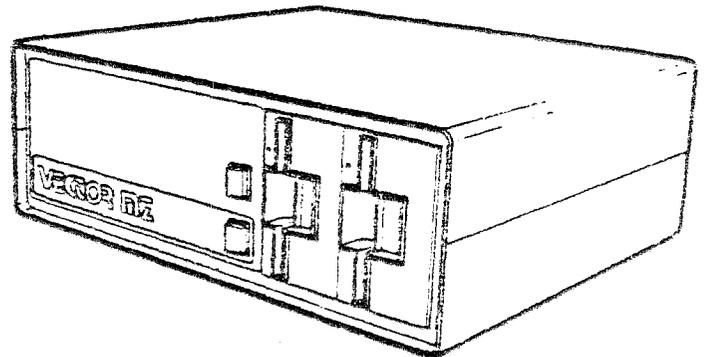
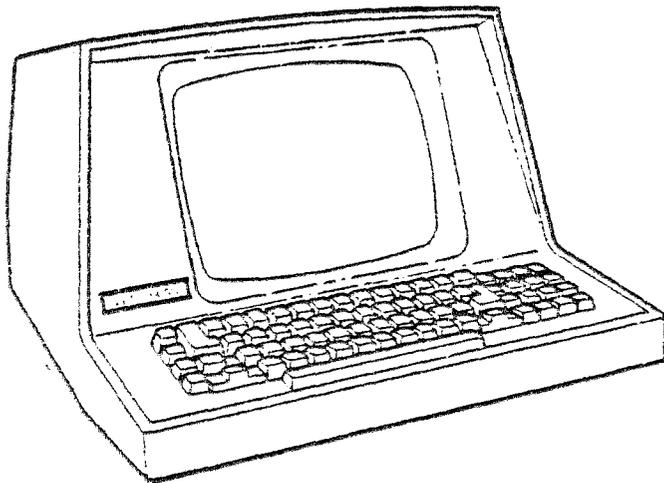


VECTOR 2800

SYSTEM

USERS MANUAL



VECTOR
VECTOR GRAPHIC, INC.

VECTOR SYSTEM 2800

OVERVIEW

Revision 1

USER'S MANUAL

Revision C

August 15, 1980

Copyright 1980 Vector Graphic Inc.

Copyright 1980 by Vector Graphic Inc.
All rights reserved.

Disclaimer

Vector Graphic makes no representations or warranties with respect to the contents of this manual itself, whether or not the product it describes is covered by a warranty or repair agreement. Further, Vector Graphic reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of Vector Graphic to notify any person of such revision or changes, except when an agreement to the contrary exists.

Revisions

The date and revision of each page herein appears at the bottom of each page. The revision letter such as A or B changes if the MANUAL has been improved but the PRODUCT itself has not been significantly modified. The date and revision on the Title Page corresponds to that of the page most recently revised. When the product itself is modified significantly, the product will get a new revision number, as shown on the manual's title page, and the manual will revert to revision A, as if it were treating a brand new product. EACH MANUAL SHOULD ONLY BE USED WITH THE PRODUCT IDENTIFIED ON THE TITLE PAGE.

REPAIR AGREEMENT

The System 2800 sold hereunder is sold "as is", with all faults and without any warranty, either expressed or implied, including any implied warranty of fitness for intended use or merchantability. However, the above notwithstanding, VECTOR GRAPHIC, INC., will, for a period of ninety (90) days following delivery to customer, repair or replace any System 2800 that is found to contain defects in materials or workmanship, provided:

1. Such defect in material or workmanship existed at the time the System 2800 left the VECTOR GRAPHIC, INC., factory;
2. VECTOR GRAPHIC, INC., is given notice of the precise defect claimed within ten (10) days after its discovery;
3. The System 2800 is promptly returned to VECTOR GRAPHIC, INC., at customer's expense, for examination by VECTOR GRAPHIC, INC., to confirm the alleged defect, and for subsequent repair or replacement if found to be in order.

Repair, replacement or correction of any defects in material or workmanship which are discovered after expiration of the period set forth above will be performed by VECTOR GRAPHIC, INC., at Buyer's expense, provided the System 2800 is returned, also at Buyer's expense, to VECTOR GRAPHIC, INC., for such repair, replacement or correction. In performing any repair, replacement or correction after expiration of the period set forth above, Buyer will be charged in addition to the cost of parts the then-current VECTOR GRAPHIC, INC., repair rate. At the present time the applicable rate is \$35.00 for the first hour, and \$18.00 per hour for every hour of work required thereafter. Prior to commencing any repair, replacement or correction of defects in material or workmanship discovered after expiration of the period for no-cost-to-Buyer repairs, VECTOR GRAPHIC, INC., will submit to Buyer a written estimate of the expected charges, and VECTOR GRAPHIC, INC., will not commence repair until such time as the written estimate of charges has been returned by Buyer to VECTOR GRAPHIC, INC., signed by duly authorized representative authorizing VECTOR GRAPHIC, INC., to commence with the repair work involved. VECTOR GRAPHIC, INC., shall have no obligation to repair, replace or correct any System 2800 until the written estimate has been returned with approval to proceed, and VECTOR GRAPHIC, INC., may at its option also require prepayment of the estimated repair charges prior to commencing work.

Repair Agreement void if the enclosed card is not returned to VECTOR GRAPHIC, INC. within ten (10) days of end consumer purchase.

System 2800 User's Manual

FOREWORD

Audience	This manual is intended for computer distributors, or others with at least a moderate technical knowledge of small computers.
Scope	It will describe how to install the Vector Graphic System 2800, how to initialize the software and how to use the disks.
Organization	Each section is written at a uniform level of technical depth. "Perspective" tells WHAT the system does and requires only a moderate knowledge of computer systems. "User's Guide" describes HOW to use the system and assumes the same level of knowledge.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Table of Contents	
I. Perspective	
1.1 Introduction.....	1-1
1.2 Standard hardware and software.....	1-1
1.3 Optional hardware and software.....	1-2
1.4 Hardware specifications.....	1-3
1.5 Pre-Installation check list.....	1-5
II. Installation	
2.1 Installation of the System 2800.....	2-1
2.1.1 Installing the 8" disk controller board.....	2-1
2.1.2 Connecting the signal cable.....	2-1
2.1.3 Connecting the power cables.....	2-2
2.1.4 Testing.....	2-2
2.1.5 Completing the installation.....	2-3
III. User's Guide	
3.1 Operating the Dualstor 8" Floppy Disk Drive.....	3-1
3.2 Kinds of disks.....	3-1
3.3 Using double, single and mixed density disks.....	3-1
IV. Software Initialization	
4.1 Cold boot.....	4-1
4.2 Warm boot.....	4-1
4.3 Return to Extended Systems Monitor Executive.....	4-2
4.4 Warm start.....	4-2
4.5 Backing up the system disk.....	4-2
4.6 Configuring the personalized system disk.....	4-3
4.7 Custom printer drivers.....	4-8
4.8 Interrupts.....	4-9
4.9 Formatting new disk.....	4-9
4.10 Other CP/M files.....	4-10
V. Drive Removal and Replacement	
5.1 Removal.....	5-1
5.2 Replacement.....	5-1
5.3 Controller board port addresses.....	5-2
5.4 CP/M 2.2 memory map.....	5-3

I. PERSPECTIVE

1.1 Introduction

A System 2800 is a general purpose microprocessor based computer system. It is delivered by Vector Graphic assembled and fully tested, including both hardware and operating system software, including a single/double density disk controller board, two 8" floppy disk drives, drive cabinet, interconnection cables and CP/M* compatible software device handler.

Double density recording gives a storage capacity of 1M bytes per dual sided drive (2 Megabyte total) and a data transfer rate of 500 kilobits/sec.

1.2 Standard hardware and software

- 1) Video console with a keyboard featuring the feel of an excellent electronic typewriter and a 10-key number pad.
- 2) A single/double density disk controller board.
- 3) Two 8" floppy disk drives featuring double density storage capacity of 1 Megabyte per drive.
- 4) 56K of random access memory.
- 5) Capability of interfacing to one serial printer and one parallel printer at a time. The printers involved may include one of Vector's system printers, or any of the many standard printers on the market.
- 6) Communications capability of interfacing to a standard asynchronous modem or acoustic coupler.
- 7) Industry-compatible CP/M 2 operating system, allowing use of most CP/M compatible software.
- 8) Microsoft Basic 80, release 5, one of the fastest and most powerful general purpose languages available, used in conjunction with CP/M.
- 9) Additional powerful software development tools including SCOPE - an advanced screen-oriented program editor; RAID - a full-screen simulator-debugger for assembly language programs; the ZSM assembler using the 8080-superset mnemonics; and the Extended Systems Monitor on ROM, allowing direct manipulation of memory and input/output.

*CP/M is a trademark of Digital Research, Inc.

10) Computer electronics consisting of:

- a) Chassis with heavy duty power supply and 6-slot fully shielded and terminated S-100 motherboard.
- b) High-speed (4 MHz) Z-80 CPU board.
- c) 64K Dynamic RAM board.
- d) Flashwriter II Video board featuring a replaceable character set.
- e) 8" floppy disk drive controller board.

1.3 Optional hardware and software

- 1) Vector Graphic offers two system printers, the Sprint 3 letter-quality daisywheel printer, and the MP dot matrix printer which prints 150 characters per second.
- 2) Memorite word processing software from Vector Graphic.
- 3) Peachtree ready-to-use general business accounting software from Vector Graphic, including programs for Accounts Receivable, Accounts Payable, General Ledger, Payroll, and Inventory Management.

1.4 Hardware Specifications

POWER

For a system with 1 terminal, 2 8" drives, and 1 Sprint 3 printer

Voltage option	115 VAC + 10%	220 VAC + 10%
Frequency	60 Hz + 0.5%	50 Hz + 0.5%
Current, Operating	1.0 Amps	0.5 Amps
Current, Surge	15 Amps	7.5 Amps
Power Dissipation	110 Watts	110 Watts
Heat generation	1200 BTU	1200 BTU

8" FLOPPY DISK DRIVES

Capacity: unformatted - 0.4 Mbytes single density/single sided
1.6 Mbytes double density/double sided.
IBM format- 0.256 Mbytes single density/single sided,
1.03 Mbytes double density/double sided.

Latency (average): 83 milliseconds

Access time - track-to-track: 3 milliseconds
average: 91 milliseconds

Settling time: 15 milliseconds

Head load time: 35 milliseconds

Rotational speed: 360 RPM

Track density: 48 TPI

Tracks/disk: 154 (double sided disk)
77 (single sided disk)

Environmental limits: Operating temperature 5 deg C to
43 deg C (41 to 110 deg F). Storage temperature
-10 deg C to 45 deg C (14 deg F to 113 deg F).
Relative humidity operating 20 to 80%. Relative
humidity storage 8 to 80%.

AC power requirements 110/115 VAC installations: 110/115 VAC
+10%, 50/60 Hz +1%, 0.8A max (start up),
0.3A max (running).

AC power requirements 200/230 VAC installations: 200/230 VAC
+110%, 50/60 Hz +1%, 0.6A max (start up),
0.3A (running).

DC power requirements: +24V +10%, +5V +5%.

CONTROLLER

Data transfer rate - single density: 250K bits/sec.

Data transfer rate - double density: 500K bits/sec.

Diskette format - single density: IBM 3740.

Diskette format - double density: IBM SYSTEM 34

Controller port addresses - E0H to E5H

1.5 Pre-installation check-list

- 1) The System 2800 can be ordered for either 110 or 220 volt power sources. Make sure that the system to be installed has the proper power supply for the power supply in your region.
- 2) It is recommended, but not required, that the power line to which the computer is connected be a "dedicated" power line; that is, the line comes directly from the building's power source, no other devices except another System 2800 making use of it, and that it is well grounded. The intent in this recommendation is to eliminate electronic "noise" on the power line which can effect the reliability of the system, and to avoid the loss of data if the circuit breaker is tripped because another device short circuits or too many devices are connected. It is particularly critical that heavy machinery not be connected to the same power line.
- 3) Do not install more than two system 2800's per 20A circuit.
- 4) Extension cords are not recommended.
- 5) Special air-conditioning and raised floors are not required for a system 2800. It will function in a normal office environment.
- 6) Do not install a System 2800 in abnormally dusty or dirty environments, due to the effect on the disk drives and diskettes.
- 7) Make sure there is adequate area for all equipment, and there is adequate desk space next to the console. The console must be low enough for comfortable typing. There must be some space left to the rear of the console for adequate ventilation.
- 8) Make sure the console is not directly opposite a bright open window, as that will create a glare on the screen.
- 9) If the carpet in the computer area is a shag or thick carpet, and if there is a lot of foot traffic near the computer, or if the operator's chair has rolling casters, there may be a build up of static in the operator and people passing by that can discharge into the system and cause the system to malfunction. If you anticipate or experience this problem, spray the carpet with anti-static spray available in many electronic supply and carpet distributors. If the system is still affected by static, we recommend the purchase of a 3M anti-static mat to be placed on the floor in the computer area.

II. INSTALLATION

2.1 Installation of a System 2800

- 1) Inspect all cartons for external signs of damage. If any damage is observed, have the delivery agent note the damage on the shipping document. Some shippers may wish to be present when the container is opened if external damage is apparent.
- 2) Open all cartons, remove the packing material, and then remove the equipment and manuals. If present, remove plastic bags from the equipment.
- 3) Place the computer console in a horizontal position with the Dualstor 8" floppy disk drive cabinet as near as possible. Be sure not to bump or jar the disk drive cabinet, as this can throw the disk drives out of alignment.
- 4) Using a Philips head screwdriver, remove the four Philips head screws, two on each side, holding the console cover to the chassis. Remove the cover. Carry out a quick internal inspection, checking for obvious shipping damage and loose boards due to shipping vibration. Press each board down firmly making sure it is fully inserted in its slot. If you find any obviously broken boards or parts, do not use the equipment in order to avoid further damage, or unexplained malfunction at the user's site at a later date. Report the damage to the carrier and report the damage to qualified service personnel or Vector Graphic.

2.1.1 Installing the 8" disk controller board

NOTE:

If your System 2800 comes with the Disk Controller Board already installed, skip directly to section 2.1.2.

With the computer power off, insert the controller board in any of the empty slots in the motherboard. The board should be firmly seated in the connector at the back of the slot. The board edges should be in the card edge guides corresponding to that slot. Mount the board with the component side toward the rear of the computer. Verify this by comparing the board you have installed with the boards already mounted in the motherboard. All the boards installed should have the component side facing the same direction.

2.1.2 Connecting the signal cable

- 1) Coming from the rear of the Dualstor is a 50-wire flat signal cable with a 50-pin connector on the end. This connector mates with a 50-pin connector on the top edge of the controller board. When making this connection, make certain that pin 1 on the connector matches pin 1 on the controller board.
- 2) You can make this identification as follows. Notice that the 50-wire cable coming from the back of the Dualstor unit is color coded on one side

and not on the other. As the unit leaves the factory, the color coded side faces down. When the cable is in this position, the wire which is attached to connector pin 1 will be on the right hand side of the cable. You can further identify this by the blue and pink alternating stripes on this side of the cable. One edge of the cable should start with a blue stripe. This identifies the wire which should be attached to connector socket 1. Now carefully examine the 8" disk controller board. It has a fifty pin connector on top arranged in two rows of 25 pins each. Be sure not to confuse it with the 34 pin connector on the top of the ZCB single board computer in your system. Notice that there is a small numeral "1" silkscreened near one end of the 50 pin disk controller cable connector.

3) Connect the cable connector into this socket so that the connector socket 1 attached to the cable connects to pin 1 on the connector.

2.1.3 Connecting the power cables

1) Connect the DC power cable (provided with the Dualstor) between the 6-pin connector on rear panel of the Dualstor and the 6-pin connector on the rear of the Vector 3. Note: The term Vector 3, as used in this manual, refers to the complete microcomputer system housed in the console cabinet.

2) Connect the AC power cord from the rear of the console to the auxiliary AC power connector on the rear panel of the Dualstor.

3) Connect the AC power cord from the Dualstor to an appropriate wall receptacle.

4) Check now that all connections have been made properly and that all boards are seated properly in their sockets.

2.1.4 Testing

1) Make sure no disks have been inserted in their slots. Also be careful around the unit with the cover off. Potentially lethal voltages are present. Turn the Vector 3 unit on by switching on main power at the rear of the unit. Turn on the Dualstor AC Power. The Vector 4.1 Monitor banner should appear on the console screen.

2) Make the following test on the unit. MAKE SURE NO DISKS ARE INSERTED!

Before booting your CP/M disk for the first time, test your connection to the controller by typing V (for boot Dualstor) without any disks in drive A. The Monitor prompt should return immediately. If the light on drive A stays on, do not try to boot up the CP/M system disk. Turn your power off and check your controller cable connection, it may need to be reversed. Even if you check your connection according to the instructions above and all checks out properly, there is a chance that your cable has the connector installed upside down. If your unit fails to boot properly, yet has a functioning Monitor program, turn the Vector 3 console and the Dualstor power off and reverse the connector on the 8" disk controller board. Turn on the power and test again. If this fails to clear the problem, contact your authorized

Vector Graphic service representative immediately. Do not try to use the unit.

2.1.5 Completing the installation

1) At the rear of the console, the basepan (bottom cover) has an angled section which is slightly larger than the the flat cable. Remove the black strain relief bracket which is attached to the angled section with two screws. Route the flat cable from the controller board out the rear of the console by clamping the cable to the angled section with the strain relief bracket.

2) To replace the console cover, fasten the cover to the basepan using the four Philips head screws removed in cover removal procedure. Tighten screws securely using a Philips head screwdriver.

III. USER'S GUIDE

3.1 Operating the Dualstor 8" Floppy Disk Drives

- 1) Turn on the power switch at the rear of the Vector 3 console.
- 2) To turn on the disk drives and the Vector 3 computer press the rocker switch marked "POWER" on the front panel of the DualStor.

NOTE:

If you have not already done so, test your connection to the disk controller by typing V (for boot Dualstor) without any disks in drive A. The Monitor prompt should return immediately. If the light on drive A stays on, do not try to boot up the CP/M system disk. Turn your power off and check your controller cable connection, it may need to be reversed.

3) Insert a system disk in the right hand drive, drive 0, with the label side up. Press down on the door until it locks in the closed position. In order for the System 2800 to work, a Vector Graphic 4.1 banner and prompt must appear on the screen after the system warms up.

4) Depress the V key on the keyboard and the Vector 3 will access drive and load the operating system into the computer. When the drive is accessed you will hear a click or series of clicks as the head is loaded and unloaded onto the disk surface. The red LED in the door release button will glow brightly as the disk is being accessed.

5) To remove a disk, simply press in on the front panel door release button.

3.2 Kinds of Disks

For 8" floppy disk drives there is a choice of using industry standard 8" double sided, double density or single sided, single density soft sector (IBM format) disks. There will be no sector holes in the disk and one index hole around the edge of the center hole. Record length should be 256 bytes for double density versions and 128 bytes for the single density version. Get these disks from computer stores or from other computer supply sources. **DO NOT USE 8" DISKS THAT HAVE BEEN HARD SECTORED; THEY WILL NOT WORK.**

3.3 Using double, single and mixed density disks

The CP/M System Disk comes configured with a mixed density CP/M operating system. This means that when you boot up your disk, you have the capability of accessing either a single or double density disk. Drive numbers A, B, C and D are used for double density. Drive numbers E, F, G and H are used for single density. Therefore, if you boot up your disks in mixed density, (designated by the CP/M sign-on "VECTOR GRAPHIC XXK CP/M VERSION 2.XX MD") and type "DIR F:", the system will look at the second drive for a single

density disk. If you reconfigure your operating system for either single or double density using the MOVCPM/S or MOVCPM/D commands, the drives will be numbered normally.

There are three system files on the CP/M System Disk. MOVCPM/S, MOVCPM/D, and MOVCPM/M. These files are used to construct single, double, and mixed density CP/M operating systems respectively. Single and double density systems should be used when more TPA area is needed. The mixed density program is approximately 1K larger than the single density or double density programs.

CAUTION

Do not try to put a single density CP/M operating system on a double density disk or a mixed or double density CP/M operating system on a single density disk.

When booted up under the single density CP/M operating system, (VECTOR GRAPHIC XXK CP/M VERSION 2.XX SD) drive numbers A, B, C and D are used for the first four drives, and single density/single sided disks only may be accessed.

When booted up under the double density CP/M operating system (VECTOR GRAPHIC XXK CP/M VERSION 2.XX DD) drive numbers A, B, C and D are used for the first four drives, and double density/double sided disks only may be accessed.

The Format/8 Program provides for formatting blank disks for either single or double density.

In order to transfer files back and forth from 5 1/4" to 8" floppies, put a 5 1/4" disk controller into the system 2800 and boot up on the Dualstor in mixed density. Drive numbers I, J, K and L are then used to refer to the 5 1/4" drives. Simply use PIP to transfer files back and forth. Remember that the backup and format programs are different for the 5 1/4" and 8" systems.

IV. SOFTWARE INITIALIZATION

4.1 Cold boot

Use the following procedure every time you want to begin using CP/M. It is called the "cold" boot procedure.

- 1) Connect all hardware.
- 2) Make sure no disks are mounted.
- 3) On the System 3 console, turn the power switch on the rear of the console to the on position. On the 8" floppy disk drive front panel turn the power switch on.

A banner will appear on the operator's console saying "Vector Graphic Monitor, Version 4.X", and "MON>" will appear on the left edge of the screen. The "MON>" is the prompt telling you that the computer's Monitor's executive is waiting for a command.

- 4) Insert and mount a Vector Graphic CP/M 2.x System Disk in drive A.
- 5) Depress V on the keyboard. Drive A should activate as indicated by its small red lamp. In a moment, you will see a banner reading "Vector Graphic 56K CP/M - VERSION 2.2x." Then a "A>" will appear on the left edge of the screen. This prompt indicates that the CP/M executive is waiting for a command. The CP/M executive is normally called CCP, which stands for Console Command Processor.

4.2 Warm boot

If you have CCP running, and then remove the system disk from drive A and replace it with a different Vector Graphic CP/M 2.x System Disk, you MUST perform a "warm boot" operation. This tells CP/M that a different system disk is in the drive. If you do not do the warm boot, CCP will work, but CP/M will not allow you to do anything that will alter the system disk now in the drive.

To do a warm boot, depress control-C after the A> prompt.

A Note on the System Error Message:

A SYSTEM ERROR message will appear under certain conditions. They generally fall under the category of attempting a warm boot of a CP/M diskette that is a different memory "size" than the original CP/M system diskette. This is particularly apparent during SYSGEN or MOVCPM procedures. When this condition occurs, the phrase "SYSTEM ERROR" will appear and any subsequent depressions of any key will cause the phrase to be repeated. To clear this condition, depress the reset key on the mainframe and reboot the disk.

Previous versions of CP/M would either return you to the Monitor program without explanation or freeze the keyboard thereby forcing you to hit the Reset button.

4.3 Return to Extended Systems Monitor executive

If you want to boot up from a different disk, or make use of any other Extended Systems Monitor command (see Extended Systems Monitor manual), you have to get back to the Monitor's executive. The RESET button on the rear of the computer chassis will accomplish this but is not always convenient. Therefore, Vector Graphic CP/M 2.x contains a special command which returns control to the Extended Systems Monitor executive.

The procedure is: after the CCP A> prompt, type MONITOR (return). You will immediately see the Monitor prompt appropriate to the type of system you have.

4.4 Warm start

If you were using CP/M and you returned to the Extended Systems Monitor executive, you can generally return to the CCP without rebooting your system disk. This is assuming you did nothing to destroy CP/M in memory. Following any Monitor prompt, simply type G 0000. In some Monitor executives, there are also single letter commands that accomplish this. In the 4.1 Monitor, depress L after the MON> prompt.

4.5 Backing up the system disk

Do not place a write-enable tab on the 8" CP/M System disk. Do not ever modify or configure this disk. You are allowed, within the CP/M licensing agreement, to copy this disk as many times as needed for your own system, so long as the copies are not sold. Thus, any procedures which you do to personalize CP/M for your particular system, as described later in this part, can be done to a COPY of the master. Such a copy is called "Personalized" Vector Graphic CP/M 2.x System Disk.

Immediately after cold booting your serialized Vector Graphic CP/M 2.x System Disk the first time, create a Personalized Vector Graphic CP/M 2.x System Disk. Use it from then on.

The following is the procedure for copying a Vector Graphic CP/M 2.x System Disk or any CP/M 2.x data disk. Use it to create your first Personalized disk from the original. Then, use it later to create subsequent copies of the Personalized disk, after it has been modified as explained later in this manual.

- 1) Make sure you have nothing you want to save in memory, because it will be erased.
- 2) Mount the CP/M system disk you want to backup in drive A. Place a write enable tab over the notch in a fresh, unused 8" soft sectored disk and mount it in drive B. The unused disk does NOT have to be formatted beforehand.

3) If necessary, either warm boot or cold boot the CP/M on the disk in drive A (unless already running and its CCP is in control).

4) When the A> appears, type BACKUP/8 (return). The program will come back with:

VECTOR GRAPHIC BACKUP for 8 inch disks. V1.x

SOURCE DRIVE (A,B,C OR D) :

5) In response, type A. In response to the question:

DESTINATION DRIVE (A,B,C OR D) :

type B. In response to the command:

READY BOTH DRIVES AND PRESS RETURN -

press the (return) key. The backup process will take approximately 9 minutes at this point.

6) At the end of the process, or earlier if an error occurs, you will see a message on the screen following the last line. This message tells you whether or not the copying process succeeded. Always look for it. If successful, you will see "FUNCTION PERFORMED CORRECTLY". If unsuccessful, you will see an error message such as "RECORD NOT FOUND !!" or "DISK IS WRITE PROTECTED !!!", in addition to a message which tells the user which track and sector the program stopped on. If unsuccessful, you should usually remount the disk, then go to step 7 and try the process at least one more time.

7) In response to the statement "(A)-AGAIN OR (R) -RETURN TO CP/M : " type an R to return to the CCP, and type an A if you want to make another copy of the same disk. If the latter, mount the next fresh diskette in drive B and return to step 5.

4.6 Configuring the Personalized System Disk

The procedure in this section has four purposes:

- 1) To set up CP/M for the printer you are using.
- 2) To enable automatic page feeding of printer output produced by PIP or applications programs.
- 3) To create an "auto" command and selecting when it is used.
- 4) To save the above selections on your Personalized CP/M System Disk.

The following explains each of these issues.

(A) Printers

Printer drivers are present on the system disk for Qume/Diablo protocol printers, Centronics protocol printers, and standard serial (Teletype or Decwriter) type printers. You can choose any one of these drivers during the configuration procedure.

Alternately, you can set CP/M up to make use of one of Vector Graphic's own printers, called "system printers." The software driver for a Vector Graphic system printer is contained on a PROM installed within the computer at the time the printer is attached. If you are using such a printer, you must select the "system printer" option during the configuration procedure. This will make use of whatever Vector Graphic printer happens to be attached.

If you have no printer, then you should select the "no printer" option.

(B) Automatic paging

The CP/M logical lister is the software pathway used by PIP printed output, assembler printed output, and applications program printed output. The logical lister routine does NOT normally insert any page breaks in the output stream, so that IF the software which originated the output ALSO does not insert any page breaks, then the output will print on top of the perforations of continuous form paper. The ZSM assembler does insert page breaks, so that you do not have to worry about it. The same is true for some applications programs. However, if the program generating the printed output does NOT insert page breaks, then there is a way for you to request that the logical lister do this. This is part of the configuration procedure. Remember, you only want to enable this "auto paging" if the program generating the printed output does NOT in itself take care of page breaks.

This is particularly useful when writing applications programs that have printed output. If you use the automatic paging option in the CP/M configuration procedure, you do not have to build a line-counter and paging capability into your application program.

You must be careful however if you do this. As mentioned above, the ZSM assembler which comes on the Vector Graphic CP/M System Disk DOES do automatic paging itself. If you choose automatic paging in the configuration procedure, then the printer will skip an EXTRA page each time it goes to a new page when printing ZSM assembler output. Therefore, before printing assembler output, you must rerun the configuration procedure and disable the automatic paging option.

(C) Form length commands

Some printers can recognize form length commands such as the Sprint 3 and the Vector MP. If your printer is able to do this and you want to use this feature, you can respond by typing Y to this question. The program will then ask you to input the form length in inches (usually 11", the default

value.) Maximum permissible length is 21-1/2", program will ignore any input longer than this.

(D) Auto commands

An auto command is a CCP command that is executed automatically when CP/M is booted up. You have the choice of making the command take place either upon a cold boot, a warm boot, or both. As an example of an auto command, normally you have to type MBASIC (return) after the CCP prompt A> in order to get Microsoft BASIC running (assuming there is an MBASIC on the system disk.) With the auto command "MBASIC (return)" you can cause the system to boot directly into Microsoft BASIC, bypassing the CP/M executive. Further, Microsoft BASIC will automatically load and execute an application program if the name of the program appears after the "MBASIC." Thus, you can create a very impressive turn-key applications system, which goes directly to a user menu, by creating the auto command "MBASIC XXXXX (return)", where XXXXX is the name of the applications program. In this way, the user never interacts with either the CP/M or the BASIC executives.

The auto command is stored on a Vector Graphic CP/M 2.x System Disk. You can only have one auto command per disk. This one auto command is the auto command which is executed automatically when you boot up CP/M 2.x from THAT disk. Of course, a system disk does not have to have any auto command. It is optional. The Vector Graphic CP/M 2.x System Disk has none when it is shipped.

(E) Save configuration selections

You have the choice of making your configuration selections temporary - resident only in memory but not on disk - or saving them permanently on a Personalized CP/M System Disk. Clearly, in order to have an auto command which takes effect in response to a COLD boot, the auto command must be stored on a disk. Thus, if you are creating a cold boot auto command in the configuration procedure, you MUST take the option of saving the configuration selections on disk.

The following is the configuration procedure:

- 1) Mount the Personalized Vector Graphic CP/M 2.x System Disk, the one you want to configure, in drive A, if not already there.
- 2) Make sure CCP is in control. If not, return control to the Extended Systems Monitor executive and cold boot from the disk in drive A. If CCP is in control, then do a warm boot by depressing control-C.
- 3) Following the CP/M executive prompt A>, type CONFIG (return).
- 4) You will then see the following on the screen:

USER CONFIGURATION - VERSION X.X

Printers - (A) Qume/Diablo (B) Standard serial

- (C) Centronics
- (D) System printer
- (E) No printer

Select one of the above :

Depress one of the 5 letter keys according to the type of printer, or no printer. Remember that D, the system printer option, is used only if one of Vector Graphic's system printer PROM's is installed in the computer. Depress the (return) key if you want to leave the printer selection unchanged from its current state.

5) Unless you selected no printer (E), (or depressed (return) and there had been no printer selected), you will then see the following on the screen:

Enable auto-page on non-console list output ? (Y/N)

Depress Y if you want automatic paging when the logical lister is printing, as explained earlier. Depress N if you want to disable this function. Depress the (return) key if you want to leave the automatic paging specification in its current state (either on or off).

6) The CONFIG program will then ask:

Does printer recognize form length commands ? (Y/N)

If your printer is capable of recognizing form length commands and you wish to exercise this option, depress the Y key. The Sprint 3 and the Vector MP are two printers that do recognize form length commands. If you have another type of printer (a Sprint 5, for instance) type N to this question. If you do not wish to change your previous response, depress the (return) key.

If you depressed Y, the program will then ask:

Enter physical form length in inches:

Type in the length of the form you are using, generally 11.

7) You will then see the following on the screen:

- Auto command specification - (A) Execute on cold boot
- (B) Execute on warm boot
- (C) Execute on both
- (D) Clear auto command

Select one of the above :

Depress one of the four letter keys. Make sure you do NOT press (return) after pressing the letter key. If you choose A, this means that the auto command will be executed only when you do a cold boot, as described earlier. B means that the auto command will be executed only when you do a warm boot,

as described earlier. C means that the auto command will be executed when you do either a warm or cold boot. D clears any auto command that was previously created. Depress the (return) key if you want to leave the auto command, or lack thereof, as it is.

If you selected A, B, or C then you will see the following on the screen:

Enter auto command:

Type the exact text of the auto command. Use the same text you would use following the CCP prompt when entering the command normally. For example, type MBASIC (return). Before hitting the (return) key, you can edit the command with BACK SPACE.

If you want to experiment with the auto command feature, use the B option that specifies execution of the auto command on warm boot only, then enter the auto command CONFIG (return). Then complete the configuration procedure. When the CCP prompt A> comes up, do a warm boot by depressing control-C. You will see that the system boots directly back into the CONFIG program. You can then experiment some more.

8) Finally, you will see on the screen:

Do you want selections made permanent ? (Y/N)

(Note: depressing the (return) key is the same as depressing N in this case.)

Depress Y to store your configuration selections on disk. You must depress Y if you want to use or cancel the auto command FROM A COLD BOOT, accomplished in step 5. If you did not specify an auto command from a cold boot, then you may answer either Y or N. N leaves your configuration choices in memory, but does not put them on disk. Such temporary selections will remain in effect until the next time you do a warm or cold boot.

Y puts your selections on disk. Y is the usual choice, because if you have to change selections, you can always change them by re-executing the CONFIG program (i.e. carrying out the configuration procedure in this section).

After depressing Y, the disk will access, and then return control to the CCP. If you get an error message "Error in disk access - abnormal exit," this means that either there is problem with the disk (mounted improperly, damaged, etc.) or the disk does not have a write enable tab on it. Check for the lack of a write enable tab before assuming the former.

9) After you have created your Personalized Vector Graphic CP/M 2.x System Disk and run the CONFIG program at least once, you have a fully personalized system disk. You may at this time back it up using the BACKUP/8 utility explained earlier.

4.7 Custom printer drivers

The "user area" is the part of CP/M which contains the printer drivers. The CONFIG program described above makes changes to the "user area" by activating and deactivating printer drivers as you request. If you type DIR (return) after the A> prompt, you will get a list of the files on the CP/M disk in drive A. If you do this with your Vector Graphic CP/M 2.x System Disk, you will see a file called USERAREA.ASM and another called USERAREA.PRN. The former is an assembly language text file which when you assemble it and load it, replaces the code in the "user area" part of CP/M. The latter is a copy of the printed output produced when you assemble USERAREA.ASM. You can print the latter using the PIP utility. (Type PIP LST:=USERAREA.PRN (return) following the A> prompt.)

You will also see a file called USERCUST.ASM. This is a copy of the "framework" of USERAREA.ASM. It contains the labels of the various routines, the EQU statements, and explanations of what each routine should have in it, but does not contain the actual printer driver routines present in USERAREA.ASM. If you want to create your own printer driver, you do it by writing it within the USERCUST.ASM assembly language text, using the CP/M editor on your system disk. Do not neglect to include in the COLDBOOT routine instructions to initialize the serial ports used by your serial printer and other serial peripherals, if any.

Use ZSM to assemble your modified USERCUST.ASM (i.e. with the Personalized CP/M System Disk in drive A and with CCP in control, type ZSM USERCUST (return).) During the assembly, you will be asked what size the system is. Enter 56 (return) for a 56K computer. You will also be asked what version (single, double or mixed) is required. ZSM will put the assembled code on the disk in drive A, calling the file USERCUST.HEX. Then load USERCUST.HEX into memory using the DDT (Dynamic Debugger) (type DDT USERCUST.HEX (return).) This causes USERCUST.HEX to overlay the user area, as desired. DDT is finished when a "-" appears. Depress control-C to return to CCP.

With a serial printer, the computer's serial ports must be reset before printing. A cold boot always does this, but the CONFIG program also does it by calling the COLDBOOT routine in the user area if a printer is selected. Hence, before testing a new serial printer driver, run the CONFIG utility and select ANY of the three standard printers (this will not damage your custom driver.) Just press (return) in response to the other questions. You can now test your printer.

When you are satisfied with it, to save this new user area onto your Personalized CP/M 2.x System Disk, execute the CONFIG program (again). When it asks you which printer you are using, and whether you want auto paging, just press the (return) key. If you do not want to change the auto command, also depress the (return) key in response to that request. Finish by responding Y to the question "Do you want your selections made permanent". (Note to programmers: when CONFIG saves the user area, it resets to zero the page position of the logical lister.)

4.8 Interrupts

For the benefit of systems programs, we have changed the way that CP/M deals with interrupts. In Vector Graphic CP/M 2.x, if a user program enables interrupts, then CP/M will leave them enabled, except for very short periods during disk access.

4.9 Formatting new disks

As explained in Section 2, you may want a disk that does not have CP/M on it, but only has desired program or data files. Before saving such files on such a disk, you have to "format" the disk. Remember, however: you do NOT have to format a disk before backing up an ENTIRE disk onto it using the BACKUP/8 utility.

To format a disk, make sure you have a Vector Graphic CP/M 2.x System Disk in the drive that is logged in, usually drive A. Put the disk you want to format in one of the other drives. Then, following the CCP A> prompt, type FORMAT/8 (return). You will see on the screen:

```
VECTOR GRAPHIC FORMAT for 8 inch disks. V1.x
```

```
SELECT UNIT TO BE FORMATED (A,B,C, OR D) :
```

Enter the letter for the drive containing the disk you want formatted. Make sure you do not enter the letter of the drive containing the CP/M System Disk. You will next see on the screen:

- 1.) SINGLE DENSITY
- 2.) DOUBLE DENSITY
- 3.) CHANGE DRIVE
- 4.) RETURN TO CP/M

```
SELECT COMMAND FROM ABOVE (1-4) :
```

Type the number of the command you wish to implement. The program will then display:

```
INSERT BLANK DISK AND PRESS RETURN -
```

Make sure the blank disk with the write enable tab affixed is in the desired drive, then press the (return) key. The program will confirm the choices you have made by displaying a message such as:

```
FORMATTING DRIVE B IN DOUBLE DENSITY
```

Several minutes will go by. When completed, the system will either report,

"FORMAT COMPLETE" or "PERMANENT DISK ERROR." Then you will see on the screen:

(R) RETURN TO SYSTEM (F) FORMAT ANOTHER DISK

SELECT ONE OF THE ABOVE :

Depress either R or F. The latter gives you the opportunity of quickly formatting an additional disk, or to try again in case of a disk error. Otherwise depress R. The system will return to CCP, showing the A> prompt.

4.10 Other CP/M files

There are many additional files on your CP/M system disk. All are explained in your CP/M documentation which you received with your system.

V. APPENDIX

5.1 Drive Removal

- 1) Eject the disk if installed. Disconnect AC and DC power cables.
- 2) Using a Philips head screwdriver, remove the four screws securing the top cover to the chassis. Remove the top cover.
- 3) Remove two screws attaching each carrier assembly to bezel door on front panel.
- 4) Remove two screws attaching each drive to front bezel. Bezel doors are now loose.
- 5) Remove screw holding spacer to front panel between the two drives. Remove spacer.
- 6) Remove five screws holding front panel to chassis (two screws on each side, one on the bottom).
- 7) Lift up on front panel and bezels will pop out. Carefully slide bezel doors through openings in front panel toward the rear of the chassis.
- 8) Disconnect AC and DC power connectors on the rear of the drives by carefully squeezing the latches together and pulling the connectors loose from the drives.
- 9) Remove four screws on the bottom of each drive and remove drives.

5.2 Drive Replacement

- 1) Slide the bezels through the front panel openings by lifting the panel and hooking the latches on the front of the bezels to the front panel. The drive is now in the chassis.
- 2) Replace the screws holding the front panel to the chassis (two screws on each side and one on the bottom).
- 3) Replace two screws inside front panel attaching bezel to drive.
- 4) Holding carrier assembly firmly against front panel, replace two screws through each carrier assembly into bezel door.
- 5) Add spacer using screw removed in step 5 of removal procedures.
- 6) Replace top cover using four screws removed in step 2 of removal procedure

5.3 Port addresses used by the 8" disk controller board

The controller board is shipped with the following port addresses preselected for the signals listed.

<u>Port</u>	<u>Input</u>	<u>Output</u>
E0	Status	Command
E1	Track	Track
E2	Sector	Data
E3	Data	Data
E4	DRQ Status	Drive, Side, Double density select
E5	DRQ Wait	
E6	Serial Data	Serial Data
E7	Serial Status	Serial Command

Ports X0 thru X5 are located on the 1793 chip. Ports X6 and X7 are on the 8251 chip (refer to Intel 8080 user's manual).

The Qume jumper locations are listed below.

1. X - Open
2. DC - Open
3. D - Open
4. C - Jumper
5. I - Jumper
6. R - Jumper
7. DS1, 2, 3, 4 Select appropriate drive address
8. TM1 and TM2 Install on drive A only
9. HL - Open
10. DS - Open
11. RI - Jumper
12. RR - Jumper
13. Y - Jumper
14. Z - Open
15. A - Jumper
16. B - Jumper
17. 2S - Open
18. DL - Open
19. WP - Jumper
20. NP - Open

System 2800 User's Manual

5.4 CP/M 2.2 memory map

<u>MODULE</u>	<u>SYSGEN IMAGE</u>	<u>48K SYSTEM</u>	<u>56K SYSTEM</u>
---------------	---------------------	-------------------	-------------------

5-1/4" Drives

BOOT	0900H	016BH	016BH
CCP	0A00H	A000H	C000H
BDOS	1200H	A800H	C800H
BIOS	2000H	B600H	D600H
USERAREA	2700H	BD00H	DD00H
TOP USER ADDRESS		A800H	C800H

Mixed 5-1/4" and 8" Drives

BOOT	0900H		0300H
CCP	0100H		B800H
BDOS	1200H		C000H
BIOS	2000H		CE00H
USERAREA	2C00H		DC00H

Double Density 8" Drives

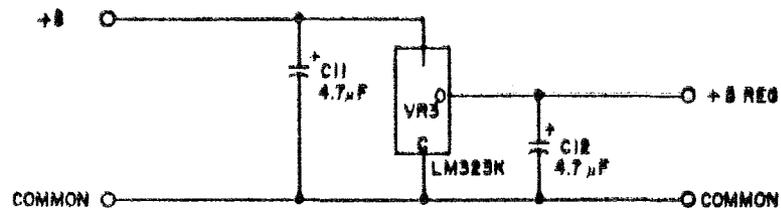
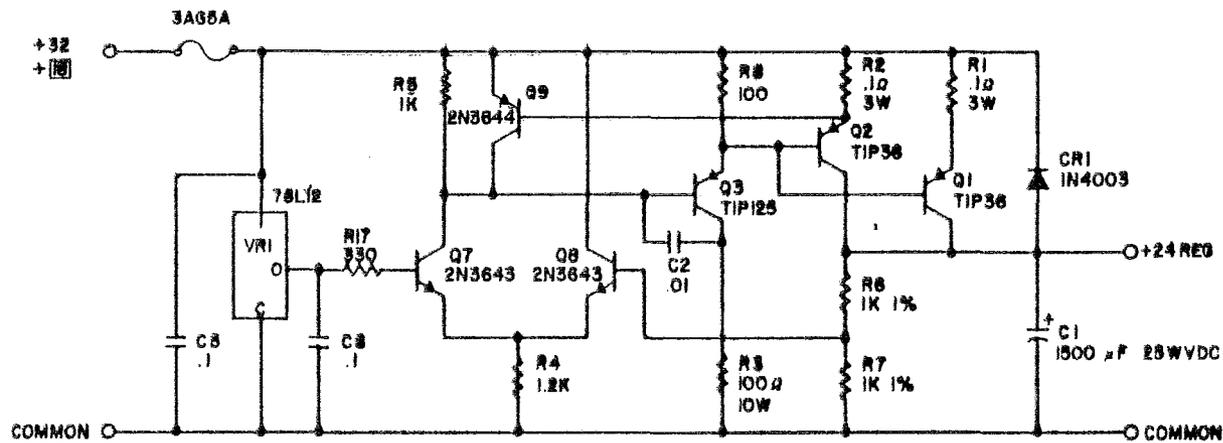
BOOT	0900H		0300H
CCP	0A00H		BD00H
BDOS	1200H		C500H
BIOS	2000H		D300H
USERAREA	2A00H		DD00H

Single Density 8" Drives

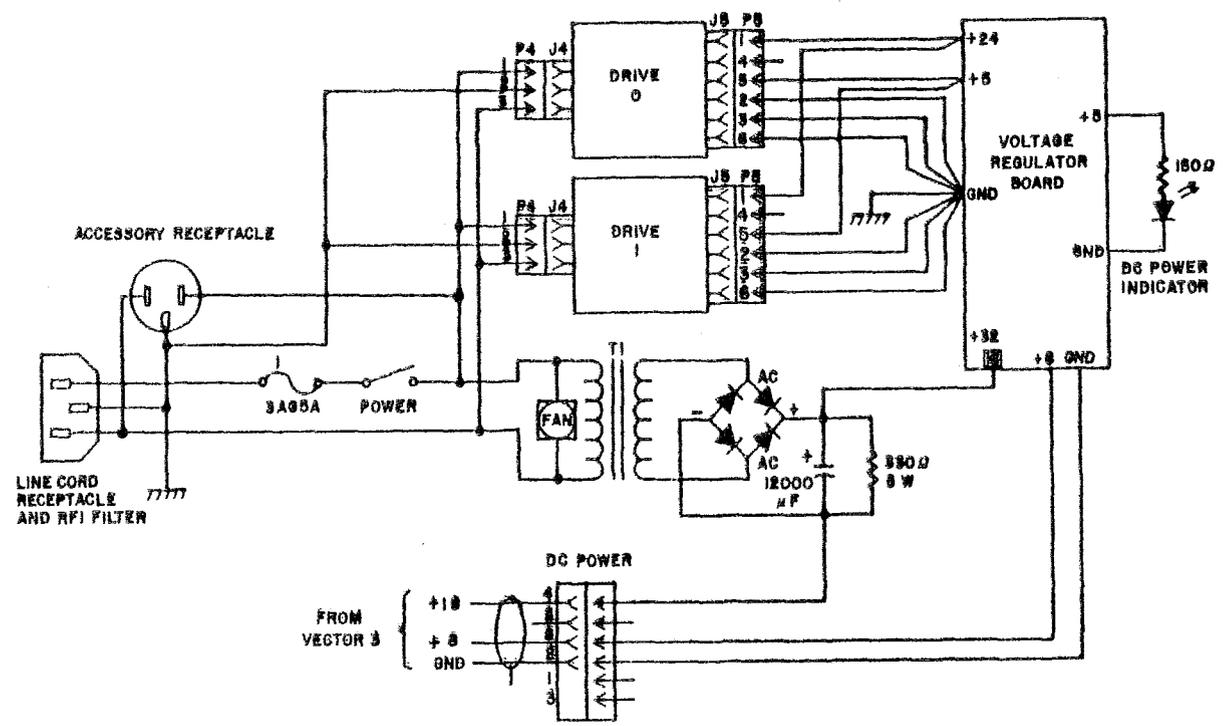
BOOT	0900H		0300H
CCP	0A00H		BE00H
BDOS	1200H		C600H
BIOS	2000H		D400H
USERAREA	2A00H		DE00H

ADDENDA FOR 8" PEACHTREE DISKS

The Peachtree Software for the double sided, double density version of the System 2800 has been shipped on two disks instead of the five disks mentioned in the manual. The first disk contains the Accounts Receivable, Accounts Payable, General Ledger and Payroll packages. The second disk contains the Inventory package. Follow the standard instructions for configuring the disk with the four packages with one exception: when asked to enter the Auto Command in the CONFIG program enter MBASIC4 MENU.



APPLICATION	DWN	DATE	VECTOR GRAPHIC INC.
NEXT ASSY USED ON	A.D.S.	10-10-90	
	CRD	DATE	
	ENG	DATE	
	APVD	DATE	
DIMENSIONS IN INCHES	SCALE	SHEET	CODE I.D. DWG NO
TOLERANCES	2:1	1 OF 1	
FRACTIONS -			3884-0000-00-00
ANGLES -			
XXX - ±.003			SIZE
			C



APPLICATION		DWN	DATE	VECTOR GRAPHIC INC.
NEXT ASSY	USED ON	A.D.S.	10-10-80	
		CKD	DATE	TITLE
		ENG	DATE	DUAL STOP FOR DISTRIBUTION
DIMENSIONS IN INCHES		APVD	DATE	CODE I.D. DWG NO.
FRACTIONS -		SCALE	SHEET	3355-0000-00-00
ANGLES -		2:1	1 OF 1	SIZE
XXX - ±.003				C
XX -				