CoCo Tools

Disk Utilities

COCO III 128/512K SYSTEM

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Introduction

Coco Tools is a comprehensive set of disk utilities packed into a single program that was designed specifically for the Color Computer 3. I provides the most complete set of functions available for the standard R.S. DOS disk system user comparable to that of the famous utility available for MS-DOS computers "PC-TOOLS".

Coco Tools provides fast and easy operation of standard DOS commands like Copy, Rename, Kill, Disk Initialize and Directory thru a consistent and easy to use interface. Copy, Rename and Kill provide easy visual selection of files, so that multiple file operations can be carried out with very few keystrokes. Disk Directories show the actual number of bytes used by all the files as well as the number of used grans and free grans available on the disk.

Coco Tools is also the most comprehensive disk repair program available for the Color Computer 3. It Quickly and Automatically diagnosis and repairs file allocation errors and corrupt directory information. It locates cross linked files automatically and allows you to view all the grans associated with a file with a simple command. It provides fast and easy recovery of deleted files without the drudgery normally associated with killed file recovery.

Coco Tools also provides lightning fast Backup and Copying of files from disk to disk at speeds you thought only higher priced computers could perform.
It performs full disk comparisons and file comparisons, Disk and File data search functions, Disk and File view and edit functions, Disk and File Verification functions, Disk and File Security Erase functions and it even has Disk Speed and Step Rate test functions!

And last but not least Coco Tools has multi-file Arciving, Un-Arciving and Test Arciving functions that allow you to compress multiple files into a single disk file. Plus you have the ability to extract any selected group or individual files from a compressed file with easy visual file selection. The File compression techniques used can save up to 90 percent of the space normally required by graphics files!

Coco Tools allows you to customize your configuration to your own preferences like display colors, printer baud rate, drive step rate and directory sorting preference to a setup file that automatically loads when Coco Tools starts up.

System Requirements

Coco Tools requires a Color Computer 3 with 128K of memory, a Disk drive and a Color or Monochrome Monitor capable of displaying 80 columns of text.

Backup Procedures

Before you begin using Coco Tools, make a backup copy using the normal R.S. Dos "BACKUP" command. The Original disk comes recorder on both sides of the disk, so you can load the program from either side of the disk in a normal R.S. drive by flipping the disk over. Always use the original disk to start CCTOOLS, as the backup copy will not execute. The Backup copy is used to restore the original disk should it ever fail.

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Startup Procedures

To startup Coco Tools you simply enter the following command from the "OK" prompt:

LOADM "CCTOOLS" <enter>

The program will automatically start executing when it is finished loading, it takes a few seconds to load up the entire program so don't panic! Once loaded, it will display the main command menu and you will be ready to enter a command. The Arcive command is pre-selected when the program starts up, just use the arrow keys or command letter to select any other command.

Disclaimer

A great deal of time and effort was used in the creation of this program, and great care was taken to insure that this program will perform and operate as advertised. If you find an Undocumented feature, "Bug" or problem with this program, please notify us. We will do our best to correct it, but we do not guarantee to do so. Cer-Comp LTD. does not warrant the suitability or functioning of its products for any particular user and will not be responsible for damages incidental to its use or misuse. This waranty is in lieu of all other warranties either expressed or implied. Cer-Comp LTD. assumes no responsibility for the consequences of the use or misuse of this or any other software and documentation.

Note..... This entire manual was Created, Edited and Printed using "Window Writer" on a Color Computer III with an OKIDATA LaserLine6 Laser Printer.

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The Main Menu

The Main menu consists of three columns of commands, broken up primarily into groups. The first group of commands deal entirely with commands related to disk files and file maintenance. The second (middle) group of commands deal with disks as a whole or with Directory functions. The third group of commands deal with miscellaneous functions, and preference or setup information for your system configuration.

```
***************************************
*   Cer-Comp CoCo Tools/Arciver V1.0  *
*          (c) 1991 By Bill Vergona   *
*                Main Menu            *
***************************************
```

Use Arrow Keys or (Letter) to Select Command and Press <Enter> to Execute

(A)rcive Files	(B)ackup Disk	Options Menu
(C)opy Files	(D)irectory	Communications Mode
(E)dit Files	(G)ran Analysis	(N)ew Disk Backup
(K)ill Files	(F)ull Disk Edit	(L)ocate Information
(M)ove Files	(I)nitialize Disk	Verify Files
c(O)mpare Files	Re-(J)uvenate Disk	(T)est Arcive
(P)urge Files	(V)erify Disk	e(X)tended Memory Edit
(R)ename Files	Erase Disk	Full Disk Compare
(S)alvage Files	(W)rite/Sorted Dir.	Print/Display Files
(U)n-Arcive Files	(Z) Disk Speed Check	(Q)uit

Select Command? (D)irectory

Prn/Comm Rate = 9600 /2400   Sort Option = Ext/File_Id   Step Rate = 6ms

Command Selection

To select commands from the main menu, you first have to select or highlight the command and then press the Enter key to execute the command. You can select commands by using the Up, Down, Left and Right arrow keys, or directly select some commands using the character key in parenthesis like the (C)opy command could be selected by pressing the "C" key.

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File Selection

For all the commands that require any kind of files to be selected, you will see a screen with the file names displayed in three columns. Each file shows the extension, file type and number of grans that the file occupies on disk. There are three ways you can select files, the (A)ll key, selects all the files, the "?" wild card option allows you to select files containing a specified character string, and the space bar which selects files individually. The Up, Down, Left and Right arrow keys can be used to position the cursor to any file and then you can select it with the space bar. When selecting files with the space bar, the cursor automatically advances to the next file to the right. Each file that is selected, is automatically highlighted, to de-select a file, you simply position the cursor to the highlighted file and press the space bar to un-select it. You can also un-select all the files by pressing the Clear key at any time. The bottom of the screen displays the drive the files reside on and the number of grans occupied by the currently selected files. This can be handy when you are copying or un-arcing files to know how much space you need to perform the function. A sample file selection menu for the copy command is displayed below, indicating 9 files selected by the ">" marker. On the screen they would be highlighted, the ">" is just used for illustration.

```
Select the file(s) to be Copied
Use Arrow keys to move pointer and Press the Space Bar Select/De-Select Files
A=All, ?=Wild card select, <Clear>=Deselect All, <Enter>=End, <Esc>=Abort


 BTNS&GFX.BAS OB 1        CALENDAR.BAS OB 4        CONFIG  .128 OB 2
>CONFIG  .BAS OB 2       >CONFIG  .DAT 1A 1       >DEBUG   .BIN 2B 2
>EPSON   .DRV 2B 1       >FINDER  .128 OB 3       >FINDER  .BAS OB 7
>FKEYS   .DAT 1A 1       >FONTS   .DAT 1A 3       >GEMINI  .DRV 2B 1
 GFXDEMO .128 OB 2        GFXDEMO .BAS OB 2        GFXDEMO1.BAS OB 2
 IBM     .DRV 2B 1        ICONS32 .BIN 1A 1        OKILASER.DRV 2B 1
 PRINTER .DRV 2B 1        RGBSETUP.CON OB 2        SG10    .DRV 2B 1
 W       .BAS OB 1        WINDOWS .128 2B 12       WINDOWS .BIN 2B 14


         Drive = 1   Free Grans = 0      Selected Grans = 21
```

File Commands

(A)rcive Files

This command allows you to select an individual or group of files from a disk and compress them into a single file on the same disk or a different disk. You can later extract the files using the Un-Arc command. The compression algorithm works very well on graphics data and small files. It can be very handy to use for sending a group of files as a single file over a telecommunications network or BBS. You are first prompted to enter a drive number containing the files to be arcived. A file selection is then displayed for you to select which files you want to include in the arcived file. After making your file selections, you will be prompted for file name including the drive where the compressed file is to be written. The command will automatically start compressing the selected files, listing each one as it begins the process.

(C)opy Files

This command allows you to select files from one disk and transfer them to another disk with simple file selection methods. If the file being copied will not fit on the selected destination disk, you are prompted to change disks, or skip the file. If a file with the same name already exists on the destination disk, you are prompted to Overwrite, Rename or Skip the file. If you select to rename the file, only the copied file name is changed, not the original. If the new name also exists you will again be notified and the options displayed. As each file is copied, a message indicating which files are being copied, and which disk they are being copied from and to.

(K)ill Files

This command is similar to the normal DOS KILL command, it removes the file from the disk directory. However, in CCTOOLS you can easily select the file or files to be killed with little effort required. The command prompts you for the drive number containing the files to be killed, and then displays a standard file selection screen. After selecting the files, you are prompted as to whether or not you want to verify each file name before it is killed. If you answer with a "Y", each file will be displayed and you are prompted with a "Y or N" prompt for each one.

(E)dit Files

This command allows you to view and edit a selected group of files. The file information is displayed on the screen in both Hex and ASCII 256 bytes or 1 sector at a time. The display also shows the Name of the file, File Type, Number of Grans, Current Gran and Sector being displayed. You can edit or change the contents of the file in either Hex or ASCII modes with full cursor control.

```
    >Relative gran of file          > Current File name
    !   >Actual Gran on Disk        !           >File Type
    !   !           >Sector in Gran !           ! > Gran Count for file
    !   !           !               !           ! !
Gran #(12)43   Sector #6       File = WINDOWS .BIN 2B 14
Use Right/Left Arrows to Adv/Backup Sector and Up/Down to Adv/Backup Gran
(E)dit mode, <Enter> to Update, <Esc> to Abort, (T)rack/Sector on Full Edit
```

```
       00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000:  EC 84 27 15 34 06 00 00 20 4E 22 A3 62 ED 84 17    ..'.4... N".b...
0010:  FF 50 25 06 EC A4 A3 62 ED A4 35 10 20 E7 35 36    .P%....b..5. .56
0020:  34 16 EC 02 ED A4 35 26 30 AB BC 00 00 20 4E 42    4.....5&0.... NB
0030:  5F D6 24 09 A6 80 A7 A0 BC 5F D6 25 F7 10 BF 5F    _.$......._.%..._
0040:  D6 10 BF 5F D4 4F 5F ED A4 ED 22 17 DF 08 F6 5F    ..._.O...."....._
0050:  00 00 20 4E 62 7F 10 26 EB 3D 39 34 10 EE E4 EE    .. Nb#.&.=94....
0060:  C4 27 05 17 FF 79 20 F5 35 90 34 02 7F 5F E6 17    .'...y .5.4.#_..
0070:  ED 49 35 82 1B 00 00 20 4E 82 57 4F FF 2D 0F 0D    .I5.... N.WO.-..
0080:  2D 04 0B 0F 02 10 12 1B 45 42 01 04 04 01 01 25    -.......EB.....%
0090:  0B 0C 02 43 75 72 72 65 6E 74 00 00 20 4E A2 20    ...Current.. N.
00A0:  49 6E 66 6F 2E 2E 2E 2E 2E 20 0D 0D 0D 57 69 6E    Info..... ...Win
00B0:  64 6F 77 20 4D 61 73 74 65 72 20 35 31 32 4B 00    dow Master 512K.
00C0:  00 20 4E C2 20 56 33 2E 31 30 0D 43 75 72 72 65    . N. V3.10.Curre
00D0:  6E 74 20 57 23 20 3D 20 00 0D 44 65 70 74 68 20    nt W# = ..Depth
00E0:  20 20 20 20 00 00 20 4E E2 20 3D 20 00 0D 4C 65       .. N. = ..Le
00F0:  76 65 6C 73 20 3D 20 00 0D 57 69 6E 64 6F 77 20    vels = ..Window
```

(M)ove Files

This command is similar to the Copy Files command in that it allows you to select files to be copied from one disk to another. However, after it copies the selected files it then removes the original files from the disk. A warning message is displayed to make sure that you understand that the original files will be removed by this command.

C(O)mpare Files

This command allows you to compare two files from the same or different disks. If you select only one file from the disk, you will automatically be prompted for the drive containing the second file for the comparison and then a file selection screen to select the second file. If you select more than two files, an error message will be displayed and the command aborted. Once the files are selected, the program checks that the files are the same type and size and displays a message if they are not. If they are of a different type or size, you are prompted as to whether or not to continue doing a byte for byte comparison of the files. If the files are ASCII type, any mismatches will display the entire text line of the files when they don't match, and single byte mismatches are displayed for any other file types. If a mismatch is found you are prompted to continue on each occurance. At the end of the comparison it simply displays a message that it is finished comparing the files, if no mismatches were displayed, the files are the same.

(P)urge Files

This command is similar to the Kill Files command in that it removes the selected files from the disk. However, this command will completely erase the data from the selected files by writing all FF's to every sector that was in use by that file before it removes the entry from the directory. This can be handy when you want to make sure that all traces of your file are removed from a disk for either security purposes or whatever. Files that are removed with the purge command can not be recovered by any means!

(R)ename Files

This command allows you to select individual or groups of files to be renamed in a single session. When you are prompted to rename a selected file, you do not have to enter the file extension unless you want to change it, the program will automatically retain the extension if not specified. If no file name is specified, the rename for that file will be skipped , so you can still change your mind up to the very last moment. If no name is entered, a message will be displayed telling you that file was skipped. If the new name you entered already exists, you will be informed and given the opportunity to skip the rename or enter another file name to be used. As each file is renamed successfully, a message containing the old and new names will be displayed.

(S)alvage Files

This command allows you to recover files from a disk that were previously killed either by this program or normal DOS. You can not recover files that were Erased with the Purge Files command. When the specified drive is entered, a display of all the killed files on the disk will be displayed. You can select a single file or group of files to be Salvaged. If the disk does not contain any killed files you will be notified and returned to the menu. Once the files are selected, you will be prompted to select a method of recovery, Automatic, Semi-Automatic or Manual.

The Automatic mode, will attempt to recover all the files selected and rebuild the directory entry with the first character of the file name as a "?". You can then later Rename the files if you wish using the Rename Command.

The Semi-Automatic mode will attempt to recover each selected file and when it thinks it found where the end of the file is located it will display the information for the last sector of the file. Along with the sector information, it will display a message as to why it thinks that the displayed information is the end of the file. A Double Sector, Binary End of File, Basic End of File, Xmodem Padding or Short Ascii File, and a prompt as to whether it looks like the end of file to you? A pointer to the last byte of the sector will be flashing in the sector information display. Chances are that if it found a Basic or Bin End of File, the program has correctly identified it and you should answer the prompt with a "Y". If you disagree, you can answer "N" and the program will continue to search for another End of File indication, or you can change to Manual mode by using the Arrow keys to backup/advance a sector or gran. If the information display appears to be totally foreign to the type of file you are trying to recover, you can choose to Ignore the current gran with the "I" option. When you agree to the end of file, a prompt message will appear for you to enter the first character of the file which was previously erased when the file was killed.

The Manual mode allows you to control the entire recovery process, it will display the first sector of the first gran of the file and prompt you as to whether or not you think you have reached the end of the file. You can use the arrow keys to advance/backup thru the file and Ignore grans that don't appear to be part of the file etc. This option is for the more experienced Hacker that has a good understanding of disk and file structures, and not for the faint of heart! For more information on recovering killed files see the sections on Disk Structure and Salvaging killed files.

(U)n-Arcive Files

This command is used to extract files from a previously Arcived file created by this program. You will be prompted for the drive containing the Arcived Files and a file selection menu will allow you to select a file or files to be Un-Arced. If a file is selected that is not an Arcived file a message stating so will be displayed. If it is an Arcived file another file selection menu will be displayed showing the files that are contained in within the Arcived file and you can select any or all files to be extracted.

Once selected you will be prompted for the drive to output the individual extracted files to, and the program will begin extracting the files. If the output disk already contains a file with the same name as the extracted file, you will be informed and prompted to either change the name of the extracted file or to skip over that file. Also if the output disk does not have enough space to write a file to, you will be informed and prompted to Change Disks or Skip the file. Once files are extracted, they will be on the disk in their normal format and can be used as such.

Disk Commands

(B)ackup Disk

The Backup Disk command is similar to the normal DOS command, it will completely copy the contents of one disk to another. However, the CCTOOLS Backup Command is many times faster than its Basic Counterpart. You will also be prompted with a warning message to make sure that you are aware that the destination disk will be completely written over by this command.

(D)irectory

The Directory command will display the disk directory in a two column format with the standard file name and extension format followed by the File type 0-3, Ascii/Binary character and Gran count. One added feature is the length of the file in bytes is also displayed, so you can see the exact file length of each file on disk. It also displays the number of free grans on the disk and the number of grans in use by files. It also checks to see if the number of free grans and used grans total 68 which is the maximum number of grans on a standard DOS disk.

```
Directory for Drive#1

BTNS&GFX.BAS    0B 1    0,666      CALENDAR.BAS    0B 4    8,997
CONFIG  .128    0B 2    2,579      CONFIG  .BAS    0B 2    2,371
CONFIG  .DAT    1A 1    0,114      DEBUG   .BIN    2B 2    4,106
EPSON   .DRV    2B 1    0,356      FINDER  .128    0B 3    5,005
FINDER  .BAS    0B 7   14,501      FKEYS   .DAT    1A 1    0,251
FONTS   .DAT    1A 3    6,144      GEMINI  .DRV    2B 1    0,356
GFXDEMO .128    0B 2    2,575      GFXDEMO .BAS    0B 2    2,568
GFXDEMO1.BAS    0B 2    2,922      IBM     .DRV    2B 1    0,356
ICONS32 .BIN    1A 1    1,536      OKILASER.DRV    2B 1    0,358
PRINTER .DRV    2B 1    0,358      RGBSETUP.CON    0B 2    3,298
SG10    .DRV    2B 1    0,356      W       .BAS    0B 1    0,746
WINDOWS .128    2B 12  25,358      WINDOWS .BIN    2B 14  31,828

Free Grans = 0  Grans used by Files = 68

<Any Key> to return to Menu
```

(G)ran Analysis

　　The Gran Analysis command will display all the files in the disk directory with the number of grans used and a list of all the grans that are in use by that file. It also check the Gran table to see if there are grans used by more than one file or grans that are not used by any file. If grans are flagged as being in use but no file gran list claims using it, a message displaying the unused gran numbers and a prompt to repair the error will be displayed. If you answer the prompt "Y", the grans will be made available and the gran table on disk updated, any other character entered will skip the disk repair. Grans that are used by more than one file can not be automatically fixed. You must examine the Gran lists for the files to determine which files are using the same gran, this can be a difficult error to repair. If the files claiming the same gran are of no consequence you can simply delete them both. You can also copy both files to another disk and use the disk edit command to determine visually which file really is using the gran and either attempt to rebuild the corrupted file or discard it.

```
Gran Analysis for Drive#0

COCOTOOL.MAN Gran List - 38,39,40,41,42,43,44,45,46,47,48,49,50,51,52
COPY    .DAT Gran List - 33
COPYFILE.DAT Gran List - 37
DIRECT  .DAT Gran List - 36
DISKEDIT.DAT Gran List - 35
FINDER  .BAS Gran List - 30,31,28,29,26,27
MAIN    .DAT Gran List - 32
MEMEDIT .DAT Gran List - 34
ccindex .man Gran List - 63
cocotool.man Gran List - 24,25,22,23,20,21,18,19,16,17,14,15,12,13
intro   .man Gran List - 53,54,55
tool    .prn Gran List - 62
tooldisk.man Gran List - 10,11,8,9,6,7,4,5,2,3,0
toolfile.man Gran List - 56,57,58,59,60,61

 Free Grans = 5  Grans used by Files = 63

 Track Sector Format - 1 12 5 16 9 2 13 6 17 10 3 14 7 18 11 4 15 8

 <Any Key> to return to Menu
```

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(F)ull Disk Edit

   The Full Disk Edit command allows you to view and edit any sector on the disk. When first executed the command will display Sector 1 on Track 0 of the specified Disk. You can then browse thru the disk advancing or backing up a sector or gran at a time. You can optionally go directly to a specific track and sector using the "T" option. To enter into the edit mode select the "E" option, when in the Edit mode, the cursor flashes at the current edit position within the sector and a message above the data specifying the current mode Hex or ASCII. You can use the Shift @ key to toggle between Hex and ASCII edit mode. Press the <Enter> key to end the Edit mode and if any information was modified, a prompt will be displayed asking if you want to write the modified information to disk. Answer with a "Y" to update the information or any other key to ignore the update.

```
Gran Directory Drive = 6        Track #17        Sector #3
Use Right/Left Arrows to Adv/Backup Sector and Up/Down to Adv/Backup Gran
(E)dit mode, <Enter> to Update, <Esc> to Abort, (T)rack/Sector <Full Edit>


      00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000: 57 49 4E 44 4F 57 53 20 42 49 4E 02 00 20 00 54   WINDOWS BIN.. .T
0010: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0020: 49 43 4F 4E 53 33 32 20 42 49 4E 01 FF 1E 00 00   ICONS32 BIN.....
0030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0040: 46 4F 4E 54 53 20 20 20 44 41 54 01 FF 1F 00 00   FONTS   DAT.....
0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0060: 50 52 49 4E 54 45 52 20 44 52 56 02 00 1D 00 66   PRINTER DRV....f
0070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
0080: 46 4B 45 59 53 20 20 20 44 41 54 01 FF 1A 00 FB   FKEYS   DAT.....
0090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00A0: 49 42 4D 20 20 20 20 20 44 52 56 02 00 1B 00 64   IBM     DRV....d
00B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00C0: 45 50 53 4F 4E 20 20 20 44 52 56 02 00 18 00 64   EPSON   DRV....d
00D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
00E0: 4F 4B 49 4C 41 53 45 52 44 52 56 02 00 19 00 66   OKILASERDRV....f
00F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
```

(I)nitialize Disk

The Initialize Command performs the same function as the DOS DSKINI command while within CCTOOLS, so you don't have to go back to Basic to format a disk and you can initialize multiple disks in the same drive with a few simple keystrokes.

Re-(J)uvinate Disk

This command is used to take disks with intermittent read errors, and re-record the data on the disk in an attempt to eliminate the errors. It does this by reading each sector on the disk, with multiple retries if necessary and re-writing the information to restore its magnetic properties to a newly recorded level. It can be handy to use on older disks to restore them to a newly recorded level before they begin to deteriorate.

(V)erify Disk

This command is a quick check to test the integrity of a disk. It reads all the tracks and sectors on the disk, checking for errors. If any errors occur, it displays the track, sector and error code for each occurance and continues on testing.

Erase Disk

This command will completely erase the contents of a disk by writing FF's to every sector on the disk. This essentially restores the disk to a state of having just been initialized. A warning message is displayed to insure that you understand that this command will erase all information on the specified disk.

Write/Sorted Directory

This command will read the directory information from the specified disk and sorts the directory according to the current sort option specified. The directory is then written back to the disk in the sorted format. All traces of previously killed files are removed from the directory, so any killed files will be lost forever after this command is executed on a disk. This is handy when you want to have your disk directories sorted for use outside of CCTOOLS.

(Z) Disk Speed Check

This command will display a bar graph on the screen indicating the specified disk drive speed. The highlighted portion of the graph indicates the acceptable limits for the drive speed. You must insert a formatted disk in the drive to be tested for the command to work correctly. It continuously displays the drive speed, so you can use this function to adjust your drive speed if necessary.

Miscelanious Commands

Options Menu

This command takes you to another menu that allows you to set your own preferences for Screen colors, Printer baud rate, Communications baud rate, Drive step rate, Sort options and to save those preferences to a setup file.

Select Colors

This is where you can select your own colors for the displays used in CCTOOLS. You can select the Foreground (text) color, Background color and Highlight Colors for menus and other displays. You can change colors by using the Arrow keys or enter the color values directly.

Drive Step Rate

This is where you can select the rate at which your disk drives move from track to track. The faster the step rate (smaller values) the faster your disk commands can execute. If you don't know how fast your drives can operate, you can test them by selecting 5 at the step rate selection. It will automatically test your drive to determine the fastest rate at which it can operate without errors and set the rate accordingly. You should set the rate for the slowest drive you will be using on the system or you may have problems when attempting to use that drive if the rate is set too fast for it to operate correctly. This step rate only applies while you are in the CCTOOLS program.

Directory Sort Options

This is where you select how you want the directory entries sorted before being used or displayed in CCTOOLS and for the Update/Sort Directory command in the main menu. You can select to sort by File-Id and Extension, Extension then File-Id or No Sort at all.

Printer Baud Rate

This is where you select the printer baud rate for commands used within CCTOOLS. Normally this is the same rate you use for normal Basic printing.

Communications Baud Rate

This is where you select the baud rate for the Communications mode within CCTOOLS. Normally this is the same rate you use for normal Terminal Communications.

Printer Test

This is a simple Printer test that outputs the ASCII printable character set to the printer continuously. This can be handy for testing new printers or checking printer baud rates etc. The test can be terminated by holding down any key.

Write Setup File

This command is used to write your preference or setup file to disk after you have customized them to your liking. It simply prompts you for the drive number containing the Original CCTOOLS disk. The setup file is called TOOLS.SET and must be written to the CCTOOLS disk or it will be useless.

Exit to Main Menu

This command simply returns you to the Main CCTOOLS menu.

Communications Mode

This command takes you into the Communications module where you can Send or Receive files to another computer. It uses the serial port on the back of the computer for communications. When you first enter the command you will be prompted to Send a file, Receive a file or go into Conversation mode. This is a Half Duplex only communications system, which means that the conversation mode can not receive data when it is transmitting nor can it transmit when receiving. But it can send and receive files using Xmodem protocol at higher than normal rates, for example you can use 4800 or 9600 baud to send and receive files computer to computer direct connect. The conversation mode is useful for simple communications between computers or to a modem to give it dialing information etc., it does not do well for networks like Compuserve or Delphi since it can not receive large blocks of data for display without error.

(N)ew Disk Backup

This command is basically two commands in one, it is useful when you want to backup from one disk to another and format the destination disk at the same time. It will format and verify the destination disk and then begin copying the source disk.

(L)ocate Information

This command allows you to search the entire disk or selected files for a specific ASCII character sequence or Numeric data sequence. This can be helpful when you wish to change some information in a file on disk. The command prompts you to select ASCII or Numeric search mode and to enter the data sequence you wish to search for. When the search begins, nothing happens until a match is found, then it displays the track and sector location and the sector data in the same format as the Disk or Edit file command. If you are searching by specified files, the current gran # of the file, sector and file information are displayed. You are automatically put into the edit mode with the cursor positioned to the beginning location of the data sequence found. You can then edit the information directly or press the enter key to tell the program to look for the next occurance. If you make any changes to the sector information, you are prompted to see if you want the information written to disk before continuing the search.

Verify Files

This command is similar to the Verify Disk command only you can select which files on the disk you want to verify. This can make identification of files which contain errors easier after doing a Verify Disk. Sometimes you can have an error on a disk in an area that is not being used by any of the files, using this command you can easily tell which if any files contain errors.

(T)est Arcive

This command is similar to the Arcive command, but it does not create a compressed output file. It is useful to give you an idea of how much a file is compressed when arced, it lists the original length of the file and its length when compressed. In some cases files may be larger by a few bytes when compressed, but this does not take into account the extra disk space occupied by the unused sectors in the last gran of a file. When it is finished test arcing the files it tells you the overall totals for all files before and after compression and the amount of grans that would be saved if the files were actually arcived. This can give you a good idea of how much space the Arcive command will save and how much space is needed for the files to be arcived to disk. Attempting to compress and already compressed file will always create a file somewhat larger than the original, typically the same applies to Binary Files. Graphics and Ascii files typically compress the most. However, in general when a group of any file types are arcived, the overall result is a saving of space since the unused sectors of the last grans are discarded.

Full Disk Compare

This Command performs a comparison of two entire disks, checking that they match exactly. Each Track and Sector are compared byte for byte and any differences are displayed. In order for two disks to compare in their entirety, they must have been created either by a Backup command or by Copying the files in the same order to a newly formatted disk. If two disks contain the same exact files, they may not compare unless they are stored on the disks in the exact same grans. This command is most useful when comparing disks after a Backup to make sure that the data was copied without error.

E(X)tended Memory Edit

This command allows you to view and edit any part of the 512k memory in the Computer. The command prompts you for a beginning 8k block number and 256 byte offset within the block. You should have a good understanding of how the CoCo 3 Memory system is structured before using this command. The screen display is similar to the Disk & File Edit displays, showing the hex and ascii information in 256 byte blocks. It also displays the block #, offset, extended address and a short message as to what part of memory is being displayed. This can be handy to view information residing in extended memory that is not easily accessible from Basic. This command can change the contents of memory and should therefore be used with extreme caution. You can easily modify CCTOOLS itself and therefore crash the system or cause damage to disk information etc.

```
Block # 60     Offset =0000   Extended Address =78000 Ext Basic        Use
Right/Left Arrows to Adv/Backup 256 Bytes & Up/Down to Adv/Backup 8K Block
(E)dit Mode, <Enter> to Update, <Esc> to Abort, (T)ransfer to Mem Block #


      00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
0000: 45 58 8E 80 DE CE 01 2A C6 0A BD A5 9A 8E B2 77   EX.....*.......w
0010: AF 43 AF 48 8E 89 4C BF 01 0D 9E 8A BF 01 12 BD   .C.H..L.........
0020: 82 9C CC 2C 05 DD E6 8E 01 3E 9F B0 CE B4 4A C6   ...,.....>....J.
0030: 0A EF 81 5A 26 FB 86 7E B7 01 9A 8E 82 B9 BF 01   ...Z&..~........
0040: 9B B7 01 88 8E 88 46 BF 01 8C B7 01 97 8E 87 E5   ......F.........
0050: BF 01 98 B7 01 79 8E 8E 90 BF 01 7A B7 01 91 8E   .....y.....z....
0060: 88 F0 BF 01 92 B7 01 6A 8E 8C F1 BF 01 6B B7 01   .......j.....k..
0070: 67 8E 82 73 BF 01 68 B7 01 76 8E 82 86 BF 01 77   g..s..h..v.....w
0080: B7 01 A3 8E 83 04 BF 01 A4 B7 01 94 8E 82 9C BF   ................
0090: 01 95 B7 01 1D 8E 84 89 BF 01 1E BD 96 E6 B6 FF   ................
00A0: 03 8A 01 B7 FF 03 8E 44 4B BC C0 00 10 27 3F 52   .......DK....'?R
00B0: 1C AF 7E E2 88 BD B9 9C 8E 80 C0 9F 72 7E A0 E2   ..~.........r~..
00C0: 12 0F E3 0F E4 B6 FF 03 8A 01 B7 FF 03 7E A0 E8   .............~..
00D0: 96 68 4C 27 08 1F 20 93 19 D3 A6 DD A6 39 19 81   .hL'.. ......9..
00E0: 83 81 3C 0E 82 1E 81 68 45 58 54 45 4E 44 45 44   ..<....hEXTENDED
00F0: 20 43 4F 4C 4F 52 20 42 41 53 49 43 20 32 2E 30   COLOR BASIC 2.0
```

Print/Display Files

This command allows you to Display or Print the Contents of an ASCII file from a disk. You are prompted for the drive containing the files to be printed and given a normal file selection menu to select the files to be printed. After selecting the files, you are asked if they are tobe displayed on the screen or putput to the printer. The program then proceeds to output the files to the specified device. If a file is found not to be an ASCII file, a messageto that effect is displayed and the program continues on to the next selected file if any, until all the files are displayed or printed.

(Q)uit

This command is used toexit from CCTOOLS back to Basic. You are prompted to make sure that you want to end using CCTOOLS. If you answer the prompt with any character other than "Y" you will simply be returned to the main menu.

Disk Structure

The Color Computer organizes the disk into 35 tracks numbered 0 to 34. Each track contains 18 sectors of 256 bytes each for a total of 4608 bytes of usable data storage per track. The Standard DOS uses tracks 0 thru 16 and 18 thru 34 for actual data storage and track 17 is reserved for the Disk Directory and Granual Allocation storage. The DOS further divides the storage allocation up into 9 sector blocks called Granules or Grans as they are more commonly called. Thus each track contains 2 grans for a total of 68 grans per disk. The smallest amount of space that a file uses on disk is 1 granule or 9 sectors, so the maximum number of files on a disk is 68, but that is very rare. Even if a file only needs 1 sector of space to contain its information, the DOS still allocates all 9 sectors of the gran to the file. This is not the most efficient storage method available and as you can see even if a disk is full, chances are that there is still a fair amount of space unused.

The Disk Directory Track

The Directory track (Track 17) is used by DOS to keep track of the files on the disk. The actual directory entries are contained in sectors 3 thru 11 with each file entry using up 32 bytes, so only 8 file entries will fit in each sector. There is enough space in the allocated sectors to store a total of 72 entries, but as stated previously only 68 of them can actually be used. The format of a directory entry is as follows:

Byte#   Contents

0-7   Filename, left justified and blank filled. If byte 0 is
          equal to 0 the entry has been killed and the entry is
          available. If byte 0 is equal to hex FF, the entry is
          available and all entries that follow are un-used. In
          other words this is end of the directory.

8-10   Filename extension, left justified and blank filled.

11   File Type: 0=Basic Program, 1=Basic Data File, 2=Machine
          Language program and 3=Text Editor source file.

12   ASCII/Binary Flag: 0=Binary and hex FF=ASCII format.

13   The number of the first granual in the file (0 to 67)

14-15   The number of bytes in use in the last sector of the file.

16-31   Reserved for future use.

Granual Allocation Table

Sector 2 of the directory track contains the gran allocation table for all 68 grans on the disk. Only the first 68 bytes of the sector contain valid information, the remaining bytes of the sector can be almost anything and typically contains part of a directory sector. Each of the first 68 bytes numbered 0 to 67 directly corresponds with a granual. These bytes will either contain a hex value of FF, 0 to 43 or C0 to C9.

FF   The corresponding granual is free and not part of any file.

0-43   The corresponding granual is part of a disk file. The
        actual value, converted to decimal, points to the next
        granual in the file. For example if the directory entry
        contains a hex 30 in byte 13 of the file entry, that points
        points to granual 30 as the first gran of the file, you
        then look in the gran table and find a 31 in byte 30.
        This means that gran 30 contains the first 9 sectors of
        the file, gran 31 contains the next group of sectors for
        the file and if byte 31 contains a 32 then gran 32 contains
        the next group of sectors for the file and so on until!

C0-C9   The corresponding granual is the last granual allocated
        to the file and the right or least significant digit tells
        how many of those 9 sectors are actually used by the file.
        So continuing with our example if byte 32 contains a C3 then
        gran 32 contains only 3 sectors that are part of the file
        and the rest of the sectors are unused. Now going back to
        the directory entry bytes 14 and 15 contain the byte count
        for the last sector of the file, so if it contains a 0034,
        then in sector 3 of gran 32, only the first 34 hex bytes
        are actually part of the file, the rest are unused.

Salvaging Killed Files

As you can see from the description of how a disk is structured, the directory entries and the Granual allocation table, it is no simple task to recover a file that has been killed or deleted from the disk. When a file is killed, the first byte of the directory entry is replaced with a 0 and all grans allocated to the file are changed to FF so they can be used again. If you write to a disk after a file has been killed, chances are that the information from the new file will overwrite some if not all of the grans that were used by the killed file and may even overwrite the directory entry itself. Therefore once you have written to a disk where a file was killed, chances are that that file can not be salvaged. If several files were killed and the disk was written to after that, there is a chance that some of the files can be recovered, but determining which ones can be recovered correctly is another story.

The more you know about the structure of the disk and its files, the better your chances of recovering files that were killed. The salvage files program uses very sophisticated techniques to locate the chain of grans and end of file, but it is not foolproof. On normal Binary files such as Basic and Machine Language programs, it is almost 100 percent accurate when it finds and displays a Basic or Bin end of file message. But when files have been written over in part, it can easily be led down the garden path and find a proper end of file, with garbage in the middle. Even if a recovered file is incorrect, there is still no harm done, you can simply kill the file again and the disk will be restored. Sometimes when multiple files have been deleted, you may have to try to recover each file individually, making sure that each file recovered is correct and if not kill that file again and try to recover the next file. It is possible that the disk allocation is so scrambled, that there is no logical path to trace. Files that were originally only one gran, should be recovered first, as they are almost certain to be recovered correctly and in the process remove illogical grans from the allocation table that would logically belong to a larger file.

Another helpful aid in recovering files is the Locate data command, if you have any idea of key words or phrases that might be somewhere in a file, you can use this command to locate in which grans they are located. This is very handy information to have, and when you try to recover a file using the manual mode of the salvage files command, you can ignore grans that don't contain the information you located or don't appear to be related.

Other Disk Repairs

Sometimes you will encounter an error when using your disk in Basic or CCTOOLS. When Basic encounters and error, it simply tell you I/O ERROR and stops whatever it was doing and returns you to the OK prompt. This can be very frustrating since you don't know what happened or why? Sometimes you can rerun your program and it will continue without error and you wonder if it will happen again, these are sometimes refered to as soft errors. Errors that occur once in a while but seem to disappear the next time you try to do the same thing. Hard errors are those that happen every time no matter how many times you try.

CCTOOLS will typically display an error message when it encounters a hard or soft disk error, telling you exactly where the error occurred and give you the option to retry or ignore the error or abort the operation it was performing at that time. Sometimes an error is due to a damaged disk and repair is not very likely. For example if you dropped you disk and the dog grabbed it or you burned a hole in it when you dropped your cigarette. It may be possible to recover some information in the case of a damaged disk but unless you don't have a backup copy and really need some of the information it is not worth the trouble.

Some hard and soft errors can be fixed simply by rewriting sector causing the problem, this can sometimes be done by using the Rejuvinate disk function.
Sometimes errors occur on parts of the disk that are not even being used by the files, but cause errors trying to backup from one disk to another. These can easily be fixed by copying all the files to another disk and reformatting the disk or discarding it.