SYSTEM REQUIREMENTS

Commodore 64
One 1541 disk drive

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Sincerely,

Michael D. Brown
President

Copy II 64/128,   Version 4.0

The following products have been submitted as 5¼" "back-up-ables" by our customers. Special instructions may be required to handle some of the more sophisticated protection schemes. You may need to use the parameters on side 1 of the disk, parameters on side 2 of the disk, or a combination of manual bit copy and the parameter on side 2. **These directions are noted with a number in ( ). See the reverse side of this sheet for the corresponding instructions. If there is no number in ( ), just use the default settings in Manual Bit Copy.**

Copy protection schemes do change frequently. If you find you can't backup your version of a particular program, let us know — we'll try to include it in a future update, or you can contact us to see if we have any in-house parms available. COPY II 64/128 is very sensitive to drive alignment. If you experience problems in making backups, you may need to have your drive aligned.

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Product Name	Product Name	Product Name	Product Name
1985, The Day After	Blade of Black Poole	Data Manager 2	Flight Simulator II
3001: A Sound Odyssey	Blitz Compiler	Deadline	Flip and Flop
Accounts Receivable Mgmt	Blue Max 2001	Death in the Carribean	Flying Colors
Ace	Bop & Wrestle v1, 2 (5)	Decathlon	Font Master II 64 v1 & 2 (13)
Ace of Aces v4 & 5 (7)	Boulder Dash	Decision in the Desert	Fourth Protocol (13)
Addition Magician	Break Street	Defenders of the Crwn. v1&2 (5)	Game Maker (5)
Adventure Constr. Set (12)	T1-T32	Disk Drive Alignment Prog 1.0	Gemini v2.0
Aerobics	T33.5-T35.5	T1-T39	T1-T40
Air Reserve I	Bruce Lee	Di-Sector	Gemstone Warrior (13)
Alcazar	T5-T18	T1-T16 step 1.5	GEOS v1.2 (5)
Alice in Wonderland	C-Power v2.3	T17-T20	Ghost Busters
front: T1-T38 Set Parm S to F	Castle of Dr. Creep	T21.5-T24.5 step 1.5	GI Joe (1)
back: T1-T38	Castle Wolfenstein (some)	T26-T35 step 1.5	Goonies (some) (8)
Aliens (12)	Certificate Maker (12)	Doodle	Great American Road Race (13)
Alpine Encounter	Certificate Maker v1 (5)	Doughboy	Gumball
Alternate Reality – City (8)	Certificate Maker v2 (5)(4)	Dragon Slayer (9)	Gunship v5 & 6 (7)
Alternate Reality – Dungeon (7)	Championship Lode Runner	Dragonworld	Hacker (13)
Amazon	Chip Wits	Drol	Hailey Project (5)
Archon	Choplifter	Early Games for Young Children	Hardball v1, 2, 5 (7)
Archon II (12)	Chopper Hunt	Easy Finance	Heart of Africa (5)
Arctic Fox (some)(5)	Chuck Yeager's Adv Flight	Easy Script 64	HED (Hi-Res Graphic Editcr)
Assembler/Monitor	Trainer (5)	Easy Spell	Hero
Aztec	Color Me (5)	Eidelon (13)	HesGames, Olympics
B-1 Bomber	Complete Personal Accountant	Electronic Checkbook	Hitchhikers Guide to the Galaxy
Backgammon	Computer Baseball	Elite v2 (13)	Home Accountant
Ball Blazer (13)	Computer Crosswords	Enchanter	Homeword
Baltic 1985	Conan (10)	Ernie's Magic Shapes	Hulk
Bank Street Music Writer	Cosmic Tunnels	Evelyn Wood Speed Reading	Hydrax
Bank Street Writer (some)	Creative Calc	Expedition Amazon	Impossible Mission
Barbie	Creative Filer	F-15 Strike Eagle (some) (13)	Indoor Sports (some)(5)
T1-T35 Set Parm C to N	Crime and Punishment	Facemaker	Infidel
Bard's Tale (some)	Crossword Magic v1 & 2 (13)	Fahrenheit 451	Infiltrator I (5)
Bard's Tale II (5)	Crossword Magic 3 (5)	Fantastic Filer v. Pro 1.1	Jet Combat Simulator
Beach Head	Crusade in Europe (13)	T1-T38 Set Parm S to F	(some) (13)
Beach Head II (4)	Crush, Crumble & Chomp	FAX	Juggles Rainbow
Below the Root (1)	Cut Throats	Fight Night v1&2 (7)	Jumpman
Beyond Castle Wolfenstein	Dallas Quest (2)	Fleet Systems II	Karate Champ (5)
Big Bird Special Delivery	Dam Busters (13)	Fleet Systems III (some) (13)	Karateka (12)
Bill Budge Pinball Const. Set	Data Manager	Fleet Systems IV (5)	Kawasaki Synthesizer

Kennedy Approach (some) (13)
Koronis Rift (13)
Kung Fu Master v1, 2 (5)
Kwik Load and Kwik Write
   T1-T20
Last Ninja (13)
Little Comp. People v1&2 (13)
Lode Runner
Logo
Lords of Conquest (6)
Lords of Midnight (5)
Make a Match
Mail Order Monsters
Mancopter
   T2-T18
Marble Madness (13)
Mask of the Sun
Master of the Lamps
Mastertype
Micro Astrologer
Micro Cookbook
Microleague Wrestling (12)
Millionaire
Mind Prober
Mind Shadow
Montezuma's Revenge
Monty Plays Scrabble
Movie Maker
Multiplan v1.0 (12)
Multiplan v1.06, 1.6
Multiplan v1.07 (5)
MusicCalc I & II (write protect
   backup before using!)
Music Processor
Music Shop
Murder by the Dozen
New York Times Crosswords
Newsroom v1 & 2 (5)
Newsroom v3 (13)
Omnicalc/Spreadsheet 64

Omni-Speller
Omni-Writer
On-Field Football
On Stage
One-on-One
Oxford Pascal
Pac-Man (some)
Paint Magic
Park Patrol
Pascal 64
   T1-T39
Peek A Byte 64
Personal Accountant
PFS File
Phi Beta Filer
PHM Pegasus (4)(13)
Pinball Constr. Set (12)
Pitfall / Demon Attack (12)
Pitstop II
Planetfall
Pole Position
   T8-T19
Print Shop v2 (5)
Print Shop Companion (5)
Print Shop Graphics Expander
   (5)
Printmaster v1.0 (13)
Printmaster v1.1 (5)
Professional Word Processor
Questron (1)
Racing Construction Set (some)
Raid on Bungeling Bay
Raid Over Moscow (old vers)
Raid Over Moscow (new vers)
   T1-T35
   T36 Set Parm D to 4
The Railroad Works
Rendezvous With Rama
Repton
Rescue on Fractalus (some)

Rhymes and Riddles
River Raid
Rock N' Bolt
Rocky Horror Picture Show (12)
Sargon III
Satan's Hollow
Scamball
Sci-Fi Training Co. (side 1)(11)
SeaStalker
Sentinel
   T1-T41
Serpent's Star v1.0
Seven Cities of Gold (12)
Shamus Case II
Silent Service v1 (7)
Silent Service v2 (some)(7)
Sky Fox (5)
Snoopy's Skywriter Scrambler
Sorcerer
Space Taxi
Spellicopter
Standing Stones
Starcross
Star League Baseball
Stealth
Stellar 7
Strip Poker
Sub Battle Simulator
Success with Math
Summer Games
Summer Games II (3)
   T1-T35 Set Parm C to N
   T18 Defaults
   Side Two Set Parm C to N
Super Cycle (4) (5)
Super Huey
Super Kit
Super Zaxxon (12)
Superbase 64
Superclone v2.0

Superterm
Suspended
Swift Calc 64
Swiss Family Robinson
Sylvia Porter's Financial Plan
   (2) (some)
Talking Teacher
Tech Sketch Micro Illustrator
Telegard
Test Drive (5)
Top Gun (5)
Top Secret Stuff
Touchdown Football (5)
Toy Bizarre
Transylvania
Trolls and Tribulations
Try Standard (12)
Ultima II (1)
Ultima III (1)
Ultimate Wizard (6)
Up For Grabs
Video Hits
VIP Terminal v1.0
Web of Dimension
Where in the USA is Carmen
   San Diego (5)
Where in the World is Carmen
   San Diego (5)
Whistler's Brother
Wizard
Word Processor C-64
Word Spinner
Wordwriter (some)
World Games (5)
World Karate Champ (5)
World's Greatest Baseball (5)
World's Greatest Football (5)
Zaxxon
Zork Series
Zorro (10)

(1) Copy both sides of this disk onto separate disks.

(2) In MANUAL BIT COPY, set Parameter 'S' to 'F' before copying this disk.

(3) One drive version only.

(4) Two drive version only.

(5) First MANUAL BIT COPY with defaults, then run "PARM" program from side 2.

(6) First MANUAL BIT COPY with defaults, then run "PARM" program from side 2 using parm setting for Heart of Africa.

(7) Make backup with "PARM" program on side 2 only.

(8) Make backup with "PARM" program on side 2 only using a 1541 drive.

(9) First MANUAL BIT COPY with defaults, then run "PARM" program from side 2 using parm setting for Marble Madness.

(10) First MANUAL BIT COPY with defaults, then run "PARM" program from side 2 using parm setting for Goonies.

(11) First MANUAL BIT COPY with defaults, then run "PARM" program from side 2 using parm setting for Hardball.

(12) Use parm within AUTO COPY on side 1.

(13) Follow method 12 first. If that fails to create a workable backup then try "PARM" on side 2.

Copy II
64/128

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If you need technical support for Copy][64/128, please call (503) 690-8080. Dial 1 then extension 5708. Our business hours are Monday-Friday, 8-5 PST.

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Table of Contents

Introduction

Important Information

Version 4 of Copy II 64/128 has been completely re-written to incorporate major improvements. Bit Copy now allows you to load, edit, create, and save parameter entries. The new parameter list, which supports these features, is included on side 1 of the Copy II 64/128 disk.

The other side of the disk contains the extensive parameter list that has shipped with older versions of Copy II 64/128. These parameters are non-modifiable and have been included with Version 4 to supplement the new list. For complete details on using the side 2 parameter entries, please see Appendix A.

Welcome to Copy II 64/128

This manual describes Copy II 64/128 version 4, which contains two distinct application programs:

- • a powerful DOS disk utility package
- • a sophisticated Bit Copy program for Commodore 1541/71 disk drives.

The DOS Utilities (referred to as the Utilities) allow you to manipulate DOS files and disks quickly and easily. The two Bit Copy programs can make backups of valuable software that has been copy-protected, as well as making fast, reliable backups of unprotected disks.

Updating Copy II 64/128

Fill out and send in your registration card now. Being a registered owner entitles you to technical support, should you need it, and it lets us tell you about product updates. If we enhance or update Copy

http://www.c64copyprotection.com/

II 64/128 in the future, all registered owners will be able to purchase the update at a reduced price.

Note: If you purchased your Copy II 64/128 directly from Central Point Software, you have already been registered and you do not need to send in the registration card.

Copyright Law

A few words need to be said about the Bit Copy programs and copy-protected software. Under the Federal Copyright Law, you are entitled to make backups of software for your own use, so that if a disk is damaged or accidentally erased, the information is not lost. Some software companies, in efforts to prevent illegal duplication, copy-protect their disks so that they cannot be copied using normal copy methods. The Bit Copy programs are designed for copying these protected disks. They are provided only to help you make backups of protected disks for your own use, not for illegal copying. (Schools and institutions wishing to copy a program for educational use on a number of computers should check with the software publisher for their educational copying policy.)

The Copy II 64/128 disk is a standard DOS disk and is not copy-protected in any way. We recommend you make and use a backup of Copy II 64/128 and store the original in a safe place.

The Utilities

The programs provided in the Utilities package enable you to do the following:

- Copy any unprotected 5.25 inch disk
- Copy files
- See the directory of a disk
- See the directory showing file lengths
- See the directory showing deleted files
- Delete files
- Delete all information from a disk
- Protect (Lock) Files
- Unprotect (Unlock) Files
- Rename files
- Format a disk

- Verify the disk is readable (No Errors)
- Display map of where files are stored on the disk
- Recover files (undelete files that were accidentally deleted).

When accessing DOS files, the Utilities will work with 35 track and 70 track (double sided) 5.25" disks and 80 track 3.5" disks.

Note: The Disk Error Checker does not support 3.5" disks.

The Bit Copy Programs

The Bit Copy programs are currently designed to work with 5.25" disks. Future versions of Copy II 64/128 may support the 3.5" disks.

The Bit Copy programs are provided so that you can make backup copies of commercial programs that have been copy-protected. Parameters for copying several programs are included right on the Copy II 64/128 disk. All you need to do is type in the name of the program you want to backup, and Copy II 64/128 does the rest. Updated parameter disks are available periodically from Central Point Software. If you want, you can also enter your own parameters to copy a disk.

Note: The Bit Copy programs do not support hard disks or RAM disks, because most copy-protection methods are tied directly to the particular drive circuitry and disk format. It would not work even if you could copy the information onto a hard disk or RAM disk. Copy II 64/128 accesses the drives directly for best performance.

Hardware Requirements

To use the Utilities or the 5.25 inch Bit Copy program, you need a Commodore 64 or Commodore 128 series (or compatible) computer. This can be any of the following machines:

- Commodore 64
- Commodore 64C
- Commodore 128
- Commodore 128D

One disk drive is sufficient to use the Utilities programs. However, a second drive can be helpful when copying disks or files.

Additional Memory

The **Copy Files** option of the Utilities takes advantage of additional memory to copy files with fewer passes. A Commodore 128 computer requires fewer passes than a Commodore 64 computer. Also, the Utilities will check for the presence of a Ram Expansion Unit (REU). If found, Utilities uses the REU to reduce or eliminate the number of passes needed to copy the files chosen.

Note: See Appendix G for information about what kinds of memory Copy II 64/128 can use.

To use the 5.25" Bit Copy program, one or two 5.25" drives can be used. The 5.25" one drive Bit Copy program will make use of a REU. Thus, when using a C64 or C128 with a Ram Expansion Unit, disk swaps are almost non-existent.

Note: The two drive Bit Copy program is written so that the disk drives communicate directly to each other, therefore no computer memory is used during the copy process.

What You Need to Know

To use the Utilities, you should be generally familiar with DOS and standard DOS operations such as DIRECTORY (or Load "$",Drive), DELETE, RENAME, etc. If you need to know more about these functions, you should refer to your Commodore Disk Drive Manual.

Using the Bit Copy programs to copy most protected disks doesn't require any technical knowledge if the program you want to copy is included in our list of parameter entries. If it is not, we provide a few suggestions on how to copy new programs.

If these suggestions don't work, or if you want to learn more about disk protection methods, then you'll need to learn and understand a number of technical concepts. Protection methods are an inexact and obscure art rather than a science. We do provide some reference

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material on disks and disk protection in the appendices; however, Central Point does not offer technical support for it.

Hexadecimal number notation is used throughout both Bit Copy programs and occasionally in the Utilities. (The hexadecimal numbers are preceded with a dollar sign, as in $D5.) Understanding hex numbers is helpful, but not necessary. Appendix F contains a table that lets you convert between decimal and hex.

For Users Interested In Learning More

We recommend the following references:

The Anatomy of the 1541 Disk Drive by Abacus Software, Grand Rapids, Michigan

1571 Internals also by Abacus Software

Inside Commodore DOS by DataMost

These books are excellent for information on file storage, track and sector formatting, and a good reference on the 1541 Drive ROM Code.

Copy II Utilities

When you first boot Copy II 64/128, you are presented with the Utilities portion of the program. The Utilities Main Menu is displayed from which you can choose the option to enter the Bit Copy mode or use the utility programs.

To boot Copy II 64/128 using a Commodore 64:

1. Place the disk in the drive. Be sure the drive is powered on.
2. Type:
   ```
   LOAD  "*",8,1
   ```
   (No spaces between commas)
3. Press Return.
4. A message appears on the screen:

```
Would You Like to Use Normal  (N)

   or FAST (F) loader?    (N/F)   N
```

Copy II 64/128 in Commodore 64 mode can be loaded using its own fast loader or with the normal Load command. Under certain hardware conditions, Copy II's fast loader may not function properly. First, choose the Fast Loader option by typing **F**. If for some reason the fast loader refuses to work properly, restart Copy II and choose the normal loader by pressing the Return key or pressing the N key. The rest of the Utilities program will then be loaded.

To boot Copy II 64/128 using a Commodore 128:

1. Place the disk in the drive. Be sure the drive is powered on.
2. Turn on or reset your computer.
3. The disk will automatically boot for you.

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http://www.c64copyprotection.com/

80 Columns

If you are using a Commodore 128 computer and have it set for 80 column mode, Copy II 64/128 will automatically handle all output for an 80 column screen.

If the monitor you are using with your Commodore 128 has the ability to display 80 columns but you were in 40 column mode when you booted up Copy II, you may switch to 80 columns. To do this:

1.   Set the keyboard switch for 80 columns.
2.   Be sure the monitor is connected to the RGB port at the back of the computer.
3.   Press the <--- key (the one in the upper left corner of your keyboard).
     Copy II 64/128 will reset itself and detect the 80 column switch. All further screen output will be in 80 columns.

Note: If for some reason you wish to return to the 40 column display, just reverse the process. Make sure the keyboard switch is set for 40 column mode and that your monitor is receiving its input from the normal video output. Now press the <--- key. Copy II 64/128 will again reset itself for the chosen mode.

The Main Menu

The main Utilities menu appears next:

```
Copy II 64/128 Utilities V4.0
(C) 1985-8  Central Point Software
-------------------------------------------

=>    C  :Copy
      D  :Directory
      Z  :Zap (Erase) Files
      R  :Recover Files
      N  :Name Change (Rename) Files
      F  :Format Disk
      P  :Protect Files
      U  :Unprotected Files
      E  :Error (Disk Error) Checker
      B  :Block Allocation Map
      S  :Sector Editor
      V  :Validate Diskette
      Q  :Quit


------------------------------------------
Src Drv:08-15[41]       Printer Port [0]
Obj Drv:09-15[71]       Expansn Ram [0]K
------------------------------------------
      Use [CRSR] & [RETURN] or LETTER
          Keys to Select an Option
```

Along the left side of the screen are the 13 main options. With some of these options are sub-menus to select specific functions.

Throughout Copy II 64/128, you can press the Left Arrow Key <— to return to the main menu.

Note : This isn't a cursor key, it's the key at the upper left of your keyboard.

The main menu items are selected by the => cursor. The default selection upon booting the program is Copy. If you want to choose

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that option, press Return. If you want to choose another option, pressing the Up or Down arrow keys will move the cursor to that option. Once the cursor is pointing to the option you want, press Return to select and run it.

Note: The menu items can also be chosen by pressing the letter in front of the option you want to choose.

At the bottom of the screen, you see the Drive designations for Source and Destination Disk. It shows the drive(s) that Copy II has found and the type of drive that it is (1541, 1571, 1581). If it's a third party drive, there will be question marks "??" in place of the 41, 71, or 81 as Copy II will not know what compatible drive it is working with. If a printer is detected, Copy II will show the device number (port) of the printer. The last item displayed at the bottom of the screen indicates the presence of a Ram Expansion Unit (REU), and the size of the unit in kilobytes. If there isn't an REU attached to the computer, a zero will be displayed here.

Printer

Copy II 64/128 allows you to print the output from various aspects of the utilities programs. If your printer is connected, and the item you have chosen has the ability to be printed, you are asked if you wish to have the output sent to the printer. If you answer yes, then all data is sent to your printer.

Disk Drives

Copy II 64/128 allows you to choose which drive a particular menu item will work with if you have more than one drive connected to your computer. Every time you press the <--- key or return to the main menu, Copy II looks at the current hardware and resets itself according to what it finds. If all your drives are on, then you are asked to choose which drive to work with when selecting an option from the menu.

Make your choice of drives, and press Return to proceed with the chosen option.

Copy

This option allows you to copy files from disk to disk or enter the Bit Copy mode of Copy II.

To copy files:

1. Select **Copy** from the main menu.
    Two choices appear:
    •Bit Copy
    •File Copy

    Note: The Bit Copy option is discussed in detail in the following chapters.

2. Select the **File Copy** option by using the Up and Down keys.
3. Press Return when File Copy is highlighted.
    A message appears:

    You must use a Formatted Diskette as
    your destination disk!
    Press [Return] when you are ready.

    Another message appears asking you to insert the disk you wish to work with in your selected drive.
4. Press Return.
    A directory of the files on the disk is displayed. The file type, name, and number of sectors it occupies is also displayed.

Copy Files

If you have two drives connected to your computer, Copy II asks which one you wish to use for the Source. The other is automatically designated the Target drive. (The Source drive contains the original disk you want to copy from. The Target drive contains the disk you are copying to.) If you only have one drive attached, you are not asked to make this choice. The File Copy program is compatible with all Commodore disk drives (1541, 1571, and 1581) and most compatible drives.

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Be sure the Target disk is formatted before copying files to it.

Note: If Copy II is running on the Commodore 128, it will utilize the fast serial BURST feature with the 1571 and 1581 disk drives.

Selecting Files

The file display is used in various ways throughout Copy II for selecting files to be worked with. Here it is used to determine which files to copy. Note that the first file in the Directory is marked with the => cursor. By using the Up and Down arrow keys, you can point to any file in the Directory. If you repeatedly press the arrow keys, the display will scroll.

The display shows the files on the disk:

```
   Copy Files Drive  # 08
   File    Type          Name              # of
                                           sectors
=> U       PRG           autoboot          1
   U       PRG           how               2
   U       PRG           fastboot          5
   U       PRG           u64               91
```

```
        [SPC]-Select a File     [S]elect All Files
                 [U]nselect all Files
           [ G ]o to COPY Files Selected
```

To select a file(s):

1. Press the Up or Down arrow keys to move the cursor.
2. Press the space bar [SPC] to select the file. The file is highlighted. You can select single or multiple files.
3. You can select all files by pressing the S key.

To unselect a file(s):

1. Press the space bar [SPC] again to unselect a file. The highlighting goes away. You can unselect single or multiple files.
2. You can unselect all files by pressing the U key.

Important: Be sure the Target disk is formatted before copying files to it.

When you've selected all the files that you want to copy, press **G** to begin the file copy process. If only one drive is being used, you are prompted when to switch disks.

As the files are copied, Copy II 64/128 checks to see if any of the files already reside on the target disk. If there are already files of the same name, you are prompted, as in this example:

```
The File :  autoboot

Exists  -  Replace it?  [Y/N]  N
```

If you decide to copy the file anyway, the existing file is deleted, then the chosen file replaces it. Selecting **N** or pressing Return simply disregards this file, and continues with any other files that need to be copied. Pressing <--- exits out of the copy option and returns you to the Utilities main menu.

As the files are being copied, the screen will display which file is currently being read or written.

On a one drive system, if a file is too large to be copied in a single pass, Copy II stores as much of the file in memory as possible and writes that portion to the target disk. On the next read, the remainder of the file is read and appended to the existing file on the target disk.

As mentioned earlier, **File Copy** will utilize any Ram Expansion Unit (REU) that is present in your computer. If the REU is large enough, you can copy an entire disk of files without having to swap disks.

Directory

To get a Directory of a disk:

1. Select the **Directory** option from the main menu.
    (The Directory is similar to the standard DOS
    DIRECTORY (or LOAD "$",8) command.)

    If you are using more than one drive, you will see a
    display similar to the following:

    ```
    Select Disk Drive

    Drive 8
    Drive 9
    ```

    The drive selection menu works very much like the
    Utilities main menu. To choose a drive, all you
    need to do is use the arrow keys so that the desired
    drive is highlighted, then press Return.

2. A message appears asking you to place the disk you want to
    work with in the selected drive and press Return.

The directory of the disk appears:

```
              Disk Directory Drive  # 08
    File     Type           Name               # of
                                               sectors
=>  U        PRG            autoboot            1
    U        PRG            how                 2
    U        PRG            fastboot            5
    U        PRG            u64                 91
```

The letters on the left signify locked (L); unlocked (U); or deleted
(*) files.
The File type appears next. The possible labels for the various file
types are as follows:

14

```
DEL                Deleted File
SEQ                Sequential File
PRG                Program File
USR                User File
REL                Relative or Random File
CMB                Subdirectory on a 1581 Disk
```

Following the file type, the file name is listed. Finally, the last item to be shown for each entry is the file size in sectors. Again, you can scroll through the files on the disk by using the up and down arrow keys. To exit the Directory, press <--- to return to the main menu.

If your printer is on, you are asked if you want the directory printed. If you answer yes to this question, the directory is sent to your printer, and you are then returned to the main menu.

Zap (Erase) Files

This option is equivalent to the standard DOS Delete command, except that a number of files can be deleted at one time.

As a precaution, files that are "locked" are not displayed on the screen so that they are not accidentally zapped.

To erase files:

1. Choose the **Zap Files** option, then select the appropriate drive (if you have more than one drive).
   A File Display appears, similar to the one used in File Copy:

http://www.c64copyprotection.com/

```
            Disk Directory Drive  # 08
   File    Type        Name            # of
                                       sectors
=> U       PRG         autoboot           1
   U       PRG         how                2
   U       PRG         fastboot           5
   U       PRG         u64               91

     [SPC]-Select a File      [S]elect All Files
          [U]nselect all Files
       [ G ]o to ZAP Files Selected
```

2. Press the space bar to highlight the file to be deleted. (Pressing the space bar selects or deselects the entry.) A number of files may be marked by using the arrow keys and [SPC].

3. To begin the deletion, press **G** for Go. All files marked will be deleted. The screen displays the file names as each file is deleted. When it is finished deleting, a message appears informing you of that fact, and asking you to press any key to continue. You will be returned to the main menu.

Recover Files

When a DOS file is deleted, it is not immediately erased. It is instead marked internally as a deleted file, and its sectors are marked as free to be re-used. If other data does not later overwrite part of the file, it can be recovered.   If a file has just been accidentally deleted, and no other disk writing has occurred, the file can always be recovered. It is therefore very important that in trying to recover a deleted file you do so before any other files have been written to the disk. If you suspect that other files have been written, first make a copy of the disk, and try recovering your file from the copy.

To recover one or more files:

1. Select the **Recover Files** option (and an appropriate drive if such is the case). A file display comes on the screen, this time containing a list of all the deleted files still stored invisibly in the Directory.

```
            Recover Files Drive  # 08
File        Type            Name              # of
                                              sectors
U           DEL             c2                37
```

```
    [SPC]-Select a File      [S]elect All Files
            [U]nselect all Files
        [ G ]o to RECOVER Files Selected
```

Note: If there are no deleted files in the Directory, the message NO FILES will appear.

2. Using the arrow keys, move to the file(s) that you wish to recover and mark them using the space bar. After you have chosen all files you wish to recover, Press **G**.

Important: Because Commodore DOS erases all file type information when a file is deleted, you need to provide this for Copy II before the Recover option can continue. The following is a display of what you see on the screen.

http://www.c64copyprotection.com/

```
           Please Select Proper File Type :

                       P - - Program

                       S - - Sequential

                       U - - User

                       R -  - Relative

         Enter Proper File Type  (ie. P)
                   for this File

     File Name   # of Sectors    F Type  ?
```

File Name	# of Sectors	F Type ?
c2	37	?

3. You will see a blinking cursor over the question mark. Copy II is waiting for you to make your choice. Ideally, you will know the original file type of the deleted file. If not try using the P or S file type first.

The file display will show the files as the program attempts to recover them. If a deleted file has already been partly or completely overwritten with other data, you may run the danger of corrupting another file that is using the same sectors as the deleted file did. It is therefore very important that in attempting to recover files you try and recover a deleted file before any other files have been written to the disk. If you have any questions, we suggest that you make a copy of the disk first and try recovering the file from the COPY of the disk.

The recovery is completed after Copy II asks you if you want to validate the disk. (See the Validate Disk section for more information about this function.) Use the Copy II **Directory** option to look at the recovered files on the disk. If Copy II couldn't recover the file, the file is still marked as a deleted file. Copy II has no way of knowing if it recovered all of the information correctly. You should always test or try using the suspect file to see if it was recovered successfully.

If you suspect that other files have been written to the disk you are trying to recover your file from, first make a copy of the disk, and try recovering your file from your **COPY**, just in case the file you are trying to recover has been partially overwritten by another file. That way you won't ruin the original disk file you are trying to recover.

Name Change (Rename) Files

To rename files, select this option and an appropriate drive. The usual file display appears, with another prompt:

```
          Rename Files Drive  # 08
   File    Type          Name                    # of
                                                 sectors
=> U       PRG           autoboot                 1
   U       PRG           how                      2
   U       PRG           fastboot                 5
   U       PRG           u64                      91

       [SPC]-Select a File      [S]elect All Files
             [U]nselect all Files
          [ G ]o to RENAME Files Selected
```

To rename a file:

1. Move the cursor to the file you want to rename with the Up and Down arrow keys, then press the space bar to select the file.
2. After selecting the file(s) you wish to rename, press the **G** key.
   The following message appears:

```
                - Change File Name -

        From:  <original file name>

            Change the File Name

        To:    <New File Name>
```

You are given the opportunity to choose a new file name for each entry you have chosen. Press Return after each entry. If you enter a file name that is already being used by another file, you are told that the name already exists and you are prompted for a new name.

After all files have been renamed, the new names are written to the directory and you are advised that all files have been renamed. Press any key to go back to the main menu.

Format Disk

This option formats a disk so that files can be stored onto it. A blank disk must be formatted before it can be used. If a formatted disk already contains information, then formatting it again will completely wipe out all the old information.

To format a disk:

1. Select the **Format** option from the main menu.
2. Enter a disk name. The name must be at least one character and no greater than 16 characters in length. If you inadvertently type more than 16 characters, you are prompted for the disk name again.
3. Press Return after entering the name.
4. Enter a disk ID. This may be two characters in length and any combination of alphanumeric characters. You can just press Return to skip this information–it is not necessary for the formatting of the disk.
5. Press Return after entering the disk ID.

http://www.c64copyprotection.com/

You are asked if you wish to verify the disk. Verification takes a little longer, but assures you that the disk media has accepted the format.
6. Press **Y** for verification or **N** if you wish to skip it. The screen appears as follows at this point:

<div align="center">

Format Disk
</div>

<div align="center">

Disk Name: sample

Disk ID: 25

Verify the format   (Y/N)
</div>

7. Place the blank disk in the selected drive and press Return.

After you press Return, Copy II displays the following information about the format while the disk is being formatted:

<div align="center">

Formatting a 15xx Drive
</div>

<div align="center">

It is Drive # xx

With Disk Name of: sample

With Disk ID of: 25

Please Wait . . . .
</div>

Note: If the disk is write-protected, the error message, "Write Protect Error!!!" appears.   You are prompted check the disk and press Return to continue.

After the format is complete, you are advised that the disk has been formatted and prompted if you would like to format another

disk. If you answer Y (yes) the process is repeated. If N (no) you are returned to the main menu.

Formatting times are as follows:

Drive	# of sides	No verify	Verify
1541	1	10 seconds	20 seconds
1571	2	18 seconds	30 seconds
1581	2	N/A	45 seconds
Compatibles	Varies	N/A	Varies

Protect Files

If you wish to protect (lock) one or more files, choose this option and select the appropriate drive (if applicable.) Protecting a file by locking it will prevent DOS from writing to, renaming, or deleting the file until it has been unlocked.

To protect a file:

1. Select **Protect Files** from the main menu.
2. Place the disk containing the file(s) you wish to protect in the selected drive. Press Return.
3. Select the file(s) using the Up and Down arrow keys and the space bar. After all files have been selected, press the G key.
   The screen displays each file as it is being locked. When it is finished, you may press any key to return to the main menu.

Unprotect Files

Use this option if you wish to unprotect (unlock) one or more files. Unprotecting a file allows you to read, write, rename, or delete the file.

http://www.c64copyprotection.com/

To unprotect a file:

1. Select **Unprotect Files** from the main menu.
2. Place the disk containing the file(s) you wish to unprotect in the selected drive. Press Return. Only the files that are locked will be displayed on the screen.
3. Select the file(s) using the Up and Down arrow keys and the space bar.
4. After all files have been selected, press the **G** key. The screen displays each file as it is being unlocked. When it is finished, you may press any key to return to the main menu.

Error (Disk Error) Checker

Note: This version of the Disk Error Checker will not work with a 1581 disk drive.

The Disk Error Checker is a fast way to check your disks for errors. Copy II first checks to see the kind of disk drive you have chosen to work with. If the drive is a 1571 drive, the disk you wish to check will be tested to see if it is a single or double sided disk.

As with other Copy II Utilities functions, if you have two drives attached you must specify which drive you want to work with.

If you have a printer attached you will be asked if you want the Disk Error Data sent to a printer.

To check a disk for errors:

1. Select the **Disk Error Checker** from the main menu.
2. Place the disk to be checked into the selected drive.
3. Press Return.
   Copy II may prompt you for a range of tracks, depending on what it determines in terms of drive and disk type.

```
        Disk Error Checker

Start Track (in hex)      $01
```

23

```
     Ending Track (in hex)     $23


          [Return] to continue
     [Space] Change tracks    [<--] Main Menu
```

If you are using a 1541 disk drive or a 1571 disk drive with a single sided disk, you will see the track range in the above example. If you are using a 1571 disk drive, and Copy II finds that the disk is a double sided disk, it will change the default ending track value to $46 (decimal 70). You will be allowed to set the starting and ending track values, or press Return at each prompt to accept the default start and end track values.

4. After you have selected the start and end track, you are given the choice of beginning the disk verification process by pressing Return, changing the track range by pressing the space bar, or returning to the main menu by pressing <-—.

The screen displays each individual track as it is being checked and indicates if the track is OK. At the end of the process, a message appears indicating the total disk errors detected and asks you if you want to check another disk. However, if an error is discovered, the following message appears on the screen:

```
                    Track # XX
```

```
     Sector #     XX    Error #     XX
          Press any key to continue
```

The error numbers and their meaning can be found in your disk drive reference manual that came with your drive.

Pressing any key continues the error checking for the remainder of the specified tracks.

If there aren't any further errors, you are returned to the main menu without any further prompts.

If the error output is being sent directly to your printer, you are not prompted to press Return after every track that has an error. The error checking continues until all tracks have been checked.

Block Allocation Map

The Block Allocation Map (BAM) gives you a display showing the sectors on the disk used by files and the free sectors. In C64 and C128 40 Column mode, this utility will display on the screen only 1541/1571 BAMS. When displaying a two sided disk in a 1571 drive, side one is displayed first, and then you are prompted to press the Return key to view the second side.

Note: The BAM of a 1581 disk can only be viewed by sending the information to a printer. In C128 80 column mode, the 1581 BAM can be displayed on your screen as well as your printer.

To see the Block Allocation Map of a disk:

1. Select the **Block Allocation Map** option from the main menu.
2. Place the disk you wish to view into the selected drive. The screen shows a grid-like map of all the sectors on the disk. The track numbers are across the top row and the sector numbers along the left edge.

   Note: The type of disk drive and disk you are viewing determines the track and sector numbers that you see on the screen. If you are viewing a 1581 BAM in 80 column mode each block on the screen will represent two logical sectors. If either or both of the sectors are being used, the BAM display will indicate that particular cluster is in use.

   In the grid, every sector on the disk that is in use is shown as a dark shaded box. Unused sectors appear as a light solid box. If the disk is mostly full, large areas of the grid will be filled in with dark inverse areas. You can see whether or not any given sector is in use by following the track number down and the sector number across and noting whether that

intersection is represented by a light (white) or dark (green) box.

Note: If Copy II found a printer when it booted up, you will be asked if you want the Block Allocation Map sent to your printer. If you answer yes to this question, the BAM is sent to your printer, and you will return to the main menu.

Sector Editor

The Sector Editor allows you to directly view and change data on any sector of the disk. It can be used with Bit Copy options for copying certain protected disks. You should use care when working with the Sector Editor to avoid accidentally erasing or modifying important data on the disk.

A good knowledge of hexadecimal, bytes, and ASCII is helpful when using the Sector Editor. Appendix B is a reference on disks, track, sectors, and blocks. Please refer to Appendix B if you need more information about these subjects.

Due to the highly technical nature of the Sector Editor, Central Point does not provide technical support for it.

Note: The Sector Editor is designed to work with 5.25" and 3.5" disks. If you are using the Sector Editor with a C128 computer, and you have the ability to use the 80 column screen, you may switch your system to the 80 column mode and press the <--- key at the upper left of your keyboard. Copy II will automatically begin handling all further output to the screen in 80 column mode. An 80 column display makes it much easier to view entire sectors in both hex and ASCII format.

To use the Sector Editor:

1. Select the **Sector Editor** option from the main menu.
    Be sure the disk you wish to work with is in the selected drive.
    The following screen appears, with the sector buffer cleared to zeroes:

```
Sector Editor v1.0                    Drive : XX

00-   0 0   00   00   00   00   00   00   00   . . . . .
08-   00    00   00   00   00   00   00   00   . . . . .
10-   00    00   00   00   00   00   00   00   . . . . .
18-   00    00   00   00   00   00   00   00   . . . . .
20-   00    00   00   00   00   00   00   00   . . . . .
28-   00    00   00   00   00   00   00   00   . . . . .
30-   00    00   00   00   00   00   00   00   . . . . .
38-   00    00   00   00   00   00   00   00   . . . . .
40-   00    00   00   00   00   00   00   00   . . . . .
48-   00    00   00   00   00   00   00   00   . . . . .
50-   00    00   00   00   00   00   00   00   . . . . .
58-   00    00   00   00   00   00   00   00   . . . . .
60-   00    00   00   00   00   00   00   00   . . . . .
68-   00    00   00   00   00   00   00   00   . . . . .
70-   00    00   00   00   00   00   00   00   . . . . .
78-   00    00   00   00   00   00   00   00   . . . . .

Track $12          Sector $00
[?] - Help Screen
```

2. Press ? or / to see the help screen, which details what
    commands are available:

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```
                    Sector Editor Commands

        B:      Beginning of Sector
        C:      Cancel Sector Editor Changes
        D:      Disassemble Sector
        E:      End of Sector
        H:      Hexadecimal Entry
        P:      PRINT Sector
        R:      Read a Sector
        T:      Text Entry
        W:      Write a Sector
        Z:      Zero Buffer
        +:      Next Sector
        -:      Previous Sector
        <---    Exit to Main Menu

        Use Cursor Keys to View/Change Data
              Press any key to Continue
```

When Copy II first shows the Sector Editor display, it sets up at the bottom of the screen a track and sector line. When first entering the Sector Editor, these values are set to the first sector of the directory track, which is track $12.

Note: Copy II knows the difference between a 1581 disk drive and a 1541/71 and sets the directory track to track 40 for the 1581 drive.

3. Press R to read a sector. You are prompted to enter the track and sector you wish to read.
4. Enter the hexadecimal track number and press Return. (All numbers used in the Sector Editor are hexadecimal.) An invalid character or number is ignored and the cursor moves to the beginning again and waits for you to type in a valid track number.

VALID TRACK NUMBERS

Drive Type	Valid Track Numbers
1541	$01 - $23
1571	$01 - $46
1581	$01 - $50

5. Enter the desired sector number in hex.

VALID SECTOR NUMBERS

Drive type	Track Range	Sector #s
1541/71 (side one)	$01-$11	$00-$14
1571 (side two)	$24-$34	$00-$14
1541/71 (side one)	$12-$18	$00-$12
1571 (side two)	$35-$3B	$00-$12
1541/71 (side one)	$19-$1E	$00-$11
1571 (side two)	$3C-$41	$00-$11
1541/71 (side one)	$1F-$23	$00-$10
1571 (side two)	$42-$46	$00-$10
1581	$01-$50	$00-$28

The disk will whir and you should see a display similar to the following if you are in 40 column mode:

```
Sector Editor   V1.0                    Drive :8

00-12 04 C2 11 00 41 55 54              ..B..aut
08-4F 42 4F 4F 54 A0 A0 A0              oboot
10-A0 A0 A0 A0 A0 00 00 00                   ...
18-00 00 00 00 00 00 01 00              ........
20-00 00 C2 11 01 48 4F 57              ..B..how
28-A0 A0 A0 A0 A0 A0 A0 A0
30-A0 A0 A0 A0 A0 00 00 00                   ...
38-00 00 00 00 00 00 02 00              ........
40-00 00 C2 11 02 46 41 53              ..B..fas
48-54 52 4F 4F 54 A0 A0 A0              tboot
50-A0 A0 A0 A0 A0 00 00 00                   ...
58-00 00 00 00 00 00 05 00              ........
60-00 00 82 11 03 55 36 34              .....u64
68-A0 A0 A0 A0 A0 A0 A0 A0
70-A0 A0 A0 A0 A0 00 00 00                   ...
78-00 00 00 00 00 00 5C 00              ........

Track $12    Sector $01
[?]    Help  Screen
```

The track and sector number you just read is shown at the bottom of the screen. Sixteen lines of the sector are displayed at a time, consisting of a hex "offset address" followed by a dash, then 8 hex data bytes (each byte is a two digit hexadecimal number), then the same 8 bytes as ASCII characters on the right. The "double cursor" appears in inverse over both the first hex value and the first ASCII value. The characters on the right may or may not make sense. (In the example above, the file names for this disk can be read on the right. If the character is a non-ASCII value is it displayed as a period.)

To understand the addresses on the left, think of the data bytes numbered from $00 as the first byte of the sector to $FF as the last byte. The top line shows the first 8 bytes, bytes $00 through $07; the next line shows bytes $08 through $0F; the next shows bytes $10 through $17, etc. The address number before the dash tells you how many bytes into the sector each line is ($00-, $08-, $10-, etc).

The address number of a byte is not the same as the value of that byte. In the example, the addresses of the first four bytes on the

second line are $08, $09, $0A, and $0B. The values of those bytes are $4F, $42, $4F, and $4F.

Moving the Cursor

The cursor is moved around the sector buffer with the cursor keys. In 40 column mode, the buffer display will scroll up and down to keep the cursor on the screen. The **B** key moves the cursor to the very beginning of the buffer; the **E** key moves the cursor near the end of the buffer.

Reading Again

If you want to read a different sector from the disk, press **R** again and enter the new track and sector numbers. You can also read the next higher numbered sector on the disk by pressing the + key, or you can read the previous sector by pressing the - key.

Changing Bytes

You can change the data in the sector buffer by entering either new hex values or new text characters.

To enter hex values:

1. Move the cursor to the appropriate place and press **H** for hex.
    The cursor changes from a highlight to a blinking cursor.
2. Enter the new value over the old.
    Press Return to advance to the next byte.
3. Press <— (at the upper left of your keyboard) to exit hex entry mode.

To enter text values:

1. Position the cursor where you wish to begin entering text. Notice that you cannot place the cursor directly into the text area by using the arrow keys.   However, when you move the cursor in the hex area, a small dot is highlighted in the corresponding area of the text area.
2. Press **T** when you have the cursor where you want it.
    The cursor changes to a blinking cursor in the text area.

3. Type in the new characters. As you type the cursor will advance.
4. Press <— to exit text entry mode.

Note: While entering text, any control characters typed (including the arrow keys and return) will be placed directly into the buffer. Only the <— key will exit text entry mode.

Writing Sectors

To write a sector back to the disk, press **W** for Write. You are then prompted for a track and sector. If you want to write to the current sector, just press Return to accept the same values. If you want to write to a different sector, enter new legal values. The disk whirs as the sector is written.

To write a sector to disk:

Note: Do not sector edit an original disk! Make a copy of the disk first, then sector edit the copy.

1. Select the **Sector Editor** option from the main menu and select the desired drive, if appropriate.
2. Place the disk you wish to edit in the drive.
3. Press **R** for read, and enter the track and sector number you want to edit. Copy II will read the sector into the memory buffer.
4. Position the cursor using the arrow keys to the address where you want to make changes.
5. Press **H** and enter the new hex values, or press **T** and type new text characters to replace the old. If you are entering several hex values, Copy II automatically advances you to the next hex byte to be changed after you have entered a new two character hex value. Press <— to exit the hex or text entry mode.
6. Press **W** (Write) to write this changed sector back to the disk.

    Note: Should you realize that the sector you just wrote was wrong and you want to recover the old sector values, Copy II can help. If you have not read another sector into the memory buffer, Copy II has a "spare" buffer where it keeps

a copy of the last sector read into memory. By pressing the C key you can cancel the last change made. This replaces the current buffer on the screen with a copy of the last sector read. You can then tell the Sector Editor to write the original sector back to the appropriate track and sector.

Disassembly

The Sector Editor can disassemble and list any 6502 machine language code that may be present in a sector. Position the cursor on the first byte you want to disassemble and press **D** for Disassembly. The sector buffer display is replaced by ten lines of disassembled code. Press **D** to disassemble another 10 lines, or press <--- to go back to the buffer display. The disassembly display appears like this on screen:

```
                    Sector Disassembler
================================================================
*       $0900          12          ???            .
*       $0901          04          ???            .
*       $0902          82          ???            .
*       $0903          11 00       ORA ($00),     .
*       $0905          41 55       EOR ($55,X     au
*       $0907          54          ???            t
*       $0908          4F          ???            o
*       $0909          42          ???            b
*       $090A          4F          ???            o
*       $090B          4F          ???            o
================================================================

        D XXXX = Disassemble at XXXX
        <--- = Disassemble One Line
        Q = Quit and Return to Sector Editor
```

Printer Dumps

Using the Printer dump option (P) from the Sector Editor prints a sector dump of the sector in memory to the printer. This sector dump looks very much like the 80 column display of the sector. The Print Disassembler will position its pointer to the beginning of the sector

buffer and disassemble the entire sector. When it is finished, you are returned to the disassembler.

Zero Buffer

By pressing the Z key, you zero out the entire buffer. This gives you a completely empty buffer with which to work.

Validate Disk

DOS keeps a map of all sectors that are currently being used on a disk. This map is called the Block Allocation Map, or BAM. As files are written to or deleted from the disk, the BAM is updated to show which sectors are being used on the disk.

The job of the **Validate Disk** command is to take each valid file in the directory, follow it sector by sector and make sure that each sector of a file is properly represented in the Block Allocation Map. If the Validate routine discovers sectors that are not being used, it releases them for future use. Likewise, if it finds that sectors are being used and are not shown as being used in the current BAM, the BAM is updated to indicate those sectors are being used.

The Validate Option will also delete any improperly closed files, and reallocate those sectors being used by that file.

Important: Because of the way a Random Access File (also known as a REL file) is structured, it is important that any disk using this file structure NOT be validated. Validating a disk with REL files on it will probably result in the releasing of all data blocks used by the random access files. Unless you are instructed by the program using the RELative file to VALIDATE the disk, NEVER VALIDATE a disk with REL files on it. You can use the DIRECTORY option from the Utilities main menu to check if there are any REL files on a disk before validating it. As an example, the Copy II 64/128 disk has a REL file on it and therefore should NOT be validated.

A summary of how a BAM is structured for various drives follows.

1541 and 1571 BAM

The BAM for these disks can be found on Track 18, sector 0. Each track of the disk is represented by four bytes of information. A typical track BAM entry for Track 1 looks like this:

BYTE #	1	2	3	4
Number of sectors		Sectors 7-0	Sectors 15-8	Sectors 23-16
HEX	14	FE	FF	1F
BINARY		11111110	11111111	00011111
BIT #		765433210	76543210	76543210

Byte number one represents the number of sectors that are free for the entire track. On any track, the maximum value here would be $15 or decimal 21 since tracks 1 through 17 contain 21 sectors on a normally formatted disk.

Bytes two through four show which sectors are used or not used. A binary value 1 says the sector is free for use, a zero shows the sector is in use.

When mapping a track, each byte of this bit map represents eight sectors. However, the sectors are mapped in inverse order, that is Bit 7 (the first bit of the byte) will represent sector 7 and Bit 0 (the last bit in the byte) represents sector 0. So in our example, sector 0 is the only sector currently being used on the track.

Note: In our example, the fourth byte should never contain a value higher than $1F. It represents sectors 16 through 21, and since no normally formatted track can contain more than 21 sectors, bits five through seven are not used.

1581 BAM

The BAM for a 1581 disk is found on Track 40 sectors 1 and 2. Sector 1 contains the BAM for logical tracks 1 through 40, and sector 2 contains the BAM for logical tracks 41 through 80. A typical entry

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for a 1581 BAM looks much like the 1541/1571 BAM. An entry for any track on a 1581 disk would be as follows:

Byte #	2	3	4	5	6
Number	Sectors	Sectors	Sectors	Sectors	Sectors
of sectors	7-0	15-8	23-16	31-24	39-32
HEX	$FF	$FF	$FF	$FF	$FF
BINARY	11111111	11111111	11111111	1111111	11111111
BIT #	76543210	76543210	76543210	76543210	76543210

Byte 1 (not displayed above) of a track entry always shows the number of free sectors remaining on the track (just like the 1541/71). However, the 1581 has five bytes following the number of free sectors. Remember one byte represents up to eight sectors, so a 1581 Track Bit Map has enough room to keep track of forty logical sectors. As with the 1541/71 BAM, sector information is kept in reverse order (i.e. Bit 0 of byte 2 represents sector 0 and Bit 7 of byte 2 represents sector 7.)

To validate a disk:

1. Select **Validate Diskette** from the menu.
    Be sure the disk is NOT write-protected. (In other words, the notch must be open.)
2. Place the disk you wish to validate into the drive.
3. Press Return.
    The following message appears:

    ```
    Validating diskette...please wait
    ```

    When the process is complete, you see:

    ```
    Diskette  validated...press  Return  to
    continue
    ```

Creating Partitions

Although the 1581 disk drive allows you to create subdirectories or partitions, Copy II recognizes and displays the subdirectories, but as of this version it will not display files within those partitions.

Quit

When you want to exit Copy II and return to BASIC, choose the Quit option.

Ram Expansion Units (REUs)

As mentioned earlier the Utilities program supports the use of REUs. For information about how Copy II uses this extra memory to reduce the number of passes when copying files or disks, please refer to Appendix G.

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Automatic Bit Copy

The Copy II Bit Copy program is designed to allow you to make backups of software which, due to copy protection methods, does not copy using standard disk duplication programs. The Bit Copy program is easy to use, yet is capable of being adjusted to handle most types of protection methods currently in use.

This chapter explains the basics of using the Auto Copy option to make archive backups of your copy-protected disks. It also discusses some helpful things you should know when using either Bit Copy program. Anybody using Bit Copy will want to read this section.

The next chapter describes the "manual bit copy" for those who want to control the bit copying more directly by manipulating the copy parameters.

A Brief Word about Parameters

Copy II can back up many protected disks automatically. However, with the increasingly complicated protection methods used, there isn't an automatic method that can copy every disk. Some protected disks can't be copied correctly unless certain parameters are changed first. These parameters are values that Copy II uses in copying a disk. If you change one or more of the parameters, this in effect tells Copy II not to copy the disk in the usual way, but to do it this way instead.

Previous versions of Copy II contained a separate program that was needed to set the various parameters. With this new version of Copy II, the parameters are an integrated part of the program with the parameter entries stored right on the disk. All you need to do is select the name of the program you want to back up. Copy II will look up the parameter changes for that program, make those changes for you, and copy the disk. If there is no parameter entry listed for a program you want to back up we also provide a number

of "Try this" entries for your convenience. Updated parameter entries are available on disk periodically from Central Point Software. The original "manual mode" is also included for typing in parameter changes yourself if you want.

Note: The parameter list from previous versions of Copy II is included on side 2 of the Version 4 disk. If you are having difficulty backing up a program using the Version 4 parameter list, try using the list on side 2. Complete details for using the side 2 list are contained in Appendix A.

There are 8 separate options in the Bit Copy program. You need to use only the first one or two options when making backups of most disks. Other options are a little more involved, and a couple are quite technical in nature. Not everyone will want to explore the more complicated options.

Helpful Things to Know When Using Bit Copy

Many copy-protected programs can be backed up with Copy II without any special parameter changes at all. These programs are not included in the list of parameter entries, but can be backed up with the special entry called TRY STANDARD. TRY STANDARD can be found in the alphabetical list of Auto Copy parameter entries. Whenever you want to back up a program that is not included in the parameter entry list, first try copying it using TRY STANDARD.

We've received calls from customers who have asked that we write the ultimate automatic-and-perfect bit copy program that would copy anything and everything without requiring parameter changes. We wish it were possible to do just that! There are some very good but rather complicated reasons why there will never be one copy method which will back up every copy-protected disk perfectly. (A few of those reasons are touched on in the appendices.)

That's where the parameter entries come in. The parameter list is constantly being updated to include new protection methods, as well as new, improved entries for previous entries.

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Occasionally you may find that a parameter entry won't back up the program it's designed to copy. Sometimes software publishers who copy-protect their products will - without fanfare - change the protection method used on the disk. When this happens a new parameter entry is needed to back up the disk. The 'old' parameter entry will still back up the older versions of the program. Or perhaps the supplied parameter entry is for a newer version of a program and you have an 'old' version. You'll sometimes find 'alternate' parameter entries for a single program listed for this very reason.

In addition, the disk copy process itself is not perfect. The Commodore disk drive circuitry has quirks of its own and won't always read the same track exactly the same way every time. There are also subtle differences between disk drives.

There are three things you can do which will often help:

1. Try it again! If your backup of a program doesn't work, try copying it again.

2. Make sure that your disk drive is properly aligned. This is much more of a problem with the 1541 drive than it is with the 1571.

3. Try using the parameter list on side 2. See Appendix A for complete details.

A number of protected programs check the write-protect notch when they start up. If your original disk is write-protected, then write-protect your backup before you begin using it.

If all else fails, then a new parameter entry is needed to back up the program. Some of our users will be interested in determining parameters themselves–many others won't. As mentioned earlier, figuring out copy-protection methods can be very complicated. We provide some information in the appendices to help you, but there is no definite "guide" that can be followed. The people who design copy-protection methods try to make it as difficult as possible.

As new parameters are developed by either Central Point Software or many of our customers, we add these new parameters to the list.

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Please see Appendix E "Additional Help for Making Backups" if you are still having problems.

If none of the above methods work, you might want to let us know the name of the program and the program version so we may add it to our request list.

Starting Bit Copy

Boot the Copy II disk as instructed in Chapter One. From the Utilities main menu, select the Copy option.

1. Select the **Bit Copy** option from the selection box using the arrow keys.
2. Press Return.
3. Select the number of drives on your system by using the Up and Down arrow keys and pressing Return.

One Drive Bit Copy: Not all types of disk drives correctly identify themselves to Copy II. If you are using a "compatible" disk drive, Copy II treats the drive as a 1541 drive and tries copying the disk with the 1541 drive routines. However since some compatible drives do not use the same hardware addresses or configurations, Copy II may not work with these drives.

Two Drive Bit Copy: As with the one drive version, Copy II examines the drives you are using and loads the appropriate drive routines based on the type of drives it finds. If you are using a 1571 and another type of drive (1541 or a compatible drive), Copy II attempts to copy the disk with the 1541 drive Routines. If both drives are 1571, then the 1571 drive routines are used.

Neither the One or Two Drive programs currently support the 1581 disk drive.

After a copyright notice, the main Bit Copy menu appears:

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```
          COPY II 128 One Drive Bit Copy V4.n
            (C) 1985-8 Central Point Software
```

```
=>    A:    Auto Copy
      M:    Manual Bit Copy
      C:    Create New Parm Entry
      E:    Edit Parm Entry
      D:    Delete Parm Entry
      L:    Load Parm Entry
      S:    Save Parm Entry
      R:    Rename Parm Entry
      Q:    Quit
```

```
        Use CURSOR keys and RETURN key
             to Select an OPTION

      [CONTROL U] to Return to Utilities
```

Selecting a Bit Copy option works the same way as in the Utilities. One of the options is always marked with the => cursor. Pressing the Up and Down arrow keys moves the cursor to a different option. Once the option you want is selected, press Return to activate it.

Auto Copy

Choose **Auto Copy** when you want to copy a program from the Copy II parameter list. A new screen appears:

```
New parm:
```

```
        Enter Parm Name or Press Return
            for List of Parm Entries
```

1. Enter the name of the program you wish to back up and press Return.

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If Copy II has the program parameters in the list, it is loaded. Otherwise, Copy II displays the list of programs it does have.

2. Press Return twice for the program list if you are not sure if your particular program is on the list.

3. Use the Up and Down arrow keys to scroll through the list. If you hold the Shift key as well as the Up or Down arrow keys, you scroll a screen at a time.

4. Press Return when the program you want is highlighted. This loads the proper parameters into memory.

   You can also choose to see only a part of the parameter entry list. This is especially helpful when you're not quite sure of the spelling for the entry you want. When you're asked for the name, type in just the first few letters of the name, then press Return. Copy II will display only those entries that begin with the characters you typed. You can then use the arrow keys and Return to select from that list.

5. Enter the original drive number.
   If you have one drive, press the Return key to accept the default value. If you are using two drives, you are prompted to enter the duplicate drive number. You may press the Return key to accept the default value or enter another drive number.
   Copy II fills in the values from the parameter file and prompts you to insert the appropriate disks when necessary.

At the bottom of the screen you'll see the following:

```
     RETURN to Begin              [Q] to Quit
 [/] to set Parms                    [<--] to Restart
     [Control U] to Return to Utilities
```

The / command is explained in the chapter on Manual Bit Copy. Pressing Return begins the bit copy process. Q cancels the copy.

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Pressing <--- takes you back to the Bit Copy menu, and pressing Control U takes you back to the Utilities Main Menu.

Note: To cancel a copy in progress on a single drive system, you must press <--- when you are asked to swap disks.

Write-Protecting Original Disks

If you want to be extra safe, put a write-protect tab over the notch on your original disk before you copy the disk. We strongly recommend you do this.

Write-protecting a disk guarantees that the computer can't write or change any information on the disk. Suppose that while using Bit Copy you accidentally insert the original disk at the wrong time or into the wrong drive. Even if this happens, the information on your original disk cannot be overwritten if the disk is write-protected. The electronics in the disk drive will prevent any program from writing onto a write-protected disk.

With copy-protected software, remember that Copy II is trying to copy a disk that was designed not to be copied! So remember that the best test of a backup of a copy-protected disk is always to boot the duplicate disk to see if it runs correctly.

Comments

When the Auto Copy is finished, it tells you that the copy is complete, and asks if you wish to copy another disk. Auto Copy also has the capability to print a comment on the screen. If a comment was included in the parameter entry, Copy II will print the comment as part of the copy process. The comments are usually helpful hints in getting the backups to work. You might see comments like the following:

```
PUT WRITE-PROTECT TAB ON BACKUP BEFORE USING.

IF BACKUP WON'T BOOT, TRY RE-COPYING TRACK 1.
```

Auto Copying again

If you select **Auto Copy** again after making a copy using the
parameter list, you are asked if you wish to use the same
parameter. For example, if you just copied a program called VIDEO
GAME and then wanted to copy a program called ARCADE GAME,
Copy II asks the following:

```
                   AUTO COPY

           USE "VIDEO GAME" ?   Y
```

Press **Y** for Yes, or just press Return to use the VIDEO GAME
parameter entry again.

Whenever a parameter entry is already loaded in the computer,
you'll be asked this question so that you can use the entry again
without having to reload it.

If you want to Auto Copy a different program from the parameter
list, you'll need to reinsert your Copy II disk so it can load the
parameter list. Press **N** for No in response to the above question.
Then you can select a new parameter entry name as you did before.

Quit

Choose the Quit option from the main Bit Copy menu when you
want to exit out of Bit Copy back to BASIC. To go back to the
Utilities, press the Control key down and while holding it down
press the **U** key also. You will be asked to make sure that your
Copy II disk is in the drive. Press Return to load the Utilities
menu.

Manual Bit Copy

Manual Bit Copy is the command to use if you want to set the parameters yourself before copying a disk. Perhaps you have parameters for backing up a program written down on paper, but not yet stored as a parameter entry on disk. Or if you're familiar with the Copy II parameters, you may want to experiment with changing them while copying disks. Manual Bit Copy lets you enter these changes.

When you select **Manual Bit Copy** from the menu, the usual Bit Copy screen appears. (It's the same as using the Auto Copy described in the previous section.) You'll be asked to answer some or all of the following questions depending on the hardware configuration, and depending on the number of drives you are using:

```
   Copy II 64/128 One Drive Bit Copy V 4.0

   Enter Drive #                Default = 8
   Duplicate Drive #            Default = 9

   Number of Sides              Default = 1

   Enter Start Track            Default = 1
   Enter End Track              Default = 35

   Track Increment              Default = 1

      RETURN to begin          [Q] to Quit
   [/] to set Parms         [<---] to Restart
      [Control U] to return to Utilities
```

If you make a mistake answering any of these questions, press the <— at the upper left of your keyboard and you'll be able to begin again.

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The first four prompts have been discussed earlier. Select which drives you want to use for your copy. Then enter the start and end track. To copy the entire disk, just press Return twice to accept a start track of 1 and an ending track of 35.

The next question, Track Increment, determines what kind of spacing to use. Most disks use adjacent tracks (track 0, 1, 2, 3 etc.). These are copied with a track increment of 1.

However, Commodore 5.25" disk drives can be positioned to read from any half track boundary. The only limitation is that, in most cases, to work reliably the tracks of information must be spaced at least one track increment apart. For example, a protected disk could use tracks 1, 2.5, 4, 5.5, etc. This would be copied with a track increment of 1.5. You can enter half tracks in response to Start Track, End Track, and Track Increment questions. Half tracks are numbers that end in ".5".

The bottom of the screen shows the various commands available to change your preferences. Press Q if you want to quit out of Bit Copy and return to BASIC. Press <--- if you want to return to the Bit Copy main menu. Press Control U to return to the Utilities main menu.

You may need to change one or more parameters before copying the disk. Each parameter has both a parameter letter and a value. For example, the Parameter C (compress sectors) can have a value of Y for yes or N for no. Answering Y to the C Parm will tell Copy II to decode sector data and allow more sectors to be stored in the computer. Other parameters have different effects. (Each parameter is explained in Appendix D.)

To change parameters:

1. Press the / (slash) key. You'll see at the bottom of the screen:

```
        * PARAMETER CHANGE *
        Change what parameter:
```

There are currently three different parameters that can be set with the one drive version of Copy II. These are:

S parameter (sectors per track)   default = V
D parameter (data rate change)   default = N
C parameter (compress data)   default = Y

Note: See Appendix D for full details on what each parameter means.

2. Type in the letter of the parameter you want to change and press Return. In this example, we will use the C parameter. The following question appears:

    ```
    Do you want Data Compression ?  N
    ```

    The current value of the parameter is displayed under the flashing cursor. To change it, type in a new valid entry and press Return. If you want to keep the current value just press Return.

    After you've entered the new value, Copy II returns to the Change What Parameter question so that you can change another parameter. When you're finished changing the parameters you want, just press Return instead of typing a parameter letter.

3. Press the Return key one more time, and you will be prompted to insert the disk or disks into the appropriate drive or drives, depending on the Bit Copy program you are using.

    Note: If you select the / key again, and look at the parm you just changed, it will display the default value, rather than what you changed it to.

4. Press Return to begin the bit copy.

Create New Parm Entry

This section describes the Bit Copy options that allow you to create and edit your own Auto Copy parameter entries, and add these to the list of parameter entries already on the Copy II disk. You'll need to know how to create a new entry, type in the special parameter values, and save the new entry to disk. If you've discovered how to back up a program yourself, you'll also need to understand what the individual parameter values mean, so you can make an entry that does what you want.

Note: Central Point Software does not provide technical support on creating your own parameter entries, but if we have specific parm information in-house we are happy to share it.

The individual items in a parameter entry are described first, then the Bit Copy options for changing the parameter entries are explained. If you just want to type in an entry that's been provided for you, you might want to skim the following material, then pick up again below under Load Parm Entry.

Each parameter entry is a set of special instructions which Copy II can use when backing up a particular program with Auto Copy. The instructions tell Copy II how to set the start and end track, track increment, any parameter changes, etc., before copying the disk.

To create a parm entry:

1. Select **Create New Parm Entry** from the Bit Copy menu.
2. Enter the name of the program at the `Parm Name:` prompt. You must enter at least one character in this field. It may be from 1 to 29 characters long, and can include any printing character except asterisk (*) or underline (_).
3. Enter your name at the `By:` prompt or press Return to skip it.
4. Press Return. You are now in the editing screen to create a new parameter entry.
5. Type in your parm entry, using the syntax rules listed in the table below. The entry does not need to be case sensitive. **Note:** You do not need to end your parm entry with a comma. Copy II will place it for you.

The delete key at the upper right of your keyboard will delete a character previously typed. To move the cursor, use the cursor keys to get to the appropriate line. Then make the changes/edits you want, and press Return to keep the changes you have made. Make sure that the line is correct BEFORE you press Return.

6. Press Return when you are finished with the parm entry to take you to the start of the next line.
7. Press Return again to complete the parm entry. If the parm doesn't make sense, a syntax error message appears at the bottom of the screen. You can press Return to enter the data again or **<---** to go the the main menu. If the parm is OK, the "parm entry valid" message appears.

Note: Possible error messages are listed in the section "Parameter List Errors."

8. Press Return to continue.
9. Press Return when you are finished. You return to the Bit Copy main menu.

- You may select Auto Copy at this point. You are asked:
  ```
  Do you wish to use "<Name of Parm>?"
  ```

  (The name displayed will be the one you just did.)

  or

- You may choose **Save Parm Entry** from the Bit Copy main menu. This will write your parm entry to disk for future use.

The following table shows the main instructions you use in writing parameter entries. Each instruction is described first, then followed by short examples where appropriate.

Note: The entry does not need to be case sensitive.

Syntax	Explanation
Trkxx-yy	Copies from track xx to yy. In other words select a START TRACK of xx, and an END TRACK of yy.
Trk01-23	Copies from track $01 to track $23.
Trk12-1B	Copies from track $12 to track $1B.
Trk01.5-07.5	Copies from track $01.5 to track $07.5. (These are half tracks.)
Trk04-05	Copies tracks $04 and $05.
Trkxx	Copies only track xx. Sets both the START TRACK, and END TRACK to xx.
Trk01	Copies only track $01.
Trk21	Copies only track $21.
STEP=z	Select a track increment of z.
STEP=2	Selects a track increment of 2 (which copies every other track).
STEP=1.5	Selects a track increment of 1.5.
x=yy	Sets parameter x to value yy.
Compress=Y	Sets parameter Compress to Yes.
Sectors=V	Sets parameter Sectors to Variable.
SIDES=x	Sets the number of sides to copy.
SIDES=1	Sets the number of sides to copy to 1.
"COMMENT"	Any comments in the parameter entry should be in quotes and on a separate line. The comments will be displayed on the screen during copying. The comment must be the last entry of your parameter. If it is not, any instructions following it will be ignored.

The instructions that do a copy must be separated by commas.

Note: There are no spaces between the commas in a parm entry. You do not need capitalization.

Here are a few examples of instructions alone or combined together:

Syntax	Explanation
Trk01	Copy track 1.
Trk01-23	Copy tracks 1 through 23.
Trk0A-0E,STEP=2	Copy tracks 0A-0E copying every other track.
Trk01-22,SIDES=1	Copy tracks 1 through 22 on side one.
Trk04-05,SIDES=1,C=N	Copy tracks 4 through 5 on side 1 with no compression.
Trk01-08,STEP2	Copy tracks 1 through 8 copying every other track.
Trk01.5-07.5,STEP1.5	Copy tracks 1.5 through 7.5 with an increment of 1.5.
Trk01,COMPRESS=Y	Copy track 1 with compression on.
Trk02-22,SIDES=2	Copy tracks 2 through 22 to both sides.

Remember that some protected disks use different protection methods on different tracks of the disk. These disks sometimes require more than one pass through the bit copy. Each pass may select a different track range and set different parameters. When Copy II reads a parameter entry to copy a disk, it gathers all of the instructions until it gets to the next track range designation, sets the appropriate track numbers, parameters, etc., then does the copy. It then reads the information for the next track range (if there is one) and then processes the next pass. When creating the entry, you need to remember that all the instructions for one pass should be between track ranges.

Note: See the section "Parameter List Errors" for a list of potential error messages.

Here is an example of a multi-pass parameter entry:

```
Trk01
COMPRESS=y,Trk01-07
Trk12-21,
SIDES=2,TRK22
```

This entry translates to first copy track 1, then copy tracks 1 through 7 with compress ON. Then copy tracks 12 through 21. Finally, copy track 22 on both sides of the disk.

Sector Edit Parameters

The Bit Copy program can also do automatic sector editing to the duplicate disk, controlled by a parameter entry with Auto Copy. Sector editing is a novel method used to help back up certain protected disks.

On some protected disks, most of the program is stored using fairly normal DOS type sectors, but one or two tracks contain special marks which a bit copy program may have trouble duplicating. When the program is loaded, it looks for these special marks on the disk. If it doesn't find them, it knows that this is a copy and not the original disk and does not run.

The sector edit approach is to actually modify part of the program stored on the duplicate disk so that when it boots, it simply ignores the fact that the marks are absent. The modification can either remove the protection check or ignore the results of the check after the test has been done. Determining what kind of change to make to a specific disk is usually a major programming task. If you already know what needs to be changed, though, it is fairly easy to make that change. (The Sector Editor option lets you make changes by hand.)

If an Auto Copy parameter entry calls for sector editing, Copy II automatically does the sector edit to the duplicate disk. The only

time you need to be aware of this is if you want to create your own parameter entries that include sector editing.

Important: Sector editing should always be done to a copy of a commercial disk, never to the original!

The sector edit instructions need to specify:

* which track and sector is to be modified and,
* the addresses in the sector to be changed along with their new values.

Here, in the correct order, are the parameter entry instructions needed to do sector editing:

SECTOR EDIT,   This starts the sector edit.

TRACK xx,   Track number.

SECTOR yy,   Sector number.

aa:dd,   The position (address) in the sector to change, and the data to change it to.

aa:dd/dd/dd   Changes to adjacent bytes in the sector.

Here are two examples to clarify this:

SECTOR EDIT,TRACK01,SECTOR08,A0:60

The above example edits the sector at track $01, sector $08. The byte at address $A0 is changed to a $60, then the sector is written back to the disk.

SECTOR EDIT,TRACK22,SECTOR01,14:00,D1:2F/AF/32

The above example edits track $22, sector $01. The byte at address $14 is changed to a $00, then the three bytes starting at address $D1 are changed to $2F, $AF, and $32.

Note: There are no spaces between the commas in a parm entry.

If an I/O error occurs while Copy II is trying to sector edit the duplicate disk, the error is displayed.

Load Parm Entry

This Bit Copy option lets you select a parameter entry from the disk, load it into memory, then see and modify the instructions that make up the entry. When you choose **Load Parm Entry,** a new screen appears:

```
LOAD PARM ENTRY

Parm Name:

By:
```

```
         Make sure Parm Disk in Drive
   RETURN = Continue        [<--] for main Menu
```

Enter the name of the parameter entry you want to load, or press Return twice to see a list of all of the parameter entries. You can select the entry name from the list, just as in Auto Copy. The disk whirs as the entry is loaded, then the parameter entry edit screen appears. Here is a sample edit screen:

```
NAME: RASTER BLASTER
BY: BUDGECO
Trk01,
Trk05-11,STEP4,COMPRESS=Y,SIDES=2,
Trk06-12,STEP4,
Trk07.5-0F.5,STEP4,
Trk01.5-03.5,STEP2,
"RETRY TRACK EIGHTEEN UNTIL BOOTS",
```

The first line shows the name of the parameter entry. The "By" line shows the software publisher's name. (This line may be blank in some entries.) Below the double line are the bit copy instructions that make up the entry. If a line is too long it will wrap around to the next line on the screen.

Edit Parm Entry

Whenever you use **Auto Copy** or **Load Parm Entry,** the parameter entry you last selected is stored in the computer in case you want to use it again. With the **Edit Parm Entry** option, you can look at or modify whatever parameter entry is currently stored in memory. When you select **Edit Parm Entry** from the Bit Copy menu, Copy II displays the parameter entry edit screen from a previously loaded parm entry (in this case, the entry we used in the previous **Load Parm Entry**).

```
NAME: RASTER BLASTER
BY: BUDGECO
```
```
Trk01,
Trk05-11,STEP4,COMPRESS=Y,SIDES=2,
Trk06-12,STEP4,
Trk07.5-0F.5,STEP4,
Trk01.5-03.5,STEP2,
"RETRY TRACK EIGHTEEN UNTIL BOOTS",
```

```
Ctrl E to Edit                    Ctrl Q to Quit
```

To edit the parm entry:

The Name and the "By" line can be up to 20 characters long, and contain any characters except "*".

1. Select **Edit Parm Entry** from the main menu and select the parm you wish to edit.
2. Press Control E to enter the edit mode and use the editing keys to change the instructions that make up the parameter entry. Once the cursor is down in the instruction area, it acts like a miniature word processor. Typing characters inserts those characters into the line.

    The delete key at the upper right of your keyboard will delete a character previously typed. To move the cursor, use the cursor keys to get to the appropriate line. Then make the changes/edits you want, and press Return to keep the changes you have made. Make sure that the line is correct BEFORE you press Return.

    When you press Return to end a line or move the cursor to another line, Copy II checks the line to make sure it contains only valid parameter entry instructions. If there is an error, Copy II prints the error message at the bottom of the screen, reprints

the previous VALID parm instructions, and allows
you to edit again.

Note: See the section "Parameter List Errors" for a
list of potential error messages.

3. Press Return when you are through editing to move the
cursor to the beginning of the last line.
4. Press Control Q to quit when you are through editing.
You return to the Bit Copy menu.

Save Parm Entry

After you've made changes to or created your own parameter entry,
choose **Save Parm Entry** if you want to save it to the disk to make it
permanent. The disk whirs as Copy II saves the parameter entry.

If there is already a parameter entry with that name stored on the
disk, Copy II displays this message:

```
Entry Already Exists - Replace It ? Y
```

```
Press [Y] or [RETURN] to replace the old entry with
the new. Press any other key if you don't want to
save it.
```

Note: If you decide not to save this parm with the same name as an
existing parm entry, you can load the parm in **Edit Parm Entry**, and
edit the name to become <Existing filename.alt> to distinguish it
from the other parm with the same name.

Note: You should normally save parameter entries onto your
working copy of Copy II. The parameter entries are recorded in two
files on the disk, called PARM.KEY and PARM.DATA. The
corresponding Bit Copy program looks for these files when it saves
an entry. If it cannot find the files, it creates them on the disk, then
saves the parameter entry into them. This is handy if you want to
store your own parameter entries onto another disk. However, if

you want to save the entry onto the Copy II disk, you need to be sure the disk is in the drive before you select Save Parm Entry.

Rename Parm Entry

Choose Rename Parm Entry if you would like to change the name of one of the parameter entries stored on disk.

To change the name of a parm entry:

1. Select **Rename parm entry** from the Bit Copy menu.
2. You may either type the name of the parm entry you wish to change or press Return twice and select the name from the list.
3. Type in the new name at the prompt.
   It may be from 1 to 29 characters long, and can include any printing character except asterisk (*) or underline (_).
4. Press Return to rename the entry and save it.

Delete Parm Entry

You may delete parameter entries from your disk by choosing the Delete Parm Entry command.

To Delete a Parm Entry:

1. Select **Delete Parm entry** from the Bit Copy menu.
2. You may either type the name of the entry you wish to delete or press Return twice and select the name from the list.
3. Press Return to delete the entry.

Parameter List Errors

If there is a problem when loading, saving, creating, or editing a parameter entry, Copy II prints an error message. This is a summary of possible errors:

```
Disk is Write Protected - Remove Tab
```

```
Press  [RETURN] to Continue
```

This error occurs if you're trying to save, rename, or delete a parameter entry on a write-protected disk. Remove the write protect tab from the disk and try again.

```
Parm Files Don't Exist on this Disk

Do You Wish to Create Them  ? Y
```

Copy II could not find any parameter entries on this disk. You probably have the wrong disk in the drive. Insert the correct parm disk, answer **N** to the above and try again.

Note: This message may also mean that the files that contain the parameter entries are somehow damaged. The parameter entry you requested cannot be loaded. You should make a new working copy from your original Copy II 64/128 disk, and use the new copy from now on.

Note: If you are saving parameter entries onto a disk other than Copy II, you will see this message. Answer **Y** to create the needed entries PARM. KEY and PARM.DATA.

```
Disk Full Error - New Parm Disk Needed

Press [RETURN] for Main Menu
```

There is no more room on this disk for saving parameter entries. You need to either delete any entries that you don't want or start saving new entries onto another disk. (See **Save Parm Entry** for more information.)

```
Entry Already Exists - Replace it ? Y
```

You are probably trying to rename a parameter entry, and the name you chose is already in the parameter entry list. You cannot have two entries with the same name. If you answer **Y** to the prompt, the parameter is replaced with the new parameter. If you answer **N** to the prompt, the current parameter is ignored and you are returned to the Bit Copy main menu.

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Parameter entry error messages:

> "Trk06-05" Start Track Greater than End
> Track

The start track number needs to be less than the end track number.

> "TrkF0"   Illegal Track Number

"TrkF0" is not a valid track number.

> "XYZABC123"   Syntax Error

Copy II can't make sense of what you typed. It's not a valid parameter entry instruction.

http://www.c64copyprotection.com/

Appendix A: Using the Side Two Parameter List

In order to support as many programs as possible to back up, we have included the parameter list from previous versions and updates of Copy II 64/128 on side 2 of the Version 4 disk. These older parameters are not compatible with the list provided on side 1.

To use the Side 2 parameter list:

1. Turn on your computer and disk drive.
   For Commodore 128 users: Your computer must be running in 64K mode when using the side 2 parm file.
2. Insert side 2 of the Copy II 64/128 disk.
3. At the `Ready` prompt, type:

   ```
   Load "parms",8,1
   ```
4. Press Return.
   You will see multiple files being loaded. You may see a message asking you to insert the parameter disk. Just press Return.

   The parameter list appears with the first program name highlighted:

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```
         Copy II 64/128 Parameters
       (C) 1988 Central Point Software
```

	Ace of Aces v4	Accolade
	Ace of Aces v5	Accolade
	Alt Reality-City	Datasoft
	Alt Reality-Dun.	Datasoft
	Arctic Fox	Elect Arts
	Ballblazer	Epyx
	Bard's Tale II	Elect Arts
Custom	Bop 'N Wrestle v1	Mindscape
Copier	Bop 'N Wrestle v2	Mindscape
	Carmen Sand USA	Broderbund
	Carmen World SdA	Broderbund
	Carmen World SdB	Broderbund
	Certif. Maker v1	Springboard
	Certif. Maker v2	Springboard
	Chuck Yeager	Elect Arts
F1: DIR	Color Me	Sprout
F3: REBOOT	Conan	Datamost
F5: EXIT	Cross. Magic v1	Mindscape

All special instructions appear to the left of the parameter list. As you scroll through the list using the up and down cursor keys, you can see the instructions change as a different program name is highlighted.

The three function keys listed in the lower left corner of the screen are fairly self explanatory.
- `F1: DIR` Shows the directory of the disk currently in the drive.
- `F3: REBOOT` Asks if you are sure you wish to reboot and does so if you answer yes.
- `F5: EXIT` Asks if you are sure you wish to exit to Basic and does so if you answer yes.
5. Select the program you wish to back up. There are 3 possible instructions that appear on the left side of the parameter list after an entry is selected. Each is described below.

To use the Copy II 64/128 and Dupes Protec. method:

1. Make the backup using Copy II 64/128. This means turning the disk back to side 1 and rebooting.
2. Copy the original disk following the manual bit copy instructions as described on page 45.
3. Load the parameter file again (following the instructions in the previous section.)
4. Select the name of the program you just copied. The following screen appears:

```
<Name of program>            <Manufacturer>


                   Insert
                 BACKUP COPY


           Hit SPACE to continue....
```

5. Insert the backup copy you just made and press the space bar. The parameter instructions will be executed on the backup and a message telling you the parameter was successful appears.
6. Re-insert the Copy II 64/128 disk (side 2) and press the space bar. You return to the parameter list.

To use the Custom Copier method:

1. Press Return and follow the screen prompts.
    All necessary copying instructions are embedded in the parameter entry.

To use the Custom Copier with 1541 only:

1. Press Return and follow the screen prompts. You must use a 1541 drive.

When the parameter program is finished, your backup should run correctly. Please note that there may be several versions of the same program listed. You may have to try a few times until you find the right parm version for your program.

Appendix B: Disks and Disk Hardware

This appendix is included as a concise reference on disks and disk hardware. It explains disk formatting and storage, and most of the terms needed before exploring disk protection methods. It is, however, a reference rather than a tutorial.

This reference assumes that you are familiar with terms such as hexadecimal, binary, bytes, bits, and subroutines.

DOS Sectors (Blocks)

The Copy II 64/128 Utilities can work with disks created by the two different Commodore disk operating systems: DOS for the 1541/70/71 disk drives, which is designed to work with 35 track 5.25" floppy disks (70 tracks with the 1571 disk drive), and DOS for the 1581 disk drive, which is capable of handling 3.5" disks. Both of these operating systems perform a number of tasks, including saving or writing files onto the disk, loading or reading files from the disk, and keeping track of where the files are stored on the disk.

Depending on what program is being run, DOS may need to access anywhere from one byte up to thousands of bytes from the disk at any one time. What is essential is a method to divide the information into manageable chunks.

The 1581 DOS divides each track into blocks, with each one of these blocks consisting of two 256 byte sectors paired together making up a physical sector of 512 bytes of data. A disk formatted by a 1581 disk drive is normally a two-sided 80 track disk. Each track is made up of ten of these large sectors or blocks. Each disk contains a total of 1600 blocks (or 3200 - 256 byte sectors). Of these 3200 sectors, 40 of them are used for the Directory and the Disk Block Allocation Map (BAM) which are all found on track 40 ($28).

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That leaves 3160 -256 byte sectors remaining for file and/or data storage. This pairing of sectors is handled by a DOS low level floppy disk routine.

The 1541/70/71 disk drives divide a 5.25" disk directly into 256 byte sectors on 35 ($23) tracks. (Since the 1571 disk drive is a two sided drive, it normally formats 70 tracks.)

When a file is saved to disk, the 1541/70/71 DOS breaks the file into 256 byte chunks, looks on the disk for sectors that are not currently in use, saves the chunks into the free sectors, makes a record on the disk of which sectors the file uses (so it can find the file later), and marks the sectors in use. The 1581 DOS is similar, except that it always works with 512 byte physical sectors.

5.25" Disks: Tracks and Sectors

The data on a normal 5.25" disk is stored in 35 circular tracks, numbered 1 through 35 ($01 through $23 in hexadecimal). The outermost track is track $01 and the innermost track is track $23.

The disk drive, controlled by DOS, can position the read/write head (similar to the tape head in a cassette deck) over any one of the tracks. As the disk spins over the head, the drive can read or write the information on that track.

Each circular track is divided into 17 or more sectors. Each sector on a 5.25" disk contains 256 normal bytes. Since the outermost tracks are longer than the innermost tracks, Commodore has chosen to take advantage of this by creating four "track ranges," which allows writing more sectors to the outermost track ranges than the innermost range. The following table shows the breakdown of this track range organization:

TRACK AND SECTOR ORGANIZATION ON 1541/70/71 DISKS

TRK RANGE	SEC #	RANGE #	TOTAL SEC/TRK	TOTAL BYTES/TRK
1a	1 to 17	0 to 20	21	5376
1b	36 to 52	0 to 20	21	5376
2a	18 to 24	0 to 18	19	4864
2b	53 to 59	0 to 18	19	4864
3a	25 to 30	0 to 17	18	4608
3b	60 to 65	0 to 17	18	4608
4a	31 to 34	0 to 16	17	4352
4b	66 to 70	0 to 16	17	4352

There are a total of 683 sectors written to a normally formatted single sided disk of the 1541/70 disk drives. A normally formatted 1571 disk contains twice this number (1366 sectors). A single sided disk can store a total of 683 sectors * 256 bytes per sector = 174,848 bytes or about 170k. A double sided disk can store twice that amount or about 340K.

Note: Commodore CP/M uses the same track and sector formatting on its 5.25" disk, however, the way the sectors are used for file storage varies greatly with its operating system.

3.5" Disks: Tracks, Sectors, Sides, Blocks

The data on a 3.5" disk is stored on 80 circular tracks. The tracks are numbered 1 to 80 or $01 to $50 in hexadecimal.

Each circular track (or side) is divided like a pie into several sectors. Each physical sector stores 512 bytes of usable data. The number of sectors per track is constant (unlike the 5.25" disks).

3.5" disks are formatted as double sided, which means they contain information on both the bottom and top surfaces of the disk media. Each of the 80 circular tracks is therefore divided into two sides. The 3.5" drives have two read/write heads, one for the bottom surface and one for the top. The disk drive can position these heads - as one unit - under and over any track of the disk.

Disk Hardware: Reading and Writing Bytes

A disk drive spins the disk at about 5 revolutions per second, or 200 milliseconds per revolution.

The bytes on the disk (and the bits that make up those bytes) must be written at evenly spaced intervals around the circular track. Since the disk media is passing over the read/write head at a fairly constant speed, that means each bit must be written onto the media at the right moment, in order to be placed onto the correct spot on the disk.

The timing involved in accessing the disk, especially when writing, must be precise. This makes disk access very timing critical.

When writing a single byte to the disk, DOS sends the byte to a special data latch on the disk controller card. The hardware then writes the 8 bits of the byte, one bit at a time, onto the disk media passing over the head.

As was mentioned before, the 5.25" disks do not have a fixed number of sectors on each track. Therefore, in order to write the correct number of sectors for each track range, the rate at which data is written to the disk must be varied. Each of the track ranges uses an internal clock to help in varying the rate at which data bytes are written to the disk. The following table is a summary of the track ranges, and the rate with which data bytes are written to the disk:

Range	Tracks	Rate/byte	Bytes/track
1a	1 to 17	26 usec/byte	7692 ($1E0C)
1b	36 to 52	26 usec/byte	7692 ($1E0C)
2a	18 to 24	28 usec/byte	7142 ($1BE6)
2b	53 to 59	28 usec/byte	7142 ($1BE6)
3a	25 to 30	30 usec/byte	6666 ($1A0A)
3b	60 to 65	30 usec/byte	6666 ($1A0A)
4a	31 to 35	32 usec/byte	6250 ($186A)
4b	66 to 70	32 usec/byte	6250 ($186A)

Note: Usec = microsecond, or millionth of a second.

If the hardware is writing bytes to track range four, it must write one bit every four usec. It takes 32 microseconds to write all 8 bits of the byte for this track range (4 usec per bit * 8 bits per byte).

To write bytes, the drive hardware must send bytes from the data latch at intervals of 32 microseconds or less, so when the hardware has finished writing one byte, it is ready to receive the next byte to write.

If another byte isn't sent to the data latch at the correct interval, then the hardware will continue to write the previous byte to the drive until another byte is written to the data latch.

Any byte value can be written to the disk. However, only some values can be read back reliably, due to the Commodore disk drive electronics.

Another limitation is that the circuitry can't reliably read more than 2 consecutive zero bits in a row. If there are too many zeros in a row, the circuitry will begin reading some of the bytes incorrectly as ones.

Bytes that have more than 2 consecutive zero bits are considered invalid bytes, because they can't be read reliably. If an invalid byte stored on the disk is read back, it might be read correctly or it might be read as a valid or invalid byte. If a byte is read from the disk as an invalid byte, then some invalid byte is stored on the disk, though it may not be the byte that was read (since the circuitry may have read it incorrectly).

Since not all possible byte values can be read correctly, information being written to the disk must be encoded in some way first, so that only valid bytes are written. DOS does this encoding for every sector it writes.

Another problem in reading the disk is finding where one byte ends and the next byte begins. The data on the disk is stored simply as a long stream of bits. Here is an example bit stream:

1101010110101010101001011

The hardware could read a byte starting with any of the one bits. If the starting point is wrong, then the bytes read will be completely wrong. What is needed is a way to synchronize the hardware to the correct byte boundaries.

To synchronize the hardware to the bytes when reading, special bytes called sync bytes are written onto the disk with every address field and every sector. A sync byte is written by sending an $FF (binary 11111111) to the disk data latch. The disk hardware is designed in such a manner that after it has detected more than ten consecutive one bits, it will set a hardware register flag to indicate that a sync field has just passed over the read/write head.

When reading a disk, DOS first looks for the presence of a sync field. Then DOS begins looking for the hardware to tell it that the sync field has passed, and it now has a byte of data ready from the data latch. If several sync bytes were written to the disk, and then a valid data pattern was written, it would look like this:

sync bytes			data byte
1111111	11111111	1111111	01010010

When reading this pattern from the disk, the hardware will automatically be synchronized, and it will read the sync bytes until it detects the first zero bit. It then knows that data is now being read.

A recording process known as GCR, or Group Coded Recording, is used to record data to the disk. With this process, each group of four (4) data bytes is encoded to 5 GCR bytes. These GCR bytes are special in that they make sure that there are never more than four consecutive one (1) bits written nor more than two consecutive zero bits written to the disk. The zero bits are important since the drive electronics uses the one bits to equalize drive fluctuations.

Each half of a byte or a nybble (also nibble) is converted to a GCR format before it is written to the disk. Each four bytes of normal data result in 5 bytes of GCR data so that each 256 byte sector (plus a few miscellaneous bytes including the checksum) is translated to 325 bytes of GCR data. The following table shows all possible values of a nybble (1/2 byte), its binary equivalent, GCR value, and a hexadecimal representation of the GCR value.

GCR/BINARY CONVERSION TABLE

Decimal	Binary	GCR Code	Hex Value
0	0000	01010	$0A
1	0001	01011	$0B
2	0010	10010	$12
3	0011	10011	$13
4	0100	01110	$0E
5	0101	01111	$0F
6	0110	10110	$16
7	0111	10111	$17
8	1000	01001	$09
9	1001	11001	$19
10	1010	11010	$1A

Disk Hardware: 3.5" Drives

The 1581 disk drives is controlled by a Western Digital Floppy Disk Controller chip. It is the responsibility of the FDC to read data, write data and format the disk. While the FDC also has the

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ability to step the read/write head, the 1581 disk drive does not make use of this ability.

The Western Digital FDC is one type of FDC that is used in the IBM disk world. Since this is the chip the 1581 drive uses to operate the mechanism by which disks are read, written and formatted, you might expect these disks to be similar to an IBM disk - and they are. The 1581 disk drive therefore does not use GCR encoding, but a byte encoding method called MFM, or Modified Frequency Modulated format. This type of encoding involves writing clock bits along with data bits. In that way the FDC is able to keep track of the real data that is written to the disk. The way the MFM works is beyond the scope of this manual.

Contents of a Sector

In order to read any given single sector, DOS must move the read/write head to the right track and begin reading bytes, waiting for that sector to pass by the head.

Every sector is made up of an address field and a data field. The address field contains information such as which sector this is and what the volume number of the disk is. The data field contains the actual information desired, such as a part of a file.

Here is a breakdown of a sector on a 5.25" disk:

Sync field

The sync field is between 4 and 5 sync bytes ($FF). This guarantees that the hardware is in sync when reading the address field or the data field.

Address Field

The address field contains a series of 8 data bytes that identify the track and sector that is being read. These eight bytes are normally followed by 8 bytes sometimes called the Header Gap.

Below you will find the first 5 GCR bytes of an Address Header. Take a look at these bytes, and then read further to see how they

can be broken down to provide meaningful track and sector information.

1. Address Header Bytes:

    52   55   75   29   4B

2. Binary Representation of the above bytes:

01010010   01010101   01110101   00101001   01001101

3. GCR 5 bit bytes from above binary string:

01010   01001   01010   10111   01010   01010   01010   01011

4. Hex representation of above GCR bytes:

$0A $09 $0A $17 $0A $0A $0A $0B

5. GCR byte translated from the GCR table above:

$00 $08 $00 $07 $00 $00 $00 $01

6. Each pair of the above bytes combined:

$08 $07 $00 $01

The meaning of each of the above 4 bytes is as follows:
The first byte ($08) is a header identifier. The next byte ($07) is the checksum for the header track, sector, and two ID bytes. The next byte is sector number (in this example, sector zero) and the last byte is the track number (track number one).

Sync Field

Another sync field of 4-5 bytes follows the address header and precedes the data field. This insures that when DOS begins to read sector data, it is synchronized and able to read real data.

Data Field

Data ID Byte $55 marks the beginning of a normal data field. The encoded data always follows this $55. The 324 bytes represent the encoded 256 byte data field. The part of DOS that does the encoding and decoding is fairly fast and efficient, but the 325 disk bytes bear little resemblance to the 260 data bytes they represent.

Reading and Writing Sectors

When either reading or writing a sector, DOS must first find the correct sector. It calls a read address field routine that looks for and reads the next address field to pass by the read/write head. DOS then checks the track and sector numbers from this address field to see if this is the desired sector. If it is not, DOS continues to look for the correct one. If it can't find the desired sector within a certain number of tries, it gives up and returns an error.

During reading, when DOS finds the right address field, it calls a routine to read the data field, which will be passing by the read/write head within a couple hundred microseconds.

During writing, after finding the correct address field, DOS calls a routine that determines when to begin writing the next data field. First, however, it lays down several sync bytes (4 or 5) to insure that the sector data will be able to be read after it has been written.

Note: During normal use, data fields are rewritten, but not address fields. When a disk is formatted, both address and data fields are written onto the disk.

In formatting each track, DOS writes a very large initial gap field, followed by a sync field, address field, sync field, the data field, another sync field, then next address field, etc. until the proper number of sectors has been written. This wipes clean any old information that might have been on the track. The data fields written are empty.

The initial gap field is large enough that the last sector put onto the track will overwrite the beginning of this field as the disk completes one full revolution.

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If the disk is spinning too fast, then the entire initial field (and possibly part of the first sector) will be overwritten, which means the formatting failed. If the disk is spinning more slowly than usual, then the remaining part of the field which was not overwritten will be very large.

When DOS begins formatting a track, it writes and rereads the number of bytes it has just written to the track. It then uses this information to calculate the number of sector gap bytes that will be written following each sector field. These trailing sector gaps can range from 4 or 5 bytes to as many as 10 to 12 depending on the track range.

Sectors on a 3.5" disk

If you are interested in knowing more about the formatting of the 3.5" disks, we suggest that you contact your local electronics store and purchase the Data Sheets on the Western Digital family of Floppy Disk Controller Chips. This reference is fairly technical in nature but will give you an in depth treatment of the mechanisms of a MFM formatted disk.

Appendix C: Disk Protection Methods

What makes a disk protected?

In Appendix B, the format of a normal DOS sector was given. Standard disk copy programs look for this format on every track of the disk. If the address headers and data fields can be found in the right places and the checksums match with the data, then DOS can be confident that the data itself is correct. This helps to produce a very reliable copy.

The simplest protection methods change this format slightly. Normal DOS cannot find the byte patterns it's looking for, and it doesn't know how to make sense of the disk data. It gives up and prints a message such as I/O ERROR. In other words, any change from a standard disk format, if it was put there to make copying more difficult, can be considered a protection method. The sophistication of the changes varies greatly. Many protected formats bear no resemblance to standard sectors at all.

There are two possible approaches to copy protection. The first is to store the program information on the disk in such a way that a bit copier can't reproduce all of it. When you try to boot the copy, the program is incomplete and will not run. The second approach is to store the program in a reasonably normal form, but also put special bytes or patterns which are difficult to copy somewhere on the disk. When you boot this, the program loads correctly, but then promptly begins by checking that the special bytes are still on the disk. If they are missing or incorrect, then the program knows that this is a copy and will not run.

Why can't a bit copy program just copy everything on the disk?

There are a few reasons for this. The most pervasive one has to do with the fact that on a circular track, although there is a first,

second, and third sector etc., there is no defined beginning or end. A bit copy program must begin reading at some arbitrary point around the track, and then make sense of what it reads.

Most disks are written with an initial large gap that precedes sector one. The end of the data area overlaps part of, but not all of, the initial field as the disk completes a full revolution. (See Appendix B.) The size of the remaining initial field is determined by how fast the drive that made the disk was spinning.

If a bit copy program can identify the beginning and ending of the data area, it can also write a large gap field before the data area. The resulting gap will probably be a slightly different size than on the original, but in most cases that doesn't matter.

Therefore, one of the tasks for a bit copy program is to identify the start and end of the useful data area on each track. Then when it writes the track, it can let the anomalies caused by varying drive speeds fall outside of this data area, where it can hopefully be ignored. Many protection methods involve making it difficult for a bit copy program to find the start and end of the track data.

The first protection methods involved very simple changes since there weren't any programs yet available that could copy these disks. When bit copy programs that could back up these disks were developed, more complicated protection methods were invented. New copy programs were released to copy the new protection methods, and new methods were created to beat the bit copy programs. This cycle still continues. The following descriptions start off with the easier changes and progress to some of the state of the art methods currently in use.

Changed Address and Data Headers

As mentioned earlier, standard disk copy programs expect to find normal sectors on the disk, with correct address headers, correct checksum, etc. These header values can also provide clues to a bit copy program to help it find the track start and end, since it knows that a sync field usually precedes every address header.

Since DOS looks for these bytes when reading a sector, changing these to new values will cause any normal copy program to fail. Header bytes, data bytes, track numbers, and checksums have all been changed in various methods. This was one of the first and simplest disk protection methods developed, and even today most disks employ this as one of their protection methods.

Half Tracks

The Commodore 5.25" disk drive can actually position to 70 different tracks, not 35. Unfortunately, the read/write head used in the drive is too wide to write complete tracks on every track boundary. It would overwrite the information stored on adjacent tracks. So DOS actually steps the head twice for every track on the disk, giving the familiar 35 tracks. But since it is possible to position the head to any of the 70 half-tracks, some disks shift the data and start using tracks on half-track boundaries. For example, rather than writing information on tracks 1, 2, 3, etc., they might use 1.5, 2.5, 3.5, etc. Any possible pattern can be used, as long as the increment is at least one whole track.

There is no easy, foolproof way to determine what half-tracks are used by a protected 5.25" disk. In general, if you try to read (with the nybble editor) a track or half-track that was never written to, you will see large areas of invalid bytes. If data was written to the half-tracks on either side, you may see a few areas that look like valid track data, as the wide read head occasionally picks up these bytes from either side.

Note: Copy II 64/128 can position the drive head over any half-track.

Extra Tracks

The hardware can (on most drives) write a few extra bytes (usually 4 or 5) after the last normal track on the disk. This would be track $27 or $28. Since a normal copy program doesn't suspect that an extra track exists, it will not try to copy it. This is part of the reason bit copy programs such as Copy II allow you to specify start and end tracks to copy.

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Long Tracks

Some 5.25" protected programs are written with a large amount of data on each track. The drives that make these disks are slowed down slightly so that the extra data will fit. If you try to copy the disk with a normal speed drive, the end of the long track will overwrite the beginning of the next track, creating an unbootable disk.

The best way to backup disks using this protection method is to adjust your drive to a slower speed before copying the disk. This is not easily done, and we do NOT recommend it.

Write Protect Check

When you use a disk that has a tab over the write protect notch, this does two things. The electronics in the drive prevents any data being written to the disk, and a flag is set which the program can check to see if the disk is write protected. Some commercial disks have no notch and so are permanently write protected.

Some protected programs that have no notch in the disk check the write protect flag when they are booted. If the flag says not write protected, then the program knows that this is an ordinary notched disk, and must be a copy rather than the original disk. It will then hang, or reboot, or ask you to insert the original. (It could also trash the data on your backup.) If you put a write protect tab over the backup before you boot it, then the program cannot use this to determine that a copy is running.

There is no ready way to determine when this protection method is being used. If you want to be on the safe side, if the original disk is write protected, always put a write protect tab on your duplicate disk before you boot it. If the original is not write protected, don't put a tab on the backup.

Nonsync Sync

A few protected programs use a pattern of normal bytes to synchronize the hardware to the disk data. This pattern usually

http://www.c64copyprotection.com/

has to be fairly long and consists of the proper bytes in order to synchronize correctly. If this method is used, then 9 and 10 bit sync bytes are not needed, making it more difficult for bit copy programs to determine the track start and end.

This covers the main methods currently in use. It should be noted that several disks use combinations of the above methods just to make things more complicated with radically different sector formats, different headers on different tracks, short sync fields or almost no sync at all, half-tracks, etc. In some cases, the combinations form almost a new protection method in itself.

http://www.c64copyprotection.com/

Appendix D: Summary of Parameters

This appendix describes the methods Copy II uses to copy a disk, and how the various parameters affect the copy process. Each parameter has both a letter and a name. The name provides a quick way to remember what each parameter does. If a parameter represents a disk byte value, it can be stored normally (for example, $FF) to represent a normal 8 bit byte. If the byte is part of a byte pattern to search for in the buffer, a zero value in the parameter means match anything for this byte.

Compress

Compress is a parameter that was developed for protection methods that write non-valid GCR bytes to a sector. Ordinarily when Copy II reads data it compresses (decodes) the GCR data so that it fits more compactly in the computer. This parm was designed so that you can tell Copy II to either Compress the GCR data before saving it or to leave the data as 'RAW GCR' data when saving it. There are only two values needed to set this parameter.

Parm Settings

Y   (The default setting) says continue to compress the data and let more information be stored in the computer.

N   Tells Copy II to save all disk data as RAW GCR bytes.

Data Rate

Data Rate allows you to set the clock speed of the read/write head. This parm allows you to read and write a track or range of

tracks written at non-standard clock rates for its particular track range. This parameter is valuable in dealing with protection methods that have tracks written with a non standard speed. The setting you choose for this parm is used in setting the recording rate of VIA2 in the disk drive at Hex location $1C00. This is a 'Control' register for many of the drive functions such as turning the drive motor on and off or turning the drive LED on and off. The layout of this control register (also known as VIA2 PB) is as follows:

PB Bit Number	Function
PB0 PB1	These two bits are responsible for control of the disk drive stepper motor.
PB2	Control Drive Motor 0 = Drive motor off 1 = Drive motor on
PB3	Controls Drive LED 0 = Drive LED off 1 = Drive LED on
PB4	Detects condition of write protect 0 = Disk is write protected 1 = Disk is not write protected
PB5 PB6	Responsible for setting the clock rate for reading and writing to a disk. See the explanation of the Data Rate parm for the setting of these bits.
PB7	This bit is the hardware response for the head electronics detecting sync bytes. 0 = Sync detected 1 = Sync not detected

The four (4) allowed values for the Data Rate parm and their meanings are shown in the following table. The meaning of the headings is as follows:
- Parm Setting is the value you choose to use in setting Data Rate.

- Byte Rate is the number of usec (microseconds, or millionths of a second) it takes to read/write one byte of data.
- Normal Track Range shows the track range that normally uses this clock setting.
- Setting for PB5 and PB6 shows the value that needs to be written to these bits in order to set the correct data rate.

Parm Setting	Byte Rate	Normal Track Range	Setting of PB5	PB6
N	varies	varies	varies	
4	26 usec	01-17	1	1
3	28 usec	18-24	1	0
2	30 usec	25-30	0	1
1	32 usec	31-35	0	0

Sectors

The Sectors parm tells Copy II what it should do when trying to determine the number of sectors on the track. The default value of this parameter is V for variable. It allows Copy II to read the track and dynamically determine the number of sectors on the current track. If you set the parameter to F for fixed, Copy II will only search for the normal number of sectors for the current track.

Some copy protection methods try to confuse bit copiers by writing more or fewer sectors to the track than normally are found. This parameter can sometimes help in determining the correct number of sectors. Normally, you shouldn't have to worry about this parameter.

PARM SETTINGS

V - Default value tells Copy II to find the number of sectors on this track.

F - Look for the normal number of sectors on this track.

Artsone

The artsone parm tells Copy II that it should add a small routine to many of the older Electronic Arts programs. The only way to include this parm is as follows:

artsone=y,

This will set a flag so that Copy II adds its routines for the older Electronic Arts Programs.

Appendix E: Additional Help for Making Backups

If you have tried to make a backup and have been unsuccessful, the following ideas may help.

- ✔ Make the backup from an original, working disk.
- ✔ Try standard defaults.
- ✔ Set Parm S from V (default) to F.
- ✔ Set ending track to 41.
- ✔ If original disk has no notch whatsoever, cover the notch on the backup before running.
- ✔ Keep trying...several times!
- ✔ Check "Load Parms" list to try another parm by the same manufacturer.
- ✔ Are the drives aligned?
- ✔ Use the 40 column mode.
- ✔ Try to copy using another machine, if possible.
- ✔ If using two drives, try reversing the copy direction–or use just one drive.
- ✔ Turn off or unplug any peripherals.
- ✔ Turn off the computer and drive(s) between copy processes when backing up more than one program.
- ✔ If using one drive, try using two if you have access to an additional one.
- ✔ Try using the parameter list on side 2 of the Copy II 64/128 disk. See Appendix A for complete details.

The following only apply in the 128 mode to back up a double sided disk:

- ✔ Use in 128 mode only.
- ✔ Use only 1571 drive(s).
- ✔ Set ending track to 35.
- ✔ Use only double sided disks.

If you've tried all the combinations above and still do not get a backup, please drop us a note or call our technical support line. Be sure and have the program name and version handy, so we can report it to our programmers.

Note: See Appendix H for information on technical support.

Appendix F: Number Conversion Tables

The table below lets you convert between decimal, hexadecimal, and binary numbers. A thorough tutorial on number systems is beyond the scope of this manual. Suffice it to say that decimal (base 10), hexadecimal (base 16), and binary (base 2) simply provide different ways of expressing any number. Decimal 11 is exactly the same as hex $0B and binary 00001011. A single hex digit is called a nibble or nybble and a binary digit is a bit. Many computer concepts and disk values can be expressed more readily using hex or binary than with decimal. That's why Copy II uses hexadecimal numbers for some values.

Dec	Hex	Binary
0	$00	00000000
1	$01	00000001
2	$02	00000010
3	$03	00000011
4	$04	00000100
5	$05	00000101
6	$06	00000110
7	$07	00000111
8	$08	00001000
9	$09	00001001
10	$0A	00001010
11	$0B	00001011
12	$0C	00001100
13	$0D	00001101
14	$0E	00001110
15	$0F	00001111
16	$10	00010000
17	$11	00010001
18	$12	00010010

Dec	Hex	Binary
19	$13	00010011
20	$14	00010100
21	$15	00010101
22	$16	00010110
23	$17	00010111
24	$18	00011000
25	$19	00011001
26	$1A	00011010
27	$1B	00011011
28	$1C	00011100
29	$1D	00011101
30	$1E	00011110
31	$1F	00011111
32	$20	00100000
33	$21	00100001
34	$22	00100010
35	$23	00100011
36	$24	00100100
37	$25	00100101
38	$26	00100110
39	$27	00100111
40	$28	00101000
41	$29	00101001
42	$2A	00101010
43	$2B	00101011
44	$2C	00101100
45	$2D	00101101
46	$2E	00101110
47	$2F	00101111
48	$30	00110000
49	$31	00110001
50	$32	00110010
51	$33	00110011
52	$34	00110100
53	$35	00110101
54	$36	00110110
55	$37	00110111
56	$38	00111000
57	$39	00111001
58	$3A	00111010
59	$3B	00111011

Dec	Hex	Binary
60	$3C	00111100
61	$3D	00111101
62	$3E	00111110
63	$3F	00111111
64	$40	01000000
65	$41	01000001
66	$42	01000010
67	$43	01000011
68	$44	01000100
69	$45	01000101
70	$46	01000110
71	$47	01000111
72	$48	01001000
73	$49	01001001
74	$4A	01001010
75	$4B	01001011
76	$4C	01001100
77	$4D	01001101
78	$4E	01001110
79	$4F	01001111
80	$50	01010000
81	$51	01010001
82	$52	01010010
83	$53	01010011
84	$54	01010100
85	$55	01010101
86	$56	01010110
87	$57	01010111
88	$58	01011000
89	$59	01011001
90	$5A	01011010
91	$5B	01011011
92	$5C	01011100
93	$5D	01011101
94	$5E	01011110
95	$5F	01011111
96	$60	01100000
97	$61	01100001
98	$62	01100010
99	$63	01100011
100	$64	01100100

Dec	Hex	Binary
101	$65	01100101
102	$66	01100110
103	$67	01100111
104	$68	01101000
105	$69	01101001
106	$6A	01101010
107	$6B	01101011
108	$6C	01101100
109	$6D	01101101
110	$6E	01101110
111	$6F	01101111
112	$70	01110000
113	$71	01110001
114	$72	01110010
115	$73	01110011
116	$74	01110100
117	$75	01110101
118	$76	01110110
119	$77	01110111
120	$78	01111000
121	$79	01111001
122	$7A	01111010
123	$7B	01111011
124	$7C	01111100
125	$7D	01111101
126	$7E	01111110
127	$7F	01111111
128	$80	10000000
129	$81	10000001
130	$82	10000010
131	$83	10000011
132	$84	10000100
133	$85	10000101
134	$86	10000110
135	$87	10000111
136	$88	10001000
137	$89	10001001
138	$8A	10001010
139	$8B	10001011
140	$8C	10001100
141	$8D	10001101

Dec	Hex	Binary
142	$8E	10001110
143	$8F	10001111
144	$90	10010000
145	$91	10010001
146	$92	10010010
147	$93	10010011
148	$94	10010100
149	$95	10010101
150	$96	10010110
151	$97	10010111
152	$98	10011000
153	$99	10011001
154	$9A	10011010
155	$9B	10011011
156	$9C	10011100
157	$9D	10011101
158	$9E	10011110
159	$9F	10011111
160	$A0	10100000
161	$A1	10100001
162	$A2	10100010
163	$A3	10100011
164	$A4	10100100
165	$A5	10100101
166	$A6	10100110
167	$A7	10100111
168	$A8	10101000
169	$A9	10101001
170	$AA	10101010
171	$AB	10101011
172	$AC	10101100
173	$AD	10101101
174	$AE	10101110
175	$AF	10101111
176	$B0	10110000
177	$B1	10110001
178	$B2	10110010
179	$B3	10110011
180	$B4	10110100
181	$B5	10110101
182	$B6	10110110

Dec	Hex	Binary
183	$B7	10110111
184	$B8	10111000
185	$B9	10111001
186	$BA	10111010
187	$BB	10111011
188	$BC	10111100
189	$BD	10111101
190	$BE	10111110
191	$BF	10111111
192	$C0	11000000
193	$C1	11000001
194	$C2	11000010
195	$C3	11000011
196	$C4	11000100
197	$C5	11000101
198	$C6	11000110
199	$C7	11000111
200	$C8	11001000
201	$C9	11001001
202	$CA	11001010
203	$CB	11001011
204	$CC	11001100
205	$CD	11001101
206	$CE	11001110
207	$CF	11001111
208	$D0	11010000
209	$D1	11010001
210	$D2	11010010
211	$D3	11010011
212	$D4	11010100
213	$D5	11010101
214	$D6	11010110
215	$D7	11010111
216	$D8	11011000
217	$D9	11011001
218	$DA	11011010
219	$DB	11011011
220	$DC	11011100
221	$DD	11011101
222	$DE	11011110
223	$DF	11011111

Dec	Hex	Binary
224	$E0	11100000
225	$E1	11100001
226	$E2	11100010
227	$E3	11100011
228	$E4	11100100
229	$E5	11100101
230	$E6	11100110
231	$E7	11100111
232	$E8	11101000
233	$E9	11101001
234	$EA	11101010
235	$EB	11101011
236	$EC	11101100
237	$ED	11101101
238	$EE	11101110
239	$EF	11101111
240	$F0	11110000
241	$F1	11110001
242	$F2	11110010
243	$F3	11110011
244	$F4	11110100
245	$F5	11110101
246	$F6	11110110
247	$F7	11110111
248	$F8	11111000
249	$F9	11111001
250	$FA	11111010
251	$FB	11111011
252	$FC	11111100
253	$FD	11111101
254	$FE	11111110
255	$FF	11111111

Appendix G: Extra Memory

Both the Utilities File Copy option and the One Drive Bit Copy programs can take advantage of extra memory in your computer so that fewer disk swaps are needed for the copy. An internal Copy II 64/128 Memory Manager within both programs invisibly handles this extra memory.

Below is a brief discussion of the Copy II 64/128 Memory Manager. You don't need to know this information to use Copy II 64/128. It is provided here for your reference only.

There are different kinds of memory that are available for your Commodore computer to use: the main RAM in your computer, BANK 1 RAM in the C128, and RAM Expansion units that can be added to your C64 or C128 computer. Unfortunately, all memory is not created equal. The extra memory does not appear to the computer as just more main memory. Expansion memory appears in a different way and requires a different method to access. This means that for an application program to use the various kinds of memory, additional programming must be written to handle each. The Copy II 64/128 Memory Manager does this handling.

It doesn't make any difference how much additional memory is available. The Memory Manager determines if there is any additional Expansion RAM available and if there is, how much. It then utilizes this memory in copying files, and in backing up disks.

Appendix H: Technical Support

Central Point Software is backed up by a technical support staff trained to provide you with fast, courteous service. If you need assistance beyond what the manual can provide, please write or call us with the information listed in the Technical Support Checklist below.

Mail
Write to: Central Point Software, Inc.
            15220 NW Greenbrier Pkwy., Suite 200
            Beaverton, OR 97006
            Attn: Technical Support

FAX
You can also FAX the information about your problem.
Our FAX number : (503) 690-8083

Phone
        (503) 690-8080.
Dial 1 then extension 5708. Our business hours are 8-5 PST,
Monday-Friday.

It would help if you called from a phone next to the computer you're having problems with. Your computer should be turned on and ready to go.

Technical Support Checklist

Before contacting Central Point Software for technical assistance, please try to recreate the problem to provide us with an exact sequence of events. If the problem reoccurs, contact us by mail, FAX, or phone with the following information:

❑ 1.   Central Point Software product: the name and version # of the application you are having difficulty with.

❑ 2.   System Information: Please include this information, along with the computer brand and model, in your written correspondence or have it accessible when contacting us by phone.

❑ 3.   Disk drives: the brand names and sizes.

❑ 4.   Additional hardware: the brand names of additional hardware attached to your computer (particularly cartridges, memory units, printers, etc.).

❑ 5.   Errors: Write down the exact wording of any error messages received from Copy II 64/128.

Appendix I: Other CPS Products

Central Point Software also sells these other disk utility and software backup products:

Copy II PC Deluxe Option Board

Copy II PC can back up most protected software for the IBM. (It can even run quite a few of them from your hard drive without a floppy in drive A.) But it cannot backup everything. So we created the Deluxe Option Board–hardware that lets you make floppy (only) backups of almost every program available for the IBM, as well as transfer IBM/Macintosh data files.

The Deluxe Option Board uses the same disk duplication technology used by software duplication firms who put the protection on in the first place. There is virtually no protection method the Deluxe Option Board cannot handle (except those protected by physically altering the disk.)

The Deluxe Option Board also makes it easy for PCs to trade data files with Macintoshes. With the Copy II Deluxe Option Board, your computer's internal 3.5" drive is transformed into a dual purpose Macintosh/IBM compatible drive.

The Deluxe Option Board will not interfere with any other hardware or software and is not needed to run the backups–only to create them.

It supports 1.2 and 1.44 megabyte drives. It works on these machines:
>IBM PC/XT/AT
>IBM PS/2 Models 25 and 30**
>Zenith 150, 151, 158
>Compaq Deskpro, 286 Plus*, Portable*
>256K Tandy 1000**, 1000SX

The Deluxe Option Board requires one slot.
* These computers require an extra $15 cable.
** These computers require specific installation procedures. Please specify when ordering.

Just $159 plus $5 shipping, $15 outside U.S.

PC Tools Deluxe is our complete DOS utility package for the IBM PC and nearly all compatible computers. PC Tools Deluxe combines all the popular features of the Norton Utilities, Fastback, XTREE, Mace, Sidekick and Disk Optimizer. When it comes to managing and protecting your data, nothing does it better than PC Tools Deluxe. It includes file undeletion, PC Backup, PC Format, PC-Cache, a disk optimizer, file encryption, and PC Shell. Also included is a complete memory resident desktop manager with a word processor, outliner, database with autodialer, appointment scheduler with alarms, keyboard macros, and financial, algebraic, and programmers' calculators. **PC Tools Deluxe** works with virtually all IBM compatibles with at least 256K of memory. ($129.00*)

PC Tools Deluxe for the Macintosh offers a complete utility package for all Macintosh computers. Features include hard disk backup, data recovery, file encryption, track and block editor, fast disk copy, and disk optimizing. ($79.95)

Copy][for the Apple Macintosh is a disk backup and utility package for Macintosh computers. Combining all the most needed functions, Copy][will let you make archival backups of your protected software easily. No parameters are needed. Copy][also includes our powerful utility program MacTools. MacTools can recover some damaged disks and undelete files. It will also display all files on a disk, including invisible files, and will let you make them visible again. You can mark any file as protected, unprotected, locked, or unlocked. Its block editor shows you what is inside any Macintosh file, and allows you to change it. Our Copy][Hard Disk application, also included on the disk, can copy many popular protected programs onto a hard disk. ($39.95)

Copy II Plus for the 64K Apple //, //+, //e, //c, IIGS and Laser 128. A 2–time winner of A+ magazine's "Reader's Choice Award." Copy II Plus is the most comprehensive bit copy program for backing up

5.25" and 3.5" Apple software and is almost totally automatic. Also includes very powerful ProDos and DOS 3.3 utilities. ($39.95)

We update our software products regularly to handle new protection methods. Updates are always available to you as a registered owner at a reduced price. Protection methods do change frequently so it is a good idea to double check with us if you need to back up a brand new release of one particular program. For more information on our products, call or write:

Central Point Software Inc.
15220 NW Greenbrier Parkway, #200
Beaverton, Oregon 97006

(503) 690-8090

*Effective May 1, 1989. All prices subject to change without notice.

Central Point Software
INCORPORATED

```
Copy II 64/128 Utilities V4 0
(C) 1985-8  Central Point Software
-------------------------------------
=>    C  :Copy
      D  :Directory
      Z  :Zap (Erase) Files
      R  :Recover Files
      N  :Name Change (Rename) Files
      F  :Format Disk
      P  :Protect Files
      U  :Unprotected Files
      E  :Error (Disk Error) Checker
      B  :Block Allocation Map
      S  :Sector Editor
      V  :Validate Diskette
      Q  :Quit

-------------------------------------
Src Drv:08-15(41)     Printer Port (0)
Obj Drv:09-15(71)     Expansn Ram (0)K
-------------------------------------
    Use (CRSR) & (RETURN) or LETTER
       Keys to Select an Option
```

Simulated sample screen:
the COPY II™ menu

Hardware requirements: Commodore 64 or 128 Computer with 1541, 1571 or 1581 disk drive(s).

- ## Protect your software investment!
  Make backup copies of protected and unprotected computer programs. Central Point's state-of-the-art technology enables you to make copies of many of the most sophisticated protection schemes! You'll have a backup handy should misfortune befall your original disk.

- ## Put it in gear and go!
  COPY II is completely menu driven. Select which function you want from the main menu and COPY II tells you what to do all the way. No need to know "computerese." No knowledge of protection schemes required. COPY II even knows which mode you're operating in (64 or 128) and which drive you're using (1541, 1571 or 1581) – automatically!

- ## Speed it up!
  COPY II can backup your disk in two minutes on a single drive system. Or take advantage of your two drive system, make backups in just one minute! Format a new or re-used disk in less than ten seconds. Load your programs several times faster using the Quick Load feature.

- ## All new utilities!
  Recover accidentally deleted files, rename files, copy files or an entire disk, verify disks, view and change data using the SECTOR EDITOR, and much more!

Apple II, Apple Macintosh, Commodore 64/128, and IBM PC are trademarks of Apple, Commodore and IBM respectively.

5M/PTW/0389

http://www.c64copyprotection.com/