

TOP SECRET STUFF

FOR THE COMMODORE 64

PROGRAMMING BY

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INSTRUCTION MANUAL BY

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FEATURES A UNIQUE AND POWERFUL
COLLECTION OF 1541 DISK DRIVE
UTILITY PROGRAMS - MANY NOW
AVAILABLE FOR THE FIRST TIME.

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*** INTRODUCTION ***

TOP SECRET STUFF is a collection of powerful utility programs for the Commodore 64 computer and 1541 disk drive which let you share secrets previously known only to the top machine language programmers in the country. Think of these programs as a valuable collection of "keys" which, when mastered, will open many doors.

This book is not intended to cover every detail, but rather serve as a roadmap for your travels through TOP SECRET STUFF. Much is left for you to discover through what we hope will be many interesting and enjoyable hours of experimentation.

Many of these programs are upgraded and enhanced versions of routines developed for our GEMINI V2.0, the ultimate disk copier, and TURBO 64, the super-fast disk loader (5 times normal speed), Commodore 64 programs. Others are brand-new programs developed expressly for this package. All, except DISK MATCHER, are designed to work with a single disk drive. This book is not a short course in such things as the operation of your disk drive and computer, the workings of the disk operating system (DOS), machine language programming, etc. Many fine books and magazine articles already exist that cover these areas very well. Having a copy of both the 64 PROGRAMMER'S REFERENCE GUIDE and your 1541 DISK OPERATION MANUAL nearby should prove helpful.

Above all, have fun, experiment and practice. Do be careful when using these programs to investigate or make backup copies of commercial programs you own. It is a good idea to make a backup copy with the included 3 MINUTE COPY program to experiment with first so that if you "have an accident" you can't repair, all is not lost. With this warning in mind, please remember that we cannot be responsible for your "accidents".

*** USING THE MENU ***

For your convenience, TOP SECRET STUFF is fully menu driven. This means that you can make your program selections directly from the menu and the correct program will automatically be loaded and run for you. Due to the use of a special fast-loader routine borrowed from TURBO 64, it is normal for the disk drive red "busy" light to be "off" during program loading. Most of the included programs have an option to return you to the main menu when you are ready to select a different program for use.

To load the menu, type in the following and press the [RETURN] key:

```
LOAD"BOOT",8,1
```

To use the menu, follow the on-screen instructions.

*** THE DOC ***

THE DOC is an especially useful program that will become more valuable the longer you use it. Its uses include repairing bad data in diskette sectors, modifying programs directly on the diskette (which can be very helpful in making backup copies of copy-protected programs), reading data in sectors containing errors, scratching or unscratching files, changing file types, changing the loading address of a program and altering the diskette block allocation map (BAM). In order that you better understand the following information, please refer to "Appendix D: Disk Formats" in your 1541 disk drive manual (your 1541 disk drive conforms to the 4040 format).

After THE DOC is running, press the [RETURN] key twice to display the BAM. At any time after this press the [F1] key to display the menu. All commands must be entered while viewing the main screen. A review of the commands follows.

To use CHANGE BYTE BY DECIMAL VALUE, position the cursor

over the byte to be changed, press the [C] key, enter the new value (from 0-255) and press the [RETURN] key. After all changes are made in this sector, REWRITE the data to the diskette (see below).

Use TEXT ENTER in the many cases where you simply want to enter standard text. Position the cursor, press the [T] key, enter the text, press the [RETURN] key and REWRITE when done. This technique is handy for changing the diskette name (track 18, sector 0), filenames (track 18, sectors 1-19) or data in programs or files.

To move one sector at a time, press either the [+] key (INCREMENT ONE SECTOR) or the [-] key (DECREMENT ONE SECTOR).

To move one track at a time, press either the SHIFTED [+] key (INCREMENT ONE TRACK) or the SHIFTED [-] key (DECREMENT ONE TRACK).

In moving around the diskette, you may encounter either an "intentional" diskette error in a copy-protected program or an accidental diskette error. In either case the type of error will be momentarily displayed followed by the data "under" the error. This data cannot be rewritten to the diskette containing the error, but it can be rewritten to another properly formatted diskette.

To REWRITE SECTOR after modifying data currently on the screen, press the [R] key. At the "are you sure" prompt, press either the [Y] key for "yes" or the [N] key for "no". Remember that once the old data is rewritten it CANNOT be recovered. If you experience trouble rewriting, be sure that the write protect tab is off the diskette.

To move directly to a NEW TRACK AND SECTOR, press the [N] key. Enter the new track number, press the [RETURN] key, enter the new sector number and press the [RETURN] key. For an explanation of the "imbedded track" number display, see the IMBEDDED TRACK NUMBER CREATOR program below. Any time you wish to look at another diskette, make this your first step. This will initialize the disk drive for the new diskette and prevent the reporting of "false" errors.

The first 2 bytes of any data block on the screen and the

2 bytes immediately preceding any file name in the diskette directory (track 18, sectors 1-19) are the "jump links" telling the DOS the location of the next sector to go to. The first byte is the track and the second the sector. To JUMP TO 2 BYTE LINK UNDER CURSOR, position the cursor at the FIRST byte of the jump link and press the [J] key. You may continue this until a jump link containing a zero track value is found (a message will be displayed on the screen) indicating the end of the file.

The load address of a program file is contained in low byte, high byte hexadecimal format in the third and fourth bytes of the first sector of the file. The program may be forced to load to different locations in the computer by changing these bytes.

A diskette may be write protected by simply changing the third byte in the BAM (track 18, sector 0) to any character other than the normal "A" (this will not prevent accidental reformatting of the diskette). Reversing the process will un-write protect the diskette.

To learn how to read a BASIC program directly on the diskette, type in and save a short program for which you have a printed listing. Using the BASIC token chart in VIC 20 Programmer's Reference Guide (if you can find one) and your listing, learn to follow the program (remember that each BASIC command is tokenized to only one byte in length):

*** HEADER READER ***

This program reads the actual information out of each sector header. It displays the actual, "physical" track and sector numbers, the "imbedded" track and sector numbers, the disk ID numbers and the header and data block check sum values. This information is vital to make best use of other TOP SECRET PROGRAMS. The "imbedded" track number is used with IMBEDDED TRACK NUMBER CREATOR, and the other numbers are used with DISK MANIPULATION SYSTEM to create errors 29, 27 and 23 respectively.

To use HEADER READER, follow the on-screen instructions.

*** SYNC CHECKER ***

SYNC CHECKER checks for the standard Commodore format sync marks normally present in each diskette track after proper formatting. A lack of sync marks in a track will result in a disk operating system (DOS) error #21. Tracks 1 through 41 are checked, but normally only tracks 1 through 35 have sync marks. The program can also be used as a fast diskette error checker. With diskettes that have some or all sync marks missing beyond track 35, the checking process may halt after track 35. In this case open the disk drive door briefly between tracks to step from track 36 to track 41.

To use SYNC CHECKER, follow the on-screen instructions.

*** SYNC MAKER ***

This program writes synchronization marks to a diskette on any track from 0-41. The allowable range of values for sync bytes is 0-65535, and for the sync bit 0-255. See the "help and tips" option of the SYNC MAKER menu for more information on its use.

To use SYNC MAKER, follow the on-screen instructions.

***** IMBEDDED TRACK NUMBER CREATOR *****

Contained in the "header" information recorded on each diskette track during standard formatting is a variety of data including the appropriate track and sector numbers. This program will change any normal "physical" track number written in the header to any desired track number ("imbedded" track number). The possible range of "physical" track numbers is 0-41 with 1-35 being standard. The possible range of "imbedded track numbers is 0-255. This program is best used in conjunction with the HEADER READER program on this diskette.

As an example, let's say you were running the HEADER READER program on an Electronic Arts diskette you own and you discovered that where "physical" track 35 belonged you actually found an "imbedded" track number of 34. To make a backup copy for your archive, you could simply use 3 MINUTE COPY (included on this diskette) to make a standard copy, then, using the IMBEDDED TRACK NUMBER CREATOR, change "physical" track 35 to "imbedded" track 34 on the backup copy. It should now run normally. This is the basis for the EA BACKUP program on this disk.

To use IMBEDDED TRACK NUMBER CREATOR, follow the on-screen instructions.

***** DEVICE NUMBER CHANGE *****

This program, for use with a single 1541 disk drive, will change the device number to any value from 7 through 30. After changing the device number, the program will display the DOS version number in the disk drive ROM.

To use DEVICE NUMBER CHANGE, follow the on-screen instructions.

*** DISK MANIPULATION SYSTEM ***

This program allows the knowledgeable user to selectively create "intentional" diskette errors (as found on some original, copy-protected diskettes), format a single track, format an entire diskette or check for "intentional" or truly accidental diskette errors.

If you are trying to make a backup copy of a copy-protected diskette you own, first try using 3 MINUTE COPY which will produce many of the intentional errors used for copy protection. If that copy does not work, try using the "read disk" option of this program in conjunction with the HEADER READER program on this diskette to collect as much information about the errors as possible. Then use the "create errors" option of this program to as-accurately-as-possible recreate the original errors on the copy.

For a description of diskette errors, see your 1541 disk drive manual.

To use DISK MANIPULATION SYSTEM, follow the on-screen instructions.

*** ELECTRONIC ARTS BACKUP PROGRAM ***

This program, when used in conjunction with the 3 MINUTE COPY program, will allow you to make a backup copy of almost any Electronic Arts program that you own. First make a 3 MINUTE COPY backup of the original diskette, and then alter the copy with this program.

To use ELECTRONIC ARTS BACKUP PROGRAM, follow the on-screen instructions.

*** 3 MINUTE COPY ***

3 MINUTE COPY utilizes a single 1541 disk drive to make a high-speed copy of an entire diskette. It is NOT intended

to backup all "copy-protected" diskettes, but it will backup many. For best results when using this program, make certain that ALL plug-in accessories are disconnected from the computer except the disk drive that you are actually using to make the backup copy.

To use 3 MINUTE COPY, follow the on-screen instructions.

If after finishing your first copy you wish to make another, just press the [RETURN] key.

When you are finished, it will usually be necessary to turn the disk drive "off" and back "on", type in the following command (the "0" after "INIT:" is a zero), open the disk drive door and then press the [RETURN] key.

```
OPEN15,8,15,"INIT:0":CLOSE15
```

This will force the disk drive head to move back to track 18 (the directory) and restore normal operation.

*** 1541 DRIVE MONITOR ***

As a convenience to machine language programmers, DRIVE MON has been provided for use with a single 1541 disk drive. It may be used to examine the contents of the disk drive memory, and may also be used to create and execute machine language programs in the disk drive.

A capsule summary of the available monitor commands (using hexadecimal addresses) is listed below:

TC AAAA BBBB

Transfers 256 bytes from the computer memory starting at address AAAA to the disk drive memory starting at address BBBB.

TD AAAA BBBB

Transfers 256 bytes from the disk drive memory starting at address AAAA to the computer memory starting at address BBBB.

M AAAA Displays disk drive memory contents
G AAAA Run M/L program at AAAA in disk drive
X Exit to Commodore BASIC

DRIVE MON has full assembler/disassembler features.
DRIVE MON supports all valid DOS commands such as the following:

@I Initialize disk drive
@V Validate diskette
@N New diskette
@R Rename file

Disk drive machine language programs may be created using hexadecimal op-codes (up to eight per line) in the following format:

: AAAA BB CC DD EE FF GG HH II

*** DISKETTE MATCHER ***

This program provides direct comparison of data blocks between two diskettes using either one or two 1541 disk drives (two are highly recommended for ease of use). Output can be directed either to the screen or printer. When changing device numbers in the dual-drive mode, make certain that you wait for the red "busy" light on the disk drive to turn "off", after powering the drive back "on", before pressing the [RETURN] key. For additional information, see the "internal command menu" option in the program menu.

To use DISKETTE MATCHER, follow the on-screen

instructions.

***** DISK FILE LOGGER *****

This program allows you to quickly log for each file on a diskette the first track and sector of the file, the number of blocks in the file, the file type (prg, seq, rel or usr), the filename, the starting (or loading) and ending address of a program file or the file length in bytes for other types of files. The output may be directed either to the screen or printer. This method will locate unused portions of memory that may be reused for other purposes such as running our TURBO 64 high speed loading program.

To use DISK FILE LOGGER, follow the on-screen instructions.

***** UNSCRATCH A FILE *****

This program will recover a file that was accidentally scratched as long as the diskette has neither been validated nor saved to since the file was scratched. All you do is specify the scratched file's former name and the file type (seq, prg, usr, rel).

To use UNSCRATCH A FILE, follow the on-screen instructions.

***** WRITE PROTECT SENSOR TEST *****

This program will let you check the write protect sensor and related circuitry for proper operation. With the program running, fully insert a diskette (that has the write protect tab removed) into the disk drive. The screen should display "write protect off". Now as you pull the diskette out slowly the display should change to "write protect on" as the notch-free portion of the diskette interrupts the

sensor light beam. You can repeat the test with a write protect tab to verify actual operation.

To use WRITE PROTECT SENSOR TEST, follow the on-screen instructions.

*** VIEW BAM ***

With this program you can investigate the block allocation map (BAM) on a diskette, or compare two different BAM's on two different diskettes to each other. The BAM is the data contained in track 18, sector 0 showing which sectors on the diskette have been filled with data (allocated) and which are still free to be used. Thus, it is a track and sector map. For additional instructions see the "program tips and help" option in the program menu.

To use VIEW BAM, follow the on-screen instructions.

*** REPAIR A TRACK ***

This program will repair errors in any track from 1-35. It reads the data in each of the sectors in the track (including "under" errors), stores the data in computer memory, reformats the track and then rewrites the data to the track. You will be asked to specify a good track to use as a header ID number reference for reformatting the defective track (unless it is the defective track, track 18 is usually a good choice).

To use REPAIR A TRACK, follow the on-screen instructions.

*** 1541 READ/WRITE TEST ***

When you want to check your 1541 disk drive for proper operation, this program will help by performing a functional test. It will format, write data, read the data and verify the data on tracks 1, 17 and 35 (the outer, middle and inner

tracks). Any data errors will be reported on the screen. As any data already in these tracks will be overwritten in the process, make sure that you use either a new diskette or one that you don't care about.

As a double check, the TOP SECRET STUFF diskette itself (which is recorded to industry standards) should load without flashing the red "busy" on the disk drive if the disk drive head alignment is correct. If your disk drive does not pass these tests, have it checked and aligned by your Commodore dealer.

To use 1541 READ/WRITE TEST, follow the on-screen instructions.

*** DISK FORMATTER ***

Using this program you can format a diskette ("new" the diskette) in just 10 seconds including verification of proper formatting. It is normal for the disk drive red "busy" light to be "off" during formatting.

To use DISK FORMATTER, follow the on screen instructions.

*** 1/2 TRACK READER ***

This program helps detect formatting on 1/2 tracks. The 1541 disk drive head stepper motor actually steps twice when going from one track to the next, so that by stepping the motor only once it is possible to achieve 1/2 track movements.

Due to looseness in the disk drive mechanism and fairly broad tracks being written to the diskette during standard formatting, it is possible to detect "false" 1/2 track formatting when in fact it really doesn't exist. Try approaching the 1/2 track under investigation from both higher and lower tracks numbers. Look for a solid "OK" indication on the screen after repeated trials before assuming that 1/2 track formatting exists.

It may be necessary to initialize the disk drive after using this program. See the "helpful hints" section of this manual.

To use 1/2 TRACK READER, follow the on-screen instructions.

*** 1/2 TRACK FORMATTER ***

This program will format a single 1/2 track at a time (for example, tracks 17.5, 19.0, 23.5, 30.0, 34.5, etc.). It will not write any other data to the 1/2 track. Beware that due to the broad track pattern written by the 1541 disk drive, adjacent 1/2 tracks will be overwritten and their data lost. Therefore, formatting track 20.5 would overwrite data in tracks 20.0 and 21.0.

It may be necessary to initialize the disk drive after using this program. See the "helpful hints" section of this manual.

To use 1/2 TRACK FORMATTER, follow the on-screen instructions.

*** HELPFUL HINTS ***

The following tips may be helpful as you learn to use TOP SECRET STUFF.

1. If while you are using TOP SECRET STUFF it stops running (locks up), it is recommended that you turn off your computer and your disk drive(s) and then reload and run the program. Other methods may yield unpredictable results.
2. If after using TOP SECRET STUFF you experience problems loading a program ("file not found" error, etc.), type in the following statement (the "0" after "INIT:" is a zero), open the disk drive door and then press [RETURN]:

OPEN15,8,15,"INIT:0":CLOSE15

This will initialize the disk drive and move the disk drive head back to track 18 (the directory) and should solve the problem. Close the disk drive door and try loading again.

3. When making a backup copy, BE SURE TO MAKE YOUR BACKUP COPY IN THE DISK DRIVE YOU PLAN TO USE IT IN LATER. No other factor in making your backup copy will influence your success and affect reliability more than this one. Also, USE HIGH-QUALITY DISKETTES. No matter how well your disk drive is working, TOP SECRET STUFF cannot make a good backup copy if your diskette is not up to the task.

Make certain that the original (source) diskette loads properly in your disk drive. If loading is too erratic (the red light on the front of the disk drive flashes frequently, or the program doesn't load at all), chances are that you will have trouble making a successful backup copy. If you frequently have trouble loading programs (especially commercial ones), your disk drive may need realignment (see your Commodore dealer).

If you still experience problems, it is recommended that you unplug all accessories from both the "user port" and the "expansion port" (see your computer manual if you are in doubt about their locations). Also, try unplugging any "extra" accessories from the "serial port" that aren't presently required (such as a second disk drive and/or a printer). As a reminder, when using the 3 MINUTE COPY program it is especially important that you have no accessories plugged into your computer except the disk drive you are using to make the backup copy.

4. TOP SECRET STUFF won't copy itself.
5. After making backup copies for extended periods of time,

you may start to notice erratic operation of your disk drive. This is frequently caused by excessive heat buildup in the disk drive. Try one or more of the following:

- a. Turn off the disk drive for about 30 minutes to allow cool down.
 - b. Lay a book on your desk under the disk drive to provide better air flow to the bottom louvers. DO NOT ALLOW THE BOOK TO BLOCK THE LOUVERS.
 - c. Place a fan designed to cool electronic equipment on top of the disk drive. Running it will provide considerable air for cooling (keep your fingers away from those blades!). This will also draw additional dust into your disk drive requiring more frequent cleanings.
6. Periodically clean and demagnetize the record/playback head in your disk drive. If you are not sure how, have someone qualified do it for you.

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