

# MANUAL

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CP/M2 Ohio Scientific C3

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CP/M2 on Ohio Scientific C3

By

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## INTRODUCTION

### GENERAL INFORMATION.

Thank you for buying software from Lifeboat Associates. You have purchased one of the most useful software systems written for the 8080/8085/Z80 microcomputers and at the same time, you have joined the largest group of disk operating system users in the world!

We have been very careful to supply you with all of the information you need to get CP/M running on your computer and to enable you to understand the system. CP/M, however, like many worthwhile things, will not be mastered without some effort on your part. Read the manual several times. Sit down at your computer and try-out all of the features to see what they do.

In order to help you, Lifeboat Associates has prepared this manual and maintains a staff at its New York headquarters. Call them at (212) 860-0300 if you need help with a problem for which no solution can be found in the accompanying documentation. Also at Lifeboat can be found a wide range of software products for use with CP/M. Refer to the catalog supplied with this manual for a listing, and regularly consult the current advertising in the various computer magazines. In the back of the manual is a problem report sheet. Use it to report errors or suggest enhancements.

### WHAT IS CP/M?

CP/M (Control Program / Microprocessors) is a software system designed to record and retrieve programs and data on floppy disks. Like all software systems, it is a collection of programs that are inter-related and are designed to accomplish specific tasks within the system. CP/M operates with 8080, 8085 and Z80 microprocessors and is largely independent of the computer and floppy disk system. It has, therefore, been adapted for use with almost all computers using the 8080 and Z80 families of microprocessors. CP/M has become a de facto standard and a large group of high level languages and application software systems have been designed to run under its control.

Lifeboat Associates has installed the CP/M operating system for your Ohio Scientific C3 computer. This means that all modifications to the operating system have been made specifically for the Ohio Scientific C3. Computer programs running under CP/M normally "talk" only to the operating system and need no knowledge of the specific hardware in use. This is what makes programs written to run under CP/M so universal.

## GETTING STARTED

### YOUR CP/M PACKAGE.

The contents of the CP/M package you have received from your dealer should contain the following:

- a. This manual (CP/M on Ohio Scientific C3)
- b. Digital Research CP/M manuals composed of the following sections:

- \* CP/M 2.0 Users Guide for CP/M 1.4 Owners
- \* An Introduction to CP/M Features and Facilities
- \* ED: A Context Editor for the CP/M Disk System
- \* CP/M Assembler (ASM) Users Guide
- \* CP/M Dynamic Debugging Tool (DDT) Users Guide
- \* CP/M 2.0 Interface Guide
- \* CP/M 2.0 System Alteration Guide

- c. An eight inch soft sectored diskette containing your CP/M system

- d. License agreement and 2 registration cards

Check that you have received all of the above material. If there is anything missing, contact your dealer or Lifeboat Associates. Check that the diskette package is in good condition. It should be sealed and not bent or damaged in any way. Every CP/M software system has a unique serial number. It is shown on your distribution diskette and the same number is imbedded in the software for identification purposes. Record this number and use it when corresponding with Lifeboat Associates regarding your software. When you copy your system disk for your own use, put the copyright notice and serial number on the copy.

If your package arrived complete and in good condition, sign and mail the registration cards accepting the terms of the Digital Research license agreement prior to opening the diskette package. Only after receipt of these cards will either Lifeboat Associates or Digital Research be able to help you in any way regarding the use or maintenance of this system.

BOOT PROCEDURE.

This procedure should be followed to boot-up your CP/M on the Ohio Scientific C3 computer. It is assumed that your computer has the following hardware requirements:

1. OSI 510 triple processor CPU board.
2. 48K of static memory starting at address 0000 Hex.
3. 8K of static memory starting at d000 Hex.
4. One (preferably two) eight inch floppy disk drives.

Important note:

Throughout this manual and in many programs <cr> means to press the RETURN or ENTER key on the keyboard. This may be referred to in other text as CARRIAGE RETURN. Most CP/M programs require a <cr> after characters are entered from the keyboard to inform the program that operator input is complete. It is the convention of this manual that the characters to be entered into a program under discussion are printed in **bold face**.

Step 1. Make sure there are NO diskettes in any drive.

Step 2. Turn on your CRT terminal and Ohio Scientific C3 computer system. If you have a C3-S1, remember to turn on the CPU cabinet BEFORE turning on the disk drives.

Step 3. Insert your CP/M diskette into the "A" drive. Disk drive names are the same as in OS-65U and OS-65D.

Step 4. Press the RESET switch on your computer. "H/D/M?" should appear on your CRT terminal.

Step 5. Type a capital "D" (a small "d" will not work!), the disk drive will click four times and the following message will be displayed on your CRT:

```
49K CP/M Vers. 2.xy  
for Ohio Scientific C3  
(C) Copyright 1980 Lifeboat Associates
```

A>

Your CP/M system is now up and running. In the version number above, "2.x" refers to the Digital Research version, "y" is the Lifeboat release number.

If the disk drive clicks only once check that you have 8K of memory starting at d000 hex.

If this is the first use of the system, refer to the next section to back-up your distribution diskette. It is most important that you put your original diskette away in a safe place as soon as possible after copying it.

BACKUP PROCEDURE

This procedure must be used to make a copy of the original distribution diskette. A blank eight inch soft-sectored diskette will first be formatted with the FORMAT program and then the original diskette will be copied onto it with the COPY program.

Step 1. Boot up your CP/M as previously explained.

Step 2. Format a new diskette by typing the command:

A>FORMAT<cr>

The format program will sign on as follows:

FORMAT Version 2.xy  
for Ohio Scientific C3  
(C) Copyright 1980 by Lifeboat Associates

Enter Disk Name or CTL-C to Reboot:

Step 3. Type B. This tells the program to use drive B.

Step 4. The program will respond with:

Load Disk in Drive, Hit Return When Ready

You should place a blank disk into drive B and press <cr>

Step 5. The program will format the disk and once again display the message:

Enter Disk Name or CTL-C to Reboot:

If you have double sided disk drives you could respond with a D to format the other side of the disk in the B drive. If not type a CTL-C to return to CP/M.

Step 6. Copy the original disk onto the newly formatted disk by typing:

A>COPY<cr>

The copy program will respond by typing its sign-on message, which appears below:



COPY Version 4.2  
Copyright (C) 1980 Lifeboat Associates

Disk copy For Ohio Scientific C3

```
*****  O P T I O N  T A B L E  *****
"A" = Copy ALL 77 tracks.
"M" = Copy disk until empty (0E5H) track.
"V" = Verify the disk by reading all data.
"F" = Copy Files until end of disk.
"N" = Copy files until empty (0E5H) track.
"O" = Copy Only CP/M system tracks.
"E" = Exit and return to CP/M.
```

Enter your selection from option table. - (Enter **M**<cr>)

Enter SOURCE drive name: (A B C or D)  
or <cr> makes default copy from A to B. - (Enter <cr>)

Insert SOURCE in A, DESTINATION in B  
and press <cr> to copy the disk  
or any other key to reset options. - (Enter <cr>)

The system will now copy the disk and display an asterisk (\*) for each track successfully copied. When done, the program will re-display the option table and request another answer. Enter E<cr> to exit.

Step 7. Now put the original disk away in a safe place where it will be available if it is ever needed. It is important to NEVER write on the original disk so you can always use it as a known starting point.

DEFINITIONS OF CP/M PROGRAMS.

ASM.COM

This program is an 8080 disk oriented two-pass assembler.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.2, Page 16 and "CP/M Assembler (ASM) User's Guide).

COPY.COM

Disk to disk copying program.

Reference: "Backup Procedure" and "Advanced Features" sections of this manual.

DDT.COM

This program is the CP/M Dynamic Debugging Tool which combines a powerful monitor program with a tool for analyzing software problems. It can perform common monitor program functions as well as assembling and disassembling programs in memory.

Reference: "CP/M Dynamic Debugging Tool (DDT) User's Guide".

DUMP.ASM

Source code for DUMP.COM.

Reference: "CP/M 2.0 Interface Guide", Appendix.

DUMP.COM

Program for dumping machine language files to the terminal in hexadecimal form.

ED.COM

This is the CP/M text editor. It permits creation and alteration of text files in ASCII under CP/M. Source code files for assembler, FORTRAN, and COBOL programs can be created and altered with this text editor.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.5, Page 25, "ED: A Context Editor for the CP/M System", and "CP/M 2.0 User's Guide for CP/M 1.4 Owners", Section 6, Page 10.

## CP/M2 on Ohio Scientific C3

### FORMAT.COM

This program prepares blank, soft-sectored, eight inch diskettes for use with the Ohio Scientific C3 computer.

Reference: "Backup Procedure" and "Advanced Features" section of this manual.

### LOAD.COM

This program reads a disk of HEX machine code such as produced by the ASM assembler and creates a COM file of the same name.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.3, Page 17.

### OSIGEN.COM

This program is used to copy the CP/M system from/to the SYSGEN Area in memory to/from the system tracks on disk.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.6, Page 27 and "Advanced Features" section of this manual.

### OSILNKS.ASM

This is the source code for the user portion of the Basic Input Output System for your Ohio Scientific C3 CP/M. All of the software drivers for the console, printer, and serial I/O ports are documented in this program.

Reference: "Advanced Features" section of this manual.

### PIP.COM

This is the Peripheral Interchange Program which is used to transfer files from disk to disk or to another peripheral. It also does other things such as media conversion necessary to print, punch, copy and combine disk files. Study the usage and forms of the PIP program very carefully because this powerful program will be used frequently.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.4, Page 18 and "CP/M 2.0 User's Guide for CP/M 1.4 Owners", Section 5, Page 8.

### READ-ME.DOC

This file, if present on the disk, will be used to communicate errors, omissions, additions and changes to this manual's description of the software.

STAT.COM

This program reports information about disk capacity, file sizes, file indicators and device assignments. This program can also be used to manipulate the file indicators and device assignments.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.1, Page 13 and "CP/M 2.0 User's Guide for CP/M 1.4 Owners", Section 4, Page 5.

SUBMIT.COM

This program allows CP/M commands and program input lines to be "batched" together for automated processing.

Reference: "An Introduction to CP/M Features and Facilities", Section 6.7, Page 28.

WFBIOS.COM

This program is used to write the bootstrap loader and the disk I/O routines to track zero of the logged-on disk drive. It is also used to configure your CP/M for fast or slow stepping floppy disk drives.

Reference: "Advanced Features" section of this manual.

XSUB.COM

This program permits the SUBMIT.COM program to pass to batched programs the input lines that the operator would have to supply in the non-batched use of the program.

Reference: "CP/M 2.0 User's Guide for CP/M 1.4 Owners", Section 7, Page 11.

ADVANCED FEATURES.

GENERAL INFORMATION.

This section of the manual describes in detail the functions of the various utility programs provided with your copy of CP/M, as well as explaining how you can alter the system configuration to suit your individual needs.

UTILITY DESCRIPTIONS.

COPY.COM

This program enables the user to copy a diskette onto another diskette. The destination diskette must be formatted (see FORMAT.COM below) first. The user has the choice of copying the entire diskette or only the active files on a diskette, among other options.

The program is self-prompting and is invoked by typing COPY<cr>.

FORMAT.COM

This program prepares diskettes for use with CP/M by writing a blank data pattern onto the disk. It will also test the disk to make sure that it is capable of holding data.

The program is self-prompting and is invoked by typing FORMAT<cr>.

OSIGEN.COM

This program is used to transfer CP/M from/to the SYSGEN area and tracks one and two of the diskette. It is invoked by typing OSIGEN<cr>. The program will sign-on:

```
OSIGEN VER 1.4
SOURCE DRIVE NAME (OR RETURN TO SKIP)
```

Normally, at this point you type the name of the disk drive from which you will read CP/M on tracks one and two. (For example type A to read CP/M from tracks one and two of the disk in the A drive.) See "Introduction to Features and Facilities", Section 6.6, Page 27 for more details.

The next prompt will be:

```
SOURCE ON A, THEN TYPE RETURN
```

To which you should reply with a <cr>.

The next prompt will be:

```
DESTINATION DRIVE NAME (OR RETURN TO REBOOT)
```

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If you are transferring a CP/M system to the B disk drive, type a B at this point.

The next prompt will be:

DESTINATION ON DRIVE B, THEN TYPE RETURN

To which you should reply with <cr>.

System tracks one and two will have been transferred to another disk and you will return to CP/M command mode (i.e. A>).

## WFBIOS.COM

This program is used to write the bootstrap load and disk I/O routines to track zero of the logged on floppy disk. The program is invoked by typing **WFBIOS<cr>**. The program will then sign-on:

WFBIOS for CP/M Version 2.2x  
for Ohio Scientific C3.

This program writes the bootstrap loader and disk I/O routines to track zero of the logged-on disk drive.  
(CTL-C to return to CP/M)

Do you have Fast or Slow stepping disk drives (F or S)?

To which you should reply with an "F" or an "S" depending upon whether your floppy disk drives are the newer type that require only about 3.5 to 4.0 milliseconds per step or the older type disk drives which requires 8.5 milliseconds per step.

Track zero will immediately be transferred to the logged-in disk drive.

#### OSILNKS: THE USER BIOS.

The source code for your user BIOS is provided so that it is possible to make changes in peripheral (printers, serial ports, etc) device drivers. You should remember that memory may be utilized only to 0bfff hex if you do make changes. Also, the peripheral device drivers for the 510 CPU board serial port, the CA-6 serial port (also known as a 430 board), the CA-10X first serial port, and the CA-9 parallel Centronics interface have all been included in the BIOS.

It is unlikely that you will have all of these devices attached to you system at one time. Therefore, some space in the BIOS may be saved by eliminating unnecessary device drivers.

The CA-10 device driver may be directed to a different port of the CA-10 by changing the address word at label CA10X. Currently it is 0cf02 hex which points to the first serial port of the CA-10. If it were incremented by two to 0cf04 hex it would point to the second serial port etc.

#### THE IOBYTE.

The IOBYTE in the system as delivered assigns the console, reader, and punch to the 510 CPU board serial port (TTY:). The printer (LPT:) is assigned to the CA-9 parallel port.

The IOBYTE is located at label BOOT+1 ("MVI A,080H ;INITIAL SETTING OF IOBYTE") in OSILNKS.ASM. If that instruction were changed to "MVI A,0C0H" the printer would be changed to the CA-6 serial port.

Also, the IOBYTE setting may be changed temporarily with the STAT command. Reference: "An Introduction to CP/M Features and Facilities", Section 6.1, Page 13 and "CP/M User's Guide for CP/M 1.4 Owners", Section 4, Page 5.

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Please use this form to report errors or problems in software supplied by Lifeboat Associates. This form is designed to act as a transmittal sheet, and problem details can be described on additional pages.

Date: \_\_\_\_\_

Software Product Name: \_\_\_\_\_ Version No. \_\_\_\_\_

Disk Format: \_\_\_\_\_ Serial Number: \_\_\_\_\_

Computer Type: \_\_\_\_\_ CPU Type: \_\_\_\_\_

Operating System: \_\_\_\_\_ Serial Number: \_\_\_\_\_ Version: \_\_\_\_\_

Memory Size: \_\_\_\_\_ Number of Disk Drives: \_\_\_\_\_

Please describe the problem you have encountered. Include references to the manual if appropriate. Try to reduce the problem to a simple test case. Enclose any appropriate listings. If you have discovered a patch or interim solution please describe it.

This form may also be used to suggest enhancements to our software products.

Information on product changes and current version numbers are published in Lifelines, our software newsletter.

PROBLEM DESCRIPTION:

Name: \_\_\_\_\_ Phone: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

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