

Chuck Towns

INTRODUCTION

The purpose of this document is to supply information about the CP/M operating system you have purchased to use on your Commander Computer system. The CP/M manual's producer by Digital Research, Inc. and our system provide most of the information you will need. The release notes herein provide a more detailed explanation of CP/M, version 2.0 on various hardware. This information is provided in the following areas:

RELEASE NOTES

CP/M^(T) OPERATING SYSTEM

Version II

FOR

COLUMBIA DATA PRODUCTS, INC.
COMMANDER SYSTEMS COMPUTERS

(301) 992-3400

Commander 900 150⁰⁰

Sturgart

CP/M^(T) is a trademark of DIGITAL RESEARCH

INTRODUCTION

The purpose of this document is to supply information about the CP/M operating system you have purchased to use on your Commander Computer system. The CP/M manuals produced by Digital Research and supplied with your system provide most of the information you will need. The release notes herein provide specific information about the implementation of CP/M, version 2 on Columbia Data Products, Inc. hardware. This information is grouped into the following areas:

1. Disk I/O implementation
2. General Device I/O implementation
3. Operational differences between this release and standard CP/M.
4. Additional utilities..
5. [^]Transferring files from CP/M 1.4 disks to CP/M 2.0 disks.

161 : Kilobyte Formatted disk capacity
 35 : Tracks
 512 : Byte physical sector size
 9 : Physical sector/track
 2 : Reserved system tracks
 64 : 32 Byte directory entries
 148 : Kilobyte file area capacity
 1024 : Byte Data allocation block size

TABLE 1 Disk organization on model 9XX, 5XX and MXX

COMMANDER COMPUTER SYSTEMS.

1. Disk I/O Implementation

Disk I/O has been optimized in this release of CP/M. The result is increased performance both in storage capacity and in the effective speed of sequential operations. The key to this optimization is in the organization, or format, of the disks. Instead of using a physical sector size of 128 bytes, a larger physical sector is used. Doing so enables substantially more of the disk to be used for data storage. The disk organization statistics are shown in table 1. The BDOS, the CCP and CP/M compatible programs still assume, however, that disk operations cause data transfers in 128 byte blocks only. The Columbia Data BIOS (Basic I/O System) reconciles this by performing blocking and deblocking operations.

The BDOS handle's disk errors reported by the BIOS by typing messages:

Bdos Err on X: Bad Sector

where X is the drive that had the error. It holds up processing until the operator presses RETURN to ignore the error or CTRL (C) to reboot. Before the BIOS reports a disk error to the BDOS, however, it types a message giving more information about the type of error in form:

READ ERROR ON DISK X : NNNNNNNN
76543210

or WRITE ERROR ON DISK X : N N N N N N N N where X is the
7 6 5 4 3 2 1 0
drive number and N N N N N N N N is the binary representation
7 6 5 4 3 2 1 0
of the status byte read from the FD 1791 Floppy disk controller.
The meaning of each bit position is explained in table 2.

The BIOS holds up processing at this point waiting for the operator to respond with:

- I - to ignore the error
- R - to retry the operation that failed
- (CTRL) C - to reboot the system

or any other key to pass the error back to the BDOS for its normal error recovery

BIT	READ	WRITE
7	NOT READY	NOT READY
6	∅	WRITE PROTECT
5	RECORD TYPE	WRITE FAULT
4	RECORD NOT FOUND	RECORD NOT FOUND
3	CRC ERROR	CRC ERROR
2	LOST DATA	LOST DATA
1	DRQ	DRQ
0	BUSY	BUSY

TABLE 2: Definition of the FD 1791 status byte.

2. General Device I/O Implementation.

The connectors for the general purpose I/O ports included as part of the Commander CPU board can be found on the back of the computer as shown in Figure 1. There is an additional serial port for communications between the CPU board and the internal Commander Terminal. The I/O byte feature has been implemented in the Columbia Data BIOS to allow access to all of these devices through CP/M. All CP/M I/O functions access one of four pseudo devices:

CON:

LST:

RDR:

or PUN:

Physical devices can be assigned to these pseudo devices by using the STAT utility or by modifying the I/O byte in memory location 03H. Table 3 shows the correlation between the physical device mnemonics recognized by STAT (and PIP) and the physical devices available on the Commander Computer system. The default assignments are as follows:

CON:=TTY:

RDR:=TTY:

PUN:=TTY:

LST:=UL1:

COLUMBIA DATA PRODUCTS DEVICE

CP/M MNEMONIC

Internal Commander Terminal	TTY:
Serial Port #1	UC1: & UL1:
Serial Port #2	CRT:
Serial Port #3	UR1: & UP1:
Serial Port #4	UR1: & UP2:
Parallel Port # 1	LPT:
Parallel Port #2	PTR: & PTP:

Table 3 Mnemonic device name assignments for 9XX and 5XX
COMMANDER COMPUTERS

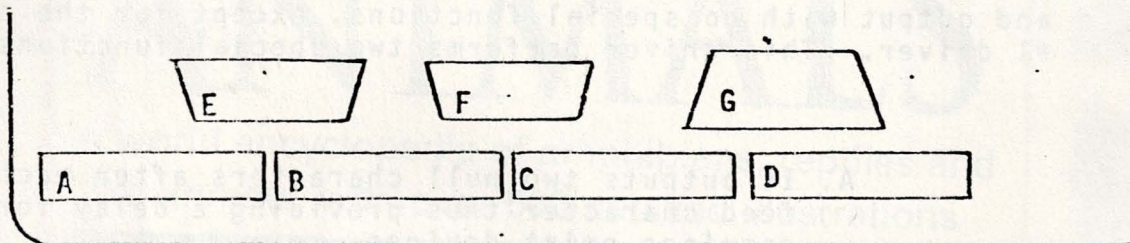


FIGURE 1. Rear view of the Model 9XX and 5XX Commander Computer showing the positions of the general purpose I/O connectors.

- A). Serial Port #1
- B). Serial Port #2
- C). Serial Port #3
- D). Serial Port #4
- E).
- F).
- G).

Each general purpose I/O device has its own driver in the BIOS. This allows special functions to be associated with specific ports. In the standard BIOS these drivers perform simple input and output with no special functions, except for the serial port #1 driver. This driver performs two special functions as follows:

- A. It outputs two null characters after each line feed character thus providing a delay for slow carriage print devices.
- B. It simulates a form feed by filling out a page with line feed characters whenever it senses that a form feed character is to be output. The number of lines per page is stored at location 46H. A default value of 66 lines per page is placed into this location.

3. Differences between this release and standard CP/M

MOVCPM

The MOVCPM program has 4 command forms as follows:

(see P.30 of AN INTRODUCTION TO CP/M FEATURES AND FACILITIES)

MOVCPM	cr
MOVCPM	n cr
MOVCPM	* * cr
MOVCPM	n * cr

The first two command forms will not work because of the size (512 Bytes) of the cold boot section on the system tracks. The last two command forms work as documented in the CP/M manuals.

COLUMBIA DATA CP/M UTILITIES

In addition to the programs normally distributed by Digital Research, this release contains three (3) additional utility programs supported by Columbia Data Products. They are, FORMAT, XCOPY, and XDIR. Their descriptions are supplied on the following pages.

FORMAT

FORMAT is a transient program that is invoked by typing 'FORMAT' at the console in response to the CP/M prompt, A>. Its function is to format a disk into 315 data sectors, with each sector having a length of 512 bytes. The 315 sectors are organized into 35 tracks with each track containing 9 sectors. In addition to organizing the disk, this program verifies that the format was actually recorded on the disk correctly by writing and reading a pattern to each sector of the disk.

An example dialogue with the format program is shown in Figure 1. The program asks you to insert the diskette to be formatted into drive "A", and then, when ready, to press the "A" key. Any data previously on the disk being formatted is destroyed. Upon completion of the format process, you are given the option to format another diskette by typing "Y". Pressing any key other than "Y" will cause the format program to execute its termination sequence in which you are asked to replace the newly formatted disk in drive "A" with a CP/M system disk. When you press RETURN, the format program causes warm restart of the CP/M.

FORMAT

FORMAT is a transient program that is invoked by typing 'FORMAT' at the console in response to the CP/M prompt. Its function is to format a disk into 512 data sectors, with each sector having a length of 512 bytes. The 512 sectors are organized into 35 tracks on the disk. In addition to organizing the disk, this program also actually records on the disk a pattern for each sector of the disk.

An example dialogue with you to format another disk is shown in Figure 1. The program asks you to type the drive letter for the disk to be formatted. Press the "A" key.

Any data already on the disk is destroyed. Upon completion, you are given the option to format another disk. Pressing any key to format another disk will cause the program to ask you to replace the newly formatted disk in drive A. When you press RETURN, the program causes warm restart of the CP/M.

```
A> format
MOUNT DISK TO BE FORMATTED
ON "DRIVE A", THEN TYPE "A"
A
DISK IS FORMATTED
TO FORMAT ANOTHER
TYPE <Y>
Y
MOUNT DISK TO BE FORMATTED
ON "DRIVE A", THEN TYPE "A"
A
DISK IS FORMATTED TO FORMAT
ANOTHER
TYPE <Y>
N
FUNCTION COMPLETE
MOUNT SYSTEM DISK ON
DRIVE A AND TYPE <RET>
```

Figure 1.

FORMAT

If in verifying the format, this program detects a disk error or retries on an operation (the disk driver will retry a failed operation 10 times before giving up) it will automatically re-format and re-verify the diskette. If the diskette cannot be successfully verified after three (3) format attempts it declares the disk to be bad and asks you if you want to format another. An example of "bad disk" dialog is shown in figure 2.

```
A> format
MOUNT DISK TO BE FORMATTED ON
"DRIVE A", THEN TYPE "A"
A
READ ERROR ON DISK A:00001000>
RETRIES DETECTED ON READ
RETRIES DETECTED ON READ
COULD NOT SUCCESSFULLY FORMAT
DISKETTE EVEN AFTER 3 RETRIES
TO FORMAT ANOTHER
TYPE <Y>
```

Figure 2

XCOPY

XCOPY is a disk reproduction utility program which is invoked by typing XCOPY in response to the CP/M prompt. As can be seen from the example dialogs in figures 1 and 2, there are two (2) copy options. The D option causes every sector of every track on Disk A to be copied to Disk B. The S option causes the System Tracks (tracks 0 and 1) of Disk A to be copied to Disk B. With either option, both the source and target disks must be formatted. In the case of the D option, all information already on the target disk, Disk B, is destroyed by the copy operation. With the S option, however, all information on the target disk is preserved except for the first two (2) tracks (which are completely overwritten by the copy operation).

COPY AN ENTIRE DISK

A XCOPY
DISK COPY UTILITY V 2.1
COPY FROM DISK A TO DISK B
S - SYSTEM TRACKS
D - ENTIRE DISK
A - ABORT COPY PROGRAM
D
MOUNT SOURCE DISK ON A, AND
MOUNT TARGET DISK ON B.....
WHEN READY,
PRESS ANY KEY
COPY COMPLETE
DISK COPY UTILITY V2.1
COPY FROM DISK A TO DISK B
S -SYSTEM TRACKS
D-ENTIRE DISK
A-ABORT COPY PROGRAM
A
MOUNT SYSTEM DISK ON
DRIVE A. WHEN READY
PRESS ANY KEY
A

FIGURE 1

COPY SYSTEM TRACKS

A XCOPY
DISK COPY UTILITY V 2.1
COPY FROM DISK A TO DISK B
S - SYSTEM TRACKS
D - ENTIRE DISK
A - ABORT COPY PROGRAM
S
MOUNT SOURCE DISK ON A, AND
MOUNT TARGET DISK ON B.....
WHEN READY,
PRESS ANY KEY
COPY COMPLETE
DISK COPY UTILITY V2.1
COPY FROM DISK A TO DISK B
S-SYSTEM TRACKS
D-ENTIRE DISK
A-ABORT COPY PROGRAM
A
MOUNT SYSTEM DISK ON
DRIVE A. WHEN READY
PRESS ANY KEY
A

FIGURE 2

XDIR

XDIR is a transient program that can be used in a manner identical to the DIR system command (see Introduction to CP/M Features and Facilities). It provides filename and size information for each applicable directory entry on a disk (see Figure 1). It displays three (3) fields for each directory entry.

ffffffff ttt(+n) SSS:

The first field, ffffffff, is the name of the file. The ttt part of the second field is the file type. The (tn) part of the second field appears on directory entries that are extents of large files (over 128 sector) where n is the extent number (eg. +1 for first extent, +2 for the second, etc.). The third field, SSS, represents the number of sectors in the field referenced by the directory entry (0 to 128).

```
A xdir
CBAS2      COM      128    CBAS2      COM+1     32      STAT      COM      24
PRODTEST   BAS       54    ASM       COM      64      PIP       COM      55
ED         COM       48    XDIR      COM       3      CRUN2     COM     128
XDUMP      COM       24    XCOPY     COM       7      CRUN2     COM+1    4
PROLOG     COM       32    CDPBOOT   ASM      35      LOAD      COM     14
DDT        COM       38    FORMAT    COM      12      XCOPY64   COM      7
CDPBOOT    HEX       11    Z         COM       1
```

```
A xdir *.com
CBAS2      COM      128    CBAS2      COM+1     32      STAT      COM      24
ASM        COM       64    PIP       COM      55      ED        COM      48
XDIR       COM       3      CRUN2     COM     128    XDUMP     COM      24
XCOPY      COM       7      CRUN2     COM+1    4      PROLOG    COM      32
LOAD       COM      14      DDT       COM      38      FORMAT    COM      12
XCOPY64    COM       7      Z         COM       1
```

```
A xdir cdpboot.asm
CDPBOOT    ASM      35
a
```

Figure 1

5. Transferring files from CP/M 1.4 to CP/M 2.0 disks. If you are already using CP/M 1.4 on a Commander Computer system, you may transfer your disk files to CP/M 2.0 disk and use them with this release. A utility is supplied on the distribution disk called B128.COM. Typing B128 causes drive B to take on the characteristics of a 1.4 disk. Another utility, B512.COM, can be used to return drive B to accept 2.0 disks. Once B128 has been run, PIP can be invoked to transfer files from the 1.4 disk in B: to the 2.0 disk in A:. Care should be taken that 1.4 utilities (eg., PIP, STAT, FORMAT, XCOPY, ETC.) transferred to a 2.0 disk should be later replaced by the corresponding utilities from the 2.0 distribution disk.

To make copies of 1.4 disks onto 2.0 disks the following procedure can be used:

1. Format a 2.0 target disk for every 1.4 source disk you wish to copy.
2. Copy the 2.0 system tracks to each of the target disks using XCOPY.
3. Insert a 2.0 distribution disk in A: and a scratch disk, formatted for the 1.4 system, in B:.
4. Type B128 cr.
5. Put PIP on the scratch disk by typing PIP B:=A: PIP.COM cr
6. Insert one of the 2.0 target disks in A: and type CNTRL C.
7. Type B: PIP cr

8. Insert the 1.4 source disk to be copied in B: and type
A:=B*.* [V] <cr> .

9. When PIP redisplays its asterisk, *, prompt the 2.0 target disk will contain the same files as the 1.4 source disk. If there are more disks to be copied then re-insert the 1.4 scratch disk containing PIP into drive B:, and repeat steps 6 through 9.



GTCCO Corporation

1055 First Street, Rockville, MD 20850
301/279-9550, Telex 898471

5-1-81

GRAFIC V3.0

Symbol Table Version

1. To use this version of GRAFIC, a user's module must be downloaded to the terminal side of the computer.

The procedure to start V3.0 at present is as follows:
(User's responses are underlined)

A> TCP < CR >

A> DDT < CR >

- IJRSYM.COM < CR >

- R7F00 < CR >

- IXMIT.COM < CR >

- R < CR >

- G100 < CR >

PLEASE ENTER SEGMENT ORIGIN ADDRESS (HEX). 8000 < CR >

PLEASE ENTER SEGMENT END ADDRESS (HEX). 97FF < CR >

^{SYMBOL}
A> GRAFIC < CR >

2. There are 2 new commands added to the V2.0 hierarchy to invoke the symbol mode. These are M and S.
3. M stands for make symbol. When M is typed the user is asked to enter a filename. The file entered must contain 100 or fewer points. This file will be read from disk to the host and subsequently downloaded to the terminal. To download 3 more symbols, M is invoked 3 more times. Each symbol is assigned an ID number as it is downloaded. This ID number will then be used to address that symbol.
4. S stands for symbol mode. This mode toggles on and off whenever S is typed. In S-mode, there are 3 commands available to the user - Z, P and E. Z downloads scales, P is used to place a symbol, and E is used to erase a symbol.



5. Whenever a symbol is "placed", it is drawn at the scale presently invoked on the terminal side. Initially, this is 1.0. To change this (i.e. to draw a symbol at half scale), Z is typed. The user enters the scale factor to use in placing symbols. This scale factor then becomes the acting scale factor for symbols until changed. I.e. if the scale is set to 0.5, all future symbols that are placed will be done so at a scale of 0.5 of what they were originally digitized at.
6. P Command (place symbol) - To place a symbol, type P and the symbol ID number. Now digitize the point where you would like to place the symbol. The symbol will be drawn with the symbol's reference point at the point digitized and at the scale active at the time. The symbol's reference point must be to the lower left of all other points used to define that symbol. You may continue placing that same symbol at the same scale by digitizing points throughout the tablet. To leave this mode, type Q.
7. E Command (erase symbol) - To erase a symbol, simply digitize a point close to the symbol's reference point. The symbol closest to the point digitized will be erased. The user may then cancel that erasure the same as the K command for a circle or arc, and the symbol will then be redrawn.

Remember, to invoke any command in normal mode (not in symbol mode), you must first exit symbol mode by typing S. The status display will show S when you are in symbol mode.



5/1/81

GRAFIC V2.0

ADDITIONS AND CHANGES TO V1.1

1. The cursor button for windowing has been changed from button 4 to button 3.
2. Downloading formats is also a command (D), so a D typed at any time will allow you to download formats.
3. The format for a point has been changed to '\$' PB X5 SØ1 Y5 CR LF where PB is push button code, SØ1 is one space, and CRLF is carriage return line feed.
4. Any keyboard command may be entered from the cursor keyboard by first going to program TERMINAL (before GRAFIC) and setting ID's for any push buttons 4 through B.
5. Any point may be entered from the keyboard as well as the digitizer by typing the point in the format shown in 3. There is no LF key on the keyboard. Use the CR key instead. (Thus CR will be typed twice.)
6. The cursor is now a crosshair.
7. B Command - Clear screen and reset buffers.
8. Z Command - In the K mode (keyboard entry for scale) you are now able to designate where the window will occur by digitizing the point to be windowed.
9. J Command - This command is used for polygon closure. When J is typed the last point digitized is saved and you may continue digitizing. When J is typed again, a line will be drawn from the last point digitized to "Join" the point saved when J was first typed. This second J will also toggle the Join mode off.
10. X Command - Typing X toggles "exact" mode on or off. When a point is digitized in X mode, the data base is searched to find the closest data point to the point digitized and that data point is used instead of the actual point digitized. X mode remains on until toggled off by typing X.
11. F Command - After a circle has been drawn, a new circle with the same radius may be drawn simply by digitizing the center of that new circle. You may continue drawing identical circles until Q is typed.



12. U Command - The cursor status is shown on the display (X and Y are printed) only when cursor button 0 is pressed.
13. There is no S (spline) command.
14. There is no command to reset the disk drives (done automatically).



GTCO Corporation

1055 First Street, Rockville, MD 20850
301/279-9550, Telex 898471

5-1-81

GRAFIC V2.1

This version is a modification to V2.0 to give disk spooling capability to enable a data file beyond 1000 points to be created and to allow it to be read back and displayed.

The disk with this program contains:

TCP
TERMINAL
GRAFIC - 1000 point version of V2.1
G10 - 10 point version

The number of points listed above are the number of points for a frame.

A frame is defined as the number of points you can digitize before these points are saved on disk. In GRAFIC there are 1000 points per frame and in G10 there are 10 points per frame. G10 is included as a practice version.

Begin V2.1 the same as you would begin V2.0 by typing TCP and then GRAFIC. When you are digitizing points (or before you begin) but before the first frame of points is filled, type S. You will be prompted for a file name. Then continue (or start) digitizing. When you reach the frame limit, a tone will sound and you will be prompted on the CRT to wait while the frame is automatically stored on disk.

When the wait prompt disappears you may continue digitizing. All editing capability of V2.0 is available to you for the frame you are digitizing before it is stored on disk. Again, you must type S before the first frame is saved. After you have entered the file name, you must not type S again until you have closed the data file you are working on. Once you have finished digitizing for a data file, type W. This will close the file. If you do not type W, you will lose the file you have created.

There is a maximum of about 9500 points allowed per disk (if there is no text). You must not create a file which will push the total number of points on the data disk beyond the capacity of the disk. If you do, you will lose the file you are working on.



GTCO Corporation

1055 First Street, Rockville, MD 20850
301/279-9550, Telex 898471

Grafic V2.1

-2-

To read the file back, just respond in the normal manner as in V2.0. However, you may not edit a spooled file once it has been created and saved. You may only edit the frame of the file you are working on while you are creating that file.

If you are familiar with CP/M you may use the PIP command to merge files together - as long as the merged file fits on one disk.