commander can optionally display everything with the C64 character set (only on EGA/VGA video cards).

Most of the image file handling routines are faster than those of the other similar utilities.

The Commander has built-in support for several Commodore archive formats (Lynx, filepacked ZipCode, LHA, Arkive and TAR). The external utilities also help you with mass-converting them.

Following is a benchmark of the Commander under plain DOS. An original 1541-II drive was used with a 35 track disk. The disk contained a 210 block file, stored below track #18. The interleave used to save the file was 10 sectors, the head movement speed was set to 16. In the charts, transfer modes marked with (*) are equipped with manual retry on disk errors, (+) means optional verify.

Whole disk copy	Read from the 1541	Write to the 1541
Normal mode	7:50 (*)	9:55 (*)
Turbo mode	2:25 (*)	2:25 (*)
Warp Mode	1:16 (*)	1:19 (*)
Hybrid turbo mode	1:09 (*)	0:48 (*)
Hybrid warp mode	0:50 (*)	0:29 (*)
Parallel turbo mode	0:48 (*)	0:48 (*)
Parallel warp mode	0:23 (*)	0:29 (*)

210 block file copy	Read from the 1541	Write to the 1541
Normal mode	2:20	2:25
Turbo mode	1:00	1:01
Warp mode	0:26 (*)	0:26 (*)
Hybrid turbo mode	0:22	0:24
Hybrid warp mode	0:18 (*)	0:10 (*)
Parallel turbo mode	0:22	0:24
Parallel warp mode	0:10 (*)	0:10 (*)

6. Connecting a Commodore drive to your PC

The serial connection is done using the well-known X1541 interface. If you want to achieve a much higher transfer speed and you're willing to modify your 1541 drive and you have a bidirectional parallel port then you can make use of the XP1541 or XP1571 parallel interface. If you only have a unidirectional parallel port then the XH1541 or XH1571 hybrid interface gives you the best performance. If you only have an EPP or ECP port then you have to substitute the X1541 interface with the XE1541 interface. You can find the description of all interfaces in the following section.

Unless you're using the XH1541 or XH1571 hybrid cable or the XP1541 or XP1571 parallel cable, don't try to access external drives under a multi-tasking system. Remove memory managers, device drivers and other resident programs, if possible.

The Commander has a machine independent synchronization method that uses the hardware system timers. The automatic calibrator inside the Commander tries to find a delay value that makes your PC communicate with the Commodore drive at the exact speed of the drive. However, if you encounter transfer problems or you want to fine tune the transfer speed then you may raise or lower the delay value in the 'Transfer options...' menu manually.

The Commander is equipped with optional fast transfer modes. In turbo mode it transfers data from and to the exter-

nal Commodore drive about 2-3 times faster and in warp mode 5-6 times faster. If you also connect your Commodore drive with the XH1541 or XH1571 hybrid cable to the PC, using turbo mode, the data transfer will be 6-12, with warp mode 6-20 times faster. The XP1541 or XP1571 parallel cable gives you 6-12 times the original speed in turbo mode and is 10-20 times faster in warp mode. The Commander has turbo and warp command routines, as well. These speed up deleting files and validating disks to 2-10 times the original speed (depending on the number and length of the files on the disk) and disk format takes only about 12 seconds.

Besides 1541 drives, the Commander supports 1570, 1571 and 1581 drives. Currently, the disk turbos for 1570 and 1571 drives are finished and you can also copy double-sided disk but 1581 drives can only be accessed at normal speed.

7. The X1541 interfaces

Here is the description of the X1541 interfaces, with which you can connect a Commodore drive to your PC to use with the Commander.

If you don't want to read through this complete chapter then you should, at least, read the most important facts about the cables and their compatibility with parallel ports of different modes:

The **X1541** cable works on older type SPP and PS/2 parallel ports, ones that have bidirectional control lines. The parallel port on I/O controller cards for 286, 386 and 486 machines and on Hercules video cards and the integrated parallel port of most newer 486 motherboards support the X1541 cable but only certain Pentium motherboards have compatible parallel ports. On motherboards with an integrated parallel port, you have to set the mode of the parallel port to SPP because the X1541 cable won't work with EPP and ECP parallel ports. However, on many newer motherboards, there's absolutely no way to make the X1541 cable work because the control lines are not bidirectional in any mode of the parallel port. You need the XE1541 extended cable on such machines.

The **XE1541** extended cable is a substitution for the X1541 cable. Its advantage is that works in all modes of all parallel ports. Its drawbacks are that you need special diodes to build it and that only a few programs support it.

The **XH1541** hybrid cable speeds up communication with a Commodore 1541 drive in all modes of all parallel ports. Its advantage is that sending data to the drive becomes 3 times, receiving data 1.5 times faster. Its disadvantage is that you have to modify your drive internally so that you can connect this cable to a parallel plug on the drive. You can't use this cable alone, only together with the X1541 cable. You can't use this cable together with the XE1541 extended cable, because of the conflict between the pins used by the two cables on the PC parallel port.

The **XH1571** hybrid cable is a modified version of the XH1541 hybrid cable, designed for 1570 and 1571 drives. Except for the periphery chip used in the Commodore drive, it is completely the same cable as the XH1541.

The **XP1541** parallel cable speeds up communication with a Commodore 1541 drive via a PS/2, EPP or ECP parallel port where the data lines are bidirectional. Its advantage is that both sending data to and receiving data from the drive becomes 3 times faster. Its disadvantages are that you have

to modify your drive internally so that you can connect this cable to a parallel plug on the drive and that its need for a bidirectional port excludes the possibility to use the X1541 cable, except on PS/2 ports. You can't use this cable alone, only together with the X1541 or XE1541 cable.

The **XP1571** parallel cable is a modified version of the XP1541 parallel cable, designed for 1570 and 1571 drives. Except for the periphery chip used in the Commodore drive, it is completely the same cable as the XP1541.

If you only have one parallel port but want to use the XH1541 or XH1571 hybrid cable or the XP1541 or XP1571 parallel cable then you can create a Y-shaped cable. One end plugs into the PC parallel port and the two other ends plug into the serial and parallel ports on the drive. You can use the X1541 cable together with the XH1541 or XH1571 hybrid cable on an SPP parallel port, the X1541 cable together with the XP1541 or XP1571 parallel cable on a PS/2 parallel port and the XE1541 extended cable together with the XP1541 or XP1571 parallel cable on a PS/2, EPP or ECP port. You can't use the XE1541 cable together with the XH1541 or XH1571 hybrid cable, because of the conflict between the pins used by the two cables on the PC parallel port.

The mode of your parallel port is a vital feature that determines which cables you can use with your machine so try to find out all the modes of your parallel port. Older I/O and parallel port cards only have the unidirectional SPP mode, most Pentium and newer 486 motherboards have integrated parallel ports and allow you to set the port mode in the BIOS setup, with the usual choices of SPP, EPP and ECP.

It's possible that, when changing the mode of the integrated parallel port in your BIOS setup, you won't find the necessary modes as they are called in this documentation. Some BIOS setups have different names for the port modes. Compatible, Normal and Standard usually refer to SPP, Extended possibly means PS/2 or EPP and Enhanced stands for EPP or ECP.

Below you find some advices about which cables to use with a given parallel port mode and vice versa. They are based on the fact that most SPP and PS/2 parallel ports support the X1541 cable and most EPP and ECP parallel ports don't. However, because of the lack of strict standards, there are exceptions to these rules. There exist SPP and PS/2 parallel ports that don't support the X1541 cable. It's also possible that certain EPP and ECP parallel ports do support it. You have to determine the true capabilities of your parallel port yourself before choosing the cables to use.

If you have a unidirectional SPP parallel port then you can use the X1541 cable and, optionally, the XH1541 or XH1571 hybrid cable, for the highest speed possible on SPP ports. If you have a bidirectional PS/2 parallel port then you can use any of the cables. For maximum speed, you're advised to use the X1541 cable and the XP1541 or XP1571 parallel cable together. The X1541 cable doesn't work with most parallel ports in EPP and ECP mode. You will have to configure them to SPP mode with the BIOS setup program or with jumpers. If the Commander still doesn't work then you can use the XE1541 cable, a substitute for the X1541 cable.

The X1541 interface is the easiest of all. You only have to connect certain pins of the serial port of the Commodore drive and pins of the parallel port of the PC. You need some plugs, some wires and some soldering skills. The XE1541 interface is not much harder, it only needs some additional diodes. The XH1541, XH1571, XP1541 and XP1571 interfaces are a lot harder to build because you need to do some modifications inside your Commodore drive. If you're not experienced at soldering then don't even think about doing them yourself. In addition, the XH1541 and XH1571 interfaces also need some diodes.

The following tables may help you to decide which cables suit your needs best. Depending on your parallel port hardware, your soldering skills and your patience, you may choose the cables that will work best for you.

This table is a compatibility chart between different parallel port modes and different interfaces.

Compatibility	SPP	PS/2	EPP/ECP
Normal (X1541)	yes	yes	no
Extended (XE1541)	yes	yes	yes
Hybrid (XH1541 or XH1571)	yes	yes	yes
Hybrid (XP1541 or XP1571)	no	yes	yes

This table shows the ways to achieve different speeds on a single parallel port in different modes.

Single port	SPP	PS/2	EPP/ECP
Minimum speed	Normal(1)	Normal(1)	Extended
Medium speed	Normal+ Hybrid	Normal+ Hybrid(1)	
Maximum speed		Normal+ parallel	Extended+ parallel

Notes: (1) This is not the maximum performance for your parallel port, you may want to use another cable configuration.

These tables show the ways to achieve different speeds on two parallel ports of different modes. The first cable refers to the primary parallel port, whose mode is indicated by the table title. The second refers to the secondary parallel port, whose mode is indicated by the column title. Note that when you're advised to swap your parallel ports then it's meant to be a logical swap, not a physical one.

Two ports, primary is SPP	SPP	PS/2	EPP/ECP
Minimum speed	Normal (1,2)	Normal (1,2,3)	Normal (1,2)
Medium speed	Normal+ Hybrid (2)	Normal+ Hybrid (1,2,3)	Normal+ Hybrid (1,2)
Maximum speed		Normal+ parallel	Normal+ parallel

Notes: (1) This is not the maximum performance for your parallel ports, you may want to use another cable configuration.

ration. (2) You don't need two parallel ports for this cable configuration, you can hook the indicated cables up to the primary parallel port. (3) This is not the maximum performance for your parallel ports. Swap your parallel ports and try again.

Two ports, primary is PS/2	SPP	PS/2	EPP/ECP
Minimum speed	Normal(1,2)	Normal(1,2)	Normal(1,2)
Medium speed	Normal+ hybrid (1,2)	Normal+ hybrid (1,2)	Normal+ hybrid (1,2)
Maximum speed	Normal+ parallel (2)	Normal+ parallel (2)	Normal+ parallel (2)

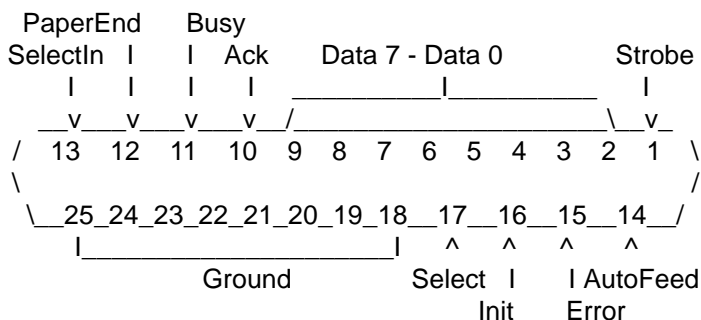
Notes: (1) This is not the maximum performance for your parallel ports, you may want to use another cable configuration. (2) You don't need two parallel ports for this cable configuration, you can hook the indicated cables up to the primary parallel port.

Two ports, primary is EPP/ECP	SPP	PS/2	EPP/ECP
Minimum speed	(1)	(1)	Extended (2,3)
Medium speed	(1)	(1)	Extended+ Hybrid (3)
Maximum speed	(1)	(1)	Extended+ parallel

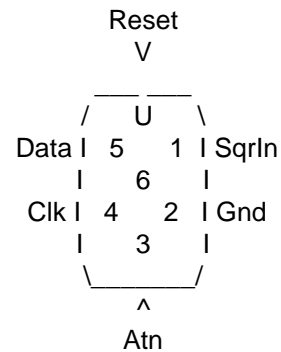
Notes: (1) You shouldn't have an EPP/ECP parallel port as your primary port. Swap your parallel ports and try again. (2) You don't need two parallel ports for this cable configuration, you can hook the indicated cables up to the primary parallel port.

The following diagrams are pictured as viewed from the solder end (back side) of the plug. It may be of help to you that the numbers are often printed in small letters onto the plug itself. When wiring the interface cables, make sure that they are not too long. A cable longer than about two meters will possibly not work, especially if it isn't shielded at all.

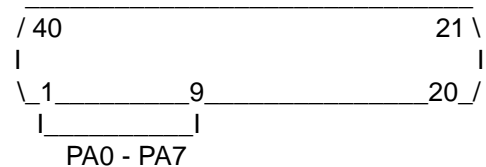
The PC parallel plug (male DB-25 connector)



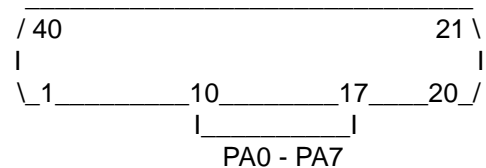
The Commodore drive serial bus plug (male 6-pin DIN connector)



The Commodore 1541 drive VIA#1 peripheral chip



The Commodore 1570/1571 drive CIA peripheral chip



You can find the VIA#1 by searching for a chip on the motherboard that has the type number 6522 on it and none of its pins 2-9 are connected to any other chip. The CIA chip has the type number 6526, 8520 or 8521 on it.

The X1541 interface connects the following pins:

CBM drive serial port

PC parallel port

- 2 Gnd ----- 18-25 Ground
- 3 Atn ----- 1 Strobe
- 4 Clk ----- 14 AtuoFeed
- 5 Data ----- 17 Select
- 6 Reset ----- 16 Init

The original specification of the X1541 interface requires the short connection of pins 2 and 15 on the parallel port plug. The X1541 program uses it for autodetection, the Commander doesn't make use of it. If you intend to use other transfer programs with your interface then you might want to do this alteration, as well.

You have to connect the X1541 interface to an SPP or PS/2 parallel port. The lines used by this cable are not necessarily bidirectional on EPP and ECP parallel ports. This interface works with all kinds of Commodore drives and their clones.

The XE1541 extended interface connects the following pins:

CBM drive serial port

2 Gnd -----	18-25 Ground
3 Atn -----	13 Selection
	1 Strobe
4 Clk -----	12 PaperEnd
	14 Autofeed
5 Data -----	11 Busy
	17 Select
6 Reset -----	10 Ack
	16 Init

This interface, unlike the X1541 interface, needs electrical components, namely diodes. These decouple the control lines of the PC parallel port while data is coming from the Commodore drive. You have to solder them right before each of pins 1, 14, 16 and 17, their cathodes - the end marked with a small band - pointing towards the pins. Note that you don't really have to use diodes on the Atn-SelectIn-Strobe and the Reset-Ack-Init lines because the Commander never uses them for input. However, if other programs in the future will support this cable then they may need a diode for these lines, as well. You should primarily use 1N5819, BAT85, BAT46 diodes or other Schottky-diodes. If you can only get 1N4148 diodes then you can try them but, be warned, they may make the cable inoperable on certain parallel ports.

You can connect the XE1541 interface to any type of parallel port. It has no common lines with the XP1541 interface therefore you can connect them both to the same PS/2, EPP or ECP parallel port, using a Y-shaped cable. This interface works with all kinds of Commodore drives and their clones.

The XH1541 hybrid interface connects the following pins:

<u>CBM 1541 VIA#1</u>	<u>PC parallel port</u>
2 PA0 -----	13 SelectIn
	2 Data 0
3 PA1 -----	12 PaperEnd
	3 Data 1
4 PA2 -----	10 Ack
	4 Data 2
5 PA3 -----	11 Busy
	5 Data 3
6 PA4 -----	6 Data 4
7 PA5 -----	7 Data 5
8 PA6 -----	8 Data 6
9 PA7 -----	9 Data 7

The XH1571 hybrid interface connects the following pins:

<u>CBM 1570/1571 CIA</u>	<u>PC parallel port</u>
10 PB0 -----	13 SelectIn
	2 Data 0
11 PB1 -----	12 PaperEnd

12 PB2 -----	3 Data 1
	10 Ack
	4 Data 2
13 PB3 -----	11 Busy
	5 Data 3
14 PB4 -----	6 Data 4
15 PB5 -----	7 Data 5
16 PB6 -----	8 Data 6
17 PB7 -----	9 Data 7

These interfaces also need diodes. You have to solder them right before each of pins 2-9 of the PC parallel port, their cathodes - the end marked with a small band - pointing towards the parallel port pins. The best diode for this interface is the usual 1N4148 or equivalent.

You can connect the XH1541 and XH1571 interfaces to any type of parallel port. They have no common lines with the X1541 interface therefore you can connect them, along with the X1541 interface, to the same SPP or PS/2 parallel port, using a Y-shaped cable. The XH1541 interface only works with Commodore 1541 drives and compatible clones. The XH1571 interface only works with Commodore 1570 and 1571 drives and compatible clones.

The XP1541 parallel interface connects the following pins:

<u>CBM 1541 VIA#1</u>	<u>PC parallel port</u>
2 PA0 -----	2 Data 0
3 PA1 -----	3 Data 1
4 PA2 -----	4 Data 2
5 PA3 -----	5 Data 3
6 PA4 -----	6 Data 4
7 PA5 -----	7 Data 5
8 PA6 -----	8 Data 6
9 PA7 -----	9 Data 7

The XP1571 parallel interface connects the following pins:

<u>CBM 1570/1571 CIA</u>	<u>PC parallel port</u>
10 PB0 -----	2 Data 0
11 PB1 -----	3 Data 1
12 PB2 -----	4 Data 2
13 PB3 -----	5 Data 3
14 PB4 -----	6 Data 4
15 PB5 -----	7 Data 5
16 PB6 -----	8 Data 6
17 PB7 -----	9 Data 7

You have to connect the XP1541 and XP1571 interfaces to a PS/2, EPP or ECP parallel port. On SPP parallel ports, the data lines are unidirectional. If you have a PS/2 parallel port then you can connect the X1541 and XP1541 or the X1541 and XP1571 interfaces to the same parallel port, using a Y-shaped cable. If you have an EPP or ECP parallel port then you should use the XE1541 interface rather than the X1541 interface. Alternatively, you can build two separate cables and buy a secondary old SPP parallel port card for the X1541 interface. The XP1541 interface only works with Commodore 1541 drives and compatible clones. The XP1571 interface only works with Commodore 1570 and 1571 drives and compatible clones.

Please, note that none of the XH1541, XP1541, XH1571,

or XP1571 interfaces is a substitute for the original X1541 interface or the XE1541 interface. You have to connect two cables to the Commodore drive and the PC at the same time to acquire the extended transfer capabilities. Don't connect the XH1541, XP1541, XH1571 or XP1571 cable alone to the Commodore drive. None of them contain a GND line so plugging them without the X1541 or XE1541 cable may short circuit your machines and damage the periphery chips. Always connect the XH1541, XP1541, XH1571 or XP1571 interface to your Commodore drive and your PC before switching either of them on and switch both machines off before pulling the cables out.

In 1541 drives, nothing is defined to any of the bits of Port A. You can connect the XH1541 interface and the XP1541 interface without any problem. In 1541C drives, bit 0 of Port A is used for the detection of the head being over track 1. After stripping this connection off of the chip, you will have to replace the DOS ROM with that of the 1541 or the 1541-II. Otherwise you'll get strange results when the drive is seeking: the DOS tries to rely on the detector line which doesn't exist anymore. In 1541-II drives, bit 0 of Port A is grounded, strip this connection off of the chip.

In 1570 and 1571 drives, there are several lines connected to the bits of Port A of VIA#1. You can't use the XH1541 interface or the XP1541 interface with them. However, you can use the XH1571 or XP1571 interfaces, cables of the same design as the XH1541 and XH1571 interfaces, to a different chip, namely the CIA, most of whose pins are unused in these drives.

The 1581 drives are completely different from the aforementioned members of the Commodore drive family. You can't use the XH1541, XP1541, XH1571 or XP1571 interfaces with them. Because of their extremely high transfer speed, no hybrid or parallel cable will be implemented for them.

If you already have a floppy speeder like Speed DOS or Dolphin DOS in your 1541, 1570 or 1571 drive then you probably have a parallel plug at its rear. In this case, you have many options of implementing the XH1541, XP1541, XH1571 and XP1571 interface. You can create another cable to connect the drive to the PC with. You can also split the cable between the drive and the C64 into a Y-shaped cable, one end plugging into the drive, another into the C64 and the third one into the PC. In this case, remember not to plug the cable into the C64 and the PC at the same time. However, your best choice is creating a small adaptor that imitates the C64 user port on one side and plugs into the PC parallel port on the other side.

If your 1541 or 1571 drive has no parallel capabilities then you might still want to create a plug at its rear. This way there will be no cable always hanging out of the drive. With another cable, you'll be able to use parallel transfer with the C64, too. Please, note that parallel copy programs for the C64 may require some additional connections on the VIA or CIA chip of the drive. Read their documentation before soldering so that you can connect the additional pins to the parallel plug, if needed.

8. Technical background information

There are three types of lines on PC parallel ports. Data lines are used to transfer data bytes between the PC and

the external device; control lines are used by the PC to send control signals to the external device; status lines are used by the external device to send status signals to the PC.

From the PC side, logically, data lines should be used for both input and output, control lines for output only, and status lines for input only. But this is not exactly the case. On the early SPP parallel ports, data lines can only be used for output; this is what we call a unidirectional parallel port. Note that this expression is mainly used for the usage of the data lines. Furthermore, with a little trick, the control lines can be used not only for output but for input, as well.

On these early SPP parallel ports, the port pins are connected via open collectors to the chipset on the I/O controller card: there is a resistor between +5V and the pin and a transistor between GND and the pin. The transistor is controlled by the chipset which is, on the other hand, controlled by the software. When the corresponding port bit is set to one, the transistor opens and the resistor pulls the signal level on the pin to high, a voltage level of 3.5-4.5V. When the port bit is cleared to zero, the transistor closes and pulls the signal level to low, at 0V. The reason for this is that the transistor can pull stronger than the resistor.

On Commodore drives, the pins of the serial port are also connected via open collectors to the periphery chip. When there are open collectors on the two ends of the same cable then three possibilities exist. If both ends pull the line low then the actual signal level, that can be read by both parties, will be low. If both ends pull the line high then the result will be a high signal. However, if one end pulls the line high and the other one pulls it low then, again, because of the strength of the transistor, the signal level will become low. The PC or the Commodore machine can pull the line high and low and the drive will be able to read this signal. However, if the machine pulled the line high then the drive will also be able to signal back, by pulling the line low. This is the only way to input data from the drive and this is exactly how Commodore machines and PC's, using an X1541 interface, work.

It is still a mystery why the original parallel port, designed by IBM, is a unidirectional parallel port. The port wouldn't have been more expensive if it allowed the software to switch the data lines into input mode. Actually, many parallel port cards are designed to be bidirectional but are crippled down to unidirectional mode. The way to enable bidirectional mode on these cards is described at the end of this chapter. Such bidirectional SPP ports are often called PS/2 parallel ports.

However, with the introduction of high-speed peripherals, open collectors started to be replaced by totem poles: there are two transistors, one between +5V and the pin, the other between GND and the pin. The two transistors are controlled in an inverted way: at a time, exactly one of them is open and the other is closed. When the port bit is cleared to zero then, as before, the transistor on the GND side closes and pulls the line low. However, when the port bit is set to one then it is also a transistor that pulls the line high. This way, the high signal level is a voltage of 5V, as opposed to 3.5V-4.5V in the open collector, and the speed of switching between signal levels is also significantly higher, allowing more data to be transferred in a given interval of time.

On certain Pentium and newer 486 motherboards, the pins of the integrated parallel port are connected via totem poles to the chipset. When a totem pole in the PC pulls the

line high then it does that with a transistor. If the drive tries to pull the line low, to send a signal, then it also does that with a transistor. The two transistors will be fighting against each other and the outcome is unknown: the signal level may remain at high, if the transistor on the PC side is stronger, or become low, if the transistor in the drive is the stronger one. Most of the time, the transistors in the PC seem to be stronger and, therefore, no data can be input from the Commodore drive. And it is not only totem poles that can render transfer programs unable to work. The chipset on some other motherboards doesn't even contain the circuitry needed to read the signal level on lines other than the status lines.

The new enhanced parallel ports, EPP and ECP ports, have bidirectional data lines so that data can be read from a hard disk or a scanner connected to the PC. However, as described above, their control lines are not bidirectional anymore. Additionally, on some motherboards, control lines are unidirectional even when the port is switched to SPP mode via the BIOS setup. The X1541 cable won't work on these parallel ports. If you can't make transfer programs work with your motherboard then you should stop testing immediately, because the fights between transistors put stress on the chips on both sides. You should rather build an XE1541 cable which is slightly different from the X1541 cable and works on all kinds of parallel ports.

You can convert unidirectional SPP parallel port cards into a bidirectional PS/2 port by disconnecting pin 1 of the data latch 74LS374 from ground and connecting it to one of the output pins on the control latch 74LS174. This pin can be any of pins 2, 5, 7, 10, 12 or 15 and must not be connected to any other chip on the board. The corresponding input pin (3, 4, 6, 11, 13 or 14) must be connected to bit 5 of the data bus. If this is not the case on your card then you can access this bit from the data latch. Find out which one of its output pins (2, 5, 6, 9, 12, 15, 16 or 19) is connected to pin 7 of the parallel port connector and get bit 5 from the corresponding input pin (3, 4, 7, 8, 13, 14, 17 or 18).

9. Troubleshooting

If you can't access the external Commodore drive properly, here are some ideas for you to try first.

First of all, bare boot your computer, disable all the resident programs, memory managers and device drivers. Exit multi-tasking systems such as OS/2, Linux, Windows or Windows '95. These circumstances may affect data transfer. Boot plain DOS on your machine and strip everything you don't need off your AUTOEXEC.BAT and CONFIG.SYS files. You may create a boot menu or a boot disk, too. Please, note that accessing the Commodore drive is not supposed to work at all under Windows NT.

During your test, don't plug anything other than the X1541 or XE1541 interface into your PC and your Commodore drive.

If the connection with the Commodore drive locks up then switch the drive off and pull the X1541 or XE1541 interface out of it. Wait for the error message "Drive not present", plug the interface back and turn the drive back on. Optionally you can reset the drive, e.g. with Control-Alt-Backspace. Then try the following.

Raise or lower the delay value.

Check whether you have switched the option 'Extended

cable' to the correct setting. For an X1541 interface, it must be off; for an XE1541 interface, it must be on.

Check if you have set the transfer mode to 'Parallel'. Unless you really have an XP1541 or XP1571 parallel interface, you should set it to 'Serial' instead because both the X1541 and XE1541 interfaces are serial, even if you connect them to the parallel port of the PC.

If you really want to access the Commodore drive via either the X1541 or the XE1541 serial interfaces under a multi-tasking system then change the transfer mode to 'Async'. In 'Serial' mode, you would most probably experience frequent lockups. If you have a Pentium or newer 486 motherboard, with an integrated parallel port and you're using the X1541 interface then enter the BIOS setup. Change the mode of the parallel port to SPP or PS/2 (usual aliases are Normal, Standard, Compatible or Extended). In case you also use the XP1541 or XP1571 parallel cable, you must set its parallel port to PS/2, EPP or ECP (usual aliases are Extended or Enhanced) mode.

If you have a Pentium TX, Pentium-II or Pentium-III motherboard then you're most probably the unlucky owner of an integrated I/O controller whose parallel port is incompatible with the X1541 cable. Try using an older I/O controller card, a parallel port card or Hercules video card with a built-in parallel port. Alternatively, you can also use the XE1541 cable.

If you use the built-in drive of a C128D or an SX64 then execute the command 'POKE 56576, 199' on the Commodore machine before accessing its drive. Every time you also access the drive from the Commodore machine, you'll have to execute this command again afterwards.

Make sure that the X1541 or XE1541 interface is assembled well, it is shielded correctly and it is not too long. If you built the cable yourself then check it against the diagrams; you might have a mirrored cable. You can also try your cable with other machines and other transfer programs.

Plug your Commodore drive to a Commodore machine to see if it works at all after all those years. You may want to borrow a working drive from someone.

If you have an integrated parallel port then check the connection between the parallel port and the motherboard. It's possible that the cable of the port is plugged onto the motherboard in a mirrored way. You can also check it with a PC printer.

If your network uses parallel port redirection then log out. Remove dongles, parallel port switches and other devices that may filter data transfer via the parallel port.

10. The author

Please, don't hesitate, send an E-mail to the address "sta@c64.org" if you have any questions, problems, ideas or wishes concerning the Commander. You can also send snail-mails to me at this address:

Kovács Balázs Budapest, XX., Orsolya utca 5. IV/12. 1204, Hungary

Joe Forster/STA

MONITOR CABLES FOR ALL OCCASIONS!



IMPORTANT

Projects presented in this column often require the use of special tools and a fair degree of manual dexterity. Besides the danger of physical injury, assembly errors could damage your equipment. In no event will Commodore World or Creative Micro Designs be liable for any direct, indirect or consequential damages resulting from the use or misuse of the information given in this article.

You may be aware that it's getting more and more difficult to find all the various video cables needed to connect the myriad of different C-64/128 compatible monitors. Being able to build your own video cables with readily available parts provides you with the assurance that you will be able to connect any Commodore-compatible monitor to your system—now or in the future. This is important because in today's marketplace for Commodore equipment you may have to take what you can find—and many times a used monitor will come without any cables.

Before we go any further, however, I do want to mention that CMD has recently begun manufacturing a complete line of C-64/128 compatible monitor cables. So, if you don't feel very adventurous or ambitious, you may opt to contact CMD to obtain a ready-made cable. But if you are like many Commodore users and enjoy the fun and challenge of a new project, read on!

Required Tools

- Soldering Iron and Solder
- Utility Knife
- Wire Strippers
- Volt/Ohm Meter with continuity buzzer recommended

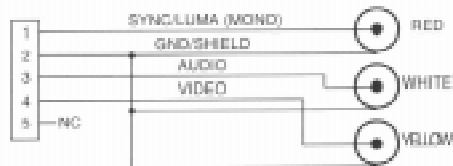
Building the Cables

First, pick out the proper cable for your application. Refer to the following paragraphs for help in making the right choice and for a list of the parts you will require. Before you begin, make

sure you have a clean uncluttered work area and all your tools and parts handy. Good Luck!

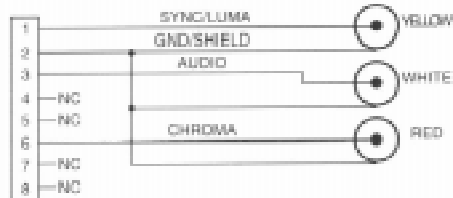
Composite Color/Monochrome Cable

This cable is needed for any C-64 that has a 5-pin video output jack, and can connect a composite color or monochrome monitor to any C-64/128. The parts you will need are a 5-pin DIN Plug (Radio Shack 274-003) and Stereo A/V cable (Radio Shack 15-1537). The latter is a patch cable, so you'll have to cut the connectors off one end.



Separate Luma/Chroma Color Cable (RCA)

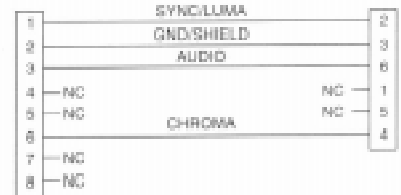
The separate Luma/Chroma color output capability of C-64's (and 128's) with 8-pin video jacks provides a clearer picture when coupled with a Monitor with matching RCA inputs (1702, 1802, 1902, 1084). To make this cable you will need the rare 262° 8-pin DIN Plug (ORA Electronics LXS82 or CMD DIN8-262) and Stereo A/V cable (Radio Shack 15-1537).



Separate Luma/Chroma Color Cable (8-pin DIN)

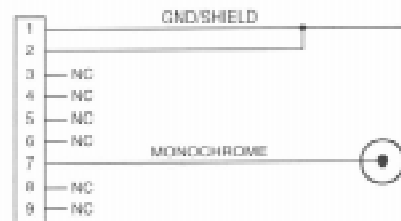
This cable will connect a C-64/128 with an 8-pin video jack to monitors that have separate Luma/Chroma inputs wired to a 6-pin DIN connector (1902A, Magnavox RGB, etc.) To make this one you will need the hard-to-find 262° 8-pin DIN Plug (ORA Electronics LXS82 or CMD DIN8-262), a length of 4-conductor shielded

computer hookup cable (Radio Shack 278-777) and a 6-pin DIN Plug (Radio Shack 274-020). Note: I think the cable comes in 30-ft lengths only, so don't be afraid to cut it down to size.



C-128 80-Column Monochrome Cable

To view the C-128's 80-column display on a composite monochrome monitor, you need this cable. It requires a DB-9M connector (Radio Shack 276-1537), DB-9 Hood (Radio Shack 276-1508), and a VCRA/V cable (Radio Shack 15-1535) with one of the ends cut off.

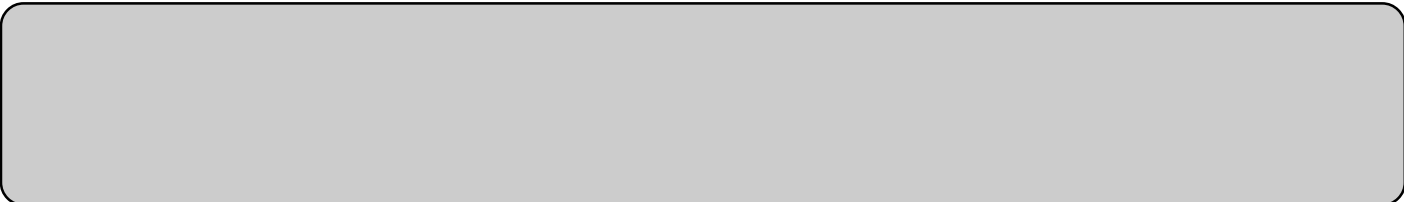
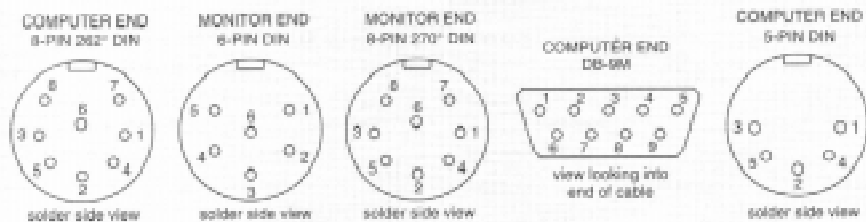
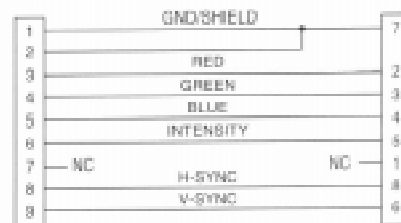


C-128 80-Column Color Cable (DB-9)

This one's easy. Buy it from CMD (RGBDB9-9) or Radio Shack (26-257).

C-128 80-Column Color Cable (8-pin DIN)

This one's not so easy. You will need a DB9M/DB9F CGA monitor cable (cut the female end off of Radio Shack 26-257) and an 8-pin DIN plug (Radio Shack 274-026). Important: Don't cut the wrong end off of the DB9 Cable! You need the male end (the one with the pins) to plug into your computer. And don't forget—before you can attach the 8-pin DIN connector, you're going to have to use your continuity tester to figure out which color wire connects to which pin on the remaining end.



THEREMIN on the Commodore 64

The Theremin was an early form of synthesizer developed by its eponymous inventor in 1924. Audible tones were generated and control of their pitch and volume was by hand capacitance.

The C64 Theremin might be better termed a 'Lumomin' (from the latin lumen meaning light) as pitch and volume are controlled by varying the intensity of light falling on two light dependant resistors. The overall effect however is very similar to that of Leon Theremin's pioneering instrument.

The circuit and control programme are very basic but variety and sophistication are limited only by your programming skills. The C64's SID chip will allow experimentation with different frequencies, wave-shapes and ADSR's. Vibrato, resonance, ring modulation and synchronization can all be explored.

Although designed and developed for the C64 the idea could be adapted for any computer with an analogue input and sound capabilities.

A 470k ohm linear potentiometer can be used in place of the volume control circuit or the volume control circuit can be omitted if you do not wish to vary the amplitude of the note generated.

Control programme (this should also be on the coverdisk).

```

10 REM C64 THEREMIN BY KIM APPELYARD
20 S=54272
30 REM CLEAR SID REGISTERS
40 FORX=STOS+24:POKEX,0:NEXT
41 REM SET DATA DIRECTION REGISTERS
43 POKES+2050,PEEK(S+2050)OR192
44 POKES+2048,64:REM SELECTS PADDLE CONNECTIONS

```

PORT 1

```

50 REM SET VOL & ADSR AND TURN ON VOICE
60 POKES+24,INT(PEEK(S+26)*15/255):REM
VOL IS RELATED TO ANALOGUE POT Y VALUE
61 REM SET SUSTAIN & RELEASE
65 POKES+6,240:POKES+4,17
70 REM SET FREQUENCY
80 F=268+((PEEK(S+25))*253.12156):REM
FREQ IS RELATED TO ANALOGUE POT X
VALUE
90 REM CALCULATE LOW AND HIGH FREQS
100 FH = INT(F/256):FL=F-256*FH:REM CALCU-
LATES HF & LF NUMBERS
105 REM FL & FH VARIABLES ARE POKED INTO
THE LF & HF REGISTERS OF VOICE 1
110 POKES,FL:POKES+1,FH:GOTO50

```

Parts List :

(possible supplier Maplin Electronics)

Resistors	All O.6W 1% Metal Film
R1,R2	1M 2 (M1M)
RV1 (optional)	470k Lin Pot 1 (FW07H)
LDR1	ORP12 2 (HB1OL)
Miscellaneous	
D-Range 9 Way Socket	1 (RK61R)
D-Range 9 Way Cover	1 (RK62S)
Fuseholder 20mm	1 (KCO1B)
Fuse 20mm 50mA	1 (WR93B)
3 30cm pieces of insulated wire	
A small length of multicore solder	

Bibliography :

Babani, M.H. (comp.) : Solid State Novelty Projects. Bernards 1976. ISBN O 900162 60 O.

Billingsley, John : DIY Robotics and Sensors on the Commodore Computer. Sunshine 1984. ISBN O 946408 300.

Crombie, David : The Complete Synthesizer. Omnibus 1982. ISBN O.7119.OO56.6.

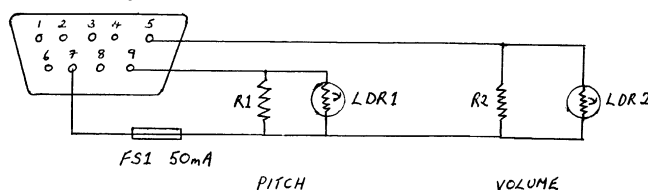
Davies, Helen : Experiments With Your Computer. Usborne 1985. ISBN O 86020 7927.

Jenkins, Mark : Electronic Music on the Commodore 64. Sunshine 1985. ISBN O-946480-59-9.

By Kim Appleyard

Technical
DIFFICULT
knowledge

D-Range 9 Way Socket.



Control Port Pin Outs :-

PIN 5	POT Y
PIN 7	+5V
PIN 9	POT X

This article first appeared in Commodore Scene issue 25

Technical
EXPERT
Knowledge

MAKE YOUR OWN SIMPLE RS232 INTERFACE

Commodore users today often find themselves trying to adapt our vintage machines to current standards. And while there have been many RS-232 interfaces available in the past, the selection is dwindling quickly. In fact, there are only two choices commercially available these days to fill this void: Aprotek's COM-MODEM Adapter and CMD's SwiftLink. Each of these are quite usable for modem connection, but only the COM-MODEM Adapter will operate with older software written only for the User port (SwiftLink attaches to the Expansion port, and requires compatible software). The problem with the COM-MODEM Adapter is that it won't work for null-modem transfers to other computers because it doesn't use the +/-12 Volt standard. Hardware 'hackers' should appreciate that the circuit in this issue will provide the correct voltages for null-modem connections. While I intended on including a circuit diagram for making a null-modem adapter, it costs less to buy than to build using Radio Shack parts. If you need the adapter, just pick up RS# 26-1496 for \$4.99.

While all the electronics parts shown are easily available from a local Radio Shack, there is one item you'll need that you may have some trouble locating: a 12 position/24 contact card edge connector compatible with the User port. These are available from Digi-Key Corporation in Thief

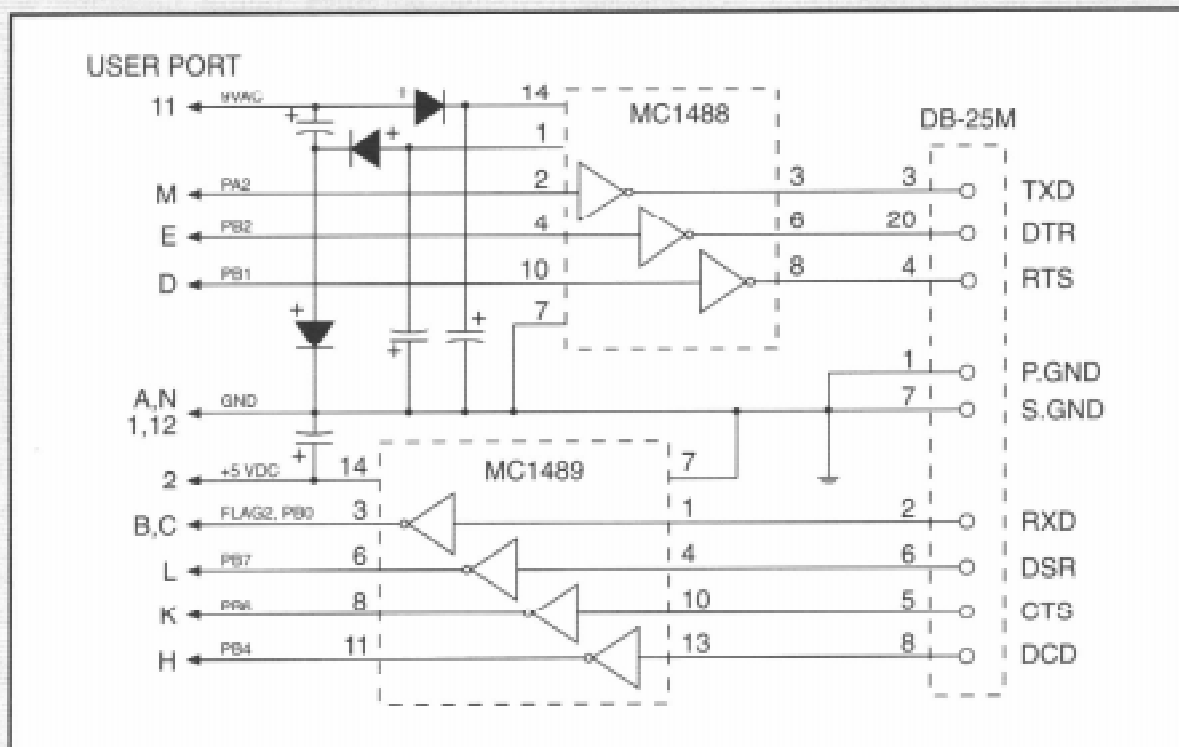
River Falls, Minnesota (1-800-344-4539). Their part number is EDC305240-ND, and the cost is \$2.14 in single quantities. This connector can be soldered to the recommended perfboard. If you plan to order from them, they also stock most of the other parts, generally for a much lower cost.

You can also substitute for the connector and wire I chose for this project—I selected ribbon cable and an insulation displacement connector for ease of assembly. You could just as easily use round cable with at least 9 conductors, and a solder-cup DB-25 male connector (RS#276-1547 @ \$1.49). You should naturally purchase a suitable hood for this connector as well (RS# 276-1549 @ \$1.19). This will reduce the overall cost of the project as well.

Finally, you'll need all the usual 'hacker' goodies, like hookup wire, soldering iron, solder, wire cutters and wire strippers. And be sure to watch polarity on the capacitors and diodes!

RS-232 Interface Parts List

Qty.	Description	RS Part #	Price	Total
1	DB-25 Male Connector	276-1558	\$3.99	\$3.99
1	25 Cond. Ribbon Cable	278-772	3.59	3.59
1	MC1488 Line Driver IC	276-2520	1.29	1.29
1	MC1489 Line Rcvr. IC	276-2521	1.29	1.29
3	1N4001 Diode	276-1101	.49	1.47
4	100µF/35V Elect. Cap.	272-1028	.99	3.96
1	Plug-in Perfboard	276-154	3.79	3.79



This article first appeared in Commodore World issue 4 and full credit is given to its author, Doug Cotton

Technical
EASY
Knowledge

INKJET REFILLING

I have used a Star LC10 Dot Matrix printer for many years and although good as printers go, I knew that there must be a printer out there that was better. Then I got myself a Hewlett Packard HP520 Ink Jet Printer, which opened up a whole new 'ball game'. Exceptional print quality compared to the Dot Matrix printer I had previously used, hence I went overboard and printed everything with this printer. This obviously used up a lot of the contents of the original ink cartridge. Suddenly, it ran out and nothing appeared on the printed page, so I had two options. (1) To dash out to try and buy a new printer cartridge for my printer at a cost of £28.50, or (2) Buy a Cartridge Re-Fill kit from a local supplier. I chose the latter and purchased a Universal kit at £10.95, manufactured overseas as it turned out. I soon experienced problems of clogging of the ink jets on the cartridge, excess or no ink etc; so after many attempts at justifying my purchase, gave it up as a bad job and bought another new Cartridge.

I knew that I would once again face the same problem, so considered the options of who could I trust to supply me with a quality product to Re-Fill my HP520 printer cartridge. So I phoned Officeland, whose RE-INK had always done what it stated it would do for re-inking dot matrix printer ribbons (see my previous articles on this subject).

They knew immediately what I needed, which was their own specially formulated and tested Universal Ink Jet Re-Fill kit for Cannon, HP, Epson etc; all fully detailed in their catalogue. I ordered this at a cost of only £8.95 (including post packing and VAT) for a 60ml bottle of ink, together with accessories, instructions etc; sufficient for two refills of my HP51626A cartridge, and I received it first post the next day. Excellent service, especially when one considers the dilatory service dished up by most suppliers.

The re-filling operation was simplicity itself, all I did was follow the instructions, job completed and I was soon using the re-filled cartridge to assess how this compared to the original. There was no difference whatsoever between the depth of print blackness and the drying time was instantaneous. Friends who own Cannon printers were contacted, two of whom ordered and tried it on their printers. They had the same results as me and were consequently delighted at the saving.

On behalf of the readers, I contacted Officeland requesting information on kits for other printers and if they could make any special offers for readers of this magazine, as they had done for Re-Ink for printer ribbons. They pointed out a few important points in their reply, as follows:-

1. They specialize in Re-Fill kits for specific printer cartridges, because regardless of other suppliers claims, not all 'Universal' kits are good for certain printers. Officeland have tailored their Universal kits with a special formula ink to cover those printers designated in their catalogue. Covered by Universal are:- Hewlett Packard, Canon, Lexmark, Olivetti, Citizen etc:

2. Inks specific for use in certain printers have been thoroughly researched and tested to ensure optimum compatibility.

Example : Epson Universal inks offered by other suppliers will work but will ultimately create problems, this is due to not being able to run at High DPI of which certain Epson printers are capable of.

3. Epson Re-Fill kits from Officeland are of a special formula and will run at both 720 and 1440 DPI, eliminating any possibility of creating blockages due to running at the higher DPI.

Footnote : My original Re-filled cartridge, which I emptied had dried up solid and apparently useless. Then I saw Officeland's Cartridge Recovery Kit priced at £5.95, so ordered this, followed the instructions, refilled with CYAN ink and now print out my Letter Headings in Blue. This gave me a new cartridge to use.

Sorry, no special offer for readers, their prices are already as low as they can be, although they do include Post/Packing and VAT.

The catalogue can be obtained from:-

Contact Address:-

OFFICELAND

10 Sterte Close

Poole

DORSET

BH15 2AT

Phone : (01202) 666155

Fax : (01202) 677958

Technical
EASY
Knowledge

HOW TO REFILL

My previous article detailed why it was cheaper to Re-Fill Ink Jet Cartridges, rather than continually buying new and why one should be cautious in which re-fill kits to purchase. There are many suppliers but only one I trust for the quality of their products. My contacts, who are many, have also had bad experience of purchasing kits from other companies. I have no personal or business interest in Officeland, I am just a very satisfied customer.

So now we come to How To Do It. I will detail how I do my HP51626A cartridge for the Hewlett Packard 520 Ink Jet Printer, but Officeland include Full Instructions for each individual printer named in their catalogue, which my friends with Canon, Brother, Lexmark etc; have also found explicit and easy to follow, however, until you purchase a Re-Fill kit, you will not know how simple it is to do it yourself!!

The Re-Fill kit if ordering black only, consists of:- One 60ml bottle of Black Ink, One Syringe, One Needle, One pair of Plastic Gloves, Full instructions and Tissue. The first thing is put on the Plastic Gloves, then open up and spread an old newspaper to work on, just in case of accidents. Never happened to me but it could do!! Take out the Needle from

it's cover and push this onto the end of the Syringe. Now you are ready to operate!!

1. Looking at the top of the cartridge you will see a plastic ball in the bottom right corner on the top. Push this in and you then have an entry hole for injecting the new ink. Do NOT pierce the hole in the middle of the arrow on the top.

2. Put a piece of good quality masking tape on the Printer Head and Air Hole, both located at the bottom of the cartridge.

3. Open the bottle of ink, insert the Syringe with Needle into the bottle and pulling up on the Syringe, fill it with ink.

4. Push down on the top of the Syringe and fill the Cartridge with ink to within .5" or 1.5cm from the top. This applies to re-filling all cartridges, empty or part, the ink remaining in the Syringe can then be replaced into the Ink Bottle.

5. Leave to stand for about 30 minutes, then either place the Plug supplied into the Re-Fill hole, or as I do, use a piece of Sellotape.

6. Remove the tape from the Print Head and the Air Hole.

7. Stand the Cartridge on the Tissue supplied and any ink escaping will soon stop.

Make sure there is no ink escaping before inserting into the printer.

End of Re-Filling of YOUR Ink Jet Cartridge. The whole operation takes about ten minutes, apart from the waiting time (5) but is a considerable saving on having to purchase new Cartridges.

USING THE RECOVERY KIT : This is a 'Quicky Bit'. You get the normal Gloves, Syringe, Needle etc; plus Head Cleaner and Cartridge Cleaner. To Use:-

a. A couple of Empty, Clean Yoguert cartons are ideal for this operation, the cartridge fits in easily and they are stable.

b. Repeat (1) above and then pour some of the contents of the Head Cleaner into the Yoguert carton so that it just covers the print head and air hole. Then insert the Cartridge to be cleaned. Leave it overnight.

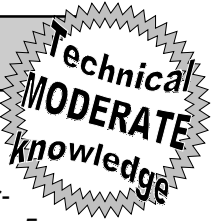
c. Empty out the Head Cleaner and put the Cartridge into the other Yoguert carton.

d. Repeat (3) but this time fill it with Cartridge Cleaner using a full 30ml and inject this into the Cartridge. Leave overnight to work. The Cartridge Cleaner will come out through the bottom.

I contacted one of our local schools and asked if they had any dead cartridges and got six. I cleaned them all as noted above, then refilled with different inks, mixing some myself to get my own colours. I can now print out Posters, Greeting Cards etc; in different colours, just by changing the cartridge to the colour I require. I guess there will be more on this in a later article.

(C)G.Potter 1998

MAVERICK AND REU'S



With today's modern Software and Hardware, one of the oldest and still a handy utility is MAVERICK. The last version to be released was I believe Version 5 series. When first released it was like a breath of fresh air and even supported 512K REU's. With the ingenuity of various people within the Commodore community the 512K REU could become a 2 meg REU, unfortunately the programmers of Maverick did not foresee this and even if you owned an expended REU the programme could not recognize it. Once again it is left to the knowledge and ingenuity of the Commodore community.

The following information I have just found in a copy of the geoJournal 1991, the newsletter of the GeoMetrix User Group of Oregon in the USA. Although I do not know if this group is still active, the provider of the information is still active within the Commodore community : RAYMOND DAY.

To update Maverick to recognize an extended REU follow the following instructions, REMEMBER to USE a BACKUP and NOT you original.

Boot up Maverick as normal, select the SECTOR MAP EDITOR, once loaded choose FIND and type in the following, \$02, \$07, \$d0, \$05. Once finished you should find 4 spots denoted by an asterisk. Raymond found them on Track, Sector : 5,18 : 10,3 : 15,6 : 32,7. This was also where I found them on my disk. Cursor up to the asterisks one at a time, and press the space bar. You should jump to another screen filled with HEX statements like LDA #\$06 etc. Locate the following and cursor down to it LDX #\$07. Press space bar and you will jump to the right where you can cursor and change the 07 to one of the following :

0f for 1 meg
17 for 1.5 meg
1f for 2 meg

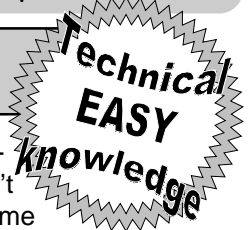
Once changed, simply press return and left arrow key to return you to the left of the code. Cursor down once, press W to write the alteration to disk. Repeat for the other locations, you can if you wish repeat your steps to make sure that the alterations have been effective.

You should now be able to access you extra Ram when using the file copy facility thus speeding up the actual time taken and will enable any one with a 1581 to do a copy in one pass. Although I have changed my Maverick I have not tried out the alterations. You can also do the same procedure with the 1581 Toolkit, select Scan disk from the menu and follow the above instructions. Only 2 occurrences will be found and on my copy I had to cursor down until I found the second location.

Happy Computing

Dave Elliott

Copying & Transferring Files From MS-DOS Computers



Recently, I was asked by Allan Bairstow how to get files working on the C64 which he had downloaded from the Internet from his PC. He was able to transfer them to CBM, but some files wouldn't work by simply running them. This article, therefore, is being aimed at everybody who requires some kind of information on transferring files from PC to 64. Because of how resourceful the Internet is for the C64/128 as well as many other computers, this information is worth knowing. I will go into as much detail as I can, based on my personal experiences.

Transferring PC files to the C64 (and vice-versa!)

There are many software packages that will achieve direct transfer between the Commodore computer and the PC. However, additional hardware may be required in all cases, be it an extra disk drive, or a cable to make up.

There is a cable that can be made which connects to the C64's and PC's serial ports, and software on both computers is able to receive and transfer files to/from each computer. I have never used this cable myself, as I don't have a PC available. The other snag with this is that you will have to build the cable yourself, as I don't think they are available anywhere. The software is available as PC, and there are many titles available. But again, I have no experience in this field, and I have had very mixed views on it - some say it's fine, but others say it's unreliable. If you're on the Internet, have a visit to <http://www.hut.fi/~msmakela/cbm/> - this is a very resourceful website which contains full information about what is needed.

Another method, which is by far the most convenient, is to save them on PC on 3.5" disk, and put them directly over to the C64. This of course requires a 3.5" drive, which are readily available in the form of an FD drive, or a second-hand 1581 hanging about. The difference for MS-DOS reading and writing is that the FD can read 1.44Mb and 720K disks, but the 1581 drive can only read 720K disks. This depends on your personal tastes. Obviously, an FD would be better because more programs/files could be transferred, but if this is out of your price range then a 1581 will do a decent job.

You must be aware that if you choose the 3.5" disk option, this will also require software. There are many software packages to read, write and even format MS-DOS disks. The most basic I have found is a piece of software called the Little Red Reader, which I believe is in the public domain, but I don't know this for sure. This piece of software can read and write 720K disks without a problem, but formatting and the 1.44Mb type are unsupported. It's bigger brother, the Big Blue Reader (ain't that clever?), is able to read, write and format 720K and 1.44Mb disks, depending on your disk drive. BE WARNED, however: you can't just shove a disk you formatted on your PC in the FD and expect the BBR to read it - you have to format the disk using the BBR's formatting program. You can format 720K disks on the PC and use them, but 1.44Mb disks need to be formatted using the BBR system.

(Personal note - I myself have found many disk errors when using the BBR's format program to create MS-DOS disks. After research I gather that all the program does is format the disk as a 720K disk, but changes the FAT (the File Allocation Table) to fool the BBR program that it has 1.44Mb disks. This caused me many disk errors. If other people have experienced this, please let me know.)

Another method is one I use myself, although the drawback is that it's for GEOS users only. GeoDOS64 is a C64/128 program which will transfer MS-DOS files to C64, and vice-versa, using 720K, 1.44Mb, or even 2.88Mb disks if you have the rare FD-4000 drive. You can read, write, format, rename, edit file info, and do a lot to the disk then you could do before. This program shines, but you need at least GEOS and a RAM expansion unit to approach it. You also need at least two drives. Also, the program will support a 1.44Mb disk you format on the PC directly, and the built-in formatter will format the disk properly - I myself have suffered no errors since using it. The program is totally free, although Version 3 is being written at the moment. Be forewarned though - the program takes over 600K of storage, so if you run out of space, get rid of the help files (they're in German anyway, so they're not essential).

File Formats

This is another problem that people face when transferring files between computers, especially when getting them off the Internet - how do I get them working on my Commie? There are many popular formats used, and luckily the utilities are easily downloadable.

Some of the formats that are used on the C64 are:

D64 Files

These files have the extension '.D64' at the end of their filename and are 1541-image files. This means that they are a sector-by-sector copy of a standard 1541 disk. These are normally 683 blocks (174,781 bytes), although some applications make bigger versions of the files. (e.g. geoConvert makes the file 175,531 bytes - not much bigger).

Possible applications you can use for this format are:

- D64-COPY V1.1
- Needs FD, C128 Only
 - Reads D64 file directly from 1.44 disk
 - NOT compatible with BBR format 1.44 disk
 - Does not work with 1581 - FD drive only
 - Fast Read/Write routines
- D64READ
- C64 or C128, 40 or 80 columns
 - Need to copy D64 file to C64 disk
 - Displays progress the program is making
- geoConvert98d
- C64/C128 40/80 columns, GEOS only
 - Needs the D64 file on standard disk
 - Takes advantage of fast-writing routines

ZipCode Format

This format is made up of four files, all with the same filename, although beginning with 1!, 2!, 3! and 4!. Once extracted, these will make up a 1541 image. This is preferable to the D64 image, because the ZipCode format actually packs the sectors, and unpkacs them when transferring them. This means that altogether they can take up less space, but this will depend on how the disk is layed out. All four files are required for the archive to work properly. When asked for the filename by the program, you enter the name without the 1!, etc - e.g. if the group of names are 1!GAME, 2!GAME, 3!GAME, 4!GAME then simply enter the filename as 'GAME'. A one-drive system is supported.

Possible applications you can use for this format are:

- ZIPCODE
- Simple 4-file extractor
 - Extracts direct to 1541 disk
- ZIP COLLECTION V2
- Supports other ZipCode formats
 - Allows usage of multiple partitions for reading from
 - Fast Write mode / Switchable Read mode
 - Can send info to serial printer (device 4)

PRG Files

Files with the PRG extension are simple programs. When you copy them across from PC to C64 format, make sure the filetype is 'PRG'. Then all you have to do is load up the program as you normally would, and it will run.

SFX Files

These are self-extracting archives, which once download you treat as a PRG file above. Follow the above, and after you run it, you will be given a prompt for a drive and device number, fully supporting partitions, and all drives are also supported. The archive will then self extract to the requested drive - anything contained in it will be written to disk. Some archives tell you about how big the contents are, but others just give you the prompt. It's pot luck, basically. However, this format is the easiest, because all you have to do is run the file, and extracting is automatic.

CVT / GEOS files

All files with the .CVT extension are as far as I am aware GEOS files. If you are downloading a program which you know for sure is GEOS, even if it doesn't have the .CVT extension, then you should still follow these steps.

These files are very easy to convert to actual GEOS files. All you have to do is copy them across to a C64 disk, boot one of the programs mentioned below, select the file and 'Convert', and your GEOS file will be runnable!

This file works by storing the header block at the beginning of the file. This is why once you've converted it, the original name will appear. For example, if you downloaded a file which had the original name 'GEOPROGP.CVT', this could change into 'geoProgPatch' or something similar.

Possible applications you can use for this format are:

- CONVERT 2.0 - 3.0
- Allows multiple file conversion
 - Will also reverse process when transferring GEOS files from Commodore to PC

- Supports SEQ and PRG files (when converting from GEOS to standard)
- geoConvert98d
- Reliable conversion
 - Will also do GEOS to Commodore file, ready for copying to PC
 - Using GEOS -> CBM will convert files one at a time
 - Can convert ALL files on one disk by one click

ARC / LNX Files

WARNING : Some versions of these files are designed to use on the PC, and won't work at all with the Commodore versions of these archives. Try them using a program like WinZIP before transporting them.

The ARC and LNX formats contain multiple files most of the time, but aren't widely used for transporting files over the Internet, but they do occur. They are not the most convenient of files, because it's often pot luck as to whether a program will work or not.

Possible applications you can use for this format are:

- ARC250
- ARC files only
 - Supports most types of file
 - Uses a command to actually create/extract the archive
- UnLynx
- LNX files only
 - Supports multiple drives (1541-type only)
 - Separate 128 version available (80-columns)
- Omega-Q
- ARC and LNX files supported
 - Supports multiple drives
 - Lists all files which are on disk - selection can be carried out with ease

TIP: If the file doesn't work the first time as an SEQ file, then try and change the filetype to PRG-type. Likewise, if the PRG-type format doesn't work, then try the SEQ format.

ZIP Files

These are normally best extracted on the PC, in MS-DOS or preferably Windows 3.1, 95 or 98. There is an unZIPper available for the C64, but it doesn't support all types of ZIP formats, and because of the updates to ZIP format that are often made, the 64's ZIP extractor won't always work.

A ZIP file normally contains a group of programs, and is often used to group together the ZipCode-format files (as mentioned previously). It can also reduce the size of a D64 file, so downloading is quicker. Also, ZIP files are noted when you click on them for downloading, and bring up a 'Save As..' box in Windows.

Possible applications you can use for this format are:

- PKUNZIP
- DOS-based
 - Uses command line to extract the files
 - Capable of handling large archives
- PKZIP
- DOS-based
 - Used to make a ZIP file
- WinZIP 6.2 onwards
- Windows-based only
 - Uses programs like PK(UN)ZIP to extract files within the Windows environment
 - Supports most formats on disk
 - Drag/dropping of files possible on some computers
 - One of the most common formats on the Internet

There are many more file types, but the main ones are covered here. There is sure to be a converter for any other file type you may come across - the key is to look for it. The FTP site I can recommend is <ftp.funet.fi/pub/cbm/>

This is basically a brief outline as to how you can convert and transfer 64/128 files from the Internet on a PC, and then get them up and running on the Commodore. It's not very complicated at all, and it doesn't have to be expensive. You can also convert stuff like text and even graphics (GIF and PCX images) to different formats.

The Maverick archiving system is more than just a copier. It sports several GEOS utilities, in addition to the parameters for backing up your GEOS disks. One of these is a file copier, illustrated below, which is capable of copying your files to a work disk 35% faster than the Desktop. This utility is very easy to use.

This file copier has a larger storage buffer and you have the advantage of selecting as many files as you want. The exceptions are the system boot files: GEOS, BOOT GEOS and KERNAL. When the system boots, it is not looking for file names, but, rather, it looks for a certain track and sector. If you copy these files over to another disk, they will no longer be in the same place and your program won't load.

After you have installed your GEOS, insert side 2 of Maverick disk 1, and look for the file copier icon. There should be two GEOS icons on this side, one is for the file copier and the other is a sector editor, discussed later. Launch the file copier and you will be greeted with the following screen.

CURRENT DISK: B: Rom1581		SOURCE: B - 1581
TOTAL FILES : 00005		TARGET: A - 1541
TOTAL BLOCKS: 00304		
	geos file disk page	
GEOPRINT	Photo Slurp	RTGGEOS24 PD
GEOWRITE	Word P Cop	SANTA MARIA
photo manager	MARICOPA	University LQ
Mini Mail	Call Form's	Epson's ppc
Handy Import	Lotus	Epson 50X Port
ScreenCon	Chsl Pac	Epson 64X HV
Icon Editor	KILLE NLO	PHOTOGRAPH
Quasi Lab25	Road LQ	DESE TOP
Contents Menu	Inithers-F	CONFIGURE
Labels	Nylonos	Pad Color Prof
Orig. Patts DA	JAVELIN	Preferences
PATTON	JOCKEY PD	Gas Salitara
Face album	BONANZA	gentile
TopLabels 1	FABENT	LockScreen
Letterhead	Frenty	ScreenGrab
MAVERICK F. C.	Binella	BlackOut
20/26/12/30	NewFont	HP High Exp 64
dira 18	Der Waterland	SWITCHER
FileCopyScreen	D S V P	PATTERN EDITOR
END 00	Burnon	Patt 99

The best way to proceed is to copy this file to a work disk, so it is always handy. The presentation of the files makes it easy to select the ones you want to copy to another disk. Select as few or as many as you wish. Be careful, though, when you copy files from a 1581 disk to a 1541 disk. You have to watch the number of blocks or else you may exceed the capacity of the disk.

The top left of your screen shows the name of the current disk, which is the source drive. It also shows the total number of files selected, or highlighted, as well as the total number of blocks of the selected files. As you highlight a file, these two numbers will increase. At the top right side of the screen are the Source and Target drives. They indicate A or B and the drive type as well.

Below this you have the usual menus. If you click on GEOS, a submenu opens up and you have the choice to exit back to the desktop, or select any of the desk accessories you have on your work disk. The FILE menu has two choices: Load Source Directory will load the directory of the disk in the source drive. The Copy Files choice is activated after you have made your setup to start copy process. When you click on DISK, a dialog box opens up where you will be able to swap the source and target drives. This file copy system will use any combination of drives that GEOS

allows. The PAGE option allows you to view the next page of files, should your disk contain more files than can be displayed in the three columns.

Files may be selected by simply pointing to the filename and clicking, thereby highlighting it. If several files to be copied are in sequence, click on the first name, hold the button and drag the cursor down to the last file. The total number of files is limited to 128 but the number of blocks is not. After you have selected all your files, choose Copy Files from the FILE menu and you will be asked if you are sure. Answer OK or CANCEL. If you select to cancel, you will return to the main screen. Select OK to copy, and you will be prompted to insert Source and Target disks, if you have two drives. Again you will have to confirm your choice. Cancel returns you to the desktop, while OK will begin the copy process. Just follow the on-screen prompts. Once the process is completed, a dialog box appears asking you to either reboot the file copier or to cancel and return to the desktop.

Another utility, GEO BOOT, gives you the choice of creating a 1581 bootable GEOS system. Normally, you would be able to use this type of drive only for applications and their data files. This utility allows you to file copy and run GEOS from a 1581, 1541 or 1571 drive, in 1571 format. Select the GEOS TOOL KIT and press Return. Follow the prompts and from the following menu select either GEO BOOT 64 or GEO BOOT 128 and press Return. For the 128 version be sure to be in 40 column mode.

Source Device and Target device may be set to any number from 8 to 11. F1 and F3 display the directories of drive A or drive B, while F8 will reboot the Maverick system disk.

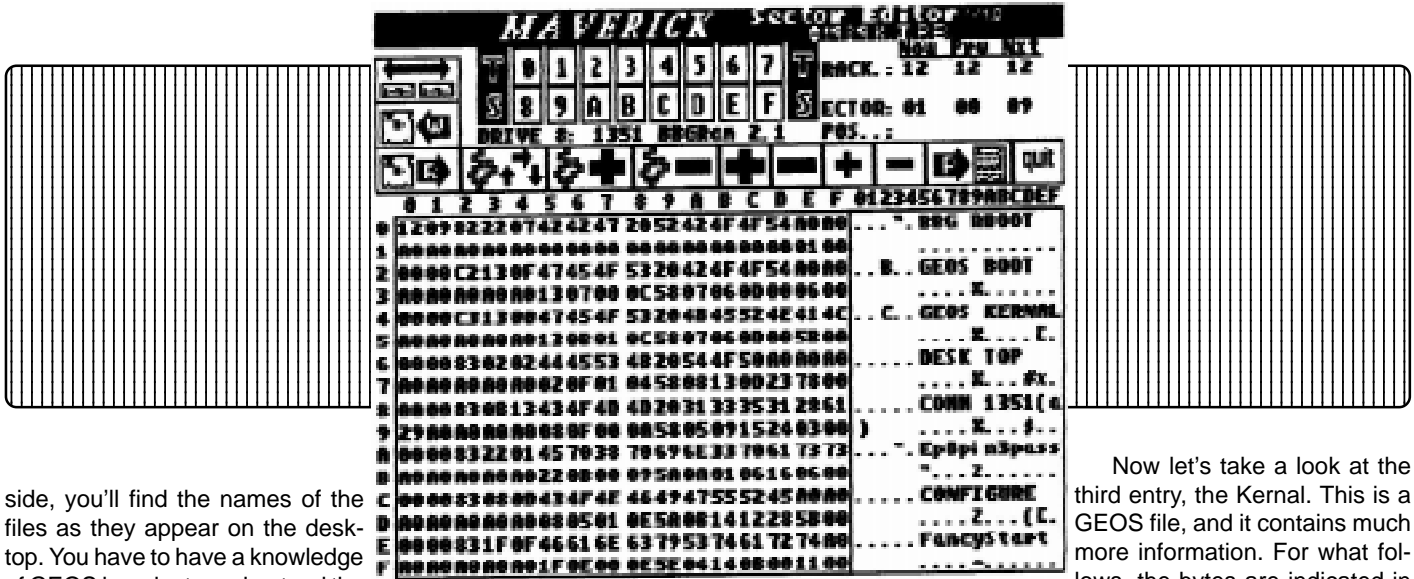
Before selecting to make a bootable copy, you must install your GEOS 2.0 disks and make sure that everything works correctly. You must use your ORIGINAL, with its protection intact, side A of your GEOS 2.0 system. Do not modify your original, i.e. deprotect it, or move files around. If you don't have an unmodified original, it will not convert your system to a bootable system. When you start the conversion process, the target disk will first be formatted. After about three minutes you will find three files on your target disk, one file for 128 users. These files will boot on the target drive. Add your input and printer drivers, the desktop and the configure files and you are in business.

The GEOS parameter menu is used to make a bootable, unprotected copy of your original disks. Again, use an unmodified original. Copy your disk with the Fast Data Copier and when the copy is complete, run the GEOS Toolkit and select the appropriate parameter. The parameter disk may be in any drive, to be selected with F1, while F3 selects the drive for the backup copy. F7 will load the parameter menu. Select the parameter needed and follow the on-screen prompts to make a deprotected copy. You will get a message informing you of a successful operation or of a failure.

Please note, that contrary to popular belief, the parameter copy does not un-install your GEOS disks. It will only deprotect them. The serial number generated during the installation process is still in the Kernal, Maverick does not remove the installation. This may be verified with an appropriate program. If you get a copy of an application from a friend, you will still be informed to use the kernal that was used in the first place to boot the application.

On side two of the Maverick system disk you will also find a GEOS file called Sector Editor (S.E.). Copy it over onto your work disk and double click on its icon. The screen that follows (on the next page) is similar to the illustration shown, showing you track 18 sector 0.

This is about the best sector editor on the market. Not only does it indicate the data in hexadecimal format, but on the right



side, you'll find the names of the files as they appear on the desktop. You have to have a knowledge of GEOS in order to understand the various data.. You change data by different means. The first is to place your cursor on the first byte of a name you want to change and enter hexadecimal numbers. For this, it is a good idea to have a conversion chart of hex and ASCII characters. The easier way is to put your cursor into the right portion of the screen, on the first character, and type away. No hex here.

The display screen shows at the top left, two drives with arrows pointing left and right. Here you change drives. The two icons below this are for reading and writing a sector, indicated by the R and W. On the right side, at the top, you find three items: Now, Previous and Next. Now indicates the present track and sector, while Next indicates the next sector in the chain. Previous simply indicates the sector viewed previously. Position indicates the position of the cursor on the sector map. This is in hex and decimal. Note that the position is indicated starting at byte 0, which is the first byte.

Track and sectors are changed by clicking on 0 to F, then on T for track, and again choosing a sector and clicking on S to lock in your choice. Click on R to read the sector thus chosen. Across the top of the sector map you find various icons that help you move in the various sectors. The first, a chain loop, permits you to move forward, following the links of the program. You also have the choice to put the cursor on a byte in the sector map, and clicking on the Chain Loop to jump to the sector indicated. Do this only on a sector address. Chain + and Chain - permit easy link following, forward and back. The large + and - read the next or previous track, respectively. The small + and - will read the next or previous sector, respectively, without following the file links. If you have your printer driver on the disk, you have the option of printing out the sector information.

What do these numbers mean? Looking at the illustration above, a representation of a track 18 sector, it is easy to follow the previously mentioned items. Now we move into the sector map, and again, it is easy to compare the right ASCII side with the left side. On the first line we have 12 and 09 as the first two bytes. The first indicates the next track in hexadecimal and the second indicates the next sector. These are the sector links. The third byte indicates the file type: 82 means PRG, while C2 means a locked PRG file.

The next two bytes, in hex, contain the address of the start of the file; 22 means track 34 and the sector is indicated by 07. Next follows the name of the file, easily compared with the right side of the screen. If the name is less than 16 characters, it is padded with shifted spaces, indicated by the A0 bytes. The rest contains only zeroes, while the last two bytes contain the number of blocks of the file. This first file is a regular DOS file.

Now let's take a look at the third entry, the Kernel. This is a GEOS file, and it contains much more information. For what follows, the bytes are indicated in

hexadecimal, easily followed by the numbers across the top and on the left side of the graphic. Bytes 60 and 61 are unused, as the sector links are only indicated at the first entry. Therefore, they are at zero. Byte 62 indicates the file type: 83 is a USR file, while C3 would indicate a locked!USR file. This byte is changed when you click on the lock button in the info sector. Bytes 63 and 64 show the first sector of the program in track and sector format. In case of a VLIR file, they will point to the index sector of the file, which, in turn, contains the file links. Bytes 65 to 74 represent the file name. If the name is less than 16 characters long, it will be padded with shifted spaces, indicated by the A0's following a shorter filename. Bytes 75 and 76 indicate the track and sector of the info block, the one you see when you select Info in the File menu. Byte 77 tells us the structure of the GEOS file: 01 for a VLIR file, and 00 for a SEQ structure. Byte 78 indicates the filetype: here 0C indicates a GEOS system boot file. The date is recorded in bytes 79, 7A and 7B, in a year, month and day format. Bytes 7C and 7D are the time in 24 hour format. The last two bytes, 7E and 7F, are the number of blocks in the file in low-byte, high-byte format.

The following is a list of the different filetypes that GEOS uses:

00	Not a GEOS file	01	C64 Basic file
02	C64 Assembly file	03	C64 Data file
04	GEOS System file	05	Desk Accessory
06	Application	07	Application Data File
08	Font file	09	Printer Driver
10	Input Driver	11	Disk Driver
12	System Boot file	13	Temporary (Swap file)
14	AutoExec file	15	Input Driver for C128

As can be seen from the above, a lot can be learned about how GEOS records its information on the disk. When you use the regular DOS Validate command, a lot of information is lost on sector 0 of track 18, most notably the Off-Page Directory Sector, bytes AB and AC. It holds the files which you have placed on the border. When you use the regular DOS Validate, this sector will be overwritten the next time you save to disk, thereby causing a Error 2, illegal track and sector. That's why you have to use the GEOS Validate command only.

As this is a program that can make or break a disk file, make a backup of the disk you wish to examine and use that one instead of your priceless originals. It is also a good idea to beef up on the GEOS file structure. A good choice is the GEOS Programmer's Handbook. And remember, the authors cannot be held responsible for the use or mis-use of this program.

Author Unkown

JPX (JUDDPEG) is a jpeg viewer for the 64. The x is for experimental. JPX loads jpegs from the current device/directory. The display is a 320x200 "window" of the full picture, whatever its size. The entire picture may be viewed using special Cheese-O-Rama technology, by starting the 320x200 window at any row/column (1 row = 8

ON THE COVER DISK!

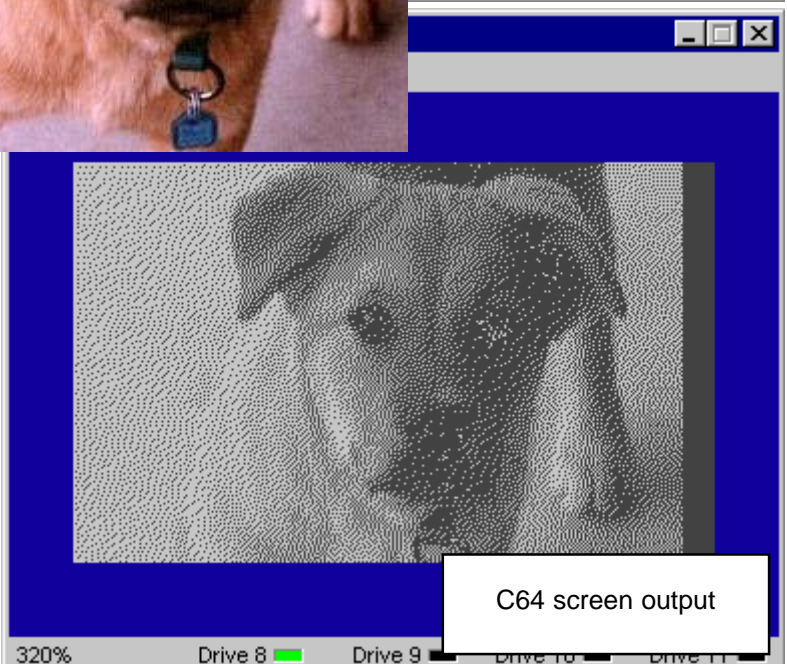
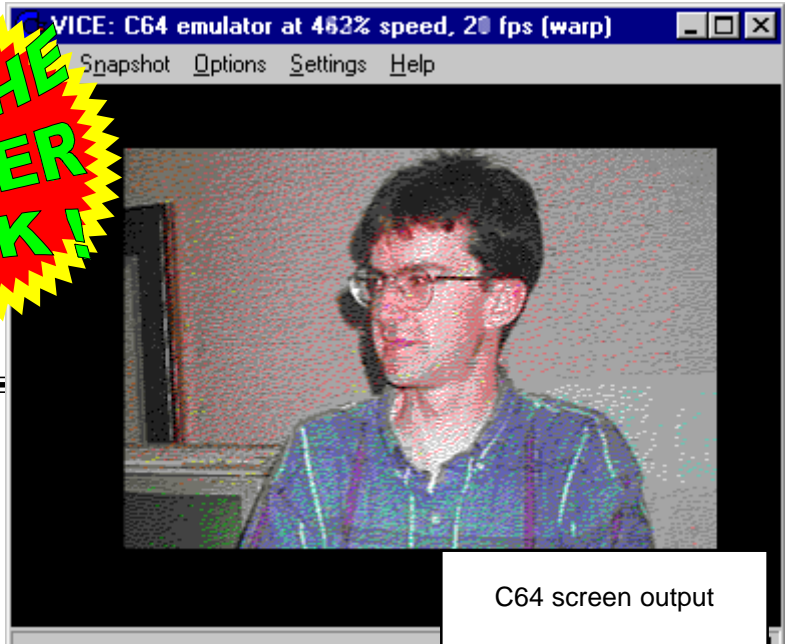
JUDDPEG

vertical pixels; 1 col = 8 horizontal pixels). Upon exiting, SYS 4096 will run the program again. Sometimes, you will encounter pictures which make the decoder barf. There are three probable causes: 1) the application uses some goofy and lame segment that the decoder doesn't understand, b) the jpeg is a progressive jpeg, and iii) there is a bug in the decoder. With the first and second possibilities the simplest solution (if you have access to a unix machine) is to run "jpegtran" on the picture jpegtran file1.jpg file2.jpg Jpegtran can also rotate pictures, as well as other simple transformations. The third possibility is, of course, impossible. But drop me an email if you encounter images which fail.

JPX is a simple program with a simple purpose: to serve as a tool for debugging the decoding routines and develop several ideas. The future of this little piece of code is the SuperCPU. Now the decoder is stable, some simple modifications can (and I expect will) be made to do things like save the image as a geoPaint graphic, or decode the entire image to postscript. That's great, but now broaden your vision a little and imagine loading in a full image, cropping, rotating, resizing/scaling the picture, touching it up here and there, lightening the image, viewing it using several different methods, and being able to save the final result in a variety of graphics formats, including 24-bit ones you can take over to Kinkos or a PC, ones you can incorporate into GEOS or feed into GoDot, or ones you can simply view on a 64. Then imagine doing that to other formats besides jpegs. Now, why did you want to dork around with jpegs on a stock machine, again?

There is a simple interface for the renderer, in case you feel motivated to write one: \$A000 Init renderer \$A003 Render 8 lines. .AY = (lo,hi) pointer to 8 lines of 8-bit luminance values, organized in 8x8 blocks (just like c64 bitmapped graphics). \$A006 Display picture "Nit" is called when the actual image decoding begins — note that the file is open, so be careful modifying \$DD00 (use LDA \$DD00 EOR xxx STA \$DD00, not LDA #\$xx STA \$DD00). "Render" is called to render 8 lines of data, organized in 8x8 blocks as as byte1 byte2 ... byte8 byte9 ... byte15 byte56 byte57 ... byte63 Note that the color data is decoded, but is currently discarded (one thing at a time, eh?). "Display" is called when the image is finished and the file closed; it should wait for a keypress. When it exits, the main code restores text mode in bank 0. Free memory includes \$40-\$7F in zero page, \$5800-\$7FFF and \$C000-\$FFFF. Note that this memory map will surely be changing in future versions.

Credits : JPX was written after a few weeks of research and one week of intense coding. Errol Smith deserves special mention and the output would be merely a set of numbers if it weren't for the very cool renderers by Adrian Gonzales.



GIF Files and GoDot - Getting the Best Output



There are loads of programs available these days to display GIF images on the C64. VGIF64 and GIFFY are two examples - these work quite well, but there is one that stands above the crowds - **GoDot**.

GoDot has been talked about before. We all know that it is a very versatile graphics package. While it doesn't allow you to create pictures, it allows you to manipulate them in many ways. One of the most useful features is converting foreign picture formats. GIF, PCX and IFF images can be converted. More commonly for multicolour pictures, the GIF format is used. Even on the Internet, the only types of images that are used on homepages I've seen are GIF and JPEG files.

The reason GoDot is considered the best is because of its output. With GIFFY and VGIF, it's directly plotted to the screen as it's loaded in (with the colours), causing pixels to look out of place, and colours getting confused. GoDot processes the picture before displaying, which seems to be the reason as to why there are very few colour clashes, and the general output is much better. As I am not the author of GoDot, and am useless when it comes to foreign graphics formats, I have no idea how they do it. The important thing is that the images are clear, and even when transferred to a C64 graphics format, are very good.

There is one problem that 64 users can face which is one I have faced more than once. It gives the graphics team here nightmares when it happens. This is when a GIF image is converted to the Commie, and there are all these different colours on the screen, making the picture look terrible. On the PC screen, it is hardly noticeable. This happens a lot with scanned-in pictures, which look fine on the PC, but look terrible when transferred through GoDot. The question hitting me was **why**?

Whenever I was given GIF images, I always looked at them on the PC through CorelPHOTOPAINT, and re-scaled them to 320x200 using this program. They looked fine - what was it that I was doing wrong? As an IT student, and someone who needed desperately to convert some brilliant GIF images to the 64, I decided to investigate...

The problem was where to start. I decided to have a look at the colour options of CorelPHOTOPAINT to see what I could learn from here. I noticed that there were three values, for Red, Green and Blue. By changing these, you could change the brightness and contrast of the colours by increasing or decreasing the different values (brightness) for each one. For black, the values were all 0 (zero), and for white, all values were set to 255 (full brightness). This got me thinking - could these have anything to do with the horrible colour on GoDot? I left this theory behind, because I just didn't know what I may end up doing!

I decided to have a talk to two college friends who are studying the same course as me, Barry and James. They advised me to alter the direct brightness/contrast/threshold controls in the program. I tried this, and found the images were slowly getting better, but it wasn't getting me to the root of the problem. I had another look at the images, and noticed that the colours again looked identical when 100% displayed in its proper form. However, it was at this time I put it into Zoom mode....

I was in the Fill mode at the time. I had doubled the size of the picture (this is enough for the images I had), and noticed nothing different. Then I noticed at the bottom of the screen some numbers moving. This data included the individual RGB values for Red Green and Blue, and the X/Y pixel positions (just like a 64 package program). Wherever I put the pointer on the picture, the RGB values changed to the values for that colour. I then moved the pointer over the troublesome area of the picture, which was horrible through GoDot, and the RGB values changed every pixel, even though the colours looked the same!! What was going on?

I decided to zoom in a little more, and found out that it was NOT the same colour. There were little red pixels scattered about the yellow area! They were so small, you couldn't notice them when viewed in normal mode. However, I couldn't be sure this was the cause of the problems, so I spent two or three hours changing all those pixels to yellow, but didn't choose any yellow - I had to make sure the yellow matched the one exactly. To make sure of this, I copied the RGB values exactly. I filled in this area, and carried out similar actions with the other parts of the picture. I re-saved the GIF image, and took it home. I loaded up GoDot, and proceeded to load the file. I displayed the picture, and lo and behold, the picture came out perfectly, except for the wrong colours. This was one problem solved. If I ever had any images like this again, spend a few hours sorting them out on the PC, or they'll be impossible.

We also recently uncovered the reason as to why the colours turned out like they did in Zoom mode - I found this out after reading **CorelDRAW for Dummies**, but it is probably true of most other graphics packages:

"PhotoPaint defines the entire image, whether it's a photograph or something painted from scratch, by thousands or even millions of tiny coloured squares called pixels.

"PhotoPaint treats the image like a mosaic. When you get close to the mosaic, you can see the individual colour tiles. When you get far away, the tiles blur into a recognisable picture. Pixels function just like those stones. When you magnify an image in PhotoPaint, you can see the individual pixels. When you restore the image to its regular size, the pixels blur together."

This explains why some scans look like they are made up of just the one colour, but are actually made up of more. Normally they are different types of the same colour, as was the case with many of the pictures that were transferred. So if you can, make sure you can alter the image before downloading. This isn't just true of GoDot - others won't work too well either!

The author of GoDot, Arndt Dettke, had set up a very useful website, containing information about all the drivers made for

GoDot - modules, loaders, savers, etc. If anyone wishes for this info on GoDot and more, they should go to <http://members.aol.com/howtogodot/> for information. Anyway, in this, a list of C64 colours and their equivalent RGB values were included. Arndt had listed the standard 64's 16-colour palette, and included the values required to make these colours on the PC. In other words, you could make up your own palette of C64 colours, which is exactly what we did. This meant that the yellow on the PC came out as yellow on the 64. After an hour, we had entered all the values, and created a C64 colour pad for CorelPHOTOPAINT. The values that were used were the following (decimal and hexadecimal values are included, depending on the type of numbers used in your graphics package):

C64 Colour	Individual Colour Values (RGB)					
	Red		Green		Blue	
Black	0	(\$00)	0	(\$00)	0	(\$00)
White	255	(\$FF)	255	(\$FF)	255	(\$FF)
Red	136	(\$88)	0	(\$00)	0	(\$00)
Cyan	170	(\$AA)	255	(\$FF)	238	(\$EE)
Purple	204	(\$CC)	68	(\$44)	204	(\$CC)
Green	0	(\$00)	204	(\$CC)	85	(\$55)
Blue	0	(\$00)	0	(\$00)	170	(\$AA)
Yellow	238	(\$EE)	238	(\$EE)	119	(\$77)
Orange	221	(\$DD)	136	(\$88)	85	(\$55)
Brown	102	(\$66)	68	(\$44)	0	(\$00)
Lt. Red	255	(\$FF)	119	(\$77)	119	(\$77)
Dk. Gray	51	(\$33)	51	(\$33)	51	(\$33)
Gray	119	(\$77)	119	(\$77)	119	(\$77)
Lt. Green	170	(\$AA)	255	(\$FF)	102	(\$66)
Lt. Blue	0	(\$00)	136	(\$88)	255	(\$FF)
Lt. Gray	187	(\$BB)	187	(\$BB)	187	(\$BB)



For CorelPHOTOPAINT, enter the three values for each colour into the R, G and B number boxes. Then drag the colours down to the palette. It's that easy! Don't forget to save them - click on the right arrow, and click on 'Save Colours'. It'll take a while, but once saved will prove very useful when wanting to edit/draw an image for use on the 64 - it means the colours you use on the PC will be exactly the same as GoDot's palette.

Another problem commonly faced by people converting images is the size of the GIF image. The PC's screen can have some big images, and it doesn't matter too much. GoDot does allow you to select where on the image you want to 'fetch' the data from, or to shrink/enlarge the image, but what if you want the whole image, or the picture is too big for GoDot? You will have to re-scale the image.

This is much more practical to do on the PC, as you can be exact with your measurements. If you can, scale it to exactly 320x200, so it will take up the whole screen. However, sometimes this isn't possible. Say you've got an image that is 320x240. The best way of doing this in CorelPHOTOPAINT is by selecting 'Resample' from the Image menu, and decreasing the size slowly until the picture's Y size is 200. This creates a re-scale of your 320x240 picture to about 286x200.

Of course, the picture may be too **long** (i.e. more than 320 pixels in length). Just do the same as above, but make sure the X size doesn't exceed 320. One example I have come across - for an image of 430x200, this was re-scaled to 320x187. The dimensions may not make much sense until you see them on-screen, before everyone starts complaining my Maths don't work out !

This brings an end to all I can write for the moment. If I get any more tips for GoDot I'll pass them on. It is a very versatile program, and I advise anyone to get it. GoDot is definitely an achievement for all graphics freaks who want to make a start at converting other graphics formats.

This brings the article to an end. I hope it will help people get the best out of their converted images. Remember, you need to be patient - the images you see on these pages took several hours (and in other cases, days) to get perfect. You should see them in colour!

Happy painting!!

LATEST! - For a while now, there has been a program available which allows you to convert GIF, JPEG, PCX, BMP, etc. images directly to Koala/GoDot format. It runs on any machine which uses Windows 95/98, and will also let you load in Koala, and other images you may know the info for. This program is free, and you can pick it up from the main website of GoDot.



Danny Tod

DOWNLOADED AREA

BACK UP YOUR DISKS NOW !

NEVER use your original disks.

DISK 1 - SIDE 1

ModPlay64 (mp64 & related files)

Plays Module music, familiar from Amiga.
Requires an REU, supports SuperCPU for much higher quality. For larger Mods an FD, HD or RAMLink is recommended.

LYNX (ultimate lynx and ultimate lynx 3)

These are archiving programs for use with Commodore file transfer programs.

ZIP UTILITIES (zip-collection, zip-disk check, zip-disk doctor & zip-subzero)

More programs to help you with file archiving, compression, error correcting and file restructuring.

File Master (file-master v1.2)

Copy files and send disk commands to and from devices #8 and #9.

CMD Diredit (cmddir)

Directory sorter/manipulator for CMD drives (FD, HD, RAMLink) - supports all kinds of emulation partitions and CMD native partitions including subdirectories.

DISK 1 - SIDE 2

DEdit64 V7.1 (dedit64)

A directory editor and sorter for CMD FD, HD and RAMLink. Has a bit more functionality compared to CMD Diredit, but misses the possibility to insert separator lines known from Dirmaster.

Wraptor V3 (wraptor3)

A note to help you with Wraptored files... after downloading a file and moving it to a Commodore disk for unwrapping, be sure that the file is a PRG type file and the filename ends with .wr3 in lowercase PETASCII characters. If not, Wraptor won't list it in the file requestor.

Wraptor is a good program to use for GEOS type files because it can convert and archive in one operation and it works with multiple files. Wraptor runs outside of GEOS/Wheels, yet it can work with GEOS type files.

Wraptor V1 (wraptor & additional files)

This version is for .wra files (this includes the documentation). This file is called wraptor.sda. After you download it*, load and run it in 64 mode to self dissolve the files. The main thing you need here is the documentation in order to understand how Wraptor V3 works.

* A ready to run version of this file is included.

Unzip64 & 128 (unzip64v214 and unzip128)

Decompresses the (in)famous ZIP files on your C64. Also GZIP files are supported. Works with FD, HD,

RAMLink and is SuperCPU optimized.

Head Alignment (hd8)

A head alignment program for your drive, device 8 only. Leave a disk in the drive while performing the test.

Performance Test (pt)

A drive performance test program to test the mechanical and electronic integrity of your disk drives.

SuperCPU Backup (supercpu backup)

A serial backup program for the 1541 which uses the

SuperRAM card - no more disk swaps required. Also works as a normal 1541 copy program without the SuperRAM card.

Byteboiler v1.1 (b.boiler 1.1/drm)

This version of the Byteboiler-cruncher was adapted to the SuperCPU/SuperRAMCard by Ninja/The Dreams. Compared to the REU version, the packer is twice as fast now !

Jamaica Monitor v3.0 (jammon3)

A monitor by Windex which supports the 65816 opcodes.

EI Cheapo Assembler v1.4 (el)

An assembler by Windex which supports the 65816 opcodes.

Leemon (816-mon sys32000)

This was the first monitor to support the 65816 opcodes, coded by Mr Lee/Cascade.

DISK 2 - SIDE 1

JuddPeg (jpz1208 - SCPU/20Mhz version & jpz120-1 stock c64/1541 version)

Views JPEG's on a C64 with SuperCPU, uses Interlace-FLI. Displays standard encoded JPEG's (e.g. saved on a PC with Paintshop Pro), progressive encoding not (yet) supported. A much slower version for the stock C64 is also on the disk.

Sample JPEG files available to view are - maurice2, cs, sjudd--1 and babybob.

DISK 2 - SIDE 2 (GEOS files only)

Wheels upgrades and goodies

Here we have some new files for your Wheels system. These files will either be new and useful applications or utilities, or they may be replacements for any of your current system files.



Dashboard 64 (db64v43)

Dashboard 128 (db128v43)

Installing this copy of the Dashboard is easy once you've unwrapped it with Wraptor V3.

Boot up Wheels and then load up the Toolbox. Click on the "options" menu and then click on "bootup settings". In the dialogue box that pops up, make sure that item #3 is selected. If not, then you could possibly have a crash when you boot up with the new Dashboard for the first time. After you've booted with the new Dashboard, you can turn that selection off again if you wish to.

Now, exit out of the Toolbox and delete all copies of the Dashboard on your system. Check all your partitions for copies. Use Finder to locate them if you need to. But if you use Finder to delete them, leave at least one available so you can exit back out of Finder! Make sure you have an extra bootable MASTER disk with the original Dashboard just in case something goes wrong. Once you've deleted the Dashboard from your system, copy the new one in its place.

Now, shut down your system and reboot. Your system should come up just as before. Open up some windows and click on some menus in the Dashboard. Check it out and make sure it's working OK after the installation. If everything looks OK, then you're all set.

This copy of the Dashboard can only be used with Wheels V4.2. Don't use it with Wheels 64 V4.0 or Wheels 128 V4.1. Look at your original Wheels disk and check the version number. If you don't have Wheels V4.2, send in your registration and you'll be sent a free upgrade, and it will include this new Dashboard and any other updated files.

The version number on this Dashboard is now V4.3. If you have Dashboard V4.2, then you should install this new version.

Toolbox 64 (tbox64)

Important: Those that are still using Wheels 64 V4.0 - Don't install this Toolbox. You'll crash your system! Instead, send in your Wheels registration so you can get your free Wheels V4.2 upgrade. And it will also be supplied with this new Toolbox.

Unwrap with Wraptor V3, then simply boot up Wheels 64 and delete your current copy of Toolbox 64. Then copy this new version to your boot disk or boot partition. The next time you reboot, you'll be sent through the bootup dialogue boxes. Don't forget to replace the copy of Toolbox 64 on your MASTER disks.

New mouse drivers for SuperCPU users (whmouse)

Smart4, Smart4R, 128Smart4, 128Smart4R, C1351S and C1351SR

To find out if you need to replace your mouse driver, check the version number. Click on the icon for your driver and then select "info" from the file menu in the Dashboard. The version number will be listed on the Permanent Name line. If your driver is V4.1 or lower, you need to replace it. The new drivers included here are V4.2.

All 6 mouse drivers are include in this one .wr3 archived file. You'll need Wraptor V3 to dearchive this file.

Finder V1.1 (finder11)

Finder is an application that can help you locate files on your system.

Finder runs only in Wheels 64 V4.2 and Wheels 128 V4.2.

GEOS Calculator (calc)

This version of the calculator is fixed so that BASIC is accessed in a more proper way and the accelerators no longer lock up or crash. This version will still work even if you don't have an accelerator. It's for GEOS 64 or Wheels 64 only. It should also work OK using MegaPatch 3.

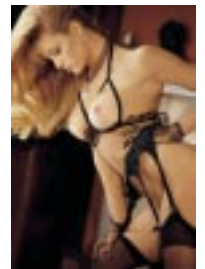
geoConvert (geoconvert e98d)

This is an absolutely fantastic program that allows you to archive / dearchive files and complete disk including .d64 images. A truly outstanding program !

DISK 3

All the files found on the first two 5.25" disks can be found here. Some additional JPEG files are have been included and these are - jb-cc--1, 2025, and sidebob-1.

There is one other JPEG file called 'filth06' (pictured), this is not a porographic picture but it does show a female in an undressed state - please do not view it if you may take offence from it.



DISK 4

Cheap (jammon)

Jammon (cheap)

WORD files for the aforementioned Commodore programs on disk 1, side 2.

PKunzip (pkunzip)

Unzip those .ZIP files on your PC. Just pick up and drop the file that you need unzipping on the 'pkunzip' file name and the program will unzip it for you.

Star Commander / early version with docs (sc081)

Transfer files to and from a 1541 directly into your PC.

Star Commander (BETA version update) (sc08241b)

As above but a newer version with more features. No documentation though.

Teledisk (teledisk)

An MS-DOS based disk copy program which can backup FD-2000 disks and create FD-2000 disk images! Attention: Works only in plain MS-DOS.

Please, take a look at the disks and enjoy your Commodore because you have already proved that the Commodore is THE most versatile computer ever developed.

Be very proud !

Allan Bairstow

INSIDE THIS SPECIAL ISSUE YOU WILL FIND

- x Converting your C128D's 1571 to a 1581
- x Connecting a laser and bubblejet printers to your Commodore
- x How to make a Parallel to User Port cable
- x User port uses
- x Fitting an isolating switch to your internal 1571 on the C128D
- x Sharing printers and other hardware with a PC
- x How to transfer files from C64 to PC / PC to C64
- x IDE64 project update
- x Inkjet refilling
- x How to make a geoCable
- x SuperCPU PD utilities
- x How to fit device switches to your 1541
- x How to Connect and use 'Star Commander'
- x Building a SEGA gamepad adaptor
- x Build a simple RS232 interface
- x Build your own Audio Digitizer
- x Monitor cable wiring diagrams
- x Modify your mouse
- x NTSC to PAL conversion
- x RAMLink adaptations
- x How to attach a PC SCSI hard drive to your CMD hard drive

and much, much more

YOUR COVERDISKS

FOUR disks full to the brim with the latest versions of software to keep your Commodore going well into this new millennium !

 **Tech2000**

C64 - C128 - C64 EMULATORS