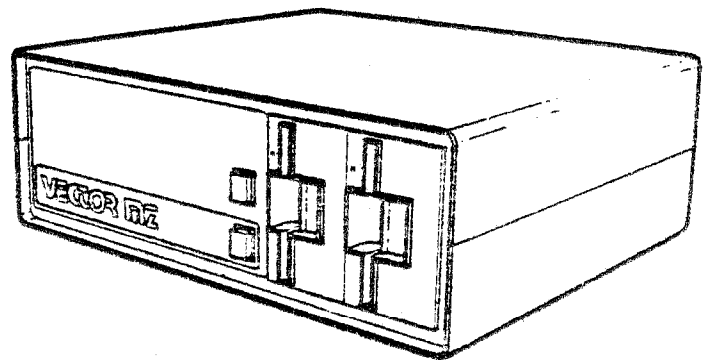
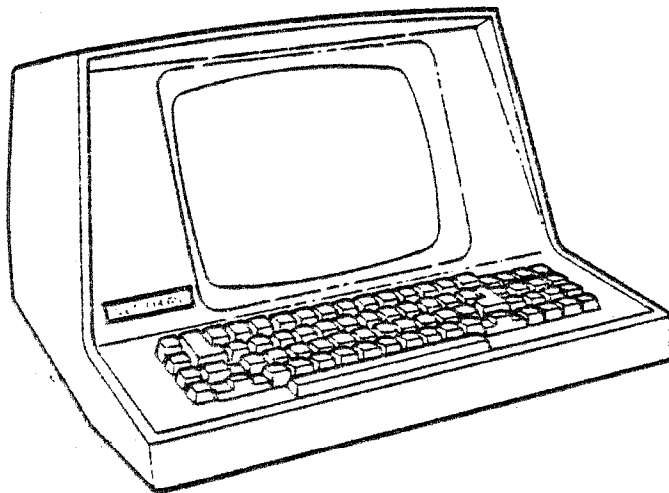


VECTOR 3030

# SYSTEM

OVERVIEW MANUAL



**VECTOR**  
VECTOR GRAPHIC, INC.



VECTOR SYSTEM 3030

OVERVIEW

INSTALLATION, USE, AND MAINTENANCE MANUAL

REVISION B

July 29, 1980

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FOREWORD

Audience	This manual is intended for dealers, distributors, salespersons, consultants, and service personnel. It requires a minimum of technical knowledge.
Scope	It describes what the Vector Graphic Vector System 3030 and its variations do, what major components these systems consist of, how to install, how to use (generally), and how to maintain (generally) the systems.
Organization	For many dealers and users, no other hardware manuals will be necessary, though technicians will make use of the more technical publications. Users will reference specific software manuals, depending on the particular application.





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I. PERSPECTIVE

1.1 Introduction

A Vector System 3030 is an economy sized, general purpose, microprocessor based computer, emphasizing modularity and commonality of components. It is delivered by Vector Graphic assembled and fully tested, including both hardware and operating system software, and including one Megastor memory module which consists of a 32 Mbyte (formatted) hard disk drive and two quad density mini-floppy disk drives.

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) An 8" Winchester-type hard disk drive capable of storing 32 Mbytes (equivalent of 44 floppy disk subsystems).
- 3) Two quad-density Micropolis 5 1/4-inch diskette drives, providing a total of 630,000 characters of on-line storage (1232 256-character sectors per diskette);
- 4) 56K of available random-access memory;
- 5) Capability of interfacing to one printer at a time, either one of Vector's system printers, or one of the many standard printers on the market;
- 6) Communications capability to interfacing to a standard asynchronous modem or acoustic coupler; standard software with the system enables 30 characters/second (i.e. 300-baud) emulation of a "dumb" serial terminal;
- 7) Industry-compatible CP/M 2 operating system, allowing use of most CP/M compatible software on the system.
- 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 PROM, allowing direct manipulation of memory and input/output.

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) ZCB Single Board Computer
- c) 64K Dynamic RAM board
- d) Flashwriter II Video board featuring a replaceable character set
- e) Floppy disk drive controller board
- f) Hard disk drive interface board

1.3 Optional hardware and software

- 1) Up to three additional hard disks can be added.
- 2) The system can support two additional diskette drives, by adding an additional Microstor module.
- 3) Vector Graphic offers the Sprint 3 letter-quality daisywheel printer as a system printer.
- 4) Memorite word processing software from Vector Graphic.
- 5) Peachtree ready-to-use general business accounting software, from Vector Graphic, including programs for Accounts Receivable, Accounts Payable, General Ledger, Payroll, and Inventory Management.

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## 4 Hardware specifications

### POWER

For a system with 1 terminal, 2 Micropolis drives, 1 Sprint 3 printer

Voltage option	115 VAC +/-10%	220 VAC +/-10%
Frequency	60 Hz +/- .5%	50 Hz +/- .5%
Current, Operating	3.5 Amps	1.5 Amps
Current, Surge	15 Amps	7.5 Amps
Power Dissipation	385 Watts	385 Watts
Heat Generation	1200 BTU's	1200 BTU's

### DIMENSIONS AND WEIGHT

	Height inches/cm	Depth* inches/cm	Width inches/cm	Weight lbs/kg
Console	12.8/32.4	18/45.7	21/53.3	22/10
Megastor Drive	7/17.8	17/43.2	20/50.8	54/24
Sprint 3 printer	7.5/18.0	18.5/47.0	23.6/60.0	28/12.7

\* Dimensions do not include requirement for cabling, typically 4 in./10.2 cm.

### ENVIRONMENT

	Operating	Storage
Temperature	10 to 32 C	-34 to 65 C
Humidity (non-condensing)	20-80%	20-80%

### SPRINT 3

Speed	55 characters/second
Paper Width	14 inches
Print quality	Tested to manufacturer published acceptance specifications

### COMMUNICATIONS

Interface	RS-232C
Asynchronous baud rates	110, 150, 300, 600, 1200, 2400, 4800, 9600

HARD DISK DRIVE

Performance

Kind of disks used	8 inch fixed hard disk
Capacity per drive	5.7 Mbytes per surface
Transfer rate	922K bytes
Average rotational latency time	8.3 milliseconds
Access time track-to-track	4 milliseconds
Access time average	34 milliseconds
Settling time	8 milliseconds
Rotational speed	3600 RPM
Recording density	8623 bits per inch (BPI)
Track density	478 tracks per inch (TPI)
Surfaces used per unit	5

Reliability

MTBF	10,000 hrs.
Soft error rate	1 in 10 EXP 10
Hard error rate	1 in 10 EXP 12

FLOPPY DISK DRIVES

Performance

Kind of diskettes used	16 sector, hard sectored, 5 1/4 inch
Capacity per drive	315K bytes, formatted
Transfer rate	250K bits/second
Average rotational latency time	100 milliseconds
Access time - track-to-track	30 milliseconds
Settling time	10 milliseconds
Head load time	75 milliseconds
Drive motor start time	1 second
Rotational speed	300 RPM
Recording density	5248 bits per inch (BPI)
Track density	100 tracks per inch (TPI)
Surfaces used per diskette	1

Reliability

MTBF	8000 hrs.
MTTR	0.5 hrs.
Media life	3 X 10 EXP 6 passes on single track
Head life	10 EXP 4 hrs.
Soft error rate	1 in 10 EXP 9
Hard error rate	1 in 10 EXP 12
Seek error rate	1 in 10 EXP 6

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### VIDEO TERMINAL

Screen	12 inch, monochromatic
Characters	ASCII, 8X10 dot matrix
Contrast	Dark on light or light on dark selected by software Normally light on dark
Brightness	Operator adjustable
Display area	24 lines X 80 characters
Radiation	Complies with U.S. Federal Regulation for Radiation Control, as required by the Radiation Control for Health and Safety Act of 1968, implemented by Title 21, Subchapter J, Code of Federal Regulation

### 1.5 Pre-installation check-list

The Vector System 3030 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.

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 Vector System 3030 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 affect the reliability of the system, and to avoid the loss of data if a 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.

Do not install more than two Vector System 3030's per 20A circuit.

Extension cords are not recommended.

Special air-conditioning and raised floors are not required for a Vector System 3030. It will function in any normal office environment.

Do not install a Vector System 3030 in an abnormally dusty or dirty environments, due to the effect on the disk drives and diskettes.

Make sure that there is adequate area for all equipment, and that there is adequate desk space next to the console. The console should be low enough for comfortable typing.

Make sure that the console is not directly opposite a bright open window, which will create glare on the surface of the screen.

If the carpet in the computer's area is a shag or thick carpet, especially 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 passing people that can discharge into the system and cause the system to malfunction or crash. If you anticipate or experience this problem, spray the carpet in the machine's vicinity once a month, or more often as needed, with anti-static spray, available in many electronic supply and carpet distributors. If the system is still affected by static, we recommend purchase of a 3M anti-static mat to be placed on the floor in the computer's area.



## II. INSTALLATION AND CHECKOUT

### 2.1 Installation of a Vector System 3030

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 withdraw the equipment and manuals. If present, remove plastic bags from the equipment.
3. Place the console with integrated computer chassis in a horizontal position with the separate Megastor Disk drive as near as possible.
4. Remove the cover of the console by removing the four Phillips head screws, two on each side. Carry out a quick internal inspection, checking for obvious shipping damage and loose boards due to shipping vibration. Press each board in 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 contact qualified service personnel, or Vector Graphic.
5. With the cover of the console still removed, connect the larger of the two female connectors on the end of the flat cable on the rear of the Megastor box to the Micropolois floppy disk drive controller board in the console chassis. Connect the smaller of the two female connectors on the other flat cable on the rear of Megastor box to the hard disk interface board in the console chassis. Return the cover to the computer. Do not replace the screws yet.
6. Using the black power cable which comes with the system, connect the console to power. Connect the female end of the cable to the special 3-prong connector at the rear of the console chassis
7. Switch the on-off switch in the rear of the console to the on position and switch on the Megastor unit. The console screen should light up showing a banner identifying the "Vector Graphic Monitor." The "Monitor", short for Extended Systems Monitor, is the piece of software built into the system and which waits for commands from the operator as soon as the system is turned on. If the screen does not light up, check the connection to the console. If the screen still does not light up, press the reset button in the rear of the console to the right of the on-off switch. If the "Vector Graphic Monitor" banner does not show up, and something else shows up instead, turn the system off then on. Try it several times if necessary, before contacting qualified service personnel.
8. When the Monitor banner shows up, depress N on the keyboard, following the MON> prompt on the screen. N causes a memory test to occur. The acceptable response is "E000 FF C3", which should appear on the next line down within a

few seconds. (E000 is the first memory address which is not Random Access Memory in a 56K system.) Following this, another MON> prompt should appear on the next line.

9. Following the MON> prompt, depress Y. This puts the system into an "echo" mode, in which each key causes its character to appear or causes the cursor to move, but has no other function. Depress every key on the keyboard except the ESC key, making sure that each one functions and that no keys stick. When you have completed this test, then depress the ESC key, which will take the system out of echo mode and put another MON> prompt on the screen.
10. Unwrap the CP/M system disk which comes with the system and insert it in the right-hand drive (drive A in the CP/M nomenclature). Insert it with the labeled side to the left and with the edge closest to the oval exposed region going in first. Push it in until it clicks in place. Mount the disk by pressing the door slowly to the right, pausing briefly at the mid-point, when the spring-pressure increases. Full instructions for use of the disk drives and handling floppy diskettes are found in the CP/M 2 System Diskette Introductory Manual enclosed with the system.
11. Boot up the CP/M operating system on the 5 $\frac{1}{4}$ " drives by depressing B on the keyboard, following the MON> prompt. The red light on the right-hand drive should light up, an audible click should be heard from the disk drive, and then a message announcing the CP/M operating system should appear on the screen.

If this does not occur within 5 seconds of pressing B, depress RESET on the back of the computer console on the 5 $\frac{1}{4}$ " drives, then dismount the disk. (To dismount a disk, press the door latch further to the right until it springs open.) Remove it from the drive and make sure that (a) it is the serialized CP/M 2 disk that came with the system, (not from a different system), and (b) that it is oriented correctly as described above. Then remount it carefully. Depress the RESET button on the computer chassis and try the B command again.

If still no CP/M message appears, repeat the process of RESETTING, dismounting, checking the disk, remounting and rebooting once again. Then, if there is no CP/M message, try the same process but use a CP/M 2 disk from a different system. If none of these diskettes will boot up, the chances are that there is something wrong with the disk subsystem that requires the help of service personnel.

12. When CP/M boots up, you should see an A> prompt on the screen following the sign on message. Type DIR (return) following the prompt. (return) means press the RETURN key. You do NOT have to use capital letters when typing a CP/M command. You should immediately see a directory of the files on the diskette, consisting of at least 5 lines of names. Make sure there is a file named BACKUP. This will be used next.
13. You are now going to copy the CP/M serialized diskette. This has the double function that it tests the disk drives for compatibility and it gives you a

working copy of CP/M - the copy which will become the Personalized CP/M 2 System Diskette. Insert and mount a completely unused diskette (or one whose contents are not needed) in the left-hand drive (drive B in the CP/M nomenclature). Make sure it is a Dysan or Scotch brand 16-sector diskette. These are the only types of diskettes you should use with the Vector Graphic system at this time, due to the high density of storage employed; other brands have been found unreliable in this system. At this time, Scotch seems to be the most reliable of the brands.

Then type BACKUP (return) following the A> prompt. In response to the question "Source drive", press A. In response to the question "Destination drive", press B. In response to the command "Press RETURN to begin", press the RETURN key. The backup process will take approximately 3 minutes at this point.

14. 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 "Copy complete".

If unsuccessful, you will see either "Bad source diskette" or "Bad destination diskette". If unsuccessful, you should unload completely, and remount the diskettes, then go to step 15 and try the process again with the same diskettes. If it does not succeed a second time and you get "Bad destination diskette", try again using a different diskette in drive B, because it is probably a defective diskette. If possible, try a different brand of diskettes, from one of the two brands mentioned above. Each time you try it, unload and remount both diskettes. After you get a successful backup, repeat the process again with the same diskettes. If you cannot consistently get a successful backup, then contact service personnel to adjust the drives.

15. In response to the statement "(R) to return to system (B) execute backup again", type an R to return to the CP/M executive (Console Command Processor), or type B if you want to repeat the backup process.
16. Once you have backed up your serialized CP/M diskette, the Vector System 3030 (without its printer) is probably functioning satisfactorily. At this time, you may follow the procedure in Section 3.6 of the CP/M 2 Introductory Manual, which configures the Personalized CP/M 2 System Diskette so that it makes full use of the 56K of memory in the system (rather than using only 48K). You can skip this procedure if CP/M will not be used by this particular user.
17. After configuring the Personalized diskette for use in a 56K system, remove the serialized diskette, return it to its envelope and store it in a safe place. Unless the Personalized diskette and all its copies are damaged, you should never use the serialized diskette again. Unload the Personalized CP/M 2 System Diskette, and label it as such, including the release number and the serial number of the serialized diskette.

18. At this time, if you are using a printer, you should connect the printer to the computer. If you are using a Sprint 3 printer from Vector Graphic, go NOW to Section 2.2 and continue there.

If it is a serial printer emulating the Diablo protocol such as Diablo 1610, 1620, or 1640, NEC Spinwriter, DataProducts serial daisywheel printer, or Qume Sprint 5 or emulating the standard serial (sometimes called Teletype) protocol (such as a Decwriter or TI 810), and it runs at 1200 baud or less, simply connect it using a 25-line flat ribbon cable to the female socket labeled "RS-232C" on the rear of the computer chassis. Some printers may require a cable with male connectors at both ends.

If it is a Sprint 3 printer from Vector Graphic, but not part of a Vector System 3 from the factory, connect the printer as described in the instructions that come with the printer.

If it is one of the above kinds of printers, remove the cover of the computer and check that the baud rate setting of Serial Channel C of the Bitstreamer II board matches the speed of the printer. Find the Serial Channel C switch near the upper left hand corner of the board, press the desired rocker down and away from the OPEN designation, and press all other rockers in the opposite direction. A Sprint 3 always operates at 1200 baud. The system does NOT have to be turned off during this procedure.

If it is a Centronic's parallel printer, contact your representative or dealer for instructions on interfacing.

If it is a TI 810 printer and you want to operate it at 1200 baud, determine if it will be used to print word-processing text, long program listings, or any kind of output which is dumped directly and continuously from memory, with no breaks for disk access or calculation. If so, an additional hardware modification to the system is required. If not, skip this step; it is not necessary for accounting applications. The modification is as follows: Remove the Bitstreamer II board from the computer. Find pin 11 of the RS-232C connector on the backplane of the computer chassis. Solder one end of a wire to this pin (on the inside of the computer) and the other end to pin 1 of chip U26 on the Bitstreamer II board. Then solder one end of a short jumper wire to pin 3 of U26 and the other end to pad 1 of jumper area N. Jumper area N is near the bottom right side of the board. Finally, look at the back side of the board and find the trace which leads downward from pad 1 of jumper area N. This trace narrows down just below the pad. Using a sharp knife, cut this trace through the narrow part, scraping the trace on each side of the cut so that the connection is thoroughly cut. Then, return the board to the system. Having made this modification, you can communicate to the printer at 9600 baud, which will speed up throughput by about 25%. Set both Serial Channel C and the printer to 9600 baud.

If you are using a kind of printer not mentioned above, refer to both the printer's manual and the Bitstreamer II manual for the information you will need to connect it, but Vector Graphic does not take responsibility for supporting this interface or its consequences.

You may now return the cover of the computer. Unless you plan further hardware modifications (such as required by the Memorex word processing software), you may screw the cover down.

Refer to the printer's manual on how to load ribbon, paper, printwheel, how to connect it to power, and how to turn it on. (Instructions for connecting and turning on the Sprint 3 in a Vector System 3 are found in Section 2.2 below.)

19. After connecting and turning on the printer, you have to configure the Personalized CP/M 2 System Diskette to work with this system. First, mount the Personalized CP/M 2 System Diskette in drive A (right-hand drive). If you just turned the system on after connecting the printer, boot up CP/M from this diskette by depressing B. If, however, the system has been on all along, then just depress control-C after the A> prompt. This is the so-called "warm boot", which tells the system a new CP/M diskette is in drive A.

Then, following the A> prompt, type CONFIG(return). Answer the first question by choosing the appropriate printer option. (IMPORTANT: If you are using the Sprint 3, select the System Printer option.)

After selecting a printer option, go through the rest of the configuration without selecting any of the special options. The fastest way to do this is to depress the RETURN key after the next two questions, and then to depress Y when you are asked whether to save the configuration on disk. Note: if you wish to understand more of what can be done with CONFIG, read section 3.7 of the CP/M 2 Introductory Manual.

If you get an error message regarding the disk system, remount the diskette in drive A, and while you are at it, make sure there is no write-protect tab on the diskette. (This tab is a piece of tape over the cutout on the right edge of the diskette, described in Section 2.6 of the CP/2 Introductory Manual.) Then try the CONFIG procedure again.

20. The best way to test the printer is to print several pages of material on it. To do this, first turn the printer on and load continuous fan-fold paper having 11-inch page length. If the printer is wide enough, use standard 14-inch wide fan-fold paper. If you are using a printer having an add-on form-feed tractor (such as the Vector Sprint 3), and if you are not familiar with it, do not try to use the form-feed tractor mechanism (which usually comes in a separate carton) at this time. Simply roll the paper up, as you would with an ordinary typewriter. Make sure that the paper is loaded so that the print-head, when at the left edge of the printer, lines up just to the right of the sprocket holes on the left edge of the paper. Make sure the ribbon and printwheel (if any) are in place, and that the cover is on. If the printer has a character spacing switch on its front, set it for 12 characters per inch. (Sprint 3 has no such switch.) Then, following the A> prompt type PIP LST:=DUMP.PRN (return). The computer will read this sample file from the diskette and then print it out.

It will use up 5 sheets of paper. Make sure that the printer spaces down to the top of each new sheet. (Note that it should do this, even though you did not specify the Automatic Paging option in the CONFIG routine. This is because the form-feed commands are within the DUMP.PRN text.) Make sure that each line is even along the left margin and that the characters in the line are level and evenly spaced. No lines should print past the right margin, even if the printer is set for 10-characters per inch. Make sure that the characters are printed completely and evenly. (If they are not, it is probably because the printwheel or the ribbon is not loaded properly).

21. If the printer came with an add-on form-feed tractor, you may put it on the printer now.

With the Sprint 3, or Qume Sprint 5 printers, you must remove the top cover of the printer and snap the tractor mechanism over the platen axle, so that its gear meshes with the platen gear. To open the metal fingers which snap over the platen axle, press on the metallic levers on each side of the form feed tractor. In order to use a form-feed tractor, the platen pressure lever on the right side of the Sprint 3 or Sprint 5 printer must be in the forward position so that the paper slides through freely.

22. Once the Vector System 3 and its printer are tested and working, you have completed the basic installation and check out of a Vector System 3. You may proceed to (1) make the necessary modifications for the Memorite word processing software (also called the Word Management System), (2) install additional terminals, (3) install graphics hardware and software, (4) connect and test a modem or acoustic coupler, or (5) make use of the other software which comes with the system.

To do (1), refer to the instructions that come with the Memorite software. To do (2), refer to the instructions which come with the Time-Share Multi-User Vector System 3 conversion package. To do (3), refer to the appropriate technical manuals for graphics-related boards and software. To do (4) (connect a modem or acoustic coupler), contact Vector Graphic. For (5), refer to the manuals for that software.

After all interior modifications are complete, you may screw down the computer cover.

## 2.2 Installing and using the Sprint 3 printer in a Vector System 3030

This section is only applicable if the internal interface components of the Sprint 3 Subsystem have already been installed within the computer chassis - in other words, it is a "Vector System 3030Q."

### 2.2.1 Unpacking

1. If not already done, remove the printer from its carton and any plastic bag. The following items should be found in the carton: Sprint 3 printer with attached power supply, power supply cover, four round metal plugs, a printwheel, and a ribbon.

2. Inspect the printer for scratches, dents, loose or damaged parts, or other signs of damage. Note any evidence of such damage on the invoice, and file a claim with the carrier immediately, if the condition of the units warrants.
3. Remove any paper wrapped around the platten.
4. Remove the top front cover by lifting up under the edge at the front of the printer.
5. IMPORTANT: Using cutting pliers, cut and remove the two plastic ties securing the paper bail during shipping.
6. IMPORTANT: Cut and remove the plastic tie securing the carriage assembly to the printer chassis.
7. Now, load the printwheel and then the ribbon in the printer. Instructions will be found in Chapter 3 of the Sprint 3 Maintenance/Training manual, if you are not familiar with the procedure. Make sure the printwheel is completely flat against the metal plate on the carriage. Make sure the carriage mechanism is returned to the horizontal position and the "C" button is clicked-down. Make sure the ribbon cartridge is fully clicked-in and the ribbon is threaded through both guides.
8. Manually slide the print-head carriage from the left side of the printer all the way to the right, and back again. Make sure it slides smoothly over the complete range. Make sure that there are no obstructions or foreign objects inside the printer. Slide the carriage fully to the left. Now, return the top cover of the printer. Make sure that the line down the center of the print-hammer lines up, or is further to the left of, the 0 mark on the printer cover.

#### 2.2.2 Connecting

9. IMPORTANT: If the computer is on, unmount any diskettes in the drives (you do not have to remove them from the drives), and turn the computer and Megastor unit off.
10. Find the 50-line flat ribbon cable coming out from inside the back of the computer chassis. Plug the far end of this cable into the socket on the right side of the rear of the printer (when you are facing the rear of the printer). Make sure that the colored edge of the cable is on the left side of the cable when you are facing the rear of the printer. (Normally, this is the only way the connector will go in because of a restraining insert in the connector.) If the connector has screws for fastening to the corresponding screw holes in the printer, tighten them down snugly.
11. Now, turn the computer and Megastor power on again. Turn the printer power on note that the lights on the front panel of the printer go on. The Sprint 3 printer in a Vector System 3 does not have a separate on/off switch. It is on whenever the computer is on. If the printer does not go on, check

that the power cable is properly installed. If it does go on, but one or more of the front panel lights does not light up, refer to the troubleshooting tips below.

12. Otherwise, return to step 19 in Section 2.1, and follow the instructions there for testing the printer subsystem. If the printer does not work during testing, you may refer to the troubleshooting points below.

#### 2.2.3 TROUBLESHOOTING

If the Sprint 3 printer does not work:

- (1) Make sure that you are commanding it correctly.
- (2) Check the POWER light on the printer. If it is off, make sure the power connection to the printer is intact.
- (3) Check the READY light on the printer. If it is off but power is on, this means either: the cover of the printer is not on tight, there is some kind of jam in the mechanism preventing the printwheel from rotating properly, there is something preventing the carriage from moving back and forth freely, or there is something more seriously wrong with the printer. Check the first three possibilities. If after correcting the problem the printer does not start up by itself, you may have to reinitialize it by rebooting the operating system, or in the case of Memorate software, issuing an RS command. If you cannot get the READY light to go back on, then refer to the accompanying Sprint 3 Printer Maintenance/Training manual or qualified service personnel.
- (4) If the other lights are on, Check the RIBBON light on the printer. If it is off, this means that the ribbon is out. Load a fresh ribbon.
- (5) If the POWER, READY, and RIBBON lights are on and it still does not print, make sure the connection to the computer is complete. Refer to the Sprint 3 manual if necessary for a description of the cabling.
- (6) If the above checks do not get the printer going, then refer to the accompanying Sprint 3 Printer Maintenance/Training manual or qualified service personnel.

#### 2.2.4 MAINTENANCE OF THE SPRINT 3 PRINTER

The Sprint 3 is a highly reliable device that will work well for long periods without attention. In a normal office environment, the Sprint 3 requires periodic lubrication and simple preventive maintenance every six months for optimal performance and to prevent more serious breakdowns. In very heavy use, this period should be shortened accordingly. Full instructions for this maintenance procedure are given in the Sprint 3 Printer Maintenance/Training manual, included in the system's hardware documentation. General maintenance procedures for the Sprint 3, for use by service personnel, are found in the same manual.



### III SOFTWARE INITIALIZATION

NOTE: There is no software at all on the hard disk as it is shipped from the factory. To initialize the disk and get it up and running the first time jump to section 3.5 in this chapter.

#### 3.1 Cold boot

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

1. Make sure all hardware is connected.
2. Make sure no disks are mounted in the floppy disk drives.
3. On the computer chassis, turn the power key or depress the power button, whichever applies. Also turn the key on the Microstor module to 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 the computer's Monitor's executive is waiting for a command.

4. If you want to work with one of the Floppy Disks, see the preceding chapter. If you have the Vector 4.0 Monitor and you want to boot up CP/M on one of the hard disk surfaces, type G followed by the appropriate address as expressed in the table below.

Surface	Address
0	EC02H
1	EC04H
2	EC06H
3	EC08H
4	EC0AH

If you have the Vector 4.1 Monitor, depressing the W key will boot you onto Winchester Drive A (surface 0.)

5. In a moment, you will see a banner reading "Vector Graphic xxK 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.

#### 3.2 Warm boot

If you have CCP running, and then decide that you want to change to a different drive surface simply type the letter of the drive you wish to access after the A: prompt, followed by a colon. For example, to change

from drive B to drive C, you would input C: in response to the B> prompt:

B>C:

Since you cannot change the disks in the Megastor, you do not have to worry about performing a warm boot unless you are using the floppy disks and change them. For more information on that see Section 3.3 of this manual.

### 3.3 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 computer chassis will accomplish this in single user systems, but in a Time-share Multi-user system from Vector Graphic, it will return ALL users to the Monitor executive, which is generally not desired. Further, the RESET button is not always convenient. Therefore, Vector Graphic CP/M 2.2 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.

### 3.4 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 4.0 Monitor, depress L after the MON> prompt. If such a command does not work, then try the G 0000 command.

### 3.5 Formatting the hard disk surfaces

#### NOTE:

Since the format procedure destroys all data which may be on a particular hard disk surface, make certain that that is what you want to do before you begin the format procedure. Once you have begun the FORMATHD program and you want to abort the procedure before the actual disk formatting has started, simply type (control) C which will return you to the console command processor (CCP).

We will assume the Megastor unit you received has no software present on the disk surfaces. It is possible that in the process of quality control and product checkout that software was left on one or more of the surfaces

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of your Megastore system, you can decide whether to keep it or to reformat the disk(s) from the beginning.

Assuming there is no software on the hard disk, we have to begin with the floppy system disk that was included with your Megastor. Turn on your Vector 3 console by flipping the on/off switch on the rear and also turn on your Megastor unit by turning the key on. Wait for the Winchester drive to get up to speed (when the sound from it stops changing pitch.) You should have the Vector 4.0 Monitor banner on your screen by now. Two diskettes were shipped with your Megastor: one contains the CP/M operating system and other various programs and one contains programs needed for initializing the hard disk. Insert the CP/M system diskette in the right 5-1/4" floppy drive of your Megastor unit with the label side to the left and close the door by moving the tab gently to the right until it will move no more and then release. Depress the B key in response to the Mon> prompt. You will hear a click as the CP/M system boots into the system from off the diskette. On the screen you should now see:

```
Mon> BOOT DISK
VECTOR GRAPHIC xxK CP/M - VERSION 2.2
```

```
A>
```

Don't let the A> prompt confuse you. After you've configured the hard disks as suggested, the right hand floppy drive will be drive F and not drive A as it is now.

Insert the diskette with the Hard Disk programs in Drive B (the left hand drive.) Close the door by moving the diskette door gently to the right until it will move no more then release. You may view the directory of the second diskette by keying in DIR B: (return). There should be three COM files on this diskette labelled: "FORMATHD", "MOVCPMHD" and "USERAHD". You can turn control over to the B disk by typing B: in response to the A> prompt. The screen should then display:

```
B>
```

Run the hard disk format program by typing FORMATHD (return).

The diskette will be accessed (again the clicking sound will be heard and the red light on the drive door will light.) In a few moments the following banner should appear:

```
WINCHESTER DRIVE FORMATTER - VERSION 1.x
```

```
ENTER SURFACE(S) TO BE FORMATTED (0-4) :
```

You may now format any of the five Winchester drive surfaces. We recommend that you format all five surfaces at this time. To do this, type 01234 in response to this question. If you should enter a number greater than 4 the phrase "ILLEGAL SURFACE" will appear. While the program is

running the following banner should appear:

NOW FORMATTING TRACK

It will be followed by the number of the track being formatted (0-579.)

This procedure may take up to 1-1/2 hours to do all 5 surfaces. Do not interrupt the system in the midst of formatting the surfaces.

What happens during this program is that the disk surface(s) are being initialized and formatted at the same time. The program checks the disk out for bad sectors, if there are any, and maps them into a reallocation table. Each track is formatted to work with CP/M but the system is not placed on the surfaces until the MOVCPMHD program is run.

When the procedure is complete, the NOW FORMATTING TRACK nnn banner will disappear and FORMAT COMPLETE will appear in its place.

Once the disks have been formatted (initialized) they are ready to have a CP/M system placed on them.

There are four numbered error messages which may occur during operation of the FORMATHD program only. (These are not to be confused with the system error messages, some of which are similar, which are listed in Section 4.7.)

FORMATHD ERROR MESSAGES

ERROR: 10 - COMMUNICATIONS  
ERROR: 11 - TIMEOUT  
ERROR: 12 - BAD MAP SECTOR  
ERROR: 13 - ALLOCATION TABLE FULL

3.6 System generation on the hard disks

A system cannot be generated on a hard disk surface that has not first been initialized. So be sure that the surface you wish to generate a system on has been formatted.

Once the particular surface has been formatted, you can use the MOVCPMHD program which is on the hard disk program floppy diskette to generate CP/M on each of the Winchester surfaces.

To generate CP/M on each of the surfaces, type MOVCPMHD in response to the B> prompt. The following banner will appear:

WINCHESTER SYSTEM GENERATOR - VERSION 1.x

Enter system size to be generated (in K bytes) :

The program will accept values from 20 to 56 here. If you simply hit

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(return) the program will generate the maximum size CP/M possible. Type a 56 in response to this question unless you wish to generate a smaller CP/M.

The next question the program will ask you is:

Enter directory size (256,512,768,1024) :

This requires some explanation. If you simply hit (return) the default value of 256 will be used. The response to this question will determine how much space on the disk will be dedicated to the DIRectory file. Since each directory entry takes up 32 bytes of disk memory, you are allocating from 8K to 32K of disk space. This factor is, in and of itself, insignificant when the surface has in excess of 5 megabyte capacity. However, the longer the specified directory, the longer it takes to access and/or display the directory. Now the directory size can be changed after data has been written to the disk provided that the new directory size is smaller than the original. If you wish to make the directory size larger, you must start by reformatting the disk and essentially starting over, thereby destroying any data extant on that disk. So make a good guess as to the directory size you will require. If you do get stuck and have to change directory size on a surface that has a lot of data on it, you might want to PIP or BACKUP the files onto another surface before changing directory size.

The program will then display:

---

Drive selection - (1) Winchester surfaces (quan 5)  
(2) Small floppies (quan 2)  
(3) Large floppies - single density (quan 2)  
(4) Large floppies - double density (quan 2)

Logical drive "A" assignment :

The user now choses which of the disk devices on his system will be the logical "A" drive. With the Vector 4.0 Monitor, the user must input G EC02 in order to boot up on Surface 0. In the Vector 4.1 Monitor the user will input a W in order to boot up the "A" drive. We suggest that the user input a 1 to the Logical drive "A" question. The program will then calculate the letter of the next possible assignable drive and prompt the user with:

Logical drive "x" assignment :

where x is the next possible assignable drive. When you have chosen all the logical drive letter assignments for your system hit the (return) key to generate the system.

For example, if you want the Winchester surface 0 to be the logical drive "A" assignment, you would key in 1 to the question:

Logical drive "A" assignment :

The program would next ask:

Logical drive "F" assignment :

The user could then answer 2 to assign the drive letters "F" and "G" to his two 5-1/4" drives. If the user had 8" floppy drives, he could answer 3 if he had the single density version and 4 if he had the double density version.

Let us say, for the sake of further example, that the user wishes to assign drive "A" and "B" to his 5-1/4" floppy drives. In response to the:

Logical drive "A" assignment :

question, the user would have to respond 2. And to:

Logical drive "C" assignment :

the answer 1 would have to be input.

When the user has finally assigned all drives that are going to be used in his system, he responds (return) to the last question in the series which, in the above two examples would be:

Logical drive "F" assignment : (return)

After this happens, the following will appear on the screen:

GENERATED VECTOR GRAPHIC xxK CP/M VERSION 2.20

Enter winchester destination surface (0-4) :

For most applications key in 0 for this question. The default value is 0 which will be processed if you just hit (return) to this question. If you wish to abort the procedure at this point, depress the CTRL and C keys simultaneously to bring you back to the console command processor. If you wish to have an alternate surface on which to backup the system you can repeat this procedure for at least one other surface at this time.

When you see the A> prompt, you will know that the system generation was successful.

If, for some reason, the system generation failed, the following banner will appear:

System generation unsuccessful - abnormal exit

If that should happen, try reformatting the disks and do the system generation procedure again. If this does not work, call your Vector Graphic Service Representative.

Once the system has been placed on Winchester drive 0 (logical drive A),

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you can boot up the system by depressing a W if the 4.1 Monitor is in use or a G EC02 if the 4.0 Monitor is being used.

The first thing you may wish to do is to transfer all the files from the CP/M system diskette and the hard disk format diskette to the first initialized hard disk surface. You can do that by first booting up the newly generated CP/M on the first surface (logical drive "A") and performing the following:

A>F:

F>PIP A:=F:\*. \*

The PIP (Peripheral Interchange Program) will then display:

Copying file:

and a list of the files will follow. You may repeat the procedure for the programs on the logical "G" drive by substituting G for F in the above example. See the manual on CP/M Utility programs for further information on this.

You may wish to assemble a custom printer driver using the program USERAHD. The only difference between this program and USERAREA described in Section 3.8 of the CP/M 2.2 Introductory manual is that the User Area is located at a different location in memory than the floppy version. Functionally, they are identical.

All other programs explained in the various CP/M manuals may be run on the hard disk system with no additional modifications.

### 3.7 Hard Disk System Error Messages

Should you experience a hardware or software fault that is detectable by the hard disk system, it will display a numbered error message. The following system error messages are found in the CP/M 2.2 version for the hard disk. Not all possible message numbers have been assigned.

#### 40-49 - REALLOCATION ERRORS

##### 41 - NO SPACE LEFT FOR REALLOCATION

This is the message which is presented when all possible sectors in the reallocation map have been assigned. To continue using the disk after this point will mean the risk of permanently losing some data. This message will follow the countdown message 51 when all reallocatable sectors have been assigned.

##### 42 - UNABLE TO READ REALLOCATION SECTOR

The chance that you will ever see this message is infinitesimal. It means that the sector that has the reallocation map is unreadable. Contact your Vector Graphic Service Representative.

50-59 - WARNINGS (RETN'S)

51 - LITTLE SPACE LEFT (<5 REMAINING RELOCATION POSITIONS AVAILABLE)

The disk operating system is set up in such a way that the system program automatically tests sectors before they are written on and, if the program detects a fault, will automatically skip over that sector and try a new sector. In order to remember which sectors are not usable, the program compiles a map which is essentially a sector containing the addresses of the bad sectors and the address of the sectors which replaced them. The program is organized to provide space for 120 of such reallocations. As long as the system has performed less than 115 reallocations, the operation of this checking device and automatic reallocation is completely transparent to the user. He may be totally unaware that it is happening. When less than 5 reallocation positions are available, however, the program will alert the user whenever it must perform such a reallocation. It will count down to 0 and display message 41 when no space is available for reallocation. When the user first sees message 51, he should contact his Vector Graphic Service Representative.

60-69 - SYSTEM ERRORS (SYSTEM TRACK)

61 - SYSTEM CANNOT BE LOADED AT WARM START

A procedure was done that prevents the system from being booted up without going through the cold start routine. To alleviate this condition, reset the mainframe and go through the cold start routine appropriate to your system. If this does not work try the MOVCPMHD routine again on the affected surface.

70-79 - OVERLAY ERRORS (REQUEST)

71 - ILLEGAL OVERLAY REQUESTED

The program has called for an overlay that is incompatible with the system.

72 - OVERLAY NOT AVAILABLE IN THIS SYSTEM CONFIG.

An overlay routine has been called for and is not available in this particular system's software.

8X - OVERLAY LOAD ERROR

The user has attempted to load an overlay file that was not completed. The second digit of the code tells why the operation was halted. See code chart below.

9X - READ + WRITE NON-DATA ERRORS

The user has attempted to read or write from or to the hard disk and a non-data error has occurred. The second digit of the code tells why the operation was halted. See the code chart below.



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### 8X and 9X Code Chart

<u>Second Digit</u>	<u>Error Condition</u>
1	Invalid Command
2	Invalid Parameter
3	Drive Not Ready
4	Drive Fault
5	Illegal Head or Cylinder Address
6	Sector Not Found
7	Data Error
8	Verify Error
9	Drive Timeout Error
A	Communications Error
B	Interface Timeout Error

