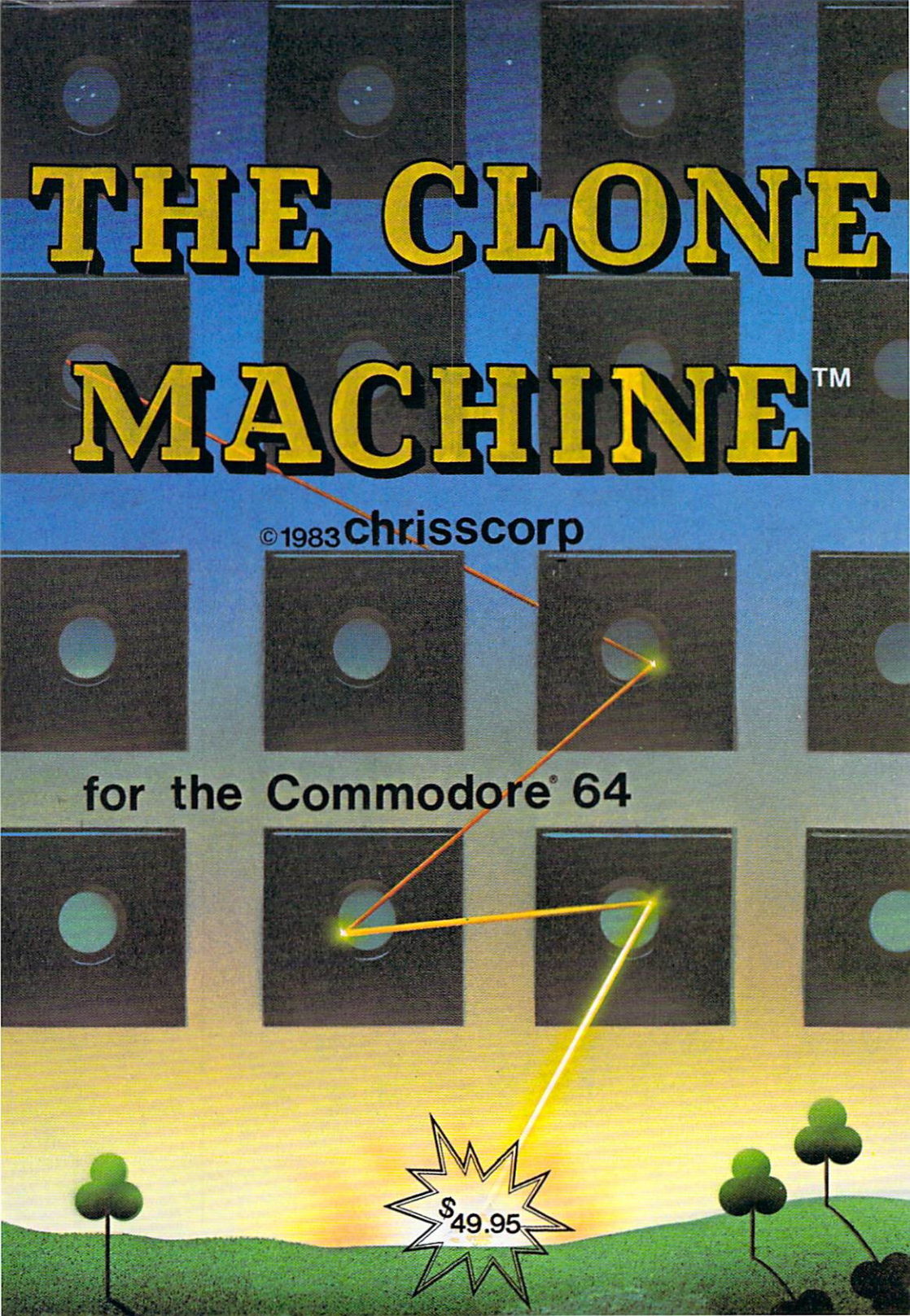
THE CLONE MACHINE™
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for the Commodore® 64
$49.95

THE CLONE MACHINE™
with UNGUARD™

The Clone Machine is a powerful,user friendly tool for users of the Commodore Disk system. The system requirements are:

1) COMMODORE 64 (or machine with equivalent operating sys.)
2) TV or Monitor
3) Commodore Disk Drive (1541 or equivalent)

OPTIONAL EQUIPMENT MAY INCLUDE:

4) Additional drives (up to four)
5) Printer (Commodore 1525 or equivalent with interface)

The Clone Machine will allow you to COPY, INSPECT, and MODIFY disks and provide a powerful tool for use with your drive. We solicit user comments and will send everyone who has returned their WARRANTY & REGISTRATION CARD, a free copy of the CLONE NEWSLETTER which will have user comments, methods for backing up most software, and tricks that you can try using The Clone Machine. Mail all comments, articles, etc. to CLONE NEWSLETTER, PO BOX 31, RIVERDALE, N.J. 07447. We will pay up to $5.00 and provide author credit for all published articles. Please be patient waiting for your copy of the NEWSLETTER, it will take a few months to compile all of the information and mail it to you.

DONT FORGET TO MAIL IN YOUR REGISTRATION because this will provide you with information of future updates to THE CLONE MACHINE. Make sure that you have included a stamp on the card and have provided us with your correct mailing address. Thank you.

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copy programs, files, full or partial disks, and even allow track/block editing.

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PLEASE NOTE

This version of THE CLONE MACHINE contains modifications to make it fully compatible with UNGUARD. As a result, the "WARM START PROCEDURE" is no longer available after using the X option of the Main Menu.

Other minor changes and error corrections have been made to improve THE CLONE MACHINE. If you know of an uncorrected problem with our product, you and all other users will benefit if you promptly notify us of it. We will make every attempt to make all corrections in a timely manner so that the CLONE MACHINE and UNGUARD will provide the maximum customer satisfaction.

THE CLONE MACHINE & UNGUARD DOCUMENTATION

SECTION 1 THE CLONE MACHINE TABLE OF CONTENTS

SECTION 2 UNGUARD TABLE OF CONTENTS

SHORT COURSE FOR USERS OF THE CLONE MACHINE

The main chapters of this User Documentation give complete instructions for use of all the TCM functions. For a quick reference, however, the following "Short Course" may be helpful:

1. TO LOAD THE CLONE MACHINE

   - LOAD"CLONE",8,1

2. TO REFORMAT A DISK

   - Main Menu Option 3.
   - Option 1 on Disk Management Menu.
   - Full instructions in Chapter 7.

3. TO LOOK AT THE DIRECTORY OF A DISK

   - Main Menu Option 3.
   - Option 2 on Disk Management Menu.
   - Full instructions in Chapter 7.

4. TO RENAME, CREATE, OR DELETE FILES

   - Main Menu Option 3.
   - Option 2 on Disk Management Menu.
   - Full instructions in Chapter 7.

5. TO COPY ONE OR A FEW FILE/PROGRAMS

   - Main Menu Option 1.
   - Option 1 on the Copy Menu.
   - Full instructions in Chapter 4.

6. TO COPY ALL OR PART OF A DISK BY TRACK/BLOCK

   - Main Menu Option 1.
   - Option 2 on the Copy Menu.
   - Full instructions in Chapter 5.

7. TO INSPECT OR MODIFY BLOCKS (RECORDS) ON A DISK

   - Main Menu Option 2.
   - Full instructions in Chapter 6.

8. TO INSPECT THE BLOCK ALLOCATION MAP (BAM) ON A DISK

   - Main Menu Option 3.
   - Option 3 on the Disk Management Menu.

Chapter 1

Overview of The Clone Machine

The Clone Machine (TCM) is a powerful, user-friendly tool for users of the Commodore 64 disk system.

The minimum system requirements for use of TCM are:

Commodore 64.
TV monitor.
One Commodore VIC 1541 disk drive.

You can also use with TCM the following additional optional equipment:

Additional disk drives up to a total of four.
Printer (any type compatible with the VIC 1525 printer).

TCM has many valuable features to make your Commodore 64 disks easier to use. In addition, you will get more out of both your computer and your software with the help of TCM.

Features of TCM fall into 3 simple catagories:

Copying
Inspecting
Modifying

There are many variations and combinations of these operations which give you power over the contents of your disks. All are explained in complete detail in the chapters of this User Documentation.

We recommend that you read Chapter 8, "Error Situations", before you do any complex work with The Clone Machine. That chapter will help you to understand how to recover in case something unexpected happens during operations.

Chapter 2

How to Load THE CLONE MACHINE.

THE CLONE MACHINE (TCM) consists of a number of programs which work together to provide the various functions. You will access these programs from menus using the simple procedures explained below.

To get started, you must load the initial TCM programs and menu from your TCM disk into your Commodore 64 computer. To do this, follow these steps exactly:

(1) Turn on the Commodore 64 and your peripheral equipment: disk,printer, or other gear. If you are notsure how to do this, refer to the User's Guide for each piece of equipment.

(2) Put you TCM disk (which came in the package you purchased) into one of your disk drives. You can use any disk drive for TCM, but you must stay with the one you choose until you finish with TCM (each time you use it).

(3) We assume that your screen says READY. If not, there is a problem with the Commodore 64. Refer to your User's Guide.

Under the READY message, type:

LOAD"CLONE",8,1

This command will load CLONE from the disk drive numbered device 8. If you are not using 8, you can use 9,10, or 11 instead by replacing the 8 in the command with the number you want to use. If you are not sure about disk drive numbers, refer to the VIC 1541 User's Manual.

(4) Press the RETURN key. This starts the loading process.

(5) You will see these messages appear on your screen as TCM

SEARCHING FOR CLONE
LOADING

(6) The screen will change to white letteing on black background and the TCM Copyright Notice will be displayed. You will hear clicking noises from the disk drive and the disk drive's red light will be on while the programs load.

(7) The TCM Main Menu will be displayed. The cursor will be blinking waiting for your menu choice. The disk drive red light will be off.

At this point, if everything happened normally, you can proceed to Chapter 3 for a discussion of the Main Menu choices.

If any of the above steps did not go as described, retry from the beginning. Turn the Commodore 64 and the disk drive you are using off and then on again so that a completely fresh start is assured.

If there is no sound from the disk drive when you give the load command, try various combinations of turning on the power first to the computer or first to the disk drive. Depending on what is attached to your Commodore 64, this may help. Make sure the disk is actually assigned to the device number you are using in the load command and make sure that no other disk drive is assigned to the same device number.

If there is a response from the disk, but the load does not complete as described, you may have a bad disk drive or you may have a bad copy of TCM. If other programs load normally from the same disk drive, see your Dealer for a fresh copy of TCM. If other programs also fail to load, your disk drive or your Commodore 64 may require service. If you have other equipment attached (eg, a printer) try attaching only one device at a time to isolate the problem.

WARM START PROCEDURE

Once TCM has been successfully loaded, there is an alternate restart method available to you. This is called WARM START and is described in Chapter 3.

Chapter 3

The Clone Machine Main Menu

You have reached the Main Menu. This menu is the starting point for all functions of The Clone Machine (TCM). All programs which are part of TCM are accessed from this menu. All programs return to this menu at the completion of their function.

The Main Menu looks like this:

```
---------------------------------------------------------------------------

THE CLONE MACHINE                MAIN MENU

  (1)  COPY FILE OR DISK.

  (2)  EDIT TRACK/BLOCK.

  (3)  DISK DIRECTORY FUNCTIONS.

  (X)  EXIT FROM CLONE.

ENTER YOUR CHOICE:

---------------------------------------------------------------------------
```

Exhibit 3-1 -- Main Menu

MAIN MENU OPTION X: Exit from Clone

If you press the X key, you will return to BASIC. Specifically:

(1) The screen will be cleared and normal colors returned.

(2) The message:

    CLONE HAS TERMINATED SUCCESSFULLY.

    will be printed.

(3) The prompt for BASIC will appear:

    READY.

MAIN MENU OPTION 1: Copy File or Disk

If you enter a 1 as your choice on the Main Menu, a sub-menu is loaded:

```
---------------------------------------------------------------------------

THE CLONE MACHINE                COPY MENU

  (1)  COPY FILE OR PROGRAM.

  (2)  COPY ENTIRE DISK.

  (X)  RETURN TO MAIN MENU.

ENTER YOUR CHOICE:

---------------------------------------------------------------------------
```

Exhibit 3-2 -- Copy Menu

This menu has two additional choices having to do with copying and an exit to return to the main menu.

COPY MENU OPTION X:

If you enter X as your choice on the Copy Menu, you will return to the Main Menu. Nothing will have changed by your visit to the Copy Menu.

COPY MENU OPTION 1:

If you enter 1 as your choice on the Copy Menu, a subprogram will be loaded which has the ability to copy individual files and/or programs from your disks. This procedure is full discussed in Chapter 4. If this is your choice, go now to the first page of Chapter 4.

COPY MENU OPTION 2:

If you enter 2 as your choice on the Copy Menu, a subprogram will be loaded which has the ability to copy an entire disk or part of a disk by track and block locations. This is fully discussed in Chapter 5. If this is your choice, go now to the first page of Chapter Five.

MAIN MENU OPTION 2: Edit Track/Block

If you enter 2 as your choice on the Main Menu, a subprogram will be loaded which has the ability to inspect or modify any individual block of data on the disk. (A block is 256 bytes, the basic unit of disk storage. If you are not familiar with this concept, refer to the VIC 1541 User's Manual.) This is extremely useful for checking the results of disk operations, for making custom changes to disk files or directories, and for patching programs, among other uses. This procedure is full described in Chapter 6. If this is your choice, go now to the first page of Chapter Six,

MAIN MENU OPTION 3: Disk Directory Functions

If you enter a 3 as your choice on the Main Menu, a subprogram will be loaded which has the ability to create files, delete files, or rename files in your disk directory. Files can include data files or program files. This procedure is fully described in Chapter 7. If this is your choice, go now to the first page of Chapter Seven.

WARM START PROCEDURE

Once you have successfully loaded TCM and have used the X option of the Main Menu to exit from TCM, you can restart TCM without reloading from disk.

That is, if TCM was loaded into your Commodore 64 and you exited normally using Option X of the Main Menu as described above, then there is a way to get back to the Main Menu without the need to go through the procedure described in Chapter 2. We call this a Warm Start.

The Warm Start procedure is not recommended unless the following conditions are all met:

(1) You ended your earlier session by using the Main Menu X option.

(2) The message:

CLONE HAS TERMINATED SUCCESSFULLY.

was displayed and your returned to BASIC normally.

(3) No program which uses memory outside of BASIC has been executed since TCM. This means that most machine language programs or advanced BASIC programs are excluded.

If these conditions are met, you can return to the TCM Main Menu by entering the following command from BASIC after the READY prompt:

SYS 51712

The screen colors will change to white on black and the Main Menu will be ready for your choice of options. If this does not happen, or if options do not execute normally, then TCM must be reloaded according to the procedure in Chapter 2.

Chapter 4

Copying a Program or File

This option is reached if you:

- Choose Option 1 of the Main Menu bringing you to the Copy Menu, then:
- Choose Option 1 of the Copy Menu.

As the program for this function is loaded you will see the following messages:

(1) PRESS ANY KEY WHEN PROGRAM
DISK IS ON DRIVE 8.

This pause is to ensure that the TCM program diskette is on the correct disk drive. If you originally loaded TCM from another drive (9,10, or 11), then the message will be for that drive instead of 8 as in this example. When you are sure that the TCM disk is in its place, press the space bar, or RETURN, or any other key.

(2) READY.
LOAD"CLONE4",8

SEARCHING FOR CLONE4
LOADING

This set of messages stays on the screen for approximately 30 seconds while the program loads. The disk drive will click and the disk drive red light will be on. When the loading completes, you will very briefly see:

READY.
RUN

and then the first screen of the "Copy a Program or File" option will appear.

If this sequence does not happen as described, see Chapter 8 (Error Situations) for recovery advice.

DISK DRIVE CONFIGURATION SCREEN

The first screen of this option gives you an opportunity to specify the disk drives you want to use for this copy process. The screen looks like this:

CLONE COMMODORE 64 VIC 1541 COPY

DISK DRIVE CONFIGURATION

FILL IN THE BLANKS WITH DISK DRIVE NUMBERS IN THE RANGE 8-11

SINGLE DRIVE COPY:

DRIVE NUMBER:

TWO DRIVE COPY:

INPUT DRIVE:

OUTPUT DRIVE:

Exhibit 4-1 Disk Drive Configuration Screen

If two drives are available on your system, the copy process will be faster and easier. However, TCM will copy effectively with only one drive if need be. During the copy process, TCM will copy from the original disk into its memory. Then you will be asked to mount the output diskette: TCM will copy from its memory to the output diskette. You will then be asked to remount the original and the copy will continue until complete. The procedure is explained in full detail in the paragraphs below. Having two disk drives available, eliminates the need for diskette switching.

If you only have one disk drive, or only want to use one drive, press the keys to enter that number (8,9,10 or 11). You can use the drive which has the program diskette on it; you will be told when to switch from your TCM program diskette to your original disk for the copy operation.

When you enter a valid disk drive number under the "Single Drive Copy" option, you will see the question:

ORIGINAL/COPY ON SAME DISKETTE ?(Y/N):

If you answer:

Y You want to make a copy of a file or program with the copy ending up on the same diskette as the original. The copy will have a different name so that you can tell which is the original and which the copy.

N You want to copy from one diskette to another so that the copy ends up on a different diskette. In this case, the copy may have the same name or a different name from the original.

After you enter Y or N you will see the Verification Screen.

If you want to use two drives for the copy operation, press return once to move the cursor from the Single Drive option to the Two Drive Option. A zero will appear as the Singe Drive number.

When you enter a pair of valid drive numbers under Two Drive Copy, you will see the Verification Screen. (Valid pairs will be two different numbers both in the range 8 to 11.)

The drive number you enter as "Input Drive" will be the source for the copy. The "Output Drive" you designate will be the drive to contain the copies.

If you want to go back to the Single Drive option, press return twice to skip over the entries under the Two Drive option. The process for this screen will restart at the beginning.

If you make invalid entries, you will be prompted again until a valid entry is made.

VERIFICATION SCREEN -- DISK DRIVES

After you have made your configuration choices, the information will be redisplayed to you and you will be asked to verify that you want to continue. If the displayed information corresponds to your intentions, press Y. If not, press N (or any other key) to return to the Disk Drive Configuration screen,

INITIALIZATION OPTION

You will be asked if you wish to initialize the output diskette. If you are using a brand new diskette, you MUST answer yes (Y). Answer no (N) if you are going to retain part of the information already on the diskette. WARNING: Initialization will DESTROY any existing information on the diskette.

If you answer yes (Y), you will be asked to insert your output diskette for the initialization process.

INSERT ORIGINAL DISK

You will be asked to insert the diskette containing original files on the disk drive you specified earlier. If your original information is on several different diskettes, you will perform the copy process on each one separately. In such a case you can have the output end up on a single diskette if you wish (and if it all fits).

Put the input diskette on the input disk drive designated: press any key when ready.

If you have specified a drive number which does not exist on your system (eg, drive 9 when you have one drive designated 8), you will get an error message flashing on the screen at this point. A beep tone will sound to call your attention to the error. Press any key to return to the Disk Drive Configuration screen.

FILE SELECTION SCREEN

As soon as you indicate that the original diskette is in the drive, you will be shown the File Selection Screen. This screen is a display of the contents of the directory of the input diskette. It shows all files (whether programs or data), along with the type of file, and certain other useful information. The File Selection Screen looks like this:

```
DIRECTORY OF DRIVE 8.

DISK NAME   : SYS006
     ID     : AA

CURRENT T/B: 18 1
NEXT    T/B: 18 4
                        START  FILE  REC
TYPE ---FILE NAME---- TR BL  SIZE  LEN

 PRG MYPROG           17 0     19
 PRG MLPRG            17 10     3
 SEQ DATAFIL6         19 0    116
 REL DATAINDEX        19 1      8  20
```

Exhibit 4-2 -- File Selection Screen

The heading of this screen tells you what diskette is on the input drive. If it is not correct, or if you want to start over for any reason, press RETURN and you will go back to the Disk Drive Selection screen.

The section titled "CURRENT T/B" indicates the track & block of the directory which is showing on the screen. All directories start at track 18, block 1. If there are more than eight file entries in the directory, then more than one block will be used to hold them. This situation will be shown when the "NEXT T/B" is different from the "CURRENT T/B".

The individual file entries occupy the rows under the heading. Each row consists of these fields:

TYPE The file type as found in the directory. Valid types are:

- PRG Program file.
- SEQ Sequential file.
- USR User defined file.
- REL Relative file.
- DEL Deleted file.
- ??? Unknown type.

Types are assigned by the system. Consult your VIC 1541 User's Manual for more information about file types.

FILE NAME The name of the file. Up to 16 characters in length.

START TR BL The starting track and block for the file.

FILE SIZE The size of the file in blocks.

REC LEN For REL files only; the length of one record in bytes.

Each block in the directory holds up to eight file entries. Therefore, only eight entries will be shown on your screen at one time. If the "CURRENT T/B" differs from the "NEXT T/B" entry in the heading information, then there will be additional file entries to examine.

If the input diskette has no active directory entries, you will see:

DIRECTORY OF INPUT DISK IS EMPTY.

ANY KEY WHEN READY.

Press any key and you will return to the Disk Drive Configuration Screen.

Valid responses for you to key in at this point are shown in Exhibit 4-3.

Operator's Responses to File Selection Screen:

KEY	MEANING.....
RETURN	You have completed file selection. If no files have been selected by you, then you will be shown the Disk Drive Selection screen again.
f1	Function key f1 (top key on the right side of the key board) will advance the screen to the next directory block. If there are no more directory blocks, then there will be no change.
f3	Function key f3 (immediately under f1 on keyboard) will select the file where the cursor is positioned. That is, if the cursor is pointing to the first file and you press f3, that file is thereby selected for copying. Each selected file is highlighted in reverse print so you can see which have been selected.
cursor key	You may move the cursor up or down by using the cursor key next to the shift key on the lower right of the keyboard. By using this cursor key you can skip over files to the ones you want.

Exhibit 4-3 Operator's Responses to File Selection Screen

When you have completed selection of the files to be copied, you will press the RETURN key. You will then be asked to supply the name of the copy for each file you have selected.

If you select eight file names, you will automatically go on to the Copy Name Screen. The program will behave just as if you had pressed RETURN after the eighth file name. Eight is the limit for one pass of the program. You will be able to copy more files after these are completed, if you want more than eight.

The Copy Name Screen will look like this:

```
PLEASE SUPPLY THE NAMES OF THE
NEW FILES TO BE CREATED:

 --ORIGINAL NAME-  ----COPY NAME---

 FILE1             COPYOFFILE1
 FILE2
```

Exhibit 4-4 -- Copy Name Screen

Each selected file name will be shown in the left hand column. The cursor will stop in the right hand column for you to enter the name of the copy.

You can enter any combination of letters and numbers to be a file name (up to sixteen characters). You can use the left/right cursor key to modify what you have typed. When you press RETURN, the name will be accepted as is and the next selected file will be shown to you.

For any file, if you want the name of the copy to be the same as the name of the original just press RETURN.

VERIFY FILES

When you have supplied names for all copies you will be shown a review screen:

```
YOU HAVE SELECTED THE FOLLOWING
FILES TO BE COPIED:

 --ORIGINAL NAME-  ----COPY NAME---

 FILEONE           FILEONE
 PROGRAM1          PRG1COPY



PLEASE VERIFY THAT THE PROCESS
SHOULD CONTINUE (Y/N):
```

Exhibit 4-5 -- VERIFY FILE NAMES

This is your last chance to change your mind and restart. Carefully review the list of files and the names to be given to the copies. If there is anything wrong, enter N (or any key other than Y) and you will return to Disk Drive Configuration. If all is OK, press Y and the copy will be performed according to your request.

COPY SCREEN

While the copy is going on, this screen will be showing:

```
-------------------------------------------------------------------------------

CLONE COMMODORE 64 VIC 1514 COPY

                                BLKS

INPUT FILES: MYFILE1            21    DONE
             YOURFILE2          9     3
             HERFILE6           128




                  TOTAL BLOCKS: 158

    NINETY BLOCK BUFFER:

    ############################

    COPYING FILE TO BUFFER.


-------------------------------------------------------------------------------
```

Exhibit 4-6 -- Copy Screen

The exact appearance of the screen depends on whe parameters of the copy as you have specified them to The Clone Machine. In particular, the information about the status of the ninety block buffer is only shown when you are copying with one disk drive.

The name of the original file is shown for each selected file. The number of blocks to be copied is given and these are totaled. As each file is copied, the number of blocks copied so far is shown to the right of the file size. Completed files have the word 'DONE' showing to the right.

If the file name you have specified for the copy already exists on the output diskette, you will have an opportunity to abandon the copy operation. When the copy of that file is about to begin, you will see this message in red at the bottom of the screen:

COPY NAME EXISTS. REPLACE? (Y/N):

If you answer N, you will return to the Disk Drive Configuration Screen. Any files already completely copied are secure, but other files selected will not be copied.

If you answer Y, the existing file with the same name as the copy will be deleted and the copy operation will proceed.

If the buffer is used (when you only are using one drive), blocks are first read from the file into the buffer. The buffer grid line, which is all blue at the start, turns green as records are put into it. A message under it tells you whether blocks are going from file to buffer or from buffer to the copy file.

If you are using only one disk drive, you will be asked to change diskettes when needed. This will occur:

- When the buffer fills (at 90 blocks) if copying a large file.

- When the file is finished.

During the transfer of blocks from the buffer to the output (copy) file, the buffer grid turns from green to blue again.

The word 'LINK' will appear to the right of the file size after all records have been copied during the updating of the directory to show the new file.

If copying a REL file (Relative File -- see the VIC 1541 User's Manual if you need to know about Relative Files), then there is also a period of time needed to create Side Sectors for the file. While Side Sectors are being created, the word 'SIDE' appears to the right of the file size.

If an error occurs during the copy operation, then a red flashing error signal will appear on the line with the name of the file being copied. The error message itself will be at the bottom of the screen also in red. See Chapter Eight for a full discussion of error situations and what to do when one occurs.

When you are asked to change diskettes (during a copy with one disk drive), you will see this message:

INSERT DISKETTE TO CONTAIN
COPY OF FILES ON DISK DRIVE 8.

ANY KEY WHEN READY.

Exhibit 4-7 -- Change Diskettes

This message, or its opposite requiring you to insert the original diskette again, require careful thought.

Make sure you know which diskette is the original and which is the copy. During a long copy with many changes you can easily get confused. Also make sure you have inserted the diskette into the disk drive numbered as per the message. If you have several drives it is easy to make an error there too.

COPY COMPLETED

When the copy process is complete, you see a message to that effect which will also tell you what drive the copy is on.

Press any key and you will return to the Disk Drive Selection Screen. If you wish, you can then look at the directory of the copy diskette by asking for a single drive copy, not on same diskette, verify Yes, and press any key.

The directory will come up as if the copy will now be the input to the next copy operation. After you look at the directory, just press return and you will once again go to the Disk Drive Configuration screen.

If you have no more work for this program, press the English Pound key to return to the TCM Main Menu.

Chapter 5

Copying an Entire Diskette

This option is reached if you:

- Choose Option 1 of the Main Menu bringing you to the Copy Menu, then:

- Choose Option 2 of the Copy Menu.

As the program for this function is loaded you will see the following messages:

(1) PRESS ANY KEY WHEN PROGRAM
DISK IS ON DRIVE 8.

This pause is to ensure that the TCM program diskette is on the correct disk drive. If you originally loaded TCM from another drive (9,10, or 11), then the message will be for that drive instead of 8 as in this example. When you are sure that the TCM disk is in its place, press the space bar, or RETURN, or any other key.

(2) READY.
LOAD"CLONE1",8

SEARCHING FOR CLONE1
LOADING

This set of messages stays on the screen for approximately 30 seconds while the program loads. The disk drive will click and the disk drive red light will be on. When the loading completes, you will very briefly see:

READY.
RUN

and then the first screen of the "Copy an Entire Diskette" option will appear.

If this sequence does not happen as described, see Chapter 8 (Error Situations) for recovery advice.

DISK DRIVE CONFIGURATION SCREEN

The first screen of this option gives you an opportunity to specify the disk drives you want to use for this copy process. The screen looks like this:

```
CLONE   COMMODORE 64 VIC 1541 COPY


      DISK DRIVE CONFIGURATION

  FILL IN THE BLANKS WITH DISK DRIVE
      NUMBERS IN THE RANGE 8-11


  SINGLE DRIVE COPY:

         DRIVE NUMBER:


  TWO DRIVE COPY:

         INPUT  DRIVE:

         OUTPUT DRIVE:
```

Exhibit 5-1 Disk Drive Configuration Screen

If two drives are available on your system, the copy process will be faster and easier. However, TCM will copy effectively with only one drive if need be. During the copy process, TCM will copy from the original disk into its memory. Then you will be asked to insert the output diskette: TCM will copy from its memory to the output diskette. You will then be asked to reinsert the original and the process will continue until complete. The procedure is explained in full detail in the paragraphs below. Having two disk drives available eliminates the need for diskette switching.

If you only have one disk drive, or only want to use one drive, press the keys to enter that number (8,9,10 or 11). You can use the drive which has the program diskette on it; you will be told when to switch from your TCM program diskette to your original disk for the copy operation.

If you want to use two drives for the copy operation, press return once to move the cursor from the Single Drive option to the Two Drive Option. A zero will appear as the Single Drive number.

When you have entered valid drive number(s), you will see the Verification Screen. (Valid pairs will be two different numbers both in the range 8 to 11.)

The drive number you enter as "Input Drive" will be the source for the copy.

The "Output Drive" you designate will be the drive to contain the copies.

If you want to go back to the Single Drive option, press return twice to skip over the entries under the Two Drive option. The process for this screen will restart at the beginning.

If you make invalid entries, you will be prompted again until a valid entry is made.

VERIFICATION SCREEN -- DISK DRIVES

After you have made your configuration choices, the information will be redisplayed to you and you will be asked to verify that you want to continue. If the displayed information corresponds to your intentions, press Y. If not, press N (or any other key) to return to the Disk Drive Configuration screen,

INITIALIZATION OPTION

You will be asked if you wish to initialize the output diskette. If you are using a brand new diskette, you MUST answer yes (Y). Answer no (N) if you are going to retain part of the information already on the diskette. WARNING: Initialization will DESTROY any existing information on the diskette.

If you answer yes (Y), you will be asked to insert your output diskette for the initialization process.

SELECT STARTING/ENDING POINT

You will now see this screen:

CLONE COMMODORE 64 VIC 1541 COPY

DO YOU WANT TO START AT
A PARTICULAR TRACK/BLOCK (Y/N)?

Exhibit 5-2 START POINT SCREEN

If you want to copy the entire diskette wall to wall (track 1 to track 35), then answer this question by pressing the N key. If, however, you want to only copy a section of the disk, you can specify the limits of that section here.

If you press the Y key, you will be asked in turn:

ENTER STARTING TRACK:

ENTER STARTING BLOCK:

ENTER ENDING TRACK:

The starting track can be any number from 1 to 35 inclusive. The starting block can be any number from zero to the maximum block number of the starting track. (If you are not familiar with the block layout on disk, see your VIC 1541 User's Manual, particularly the chart on P55 "Block Distribution by Track" for the 4040 drive.)

The ending track number must be greater than or equal to the starting track number.

All entries of track/block numbers must be two characters. Therefore, to enter track one, enter either "1 " or " 1" or "01" etc. If you enter invalid numbers the prompt will be repeated.

There is no ending block specification. The ending track will be copied to its end.

INSERT ORIGINAL DISK

You will be asked to insert the diskette containing original files on the disk drive you specified earlier.

Put the input diskette on the input disk drive designated: press any key when ready.

If you have specified a drive number which does not exist on your system (eg, drive 9 when you have one drive designated 8), you will get an error message flashing on the screen at this point. A beep tone will sound to call your attention to the error. Press any key to return to the Disk Drive Configuration screen.

If you have specified two disk drives for the copy, you will get a second message asking for you to insert the diskette for the copy into its drive.

COPY SCREEN

While the copy is going on, this screen will be showing:

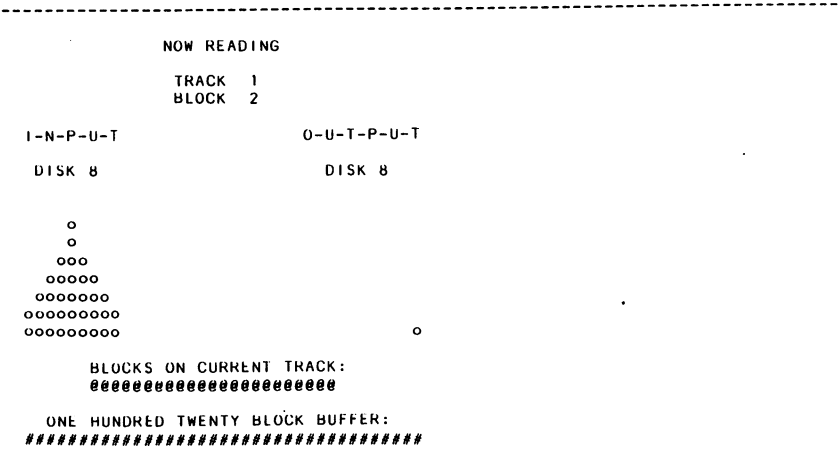

Exhibit 5-3 Copy Screen

The exact appearance of the screen depends on the parameters of the copy as you have specified them to The Clone Machine. In particular, the information about the status of the 120 block buffer is only shown when you are copying with one disk drive.

The track/block currently being copied is shown on the top center of the screen. The input and output disks are shown as a pyramid of "stones" to be moved from the input (on the left) to the output (on the right). You can get a quick visual impression of progress by the relative size of the piles. This is not as effective when you are not copying the entire disk.

In the center, below the pyramids, is a stripe of characters representing the blocks to be copied from the current track. As copying proceeds, this runs from left to right.

If the buffer is used (when you only are using one drive), blocks are first read from the file into the buffer. The buffer grid line, which is all blue at the start, turns green as records are put into it.

If you are using only one disk drive, you will be asked to change diskettes when needed. This will occur when the buffer fills and at the end of the copy.

While the buffer fills, the top line of the screen will be "NOW READING". When the buffer is being emptied onto the copy diskette, the top line will read "NOW WRITING".

During the transfer of blocks from the buffer to the output (copy) file, the buffer grid turns from green to blue again.

If an error occurs during the copy operation, then a red flashing error signal will appear. This will be on the left if the error was on the input drive, or will be on the right if the error was on the output drive. See Chapter 8 for a full discussion of error situations and what to do when one occurs.

When you are asked to change diskettes (during a copy with one disk drive), you will see this message:

INSERT DISKETTE TO CONTAIN
COPY OF FILES ON DISK DRIVE 8.

ANY KEY WHEN READY.

Exhibit 5-4 -- Change Diskettes

Tis message, or its opposite requiring you to insert the original diskette again, require careful thought.

Make sure you know which diskette is the original and which is the copy. During a long copy with many changes you can easily get confused. Also make sure you have inserted the diskette into the disk drive numbered as per the message. If you have several drives it is easy to make an error there too.

COPY COMPLETED

When the copy process is complete, you will see a message to that effect which will also tell you what drive the copy is on.

Press any key and you will return to The Clone Machine Main Menu.

If you want to make another copy, you can reselect the same option. Choose Option 1 of the Main Menu, and Option 2 of the Copy Menu. The Disk Drive Configuration Screen will appear immediately without a "LOAD" step in between.

Chapter 6

Inspecting or Modifying Information on Disk

This option is reached if you choose Option 2 of the Main Menu.

As the program for this function is loaded you will see the following messages:

(1) PRESS ANY KEY WHEN PROGRAM
DISK IS ON DRIVE 8.

This pause is to ensure that the TCM program diskette is on the correct disk drive. If you originally loaded TCM from another drive (9,10, or 11), then the message will be for that drive instead of 8 as in this example. When you are sure that the TCM disk is in its place, press the space bar, or RETURN, or any other key.

(2) READY.
LOAD"CLONE2",8

SEARCHING FOR CLONE2
LOADING

This set of messages stays on the screen for approximately 30 seconds while the program loads. The disk drive will click and the disk drive red light will be on. When the loading completes, you will very briefly see:

READY.
RUN

and then the screen of the "Edit Track/Block" option will appear.

If this sequence does not happen as described, see Chapter 8 (Error Situations) for recovery advice.

EDIT TRACK/BLOCK SCREEN

Your screen will now look like this:

```
TB/EDITOR  DISK=8  TRK=18 BLK=1  MODE=H

   0 1 2 3  4 5 6 7  8 9 A B  C D E F

 0
 1
 2
 3

 4
 5
 6
 7

 8
 9
 A
 B

 C
 D
 E
 F
```

Exhibit 6-1 TB/EDITOR Screen

The top row of fields (DISK, TRK, BLK, and MODE) are called the Header. You use the header to specify what block on disk you want to look at and how you initially want to view it. The values displayed are the defaults. If you press RETURN for each field, the default values will remain. If you key in another value, your value will be used.

When this screen initially appears, or whenever you return to the header area, the cursor will be positioned at the DISK field. If disk drive number 8 holds the diskette you want to inspect/modify, then just press RETURN. The cursor will move to the next field. If you want to specify a different drive (9,10, or 11) then enter that number.

Enter, in turn, the track (TRK) and block (BLK) you are interested in. Press RETURN for any field which you want to accept as is (default value).

If you want to go back to a prior header field you may by using the left/right cursor keys.

The last header field is the MODE. Your choices are ASCII (enter A) or HEX (enter H). In ASCII mode you will be shown printable characters only. Non-printable characters will be indicated as a period (dot).

In HEX mode each byte position will be displayed as two hex digits. When changing a HEX value, you must change both digits or the change will not be made.

The grid on the screen represents the full 256 bytes of a disk block (sector). At the top left is byte 00. Reading across the first line is 00, 01, 02... 0F. The next row is 10, 11, 12... 1F.
This pattern continues to FF in the lower right of the screen. The display is interrupted by a space after each four bytes (horizontally and vertically) for easier reading.

As soon as you have supplied a value for all header fields (default or yours), the disk will be read and the block will be displayed. You should see the red light on the drive go on briefly as the block is read.

Here is a typical display in HEX mode:

```
TB/EDITOR  DISK=8  TRK=18 BLK=1  MODE=X

   0 1 2 3  4 5 6 7  8 9 A B  C D E F

 0 12048211 00434C4F 4E45A0A0 A0A0A0A0
 1 A0A0A0A0 A0000000 00000000 00000000
 2 00008211 01524F4F 54A0A0A0 A0A0A0A0
 3 A0A0A0A0 A0000000 00000000 00000000

 4 00008211 08535953 303130A0 A0A0A0A0
 5 A0A0A0A0 A0000000 00000000 00000000
 6 00008211 04535953 303031A0 A0A0A0A0
 7 A0A0A0A0 A0000000 00000000 00000000

 8 00008211 06535953 303032A0 A0A0A0A0
 9 A0A0A0A0 A0000000 00000000 00000000
 A 0000820F 00535953 303131A0 A0A0A0A0
 B A0A0A0A0 A0000000 00000000 00000000

 C 00008211 11585858 303030A0 A0A0A0A0
 D A0A0A0A0 A0000000 00000000 00000000
 E 00008213 00898989 313131A0 A0A0A0A0
 F A0A0A0A0 A0000000 00000000 00000000
```

Exhibit 6-2 HEX Mode Display

The above example is from a typical program directory. The format of directories and other types of records will be found in your VIC 1541 User's Manual.

OPERATOR'S RESPONSES TO TB/EDITOR

When the disk block is initially displayed, the cursor will be at byte 00 in the upper left of the body of the screen. Your valid responses are summarized in the following table:

KEY	MEANING
RETURN	Return to header fields.
Cursor Keys	You can move from byte field to byte field by using the cursor keys. Press CLR/HOME to jump the cursor to position 00.
f1	Function key one (top key of group on right side of keyboard) advances to the next disk block. The order is determined by the physical arrangement of the disk. If you are viewing track 18, block 1 and press f1, you will advance to a view of track 18, block 2. If you are viewing the last block of a track and you press f1, you will advance to the first block of the next track.
f3	Function key three (under f1) moves back one block. This is the same action as f1 but in a reverse direction.
f5	Function key five (under f3) follows a chain of blocks. When you press f5 you will move to a view of the track and block determined by the two bytes where the cursor is positioned. See the body of this chapter for more information on chain following.
f6	Function key six (under f5) moves immediately to track 18, block 1.
f7	Function key seven (under f5) changes the display mode. If you are viewing a display in ASCII mode and press f7, the display will change to HEX mode. If you are viewing ASCII and press f7, the display changes to HEX.
f8	Function key eight (SHIFT f7) causes a copy of the screen to be printed. Make sure the printer is on and the paper in the correct position before pressing f8.
English Pound	Immediate return to header with no update of data on disk. Use to escape from incorrect entries.
Other Keys	You can alter the contents of the disk by keying your changes over the old values. Changes will be shown in reverse print on screen.

Exhibit 6-3 Operator Responses to the TB/EDITOR Screen

If for any reason your request cannot be carried out (eg, the disk drive is not operational), am error message will appear in the upper left of the screen. It will flash and a beep tone will sound until you press any key. That action will return you to the header fields.

The text of the error message is also provided. See your VIC 1541 User's Manual for explanation of the error text.

MORE ON CHAIN FOLLOWING

The f5 chain following feature is a very useful way to review sequential files such as programs, directories, etc.

In the Commodore 64 disk system, files are linked together by having pointers to the next track/block in the first two bytes of the current block. (If you are not familiar with file and record formats, refer to your VIC 1541 User's Manual).

Therefore, if you are viewing a record in a sequential file, and the cursor is positioned at byte 00 (where it will be if you don't move it), then merely press f5 to see the next record, press f5 again for the record after that, etc.

If at any time the track/block value pointed to by the cursor is invalid, you will be returned to the first record of the disk directory (track 18, block 1). This normally happens at the end of a file since the chain is terminated with byte 00 set to zero in the last block.

To start a chain for a particular file, notice that in a directory entry bytes three and four are the track/sector of the first record in the file. Just position the cursor at byte three of the file entry you are interested in and press f5. Thereafter, things are set up for you since each record in the file has the track/sector of the next record in byte 00 where the cursor normally rests.

CHANGING DISKETTES

You can change diskettes any time you are positioned in the header fields.

TERMINATION OF TB/EDITOR

You can return to The Clone Machine MAIN MENU by pressing X in any field of the header. If you are in the body of the screen, return to the header by using the RETURN key and then press X.

Chapter 7

Inspecting or Modifying a Disk Directory

This option is reached if you choose option 3 of the Main Menu called "Disk Directory Functions".

As the program for this function is loaded you will see the following messages:

(1) PRESS ANY KEY WHEN PROGRAM
DISK IS ON DRIVE 8.

This pause is to ensure that the TCM program diskette is on the correct disk drive. If you originally loaded TCM from another drive (9,10, or 11), then the message will be for that drive instead of 8 as in this example. When you are sure that the TCM disk is in its place, press the space bar, or RETURN, or any other key.

(2) READY.
LOAD"CLONE3",8

SEARCHING FOR CLONE3
LOADING

This set of messages stays on the screen for approximately 30 seconds while the program loads. The disk drive will click and the disk drive red light will be on. When the loading completes, you will very briefly see:

```
READY.
RUN
```

and then the first screen of the "Disk Directory Functions" option will appear.

If this sequence does not happen as described, see Chapter 8 (Error Situations) for recovery advice.

DISK DRIVE SELECTION SCREEN

The first screen of this option gives you an opportunity to specify the disk drive you want to use. The screen looks like this:

```
--------------------------------------------------------------------------------

THE CLONE MACHINE        DISK MANAGEMENT


        DISK DRIVE SELECTION

  FILL IN THE BLANKS WITH DISK DRIVE
      NUMBER IN THE RANGE 8-11

      DRIVE NUMBER: 8


--------------------------------------------------------------------------------
```

Exhibit 7-1 Disk Drive Selection Screen

The default disk drive 8 can be selected by pressing RETURN. To select a different disk drive number, press the keys to enter that number (9,10 or 11). You can use the drive which has the program diskette on it; remove the TCM program disk now and insert the disk you wish to use for this operation.

If you make an invalid entry, you will be prompted again until a valid entry is made.

INSERT DISK

After you have indicated which disk drive you want to use, you will be asked to insert the proper diskette. Press any key when you have the diskette in the disk drive.

DISK MANAGEMENT MENU

After you have made your disk drive choice, the Disk Management Menu appears.

DISK MANAGEMENT MENU FOR DRIVE 8.

(1) REFORMAT (NEW) A DISK,

(2) DISPLAY/MODIFY DISK DIRECTORY,

(3) DISPLAY BLOCK ALLOC MAP (BAM).

(X) EXIT TO MAIN MENU.

ENTER YOUR CHOICE:

Exhibit 7-2 Disk Management Menu

If you press X for your choice, you will return to the TCM Main Menu.

Each of the other options is explained in a section below.

OPTION 1 -- REFORMAT (NEW) A DISK

When you choose Option 1, you will see this message:

YOU HAVE REQUESTED THAT THE DISK ON
DRIVE NUMBER 8 BE REFORMATTED.

IS THAT WHAT YOU WANT? (Y/N)?

The drive number specified will be the one you selected on the Disk Drive Selection screen. In this example it is drive 8, but you can specify 8-11.

If you reply N, then you will return to the Disk Drive Select screen. If you reply Y, then you will see the message:

PUT THE CORRECT DISK INTO DRIVE 8
FOR REFORMATTING.

WARNING!!!! All DATA WILL BE LOST.

PRESS RETURN WHEN READY OR ANY OTHER
KEY TO ABANDON THE OPERATION.

Open the disk drive and check that the correct diskette is in it. This is your last opportunity to recover if you have the wrong diskette in the drive or if you have selected the wrong drive.

ALL DATA WILL BE LOST!!!! When the disk is reformatted, it is completely cleared. Any files, programs, data, etc. that you may have stored on it will be gone forever. That's why you are given several chances to back out of this operation in case you have made an error.

If you press any key other than RETURN, you will go back to the Disk Drive Selection screen and nothing will have changed on your diskette. If you press RETURN, then you will see the message:

DISK BEING FORMATTED. PLEASE STAND BY.

The red light on the disk drive will be on and the drive will make clicking sounds for approximately 90 seconds. When the reformatting is completed, you will return to the Disk Drive Selection screen.

The diskette will have been given the name "CLONE" with the ID of "CC". If you want some other name/id, use option 2 to modify it.

OPTION 2 -- DISPLAY/MODIFY DISK DIRECTORY

When you choose Option 2, the diskette in the selected drive is read. The red light on the disk unit goes on briefly.
You will be shown this screen which is a display of the contents of the directory of the input diskette. It shows all files (whether programs or data), along with the type of file, and certain other useful information. The Directory Display Screen looks like this:

```
DIRECTORY OF DRIVE 8.

DISK NAME  : SYS006
     ID    : AA

CURRENT T/B: 18 1
NEXT    T/B: 18 4
                          START  FILE  REC
TYPE ---FILE NAME---- TR BL  SIZE  LEN

 PRG MYPROG           17 0     19
 PRG MLPRG            17 10     3
 SEQ DATAFIL6         19 0    116
 REL DATAINDEX        19 1      8  20
```

Exhibit 7-3 -- Directory Display Screen

The heading of this screen tells you what diskette is on the input drive. If it is not correct, or if you want to start over for any reason, press RETURN and you will go back to the Disk Drive Selection screen.

The section titled "CURRENT T/B" indicates the track & block of the directory which is showing on the screen. All directories start at track 18, block 1. If there are more than eight file entries in the directory, then more than one block will be used to hold them. This situation will be shown when the "NEXT T/B" is different from the "CURRENT T/B".

The individual file entries occupy the rows under the heading. Each row consists of these fields:

TYPE The file type as found in the directory. Valid types are:

PRG Program file.
SEQ Sequential file.
USR User defined file.
REL Relative file.
DEL Deleted file.
??? Unknown type.

Types are assigned by the system. Consult your VIC 1541 User's Manual for more information about file types.

FILE NAME The name of the file. Up to 16 characters in length.

START
TR BL The starting track and block for the file.

FILE
SIZE The size of the file in blocks.

REC
LEN For REL files only; the length of one record in bytes.

Each block in the directory holds up to eight file entries. Therefore, only eight entries will be shown on your screen at one time. If the "CURRENT T/B" differs from the "NEXT T/B" entry in the heading information, then there will be additional file entries to examine.

Valid responses for you to key in at this point are shown in Exhibit 7-4.

KEY	MEANING
RETURN	You have completed changes. The directory will be updated and you will return to the Disk Drive Selection screen again.
f1	Function key f1 (top key on the right side of the key board) will advance the screen to the next directory block. If there are no more directory blocks, then there will be no change.
f2	Function key f2 (SHIFT f1) gives you the opportunity to create a new file entry. You will see the message: ENTER FILE CREATE INFORMATION ABOVE. and the cursor will be positioned under the 'TYPE' column. Enter a valid type and press RETURN. Then enter the name of the file to create and press RETURN. If the TYPE is 'REL' you will also be asked to enter a record length. The message: IS ALL INFORMATION CORRECT? (Y/N)? is your opportunity to answer N if you have misentred anything. If everything is correct, then enter Y; the file will be added to the directory in the first available entry slot.
f4	Function key 4 (SHIFT f3) will delete the file where the cursor is positioned. The file name will be highlighted in reverse characters and you will be asked: PLEASE VERIFY THAT YOU WANT TO DELETE THE HIGHLIGHTED FILE? (Y/n)? If you press Y, the file will be deleted from the directory. If you press N, there is no action taken with the file.
f6	Function key 6 (SHIFT f5) permits you to update the disk name and/or the disk ID in the header information. The cursor will move to the name field. Key in any changes in either field and press RETURN when finished. The diskette will be modified to conform to your changes.
f8	Function key 8 (SHIFT f7) causes a copy of the screen to be printed. Make sure the printer is on and the paper in the correct position before pressing f8.
Cursor Keys	Use the cursor control keys to move up/down to different file entries or move left/right within the name field of one entry.
Other Keys	You may type any changes to the name field of any file entry. Any change that you make will be updated to the disk when a function key or RETURN is used.

Exhibit 7-4 Operator's Responses to Disk Directory Screen

You may use these response options in any combination and as much as you need to make all your changes on one diskette.

OPTION 3 -- DISPLAY BLOCK ALLOCATION MAP (BAM)

When you choose Option 3, you will see a new screen containing a visual display of the Block Allocation Map. The screen looks like this:

```
BAM DISPLAY
            11111111 1 12222222222333333
   12345678901234567 8 90123456789012345
0  ooooooooooooooooo o ooooooooooooooooo
1  ooooooooooooooooo o ooooooooooooooooo
2  ooooooooooooooooo o ooooooooooooooooo
3  ooooooooooooooooo o ooooooooooooooooo
4  ooooooooooooooooo o ooooooooooooooooo
5  ooooooooooooooooo o ooooooooooooooooo
6  ooooooooooooooooo o ooooooooooooooooo
7  ooooooooooooooooo o ooooooooooooooooo
8  ooooooooooooooooo o ooooooooooooooooo
9  ooooooooooooooooo o ooooooooooooooooo
10 ooooooooooooooooo o ooooooooooooooooo
11 ooooooooooooooooo o ooooooooooooooooo
12 ooooooooooooooooo o ooooooooooooooooo
13 ooooooooooooooooo o ooooooooooooooooo
14 ooooooooooooooooo o ooooooooooooooooo
15 ooooooooooooooooo o ooooooooooooooooo
16 ooooooooooooooooo o ooooooooooooooooo
17 ooooooooooooooooo o oooooooooooo
18 ooooooooooooooooo o oooooo
19 oooooooooooooooo
20 oooooooooooooooo          TRK: 15
```

Exhibit 7-5 -- BAM Display Screen

The columns of dots on the screen represent block (sectors) on the disk tracks. Tracks are numbered 1-35 across the top of the array. Each column contains the blocks for one track. The tracks do not all have the same number of blocks. As you can see, higher numbered tracks have fewer blocks.

Available blocks will be shown in green; allocated (not available) blocks will be shown in red.

As the display is created, the track numbers will be shown at lower right. When the display is completed, you can exit back to the Disk Drive Selection Screen by pressing the English Pound key. A message to that effect is displayed in the lower right when the screen is ready.

For more information about the BAM, refer to your VIC 1541 User's Manual.

CHANGING DISKETTES

When you return to the Disk Drive Selection screen or when you have the Disk Management Menu on the screen, you can change diskettes. A message is provided to remind you each time you go through Disk Drive Selection.

RETURN TO MAIN MENU

You can return to the TCM Main Menu by using the X option of the Disk Management menu. You can also return to the Main Menu by pressing the English Pound key when you are on the Disk Drive Selection screen.

Chapter 8

Error Situations

During execution of The Clone Machine (TCM), many different error situations can develop. This is especially true with disk operations since the interaction between disk and the Commodore 64 can be complex.

This chapter is organized into two main sections. The first section, GENERAL ERRORS, discusses errors which can occur without reference to a particular feature or specific sub-program of TCM. The second section, is sub-divided by the specific TCM options.

If an error occurs while you are using TCM, go first to the specific section for the feature/option you are using at the time of the error. If nothing there seems to cover the situation, try the General Errors section.

GENERAL ERRORS

1. Error Message During loading.

Each time you select a major sub-topic from the Main Menu, a program is loaded from the program diskette.

If the program disk is not on the disk drive when you attempt to load, you will see the following messages:

```
SEARCHING FOR CLONE3
?FILE NOT FOUND  ERROR
READY
RUN

READY
```

The red light will be flashing on the disk drive.

This example shows CLONE3 has not been found and the load has failed. This will definitely happen if the diskette is not on the correct drive. It may also happen if there is something wrong with the diskette or the drive.

To recover:

(1) Use the warm start procedure by typing:

```
SYS 51712
```

You will see the Main Menu displayed.

(2) Try the load again. If it still does not work, there may be a problem with the disk drive or diskette. If alternates are available, then try them now.

(3) If nothing will load, your dealer will have to assist you with a new disk drive and/or new software diskettes.

2. Loading Fails with No Error Message.

During program load operations it is possible for the disk drive to "hang up" leaving you waiting for a load which will never take place. You will have the following symptoms:

(1) The last message on the screen is "SEARCHING FOR ..." or "LOADING".

(2) The red light is on continuously on the disk but there is no sound.

(3) You have waited several minutes and there is no change observed.

To recover:

(1) Turn off the Commodore 64 but DO NOT turn off the disk drive itself.

(2) Turn the Commodore 64 back on. This should have the effect of re-initializing the disk drive and the red light should go off.

(3) Re-load TCM according to the procedure in Chapter 2.

3. System Dies During Operations

Your system may "die" during some operation. For example, during a copy there could be a power failure or a problem with the Commodore 64. While these troubles are remote possibilities, over a period of time you are likely to have such experiences.

To recover:

Exact recovery procedures will have to be based logically on the status of your system and operations at the exact moment of the failure. Our advice here must therefore be limited to helping you diagnose that status.

(1) Remove all diskettes from their disk drives. This will protect them from any further damage.

(2) Turn off all equipment. Turn equipment back on as per normal power up procedures.

(3) Choose a diskette which you do not care about and which was not in the disk at the time of the failure. Attempt to load its directory with the command:

LOAD"$",8

If you are not using drive 8, substitute the correct drive number.

If this load operates normally, then go on to the next recovery step. If not, try other non-essential diskettes. If nothing works, your system is probably damaged and requires help from your dealer.

(4) Load TCM using the procedures in Chapter 2.

(5) Use options 2 and 3 of the Main Menu to examine the diskettes which were in use at the time of the problem. Use the copy features to recreate individual files onto another diskette if appropriate.

(6) Restart your original operation, but safeguard essential diskettes by using copies wherever possible until you are confident things are working properly.

INDIVIDUAL OPTION ERRORS

1. Errors during "Copy File or Program"

(1) Disk Error Message. If a mechanical or software error is detected on one of the disks in use, you will see the flashing E-R-R-O-R message and hear a beep tone.

If this occurs before the copy process begins (as explained in Chapter 4), then you have probably specified an invalid drive number or the drive is not turned on. Press RETURN, make sure the drive is on and reselect the drive.

If this occurs during the disk operation, the E-R-R-O-R indicator will be on the same line as the name of the file being copied. A message on the bottom of the screen in red will give details of the error. Refer to your VIC 1541 User's Manual P43-46 for details of numbered messages. Make notes regarding the error message and file name, then press RETURN. You can restart the operation at the Disk Drive Configuration screen.

(2) Disk Error with No Message. If the disk drive malfunctions, but does not send a signal to the Commodore 64, then you may have disk errors with no message. You should suspect this situation if one or more of these symptoms are observed:

- Disk drive starts making unusual noises.
- Disk drive light flickers at high speed or very irregularly.
- There is no change in the displayed block numbers for an extended time.

Your judgement is important since there are no exact standards for this type of error.

When you have determined that the disk is indeed malfunctioning, use the following procedure to try to recover:

- Open the door of the disk drive and remove the diskette.
- Turn off the disk drive. You should get an error indication on the screen as soon as you turn off the switch.
- Turn on the disk drive
- Press RETURN to clear the error and go back to Disk Configuration.
- Restart the program procedure.

The original diskette you were using may be ruined. Use TCM options to look at the directory, at records in the file being copied, etc. If the diskette can be examined without abnormal indications, retry the copy operation.

NOTE: An interrupted copy operation may leave a file partially created.

If you are going to restart the copy, reply "Y" to the "REPLACE?" question when the copy process starts on the output file.
If you are not going to copy, you can delete the file using the Disk Directory Functions (Option 3) of the Main Menu.

2. Errors during "Copy Entire Disk"

(1) Disk Error Message. If a mechanical or software error is detected on one of the disks in use, you will see the flashing E-R-R-O-R message and hear a beep tone.

If this occurs before the copy process begins (as explained in Chapter 5), then you have probably specified an invalid drive number or the drive is not turned on. Press RETURN, make sure the drive is on and reselect the drive.

If this occurs during the copy operation, the E-R-R-O-R indicator will be on the left if the problem is with the input drive or on the right if the problem is with the output drive.

Make notes regarding the track and block being copied at the time of the error and whether you are reading or writing, then press RETURN. You can restart to operation at the Disk Drive Configuration screen.

When you restart, you will use the option to "Start at a particular track/block". If you are using two drives, then start at the beginning of the track where the copy was interrupted. If you are using only one drive, and therefore the buffer, you must go back to the point where the last buffer was transferred to the output disk.

If the ORIGINAL disk was in the drive at the time of the interruption then use this table for restarting. This is the table to use if the top line of the screen was "NOW READING".

TRACK/BLOCK INTERRUPTED	TRACK/BLOCK TO RESTART
Up to 6/14	1/0
6/15 - 12/8	6/15
12/9 - 18/2	12/9
18/3 - 24/8	18/3
24/9 - 31/1	24/9
31/2 - up	31/2

For example, if you were stopped at track 12, block 15 then you are above 12/9 but below 18/2. Therefore, restart using track 12, block nine.

If the COPY diskette was in the drive when you were stopped, then restart at the beginning of the current track. For example, if you were stopped at track 12, block 15 then restart at track 12, block 0. When the top line of the screen is "NOW WRITING", the COPY diskette is in the drive.

For all restart situations, your ending track will be the same as your original ending track (since you still want to make the same copy). If you are copying to the end of the diskette, the ending track is 35.

(2) Disk Error with No Message. If the disk drive malfunctions, but does not send a signal to the Commodore 64, then you may have disk errors with no message. You should suspect this situation if one or more of these symptoms are observed:

- Disk drive starts making unusual noises.

- Disk drive light flickers at high speed or very irregularly.

- There is no change in the displayed block numbers for an extended time.

Your judgement is important since there are no exact standards for this type of error.

When you have determined that the disk is indeed malfunctioning, use the following procedure to try to recover:

- Open the door of the disk drive and remove the diskette.

- Turn off the disk drive. You should get an error indication on the screen as soon as you turn off the switch.

- Turn on the disk drive

- Press return to clear the error and go back to Disk Configuration.

- Restart the program procedure.

The original diskette you were using may be ruined. Use TCM options to look at the directory, at records in the file being copied, etc. If the diskette can be examined without abnormal indications, retry the copy operation.

3. Errors during "Edit Track/Block"

(1) Disk Error Message. If a mechanical or software error is detected on the disk in use, you will see the flashing E-R-R-O-R message and hear a beep tone. The error text will be displayed below as received from the disk drive. See your VIC 1541 User's Manual for details of the interpretation of the error message text.

If this occurs at any time during attempts to read or write the disk, then the message will appear in the upper left portion of the body of the screen (starting at byte position 00.

Common causes of this condition are:

- You have specified the wrong disk in the header.

- You have specified the right disk, but it is not turned on.

- Attempting to read an unformatted disk (brand new).

To recover, press RETURN and you will return to the header fields. Correct any problems you can determine, and try again.

If the error message cannot be eliminated, then you may have a physical problem with the disk drive or diskette as discussed in other sections.

(2) Disk error with no message.

If a mechanical or software error occurs but the disk drive does not send a signal to the Commodore 64, then you may have disk errors with no message. You should suspect this situation if one or more of these symptoms are observed:

- Disk drive starts making unusual noises.

- Disk drive light flickers at high speed or very irregularly.

- The cursor is blinking after a read (indicating the read is finished, but there is no change in the display.

Your judgement is important since there are no exact standards for this type of error.

When you have determined that the disk is indeed malfunctioning, use the following procedure to try to recover:

- Open the door of the disk drive and remove the diskette.

- Turn off the disk drive. You should get an error indication on the screen as soon as you turn off the switch.

- Turn on the disk drive

- Press return to clear the error and go back to the header.

- Restart the program procedure.

The original diskette you were using may be ruined. Use TCM options to look at the directory, at records in files, etc.
If the diskette can be examined without abnormal indications, retry the edit operation.

(3) Recovery from keying errors in the body of the screen.

If you are keying changes into the display of a block, and you find that you have made errors, you may return to the header without updating the disk by pressing the English Pound key.

Remember that pressing RETURN or any function key will update the disk with any changes. To avoid that, use the above suggestion whenever you are unable to recover from keying mistakes.

Chapter 9

Advanced Topics

1. Use of the English Pound Key

The English Pound key is located in the upper right of the key board next to the "CLR/HOME" key.

The English Pound key will allow immediate termination of most TCM operations. As noted where appropriate in the preceeding chapters, the English Pound key is usually a special entry which ends the current operation and returns you to an earlier menu or selection screen. That allows you to start over from a stable point.

In general, if you must terminate and are not sure of how to do it, press the English Pound key. It will either do nothing or will stop the process and return you to a prior point in an effective, non-destructive manner.

When this occurs during the selection stages of an operation, normally there is no harm done. However, if you use this option during copying you will typically leave a partial copy on the output diskette. You may have to use the Editor or Directory Management functions to "clean up" after such a situation. If you are copying individual files, review the "REPLACE" option (Chapter 4) available to you when TCM detects that a file already exists with the name you want to use for your copy output.

2. Directory Modifications with TB/EDITOR

TB/EDITOR (Option 2 on Main Menu) gives you unrestricted access to any block on the disk. If you are not familiar with the format of the disk, refer to your VIC 1541 User's Manual which contains charts with the formats of all directories and files.

In particular, you can get into the disk directory and make any changes you desire. It is important, however, to be aware of the block allocation scheme used ty the Commodore 1541 Disk Operating System (DOS). If you ignore the conventions being used, you may create problems for later use of the disk.

When a file is created and manipulated using "normal" DOS procedures, all conventions of block allocation and deletion are followed. TCM and most other programs for 1541 disks follow the same rules as described in the User's Manual. A "Block Allocation Map" (BAM) is maintained on the disk so that the DOS knows at all times what blocks are in use.

TB/EDITOR gives you the ability to circumvent all this since you can directly modify directory entries. If you modify file status bytes, no update of the BAM takes place unless you do it.

For example, if you go into the directory (starting at track 18, block 1) and modify the TYPE byte of an entry to zero, the file is effectively deleted. No program will find that entry since the zero type byte says it doesn't exist. No commands can find it. However, records belonging to that file are still marked "allocated" in the BAM and cannot be used (by normal file techniques).

Refer to the VIC 1541 User's Manual for an inadequate, but useful, treatment of these matters. Before you make directory modifications, make sure you are aware of the full consequences of any changes.

5. Using the TB/EDITOR to Copy

Small scale copies can be made using the TB/EDITOR by the following procedure:

For each block to be copied:

- Determine the track/block number of the block.
- Use TB/EDITOR to read in the block.
- Without any keyboard entries, change the diskette from the input diskette to the output diskette.
- Key over some byte with the same information. (eg, key zero over zero)
- Press return or other appropriate function key.
- Change back to the input diskette.
- Repeat until all records have been copied.

This will work ONLY IF the copy can be positioned in the same track/block locations on the output disk as it is on the input disk without harming anything already on the output disk. It would be suitable, for example, to update a copy with a small change made to the original.

In general, TB/EDITOR closes all disk access after each operation so that you can freely change disks within operations if you are sure of what you want to accomplish.

4. Copy Protected Diskettes

Some software companies "copy protect" their products. This means that a method is employed so that no copies (or only a few copies) can be made of their product. This can be a problem for the user since he must rely on service from the software company in the event that something happens to his original software diskette.

With The Clone Machine (TCM) you can make working copies of protected diskettes in many cases. The procedure will vary, however, with each particular protected product. No general procedure can be specified which will work in all cases since there can be many different ways to implement protection.

The first thing to try is to make a copy of all allocated tracks. Use the BAM display feature of TCM (Option 3 of Disk Management) to see the range of tracks which have been used, then use Copy Entire Diskette (Option 2 on the Copy Menu) to copy that range of tracks.

If the resulting diskette does not work like the original, try copying all tracks (1-35). Sometimes something has been hidden on a non-allocated track.

If the copy still does not work, then a more complex protection scheme has been used. Protection schemes are like puzzles. To overcome the protection method, someone must make an analysis of it and solve the puzzle.

More complex methods of protection may involve "bad sectoring". This is done by changing the disk drive characteristics when the disk is created so that certain sectors are not recorded in the normal fashion. If copied by TCM, and then read in, different data will be received by the computer than would be the case with the original. Such a copy will fail to perform like the original.

It is necessary to analyze the program itself, determine what data is expected from the sectors in question, and then either patch the disk to provide the data, or patch the program to skip over the test. Patches are easily made with TB/EDITOR (Option 2 on Main Menu), but knowing what to patch is the key issue.

To analyze a program to determine what to patch requires skill in machine language and a knowledge of both Commodore 64 and the 1541 Disk Drive commands. Teaching those skills is beyond the scope of this discussion, but we can assure you that it is possible to crack almost any protected program using TCM along with a monitor/disassembler.

The Clone Newsletter will take up these topics in more detail. The Newsletter will give examples of how to "break" the protection methods of popular products and will give the resulting parameters needed to make successful copies using TCM. Be sure to return the reply card packed with your copy of The Clone Machine to get your FREE copy of the Newsletter and subscription information.

********** WARNING!!!! **********

THE COPY FEATURES OF THE CLONE MACHINE HAVE BEEN DEVELOPED SOLELY FOR THE EXPRESS USE OF MAKING A BACK UP COPY OF YOUR OWNED DISK.

****

SECTION 2 UNGUARD

Chapter 1

Overview of UNGUARD

UNGUARD is a program for the Commodore 64 computer with one or more 1541 disk drives.

UNGUARD provides a powerful, user friendly tool which may be used in conjunction with THE CLONE MACHINE to create copies of many types of copy protected diskettes.

The most common method of copy protection for Commodore 64 diskettes uses error coding of sectors. The original disk will have one or more sectors (a particular record at a particular track and block location) where an error condition has been artificially created. This error condition becomes a sort of "combination lock". The program will check the particular sector for an error. The disk is considered "genuine" if the proper error code is found in the proper location.

When you make copies without the corresponding error codes, the copies will not work. The program looks for the error code, does not find it, and aborts the execution.

UNGUARD gives you a set of tools which allow you:

1. To determine what errors exist and where on any diskette, and

2. To reproduce the correct type of error in the correct place.

You can, of course, use the error creation capability to copy protect your own diskettes.

In the sections which follow, we assume that you are familiar with the operations and documentation of THE CLONE MACHINE. If not, begin with the User Documentation for THE CLONE MACHINE before reading this manual or attempting to utilize UNGUARD.

********** WARNING!!!! **********

THE COPY FEATURES OF UNGUARD HAVE BEEN DEVELOPED SOLELY FOR THE EXPRESS USE OF MAKING A BACK UP COPY OF YOUR OWNED DISK.

****

Chapter 2

How to Load UNGUARD

The load command for UNGUARD is:

```
LOAD"UNGUARD",8,1
```

For a full discussion of loading, refer to Chapter 2 of the User Documentation for THE CLONE MACHINE. Steps 1-7 of the loading procedure for CLONE are identical for UNGUARD (but substitue UNGUARD for the program name).

There is a normal pause during loading. This occurs after the copyright message comes onto the screen. The computer seems to be doing nothing for approximately 10 seconds. This is normal if the Main Menu appears after the 10 second pause.

Chapter 3

UNGUARD Main Menu

When UNGUARD has successfully loaded, your screen will display the Main Menu. This menu is the starting point for all functions of UNGUARD. All functions which are part of UNGUARD may be accessed from this menu. All functions return to this menu at the completion of their processing.

The Main Menu looks like this:

UNGUARD -- C64 DISK UNPROTECTOR

MAIN MENU:

(1) ANALYZE/REPORT ALL ERRORS.

(2) ANALYZE/REPORT ERRORS ON 1 TRACK.

(3) INITIALIZE THE OUTPUT DISKETTE.

(4) COPY BLOCK ZERO OF TRACK 18.

(5) CREATE ERRORS ON THE DISKETTE.

(X) END PROGRAM -- RETURN TO BASIC.

ENTER YOUR CHOICE:

Exhibit 3-1 -- Main Menu

MAIN MENU OPTION X: Exit from UNGUARD

If you press the X key, you will return to BASIC as was the case for THE CLONE MACHINE.

MAIN MENU OPTION 1: ANALYZE/REPORT ALL ERRORS

If you enter 1 as your choice on the Main Menu, UNGUARD will read every block on the disk and display an error report for you. You will see the message:

INSERT DISKETTE TO BE ANALYZED.

ANY KEY WHEN READY.

Remove the program diskette and put the diskette you want to analyze into the drive. This will normally be the source diskette, the original you want to copy. You may also be checking that you have created the correct pattern of errors on a copy diskette after using Option 5. In any event, put the disk in the drive and then press RETURN or any other key to continue.

The message:

INITIALIZING ERROR MATRIX....

will be displayed briefly while the program prepares for the analysis. Then you will see a sequence of messages similar to this one:

TESTING 1 12

This means that block 12 of track one is being read to see if there is an error. When an error is found, you will see a message to that effect displayed briefly. You do not need to take note of the interim messages. A full report will be displayed at the end of the process.

It takes approximately ten minutes to read the entire disk--longer if there are many errors. When all blocks have been read you will see an error report in this format:

```
REPORT OF ERRORS FOUND:

TRACK     BLOCK     ERROR

 1         1         23
 1         2         23


END OF REPORT.  ANY KEY TO CONTINUE.
```

Exhibit 3-2 -- Error Report

The error numbers (23 in this example) are explained in the VIC 1541 User's Manual. You will need to make a copy of the information on this display for later use. Usually there are only a few errors on any one diskette. Sometimes an entire track has the same error on every block; this make a long display, but the information is very repetitive. If the number of errors requires more than one screen to display, you will be given a chance to view each screen before going on.

If there are no errors, a "NO ERRORS" message will be briefly displayed, and the program will return to the Main Menu. If you step away from the computer while the analysis is running, and return to find the menu displayed, there were no errors detected on the diskette.

MAIN MENU OPTION 2: ANALYZE/REPORT ERRORS ON 1 TRACK

This is essentially the same as Option 1, but restricted to one track at a time. You will be asked to enter the track to be analyzed. (Enter 2 digits or a space and one digit). Otherwise the messages and report are the same as Option 1.

MAIN MENU OPTION 3: INITIALIZE THE OUTPUT DISKETTE

This option is used to prepare a diskette which will be used to contain a copy of a protected diskette. You will first be asked to:

INSERT ORIGINAL DISKETTE.

ANY KEY WHEN READY.

Put the source diskette, the original you want to copy, into the disk drive. The program will read the disk ID from this diskette (to make sure the copy will match). This takes only a few seconds.

You will then be asked to insert the copy diskette. ALL INFORMATION ON THE COPY DISKETTE WILL BE WIPED OUT AS PART OF THE INITIALIZATION. MAKE SURE YOU ARE PUTTING IN THE CORRECT DISKETTE!!!!

You will be asked to verify that this is indeed the correct diskette for initialization. If you answer yes (Y), you will see the message:

INITIALIZING DISKETTE....

on the screen for approximately 90 seconds. Then the Main Menu will return.

MAIN MENU OPTION 4: COPY BLOCK ZERO OF TRACK 18

If you enter 4 as your choice on the Main Menu, you will be able to copy the control block of your source disk onto the copy diskette. This information includes the Block Allocation Map (BAM) and other control and formatting information used by the Disk Operating System in the 1541. It is essential that this be copied last, after all other copy operations have been completed. This option gives you a convenient way to do that without returning to THE CLONE MACHINE program.

You will be asked to insert your original diskette so that block zero of track 18 (the control block) can be read in. Then you will be asked to insert the copy diskette to receive the information.

This operation only takes a few seconds after which you will return to the Main Menu.

MAIN MENU OPTION 5: CREATE ERRORS ON DISKETTE

This option gives you the capability to specify an error type and exact location to set it on the diskette. The following two chapters (Chapter 4 and Chapter 5) give more detailed information on how to analyze your original diskette and what steps to take to copy it. In this section, you will be shown the messages and responses involved in this option.

You will first be asked to:

INSERT DISKETTE TO RECEIVE ERROR CODING.

ANY KEY WHEN READY.

Insert the proper diskette and press RETURN or any other key. The disk drive will operate briefly as it sets up for the new diskette.

You will then be asked successively to enter the TRACK, BLOCK, and ERROR type to use. Each response must be two digits or one digit and a space. You will then see the message:

SETTING ERROR TYPE 23 AT 2 1

OK TO CONTINUE (Y/N)?

In this example you will be setting error type 23 at track 2, block one. If correct, enter yes (Y).

For error type 21 only, there is an additional input. You will see the message:

ENTER TIMING CONSTANT (10-99):

There is full information on choosing a timing constant in Chapters 4 and 5. Enter the two digits at this time.

You will then see several messages notifying you of the processing steps in setting the error code you have requested. Some codes require several passes to complete. Some take extra passes to overcome problems encountered. Ultimately, you will either return to the Main Menu or will see the error screen display as follows:

UNGUARD -- C64 DISK UNPROTECTOR

THE REQUESTED ERROR CANNOT BE CREATED
AT THE TRACK AND BLOCK YOU HAVE
SPECIFIED.

TRACK= 1
BLOCK= 1
ERROR= 23

ANY KEY TO CONTINUE.

Exhibit 3-3 -- Error Screen

You will see the error screen if for any reason the attempt to create the error was unsuccessful. It will appear if you have specified an invalid error type or one which UNGUARD is unable to duplicate. See Chapter 6 for more information on Error Situations.

If you return to the Main Menu, then UNGUARD has completed the requesed processing.

Chapter 4

How to Analyze and Copy A Protected Diskette

You have a diskette you want to copy. You may not know if there is any protection or not. This chapter will give you a "cook book" approach to determining what steps to take to gather the information you will need; it will then tell you how to use that information to actually make the copy.

Chapter 5 gives additional information about the individual error codes and how to set them.

Step 1. Map the Errors (if any)

Most copy protection schemes used on diskettes intended for the Commodore 64 with 1541 disk drives use the method of error blocks. That is, one or more blocks on the disk have errors artificially induced on them. The program on the disk is written to look for those specific errors in certain specific places. If it finds the errors, the disk is considered "genuine". If not, the program assumes it has been copied and will abort.

Conventional programming techniques do not provide any method for overcoming this. They cannot create the necessary errors. UNGUARD reprograms the 1541 disk controller itself to write the necessary information in the correct place. You can create a copy disk which is indistinguishable from the original. In fact, your copy is as copy protected as the original and cannot be further copied without UNGUARD.

So the first step is to find out what errors are on the disk and where. Use Option 1 on the Main Menu to run an analysis. When it completes, copy down on a sheet of paper the results. The information you will need is track/block/error-type for each error.

Step 2. Review the BAM

The Block Allocation Map (BAM) tells what tracks have been used to contain information. Therefore, our next step is to use THE CLONE MACHINE to review the BAM on the diskette you want to copy.

Load THE CLONE MACHINE and choose Option 3 on the Main Menu. When the Disk Management Menu comes up, choose Option 3 there. The BAM will be displayed.

On that display, note the lowest and highest tracks used. Tracks in use are shown in RED on the display. If there are significant gaps, note the ranges used.

For example, you may see that tracks 12 through 24 are in use. Or you may see a pattern like track 5 to 9 and then 17 through 19. Add these notes to your error analysis results from step one.

Step 3. Make a Copy Plan

Based on the first two steps, you can now make a copy plan. All plans should have certain steps in common:

(1) Initialize the output diskette using Option 3 of UNGUARD. This makes sure that the disk ID of the copy is the same as that of the original on all sectors. That is important in some protection methods.

(2) Copy the tracks shown in the BAM to have been used. This should be done in two steps. Step one is to copy all tracks less than or equal to track seventeen. Step two is to start with track eighteen, block one (not zero) and copy from there to the maximum track used. It is vital to skip over the sector at track 18, block zero since in some cases it will have been coded to make further copying impossible once it has been copied (by operating system mismatch).

(3) When you are finished copying the significant sectors, use UNGUARD Option 5 to set the errors you found in step one. See Chapter 5 for more specific details on that.

(4) Finally, use UNGUARD Option 4 to copy track 18, block 0.

(5) Try the copy diskette. If it works, you are finished. If not, there may be information on tracks you did not copy. This may be because the BAM does not show all blocks actually used. Try copying the additional tracks right onto the output diskette. If the copy now works, you have succeeded. If not, try re-starting the process but this time copy from track one, block zero through track 17, then track 18, block 1 through track 35. Then go back to step (3).

A typical copy plan, expressed in a shorthand notation, would look like this:

Init.	Initialize the copy
6/0 - 17	Copy track 6, block 0 through track 17.
18/1 - 30	Copy track 18, block 1 through track 30.
E21 on trk 2	Create error 21 on track 2 (all sectors)
E23 on 35/8	Create error 23 at track 35, sector 8.
18/0	Copy track 18, block 0.

The meaning of each step is explained in the notes to the right on each line.

NOTE: Your copy plan can skip over any tracks which have every sector error coded. For example, if track one has every block coded with error 21, then you can start your copy with track 2.

See Chapter 5 for additional details about the individual error codes.

Chapter 5

Setting Individual Error Codes

This chapter will give you specific information about setting the individual error codes using UNGUARD. The analysis steps (Option 1 or 2) can be used to determine what codes exist on the original disk you are trying to copy. Those same options can be used to verify that your copy diskette has the correct pattern of errors on it after UNGUARD has been used to set them.

If you request a particular error, but find when you verify that a different result has been obtained, try the copy disk "as is" before restarting. Some programs are not very sensitive to the exact error code or even the exact position on the disk (where multiple blocks are involved). If the copy does not work, then you will have to start over. Many times, however, it will work.

ERROR 20, ERROR 22, ERROR 23

To set these error codes, you must specify the track and block location corresponding to the position on the original.

You should get exact results.

ERROR 21

Specify the track on which to create ERROR 21 and the first block of the zone to be affected. You will be asked to enter a TIMING CONSTANT. The TIMING CONSTANT will determine the number of blocks affected. The timing constant to use will depend on a number of variables including the specific physical characteristics of your disk drive, the particular track involved, etc.

A low timing constant (10-25) will affect only a few blocks (2 to 5 typically). A timing constant of 99 will affect every block on the track. Mid-range timing constants will affect some portion of the track more or less in proportion to the value you choose.

We suggest that you initialize a diskette and practice using various timing constants on various tracks to see how your 1541 drive works in this regard. Take notes. Then you can use that information when you have a real copy situation to tackle. Pay particular attention to tracks 1 and 35 since they are frequently used for error coding.

You will often find that copy protected disks which use ERROR 21 will have the entire track coded (use timing constant 99) or roughly one-half of the track coded (try timing constants in the range 40-60). You will also find that even if you do not get exactly the same pattern as the original, your copy will work since the program probably checks a block near the middle of the effected zone.

When you create Error 21 on less than a full track, it is normal for the first affected block to have a different error code (Eg, Error 20).

ERROR 27

This error will be set for every block on the entire track you specify. You will be asked to specify a block, but that input is not used. Enter zero as the block number.

NOTE: Use Option 1 (all) or Option 2 (one track) to check the error codes you have set. If you did not get the result you were looking for, retry the process. Because of the physical nature of the drive, sometimes it takes more than one try to get the error code to "take".

Chapter 6

Error Situations

See Chapter 8 of the User Documentation for THE CLONE MACHINE. Much of the discussion there under "General Errors" will apply to loading problems and general problems with the Commodore 64 system.

UNGUARD executes programs in the 1541 disk controller. Under some circumstances, problems can occur which cause the 1541 to "hang up" and never return control to the Commodore 64. The computer idles indefinitely waiting for the disk to complete its work. If you see that neither the disk nor the computer has shown any activity for two minutes or more, then use the following procedure to recover. Do not be impatient. Many of the UNGUARD procedures have perfectly normal delays where nothing appears to be going on, but internal processing continues.

Recovery steps if disk drive "hangs":

1. Turn off the 1541 and remove your diskette.

2. Turn on the 1541. Turn it off again and then on again one or more times until the Commodore 64 responds.

3. If you are requested to enter the program diskette, first make sure that the disk drive is turned on. Then, enter the diskette containing THE CLONE MACHINE/UNGUARD programs. Press any key. You will return to the UNGUARD Main Menu after a brief processing delay.

4. If the UNGUARD Main Menu appears, retry your last operation. You now should be back to normal conditions.

   If an error message appears, type:

   GOTO 200

   and then press RETURN. The UNGUARD Main Menu should appear. Retry your last operation and proceed normally.

If this recovery sequence does not work, restart UNGUARD from the beginning. Turn the Commodore 64 and 1541 off/on one or more times before reloading UNGUARD to ensure that everything has been reinitialized.

If the Error Screen appears (Exhibit 3-3), you should retry the last operation. It is not unusual for several trys to be necessary to set some error conditions. If you fail repeatedly, try a different diskette and/or a different disk drive (if possible).

Occasionally, UNGUARD will not start at all. In such a case you will get either a "hang up" with the copyright notice displayed or you will return to BASIC without ever seeing the Main Menu. If this happens, try taking out the diskette, turning off both computer and disk drive, and then retry.