Rapid Transit Systems

*Experience life in the Commodore fast lane with a speed-up
cartridge or a ROM replacement.*

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By RAY ROBERTS

The C-64's many excellent features have made it one of the most popular computers in history; and, of course, the 1541 disk drive is the mass storage device most often used with it. Virtually all commercial software for the C-64 is now available on 1541-format disks.

Frankly, though, the disk operating system (DOS) leaves much to be desired. Among other things, the transfer of data between the 1541 and the computer is abysmally slow when compared to other computer systems—a result of inefficient communications software routines built into the 1541 DOS ROM and the C-64 Kernal ROM.

Fortunately, there are ways to speed up the system. One method is to use a fast-load program, such as Sizzle (*RUN*, December 1987), that can be tucked away in computer memory. The primary disadvantage of this approach is that, sooner or later, you'll load a program that uses the same memory area as the fast-loader. Then you'll have to find a different memory location for the latter (if you can).

A second solution is a cartridge that plugs into the expansion port. The software in such cartridges usually doesn't occupy much of the normal RAM in the computer, so most programs can be loaded and operated without conflict. Most fast-load cartridges offer many other features as well, such as fast-saving, easy-to-use DOS commands, a screen-dump utility, programming aids, a machine language monitor, preprogrammed function keys and archival backup. Fast-load cartridges do tie up the expansion port, but some of them have so many features that you may have to remove the cartridge only rarely.

The third solution to the speed problem is to actually replace the ROM chips in the computer and disk drive with improved versions thereof. Some of these ROM replacements produce near-

A sampling of the fast-load cartridges available for you to plug into your Commodore's expansion port.

ly incredible fast-loading and -saving.

The biggest drawback to ROM replacement is that installation requires opening the computer and disk drive to remove the old chips and insert the new ones. This isn't too difficult if you're one of the lucky ones to have a socketed Kernal ROM in your C-64, but, if you don't, first you'll need to install a 24-pin IC socket (which can be rather nerve-racking). If you're thinking about going the ROM-replacement route, you should first determine whether your Kernal ROM is socketed, so you'll know what you're getting into ahead of time. (Don't forget that if your computer is still under warranty, opening its case could void the warranty.)

In this article, I'll survey six fast-load cartridges and four ROM-replacement products. I hope the information helps you find a product that suits your needs. Table 1 presents a comparison of loading and saving times. Table 2 is a list of manufacturers and prices.

FAST-LOAD CARTRIDGES

The inexpensive **FastLoad Cartridge**, from Epyx, has been a best-seller for a couple of years. This product's features include fast-loading, a DOS wedge and a machine language monitor. Pressing the British pound (£) key allows you to

select disk utilities, including file copying, disk duplication, file renaming, disk formatting and file locking. The Epyx cartridge even offers a rudimentary disk editor. The documentation comes in a well-written, 12-page instruction manual.

Another popular and inexpensive cartridge is Access Software's **Mach 5**, also with fast-loading and a built-in DOS wedge. I found the Mach 5 a little hard to get used to, because some of the DOS commands are defined differently than in the DOS 5.1 utility that comes with every new 1541. However, you can easily obtain a full-screen display of all the commands by pressing the left arrow and then M (for menu). The Mach 5 also includes simple two-keystroke commands for opening and closing a printer channel, making hex/decimal conversions and disabling the 1541 drive rattle. It doesn't provide a machine language monitor.

The **Mach 128** cartridge, also a product of Access Software, provides fast-loading in 64 mode and the same DOS commands as the Mach 5 in both C-64 and C-128 modes. If you've graduated to the C-128 and miss the familiar and easy DOS 5.1 commands, this cartridge may make the transition between computers easier. One simple but nice fea-

ture of the Mach 128 is that it prints colons after the filenames when you display a directory by pressing $. Then, to run a program in 128 mode, all you have to do is move the cursor up to the filename and press the F6 key!

The Soft Group's **Explode!** cartridge provides fast-loading and the standard DOS commands, plus graphics capture and manipulation capabilities. While a program is running, you can capture, save to disk and print any hi-res or text screen, at the touch of a button. If you get the cartridge with the disable switch ($5 extra), you can use it to capture hi-res screens on the 40-column C-128 screen. This cartridge can also convert nonstandard hi-res and text screens into standard Koala and Doodle! pictures and strip the color from a picture (positive or negative). It's even possible to save and print sprite images by using a machine language monitor to overlay the sprite image on the captured picture.

The Explode! documentation comes on a disk in seven separate files that can be printed with a sequential file reader that's also on the disk (total, 13 pages). Unfortunately, the separate files make the printing complicated and slow. The documentation also appears to have been written at the last moment; it's disjointed and confusing. It even ends with the comment, "Well, it's 2:30 AM. . ." I hope The Soft Group will improve the documentation, because otherwise Explode! is a good product.

The **Final Cartridge III**, from H&P Computers, provides fast-loading, fast-saving and DOS commands. It's the only cartridge I reviewed that has fast-saving capability. It also offers a multitude of other features, including programming aids (30 new Direct-mode commands and improved screen editing), programmed function keys, a powerful machine language monitor, a notepad, a calculator and an alarm clock. What a terrific environment for Basic and as-

sembly language programming! There's also a "freezer" option, with which you can disable sprite detection in games, autofire the joystick and make archival copies of programs by saving from memory to a disk.

The Final Cartridge III has a user interface similar to GEOS and the Amiga, with windows and drop-down menus, and it's easiest to operate with a joystick or a mouse. The 57 pages of documentation are well-written.

I had one significant problem with this cartridge: I couldn't save programs with the DSave command on either a C-128/1571 (new ROM) combination or a stock C-64 and 1541. In both cases, it would save a few blocks and then stop. I can't explain the failure, but I hesitate to fault the cartridge software; there may have been a bad contact.

The **Super Snapshot**, another high-powered cartridge for the C-64, comes from Software Support International. It includes a fast-loader, DOS wedge,

screen dump utility, machine language monitor, utility menu, preprogrammed function keys and an excellent archiver utility that works by saving the program directly from memory to disk (the "snapshot").

If you're a QuantumLink user, you'll like this cartridge because it lets you perform disk operations while online by just pressing the button on the cartridge and selecting the utilities option. Super Snapshot comes with a well-written, 25-page instruction manual.

Just recently, I spotted an ad from Software Support for Super Snapshot V3.0. The price appears unchanged, but this product offers some new features, including fast-saving, graphics screen dumps, a file copier and a disk copier.

ROM REPLACEMENTS

1541 Flash!, from Skyles Electric Works, was one of the first ROM replacement products available (copyright 1984) for the C-64/1541 combination. ▶

Table 1. Load and save times (130 disk blocks), in seconds.

FAST-LOAD CARTRIDGES:	LOAD	SAVE
C-64, unembellished	83	88
Epyx FastLoad	17	88
Explode!	12	88
Final Cartridge III	10	*
Mach 5	17	88
Mach 128	17	88
Super Snapshot	15	88

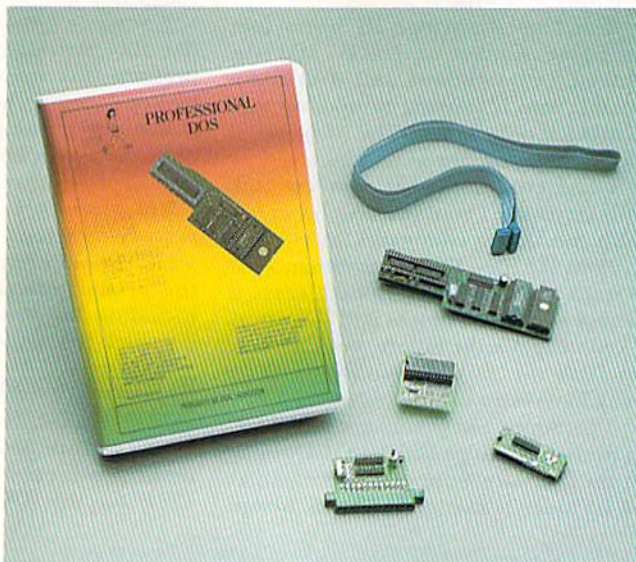| ROM REPLACEMENTS:		
1541 Flash!	21	72
JiffyDOS/64	9	37
RapiDOS	11	68
RapiDOS Professional	3	6

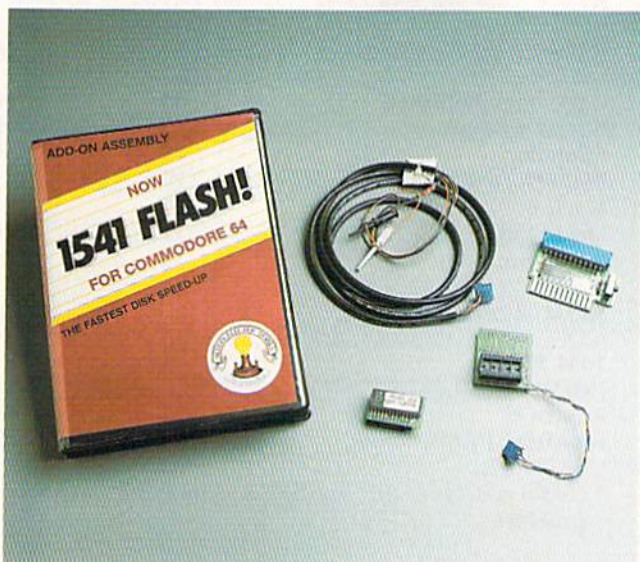* Could not save with the DSave command; possibly an equipment problem.

You must decide whether a fast-load cartridge or a ROM replacement is best for your needs.

RapiDOS Professional is an example of one of the most recent ROM replacement products.

1541 Flash!, one of the earliest available ROM replacement products.

Replacing the C-64 Kernal ROM and the 1541 DOS ROM, it speeds up program loading and slightly decreases saving time, has a built-in DOS wedge and adds some editing commands. Besides the ROMs, the hardware includes a pass-through cable card that plugs into the user port and a cable that connects it to the 1541 with two microclips and a ground wire. Installation instructions are detailed and include good pictures.

I found **JiffyDOS/64**, from Creative Micro Designs, the simplest to install of the four ROM replacements I tested. All I had to do was replace the C-64 Kernal ROM and the 1541 DOS ROM with small JiffyDOS ROM-adapter board assemblies, which plug easily into the ROM sockets, and mount a JiffyDOS-disable toggle switch on the side of the computer and the disk drive. There are no extra cables going to the disk drive or additional circuit boards occupying any peripheral ports on the computer. If it weren't for the JiffyDOS opening screen and the small toggle switches on the computer and drive, you'd never know your C-64 was modified.

JiffyDOS's performance was impressive. Programs that I'd saved when it was active (interleave of 6) loaded more than nine times faster than normal, and programs were saved in less than half the normal time. Even reading and writing sequential and relative files was faster. JiffyDOS can really add zip to a word processor or database manager!

The DOS wedge provides all the standard commands, plus 15 new ones that include Disable Head Rattle, List Basic Program from Disk, Enable/Disable Function Key Definitions, Change Disk Interleave, Lock/Unlock File, List ASCII Text File, Un-New, Screen Dump (text) and more.

The 50 pages of documentation are excellent. The creator of JiffyDOS is also a science writer, and his training and experience show.

There's no machine language monitor in the JiffyDOS ROM, but JiffyMON, one of the fullest-featured monitors I've seen (with excellent documentation), is included in the package on a disk.

Since JiffyDOS/64 doesn't occupy any ports on the computer, it's hardware-compatible with all computer peripherals, and you can't beat Creative Micro Designs' 30-day, money-back compatibility guarantee, which entitles you to a complete refund if you're dissatisfied because of any software-compatibility problems.

The firm tells me that JiffyDOS/128 is under development and will provide disk-access speedups in 64, 128 and

CP/M modes on the C-128. It should be available by the time you read this.

RapiDOS, by Chip Level Designs, consists of two ROM adapter boards, a user-port connector, a board mounted on top of a 6522 chip in the disk drive and a 3½-foot length of ribbon cable. The "preliminary manual" offered reasonably good installation instructions; its computer-generated drawings were sufficiently detailed to prevent any problems. However, the adapter boards were too large to allow replacement of the RF shield in both the computer and the disk drive, so you might expect more TV interference from your computer system after installation of RapiDOS.

In my tests, loading times decreased by a factor of up to 7½ and saving times were reduced by about 25 percent with RapiDOS. It also offers a limited DOS wedge, improved editing features, preprogrammed function keys, a screen dump (text), hex/decimal conversion and a simple machine language monitor.

One major drawback to RapiDOS is that the user port is occupied and any attempt to access device 2 (modem or RS-232) will give an Illegal Device error. It therefore appears that any computer outfitted with RapiDOS (or RapiDOS Professional—see below) can't be used for telecommunications.

RapiDOS Professional employs the same user-port ribbon-cable setup as RapiDOS, but a different Kernal ROM adapter board and a 5-inch piggy-back IC board are mounted inside the 1541. Again, there isn't enough room after installation to reinstall the RF shields.

The loading and saving performance of RapiDOS Professional is absolutely incredible. In my simple test, the 130-block file loaded in less than three seconds! That's more than 28 times faster than normal! Saving speed was nearly as impressive (six seconds, versus a normal 88). RapiDOS Professional accomplishes this feat by using 8K of RAM track buffering and hardware data conversion from GCR to ASCII format. The disk drive, therefore, reads an entire track into the drive RAM, where it's nearly instantaneously converted to 8-bit ASCII and then transferred to the computer over a parallel line.

RapiDOS Professional offers an option to extend a 35-track disk to 40 tracks without altering the existing data on the disk. This adds 85 blocks to the disk. It also has a command for renaming disks and changing the ID number. Otherwise, the editing features and DOS commands of this product are identical to those of RapiDOS.

Chip Level Designs also sells a Kernal

Table 2. Manufacturers and prices.

FAST-LOAD CARTRIDGES:

FastLoad
Epyx
PO Box 8020
Redwood City, CA 94063
$25

Explode!
The Soft Group
PO Box 111
Montgomery, IL 60538
$29.95

Final Cartridge III
H&P Computers
154 Valley St.
South Orange, NJ 07079
$69.95

Mach 5 and **Mach 128**
Access Software
2561 South 1560 West
Woods Cross, UT 84087
$25 and $35

Super Snapshot
Software Support International
2700 NE Andresen Rd.
Vancouver, WA 98661
$54.95

ROM REPLACEMENTS:

1541 Flash!
Skyles Electric Works, Inc.
231-E South Whisman Rd.
Mountain View, CA 94041
$69.95

JiffyDOS/64 and **JiffyDOS/128**
Creative Micro Designs
PO Box 789
Wilbraham, MA 01095
$49.95 and $59.95

RapiDOS and
  RapiDOS Professional
Burst-ROM and **Burst-ROM 128**
Chip Level Designs
PO Box 603
Astoria, OR 97103
RapiDOSs: $49.95 and $99.95
Burst-ROMs: $32.95 and $38.95

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replacement ROM for the C-64, called **Burst-ROM 64**. This product gives the C-64 a "Burst mode" when used with a 1571, 1581 or ICT hard drive, and it contains a DOS wedge. I didn't have an opportunity to try the Burst-ROM 64, but I did install a **Burst-ROM 128** in my C-128. It's supposed to provide the same features in 64 mode on the C-128 as the Burst-ROM 64 does on the C-64, but all I could get to work was the DOS wedge. I was never able to do fast-loading. It's possible that I made an error in the installation by clipping one of the five microclips from the circuit board to a wrong pin; the "preliminary" instructions for installation weren't very good. I hope Chip Level Designs provides better blowup diagrams in the future.

MAKING YOUR CHOICE

All of these products are much more than just fast-loaders. As we've seen, they also possess such features as fast-saving, DOS wedges, machine language monitors, graphics capturing, program copying (by memory dumping), sprite disabling, programmed function keys, Basic language extensions and new editing commands. Talk about adding power to your computer!

It's not easy to make a choice from so many products with so many different features. I would suggest that you think carefully about what is important to you and look at how each product meets your needs. Also, consider the hardware itself. Do you want a cartridge, or are you willing to open up the computer and replace integrated circuit chips? If you're considering one of the ROM replacement products, check first to see if your computer has socketed ROM chips. Finally, of course, you must factor in the cost of the product. ■

Dr. Ray Roberts, a biochemist, is the founder of KnowledgeWare, a software company in Gainesville, Florida. He is also the author of Multifinder, a shareware C-64 database manager.