

COCKROACH SOFTWARE presents TURBO-ROM

WELCOME TO TURBO-ROM

TURBO-ROM is a replacement component for your Commodore 64, Commodore SX64 or Commodore 128 computer which fits neatly inside your computer. The concept behind TURBO-ROM is to provide you with greatly increased access speed to your 1541, 1570 or 1571 disk drive, and to simplify disk commands in general.

If you have used the Commodore 64, SX64 or Commodore 128 in Commodore 64 mode, you will know that disk access is slow. This can be very frustrating as even the most simple disk unit operations seem to take a long time.

TURBO-ROM is designed to overcome these limitations of your Commodore system at minimum of installation cost, and maximum flexibility of use.

Inside every Commodore computer is a powerful operating system - ready for you to use whenever you switch it on. By increasing the size of that operating system, TURBO-ROM allows you to use your disk drive to the maximum possible enjoyment. And isn't that how it should be?

WHAT IS TURBO-ROM?

TURBO-ROM is two computer "chips" in one.

To create TURBO-ROM, some of the Basic routines built into your Commodore computer had to be removed to make way for new, faster ones.

But that meant that some features of the computer could not be used. So, the original routines had to be there if you wanted them.

So TURBO-ROM has BOTH the original and the NEW routines, and you may select which to use at the flick of a switch.

(The switch may be operated whilst the computer is switched on without fear of harming the equipment. Best results are obtained if the switch is operated immediately after typing SYS 64738 - RETURN. i.e. just at the point where the screen appears to shrink. Typing ZAP - RETURN has the same effect from TURBO mode, or pressing the reset switch if fitted.)

WHAT WON'T IT DO?

It makes lousy coffee, but in the software department, it is very docile, and will load almost everything. This includes programs with their own in-built fast load systems, and programs made with special devices like ISEPIC. There are a very small number of programs that don't load with TURBO-ROM, so you will have to reach out, flick the switch to bring back a standard C64, then try loading again. Read the section on COMPATIBILITY, where more details are provided.

CAN I PUT IT IN?

For the most part, yes. For a few, you may need to put in a small socket, which requires some soldering. If you are not confident about this, any competent electronics technician can install it for you in a few minutes at low cost. We even provide all the parts you will need. Turn to FITTING TURBO-ROM for full instructions.

THEN WHAT?

Set the switch to TURBO-ROM, and turn on your computer and disk drive. You can also turn on your printer, because TURBO-ROM is very friendly, and will not lock up if a printer or a second disk drive is switched on. If you are using something like VIC SWITCH, turn it on too. TURBO-ROM announces itself with a distinctive screen.

The most obvious use that comes to mind is to load a program, and you can do it a number of ways. Type `LOAD"PRGNAME` and press RETURN (<CR> from now on). Because TURBO-ROM doesn't need to be told about the first disk drive number, you don't have to type the old `LOAD"PRGNAME",8` command in full.

Another way is to type `@$ <CR>` and list the disk directory to the screen. This won't erase any program you may already have in memory.

Now, use the CRSR keys to put the cursor at the left end of the program entry you want. Press SHIFT and RUN/STOP together, and TURBO-ROM will enter `LOAD` before the name, and `,8,1` after it. The cursor will be flashing on the second comma, so you may press RETURN for a type `,1` load, or tap SPACE twice to erase the `,1` and then RETURN for a standard load. These actions are very easy to remember, and extremely convenient.

SAVING AND VERIFYING

The method is much the same as the load function. Type `SAVE"MYPROG <CR>` and away goes your program to disk. Simple as that.

Verify is the same. The shorthand `S sh-A` and `V sh-E` are just fine, as is `L sh-O` for `LOAD`.

BUT REMEMBER...

Any relocating load, save or verify will require the normal syntax, like `S sh-A"THISPROG",8,1`

I HAVE TWO DRIVES

Lucky you. No problems. Follow the normal (full) syntax rules, and ALWAYS include the device number (9, 10 or whatever).

If you want to use a second drive for a number of activities, TURBO-ROM allows for device number changes. the command `@9 <CR>` will change the present disk on line to device 9. The other drive can then be switched on. Later on, the rules about device numbers will be explained more fully.

THE SAVE@ DEBATE

This may be new to you, so a quick explanation. Folklore has a story that using the "SAVE WITH REPLACE" command causes problems. SWR is a technique whereby you ask the disk drive to save a program having the same name as one already stored there. This is often used when a program is loaded into the computer, modified, then needs to be stored again.

The debate has raged for years. No one has ever proven the existence of the problem beyond reasonable doubt, but from time to time things go awry when using SWR.

TURBO-ROM avoids the problem. SWR firstly removes the original program from

disk, then saves the new version. So there is no SWR problem any more, provided you have a TURBO-ROM.

AUTOLOAD

Sometimes you want to load the first program on disk. OK, Simply type * <CR> and LOAD":*",8,1 will appear on screen, and the first program on disk will load. The colon guarantees that the very first program is loaded. If left out, then TURBO-ROM will get the last program again for you. Both styles have use, so have been included.

WHAT ELSE????

Time for a full list of everything your TURBO-ROM will do for you.

TURBO-ROM COMMANDS

LOAD LOAD"MYPROG <CR> for normal load programs
LOAD"MYPROG",8,1 for relocating load from device 8
LOAD"MYPROG",9 to load from device 9
@\$ <CR> to get directory, then cursor to program on screen and then SHIFT+RUN/STOP <CR>
* <CR> will type a special load message on the screen for you.

SAVE SAVE"THISPROG <CR> for normal save
SAVE"THATPROG",8,1 for relocating save to device 8
SAVE"YETMORE",9 (or,9,1) to save to device 9

During SAVE, TURBO-ROM checks FIRST that there is enough room on the disk to save the specified program. If there is, then the command is processed normally. If not, the command is aborted, then the error light on the disk drive will flash, and you will be told error 52, FILE TOO LARGE ERROR. That will save you from "splat" files where the disk simply runs out of free space.

COCKROACH DOS WEDGE

@ <CR> reads the disk error channel, and delivers the disk error string to you, hopefully 00, OK,00,00.

@\$ <CR> prints the directory of the current disk on the screen, without disturbing the program in memory. SPACE pauses the listing, STOP stops it.

@\$?XXXX* <CR> Commodore drives use "?" as a "wildcard". ? means that the character in that position in the name is not matched when searching the directory. So ?TESTRUN would find and show you 1TESTRUN, 6TESTRUN and so on. The * is a "don't care". If you enter @\$HIDER*, then TURBO-ROM will match HIDER and ignore any other disk names it finds. The ? and * may be used together, such as @\$?TITLE*, to find disk names with TITLE as the second to sixth characters.

@\$: <CR> will list the disk title, ID and blocks free. Handy for checking how much disk space remains.

@I <CR> initializes the disk in the drive.

@V <CR> validates the block allocation map (BAM) on the disk in use.

@S:WHATEVER <CR> will scratch (erase) the file WHATEVER from the disk.

@R:NEWNAME=OLDNAME <CR> changes the program name of OLDNAME to NEWNAME.

@N:MYDISK,PG <CR> will new (format) the disk in the usual slow way. Leaving off the ID (PG in the example) clears out the directory track only.

@F:YOURDISK,FF <CR> does a fast new (format), i.e., erase, format and verify, in 30 seconds.

@9 <CR> changes the device number of a 1541 drive from 8 to 9. This is very useful when two drives are connected up. The sequence is:

1. Turn on ONLY the drive to be made device 9
2. Type @9 <CR>
3. Turn on the other drive. This will be device 8.

Remember, to use device 9, the full syntax must be used, e.g., LOAD"DOOVER",9 <CR>. COCKROACH DOS WEDGE remembers the last drive you used, and you may shorthand further commands to that drive. So, in the case of DOOVER, TURBO-WEDGE will now send all commands to device 9, and commands to device 8 must now be typed in full.

@P <CR> is the same as OPEN4,4:CMD4. Any further screen output will now go to the printer. Type LIST after @P, and the program in memory will automatically list to your printer.

@O <CR> is the same as PRINT#4:CLOSE4, which will deselect the printer, and all output will return to your screen.

ZAP <CR> is for a cold start. It has the same effect as SYS64738. If you need to switch from TURBO-ROM back to standard ROM, type ZAP (CR) and flick the switch

OLD <CR> will restore a Basic program to you after a reset or an accidental NEW command. You may use NEW (CR) followed by OLD (CR) to reset the pointers after loading a machine code program. (You may have wondered why you get OUT OF MEMORY ERROR when you try to do any thing with the BASIC program you were just workin on. - This trick fixes that up!)

MON <CR> has been provided to link to machine code monitors. It hooks to MONAD (Paul Blair) or DRVMON64 (Starpoint) at \$8000 or \$C000. (Any machine code which has \$AD as the first byte at \$8000 or \$C000 will be recognised by MON).

SHIFT+RUN/STOP is for use with @\$, allowing you to load a program straight from the directory. Get the directory on screen, and put the cursor on the same line as the program you want. Press SHIFT and RUN/STOP together, and LOAD will be printed to the left of the program name, and ,8,1 at the right. If you want a standard load, type ":" <CR>, or tap the space bar twice to erase the ,1 then <CR>. Note that this function does not operate on the top screen line.

SCREEN DUMP To get a low resolution screen dump at ANY time, simply hold down the Commodore key and press F7. Make sure there is a printer on-line, though, or odd things may happen. This feature is not designed for hires or multi-colour screens. (May be used as a mini word processor. - Simply type onto the screen, do not use RETURN or you will get the message SYNTAX ERROR - use the cursor keys instead.

One warning note. If you use @\$ to get the directory, but the disk has never been NEWed (formatted), then the error light will flash, which is what you would expect. If you decide to NEW the disk with @F:NAME,ID the light will flash at you when the job is complete. If you now type @ to clear the disk error, it will print 00, OK,00,00. Don't believe it!! The

format is NOT complete. You have been warned.

What you do instead of the @F routine is to send @UJ. This resets the disk drive, and NOW you can NEW the disk correctly.

COMPATIBILITY

TURBO-ROM has been designed to load as many commercial programs as possible. Given the enormous variety of tricks being used for one reason or another, this is a very big plus. But, as mentioned earlier, there will always be a few that are so different that no product could claim 100% success. TURBO-ROM must then be switched out to restore the computer to normal operation. But that's all that is required, a flick of a switch. (use ZAP or SYS 64738 or press your reset button if fitted, then flick the switch whilst the screen is shrinking).

TURBO-ROM does not improve everything. A few programs have load and save routines built in, and these are written in such a way that they bypass the normal operating system, preferring to use a slow load/save. Without rewriting these programs, TURBO-ROM will not improve them.

Equally, TURBO-ROM has not been designed to speed up access to sequential (SEQ) and relative (REL) files. Because of limited availability of programming space in TURBO-ROM, some choices had to be made. The election results favoured the TURBO-DOS commands over SEQ and REL file speed. With time and world-wide acceptance, this seems to have been the correct choice.

To provide an indication of speed gains, the following table compares TURBO-ROM to 1541 FLASH. In the table, which is load time in seconds, the numbers in parentheses () represent the speed improvement factor when compared to a standard computer.

PROGRAM	STANDARD	1541 FLASH	TURBO-ROM
PITSTOP II	144.99	Failed	29.78 (4.87)
COLOSSUS CHESS	124.24	43.91 (2.87)	29.29 (4.31)
DOODLE	87.92	33.44 (2.63)	24.85 (3.54)
GHOST BUSTERS	185.67	93.94 (1.98)	76.97 (2.41)
PFS FILE	129.50	47.57 (2.72)	29.28 (4.42)
EASY SCRIPT	63.49	31.30 (2.03)	54.91 (1.16)

With "normal" programs, some load and save comparisons are interesting.

# BLKS	TYPE	STANDARD	1541 FLASH	TURBO-ROM
25	LOAD	17.40	5.74 (3.03)	3.82 (4.55)
50	LOAD	33.15	10.30 (3.22)	6.30 (5.26)
100	LOAD	65.44	19.35 (3.24)	11.13 (5.88)
200	LOAD	127.32	38.77 (3.28)	21.20 (6.01)
25	SAVE	19.64	14.20 (1.38)	6.90 (2.85)
50	SAVE	36.83	26.03 (1.41)	9.10 (4.05)
100	SAVE	70.40	49.99 (1.41)	13.60 (5.18)
200	SAVE	137.16	97.94 (1.40)	22.57 (6.08)

If you save a program with TURBO-ROM, it will load a little faster than this table indicates, because there is a modified sector pattern used in TURBO-ROM. This in no way affects the disk when used in non-TURBO-ROM mode.

THE CREDITS

TURBO-ROM evolved during 1985. COCKROACH SOFTWARE had produced the highly successful TURBO 64 package, which created special fast loading disks for the Commodore 64. These were particularly welcomed by schools, simplifying management of computer classes at very low cost.

The key team at COCKROACH, Ralph Down and Stu Burrows, were still not satisfied. Sales of Commodore 64's passed the multi-million mark, but still there was no passive system that could be easily fitted without being a qualified space engineer, and used without fear of what it might be doing to the computer or disk drive.

Paul Blair, meanwhile, was tearing bytes out of computer memory, to see how far he could go before the computer collapsed altogether. Then he plugged in a few simple disk routines (that worked!) and the idea for TURBO-ROM was born.

The rest of the story will be obvious. Paul talked to Ralph and Stu, who promptly gave up all notions of gracious living for a few months. Patiently, they turned TURBO-ROM from a RAM-based system to the ROM you see today. As the trio lived 1000 miles apart, you can imagine some of the gestation problems.

COCKROACH is pleased to bring TURBO-ROM to Commodore users. Having revolutionised home computing, the Commodore 64 has finally come of age with a low cost, easy to install and use, reliable disk system. And if you don't believe us, just ask any TURBO-ROM user. They will tell you.

Ralph Down....Stu Burrows....Paul Blair
COCKROACH/COMPUCHART
Australia

FITTING TURBO-ROM IN YOUR COMMODORE 64

This section will describe how to fit TURBO-ROM to your Commodore 64. There are separate instruction sheets for the SX64 and Commodore 128 computers.

Before starting, clean off a work space and get yourself some light on the area. Nothing can be done in the dark.

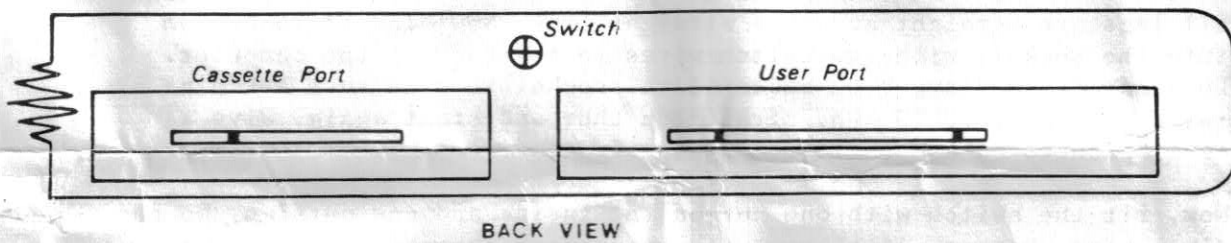
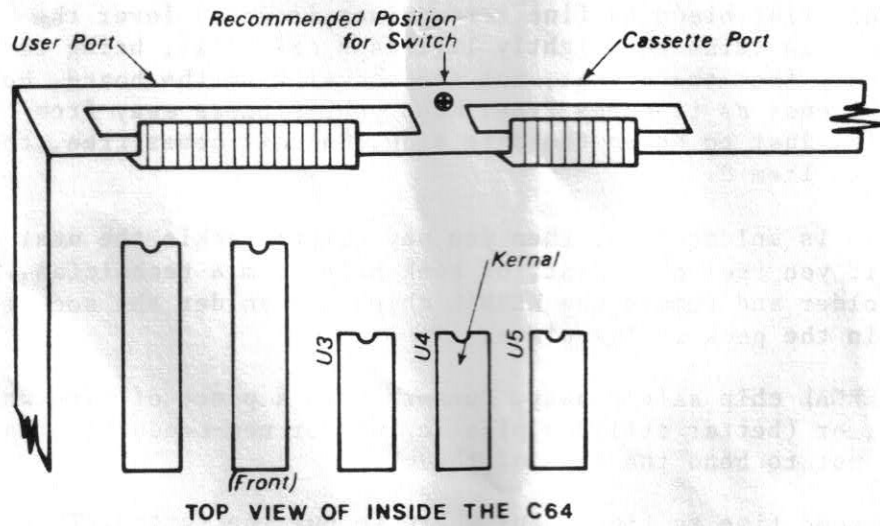
1. Disconnect all leads from the C64 - power, disk, video and anything else. Put the computer upside down on your bench.
2. Remove the three screws holding the computer body halves together. Now turn the computer right side up.
3. Gently lifting from the front edge, hinge the top half backwards and up. Prop the top open with the casing about vertical.
- 4a. If your computer has a foil covered layer, unclip it from the metal bracket at the right rear, and open it forwards to expose the main circuit board; or-
- 4b. If there is a metal screening plate, remove the screws holding it in place and lift it off
5. With the help of the diagram, find the KERNAL chip. It will be in a place on the main board marked "U4", and will have a number 901227

stamped on it. Most C64's will have this sitting in a small plastic socket (its black and under the chip - look closely). If not, go on to Item 7.

6. With a small flat blade (a fine screwdriver is good) lever the chip out. Take it in turns to slightly lift each end of it, being careful to lift the chip from the socket, not the socket from the board. Hold the chip by the ends as it comes free. Keep your fingers away from the legs of the chip, just to be on the safe side. Once it comes free, then you can go on to Item 8.
7. If the chip is soldered in, then you may either tackle the next part yourself if you feel confident, or seek help from a technician. The job is to desolder and remove the KERNAL chip, and solder the socket provided in the pack in its place.
8. Put the KERNAL chip safely away. Push it into a piece of fine white poly foam, or (better still) a plastic tube or non-conductive material. Take care not to bend the legs of the chip.
9. This is a good time to figure out where to put the switch. This is up to you, but the diagram shows a good place. If you agree, drill a small hole (9/32" is fine) ready for installation.
10. Remove TURBO-ROM from its packing. Hold it to the light, and check that all legs are straight and in a straight line. Now, insert TURBO-ROM into the socket, with the switch wires to the back of the computer. Look carefully along both sides of the socket to make sure ALL pins are in, else remove TURBO-ROM, straighten them and start again. Give a final push to ensure that fitment is tight.
11. Now, fit the switch with one nut on the inside and one outside. No bad jokes here. Do not overtighten, you may crack the casing.
12. If you have a metal screen plate, check that it will still fit. Otherwise, either bend the metal finger back a little, or cut a small hole with scissors to clear TURBO-ROM. If you have a foil card, close it up and reclip it in place.
13. Close the upper casing onto the lower casing, using the "fingers" along the back of the casing to ensure proper closure. Turn the computer upside down, and replace the three screws.
14. That's it. Replace the cables as required, and power on. If everything has been done correctly, TURBO-ROM is ready for action. If the usual screen come up on your set, flip the switch then reset the computer. The TURBO-ROM is ready for you to use.
15. If there is no screen, something is amiss. The most common problem is that the legs of the chip have bent during insertion. Re-open your computer and take a look.

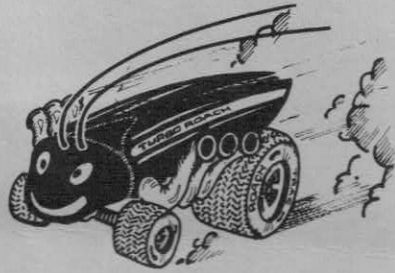
Do not try to pull TURBO-ROM apart. It contains fine components that you may damage, and we can't accept any responsibility in these cases.

DO NOT attempt to solder TURBO-ROM into your computer, for much the same reasons. The socket (either original or newly inserted) is there for a reason, so please use it.



SUGGESTED INSTALLATION

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