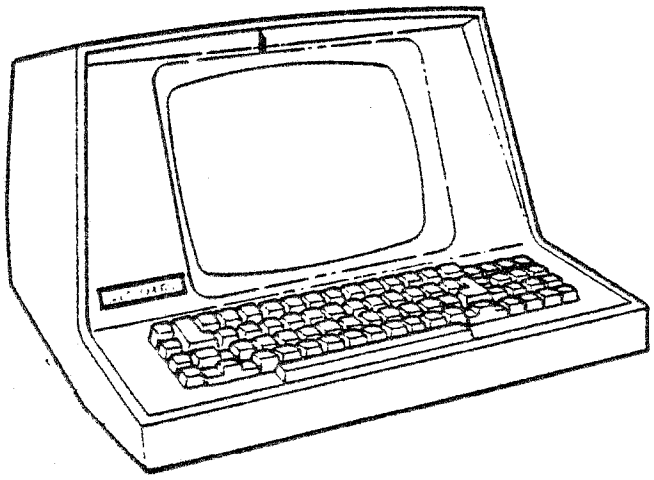
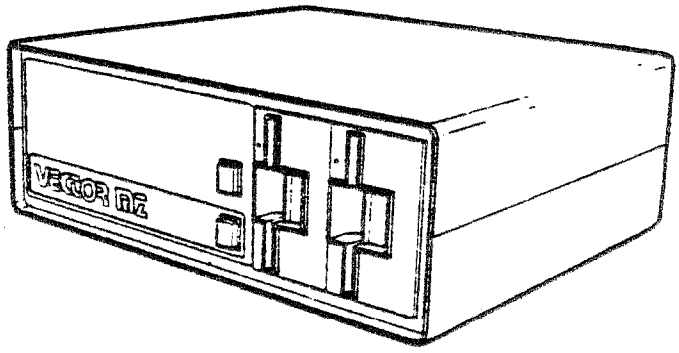
VECTOR

SYSTEM B

OVERVIEW MANUAL





VECTOR

VECTOR GRAPHIC, INC.

VECTOR SYSTEM B

VECTOR SYSTEM B+S3

VECTOR SYSTEM B+MP

INSTALLATION, USE, AND MAINTENANCE MANUAL

Revision C

JULY 8, 1980

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The System B or its variations 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 B or its variations that is found to contain defects in materials or workmanship, provided:

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FOREWORD

Audience	This manual is intended for dealers, distributors, salespersons, consultants, and service personel. It requires a minimum of technical knowledge.
Scope	It describes what the Vector Graphic System B 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 System B is a general purpose microprocessor based computer. It is delivered by Vector Graphic completely assembled and fully tested, including both hardware and operating system software, and including 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. 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).

3. 56K of available random-access memory.

4. 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.

5. 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.

6. Industry-compatible CP/M 2 operating system, allowing use of most CP/M compatible software on the system; and the MDOS operating system, which can be used instead.

7. Microsoft BASIC-80, release 5, one of the fastest and most powerful general purpose languages available (used in conjuction with CP/M); and Micropolis BASIC, used in conjunction with MDOS.

8. 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.

9. Computer electronics consisting of:

   a) Chassis with heavy duty power supply and 18-slot fully shielded and terminated S-100 motherboard;

   b) High-speed (4 MHz) Z-80 CPU board;

   c) Bitstreamer II input/output board, featuring 3 serial I/O channels, 2

parallel I/O channels;

d) 64K Dynamic RAM board;

e) 12K PROM/RAM board, which includes 12K of PROM sockets and 1K of scratch-pad RAM;

f) Flashwriter II Video board featuring a replacable character set;

g) Floppy disk drive controller board;

1.3 Optional hardware and software

1. The system can support two additional diskette drives, by adding the MicroStor module.

2. The system can support up to four additional consoles (5 total), each operating simultaneously and carrying on almost any task (for example, word processing concurrently with accounting, on different consoles).

3. 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. When integrated at the factory with a System B, the system is called respectively a System B+S3 or a System B+MP.

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.

6. Sophisticated graphics capabilities, including Vector's High-resolution Graphics Display Board, Vector's Video Digitizer Board if desired, a graphics monitor, a TV camera (not available from Vector Graphic) to go with the Digitizer, and associated software.

1.4 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 Amps	1.5 Amps
Current, Surge	15 Amps	7.5 Amps
Power Dissipation	350 Watts	350 Watts
Heat Generation	1200 BTUs	1200 BTU's

DIMENSIONS AND WEIGHT

	Height inches/cm	Depth* inches/cm	Width inches/cm	Weight lbs/km
Terminal ("MT")	12.8/32.4	18/45.7	21/53.3	22/10
Mainframe ("MZ")	7.5/18.0	16.75/42.5	20.5/52	40.5/18.3
Sprint 3 printer	7.5/18.0	18.5/47.0	23.6/60.0	28/12.7
MP printer	7/17.8	13/33.0	18/45.7	21/9.5

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

MP PRINTER

Speed	150 characters/second
Interface compatability	TTL level: 2 parallel output ports and 1 parallel input port. Designed for Vector Graphic systems though may be used with most Z-80 S-100 bus systems which can supply an additional 2-1/2 amps at +8VDC and -16VDC

DISKETTE 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

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 System B, System B+S3, or System B+MP 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 System B 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 System B's per 20A circuit.

Extension cords are not recommended.

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

Do not install a System B 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 printer MUST NOT be placed on top of the computer mainframe. The console should be low enough for comfortable typing. There must be some space on the left side and in back of the computer mainframe, for ventilation.

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 System B

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 computer chassis in a horizontal position and the "Mindless Terminal" console as near as possible.

4. Remove the cover of the computer mainframe by unscrewing the four Phillips head screws, two on each side. Note that one of the four screws may be shorter than the others, and take note of which hole it came from. 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 contact qualified service personnel, or Vector Graphic.

   Return the cover to the computer. Make sure that the slotted edge is on the same side as the slotted side of the bottom chassis. Do not replace the screws yet.

5. Using the black power cable which comes with the system, connect the computer to power. Connect the female end of the cable to the special 3-prong connector at the rear of the computer chassis.

6. Connect the console (the "Mindless Terminal") to the computer chassis using the 25-line flat ribbon cable found in the console's carton. The male end of the cable plugs into the socket at the rear of the computer chassis labeled "Mindless Terminal." (Do not plug it into the socket labeled "RS-232C".) The female end plugs into the back of the console.

7. Turn the power key in the front of the computer chassis. The RESET light should go on and the fan at the back of the computer should begin turning. If the RESET light comes on but the fan does not, DO NOT operate the computer, but contact service personnel. Also contact service if the RESET light does not go on but the fan does. If neither one goes on, check the power connection and the fuse at the rear of the computer chassis. However, if both go on, then after warming up a short time, 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.

8. If the RESET light goes on, but the screen does not light up, check the connection to the console. 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.

9. 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.

10. 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.

11. 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.

12. Boot up the CP/M operating system 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 computer chassis, 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 key 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, or if you have none, then try using the MDOS diskette that came with the new 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.

13. 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.

14. 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, Scotch, or Maxell 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.

15. 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 three 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.

16. In response to the statement "(R) to return to system (B) execute backup again", type an R to return to the CP/M executive (called "CCP"), or type B if you want to repeat the backup process.

17. Once you have backed up your serialized CP/M diskette, the System B (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.

18. After configuring the Personalized diskette for use in a 56K system, remov 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.

19. At this time, if you are using a printer, you should connect the printer to the computer. If your system is a System B+S3 from Vector Graphic, go NOW to Section 2.2 and continue there. If your system is B+MP go NOW to Section 2.3 and continue there.

20. If it is a serial printer emulating the Diablo protocol (such as Diablo 1610, 1620, or 1640, NEC Spinwriter, DataProduct serial daisywheel printer, or Qume Sprint 5) or emulating the standard serial (sometime 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 System B+S3 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 th Bitstreamer II board matches the speed of the printer. Find the Seria 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 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: with computer power turned off, 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 c each side of the cut so that the connection is thoroughly cut. Then, retu

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, again making sure the slotted edge is on the same side as the slotted side of the chassis. Unless you plan further hardware modifications (such as required by the Memorite word processing software), you may screw the cover down.

Refer to the printer's manual for 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 System B+S3 are found in Section 2.2 below).

21. 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 or MP, 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 metallized 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.

22. 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 i. 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).

23. 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 th form feed tractor. In order to use a form-feed tractor, the platen pressur. 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.

24. Once the System B and its printer is tested and working, you have completed the basic installation and check out of a System B or a System B+S3. 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 System B 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 System B+S3

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 "System B+S3".

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, special power cable (a thick round cable with a 12-pin molex connector at one end), 4 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. Using a 7/16-inch (or 11 mm) socket wrench, remove the four screws securing the printer to its shipping pallet.

4. Insert the 4 round metal plugs in the holes vacated by the pallet screws on the bottom of the printer.

5. Remove any paper wrapped around the platten.

6. Remove the top front cover by lifting up under the edge at the front of the printer.

7. IMPORTANT: Using cutting pliers, cut and remove the two plastic ties securing the paper bail during shipping.

8. IMPORTANT: Cut and remove the plastic tie securing the carriage assembly to the printer chassis.

9. 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.

10. 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

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 off.

1. 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.

2. Find the printer power cable which came in the printer carton. Plug the 12-pin molex connector into the middle molex socket on the back panel of the computer. It can only go in one way. Press it firmly as far in as it can go.

3. Insert the other end of this cable into the connector on the left side of the rear of the printer (when you are facing the rear of the printer). It will not go in very far until you start tightening down the screws in the cable connector. However, it cannot be screwed down at all if you try to attach it upside down, so that there is no way to make a mistake. Tighten the two screws on the ends of the connector alternately, until the connectc is in as far as it will go.

4. Now, turn the computer power on again. Note that the lights on the front panel of the printer go on. The Sprint 3 printer in a System B+S3 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.

5. 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 Troubeshooting

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 computer is completed. If necessary, check the System B manual for a description of the cabling.

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 kir 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 Memorite 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 System B 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 documenation. General maintenance procedures for the Sprint 3, for use by service personnel, are found in the same manual.

2.3 Installation of the MP Dot Matrix Printer

2.3.1 Unpacking

1. Using cutting pliers, remove the plastic tie securing the carriage assembly to the printer chassis. Cables, PROMs, and manual are found in plastic bags.

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.

2.3.2 Cable Hook-up

1. With the power at the mainframe turned off, connect the printer power cable (Molex connectors at both ends) to the six-pin printer power connector on the back panel of the mainframe to the matching connector at the back of the MP.

2. With the power at the mainframe still turned off, connect the printer signal cable (the flat cable with a 25-pin connector at each end) from the printer signal connector on the back panel of the mainframe to the matching connector on the back panel of the MP. The cable hook-up procedure is now complete.

2.3.3 Loading Paper

1. Remove the clear plastic top from the printer.

2. Tilt tractor feed mechanism forward until it stops.

3. Place box of fan folded paper behind printer.

4. Feed paper carefully into paper guide inlet at bottom of printer until it feeds up between platen and print head. Open tractor guides. Pull paper up through tractor assemblies, aligning guide holes in paper with tractor feed pins. It would be convenient at this time to position the top of the next form just above the print line. Make sure that both the left and right sides are aligned correctly, otherwise the paper will bind. An easy way to do this is to count the number of holes from the top of form to the first (top) pins on either tractor. They should be the same. Now, close the tractor.

5. Replace the plastic cover on the printer. The paper feeding process is now complete.

2.3.4 Initial Testing

After the cables have been hooked up and paper has been installed in the MP, some initial testing can be done to assure that everything is working properly. Test procedures are provided for Vector Graphic systems under CP/M.

NOTE:

When used with the printer driver furnished, the printer will not print a line until a carriage return has been received unless the automatic CRLF function has previously been selected. The characters received are stored in a buffer until a carriage return causes the program to send an entire line to the printer.

2.3.5 Testing the MP and Printer Driver under CP/M

1. Boot up CP/M using the normal procedure.

2. Type CONFIG (return). The program will prompt you on various system choices. In response to the question about printers, type D. By typing YES to the question about making the selection permanent, the system will configure itself to work with the MP printer every time it is booted up.

3. Type ©P. This causes the MP to print all data input from the keyboard. Type a few words of your choice to confirm that the printer is operating properly. By typing DIR (return), a list of the files on your diskette will be printed. Typing ©P will toggle the print function on and off.

2.3.6 Printer Control Commands

The following commands cause the MP to perform the listed functions provided the system has been initialized as explained in the following two sections. These commands will work from the keyboard or they can be sent under program control to perform various print functions.

1) Tab: type ©I or the (tab) key.

2) Line feed: type ©J or (lf) key.

3) Form feed: type ©L.

4) Carriage return: type ©M or (return) key.

5) Toggle auto. CRLF flag: type (ESC) and A.

6) Toggle character/graphic flag: type (ESC) and G. (Works only if MP Graphic PROM is present).

7) Toggle 80/40 flag: type (ESC) and N.

8) Set top of form: (ESC) and T.

9) Set form length: (ESC) and Fxx; xx designates form length in 1/6 inch increments. For values above 99 lines use A, B and C to represent 10, 11 and 12. These values are valid only for the ten place, they are not valid for the units position. To set a form length of 11", xx=66; 14", xx=84.

2.3.7 Printer Control Commands under CP/M

1. The first time the printer is used with a particular CP/M diskette, the CONFIG routine must be run. After this has been done once, it does not have to be repeated provided that the same diskette is used each time.

2. To turn the printer on under CP/M type ©P.

3. To turn the printer off type ©P.

NOTE:

To use any of the commands which use the (ESC) key, touch the key lightly, key in the next letter(s) and depress (return).

2.3.8 Printer Control Commands under Basic

The printer can be controlled from Microsoft Basic by doing the following:

1) In the immediate mode, the command LLIST will output a program listing to the printer.

2) During program execution, output may be printed by simply using the LPRINT or the LPRINT USING commands.

2.3.9 Troubleshooting

1. If the MP printer does not work, make sure you are commanding it correctly.

2. If necessary, check the cabling on the system B to insure that all cables are connected correctly.

3. If the printer still does not work, immediately notify your authorized Vector Graphic dealer.

2.4. Maintenance of the MP Printer

In order to assure satisfactory printer performmance, it is recommended that repairs and overhauls should be done by the Vector Graphic Dealer. Normal maintenance, however, such as changing ribbons and periodic lubrication, may be done by a person with average mechanical skill by following the instructions which follow.

2.4.1 Changing Ribbons

Replace ribbon only with a type intended for use with dot matrix printers. DO NOT use an ordinary typwriter ribbon, even for "emergency use". To do so will result in poor print quality and shortened print head life. To change ribbon do the following:

1) Remove both spools and the ribbon in place if there is one. Pay attention to how it is threaded.

2) Remove the new ribbon and spools from their package.

3) Unwind approximately 24 inches of ribbon from the feed spool.

4) Place the feed spool on the left spindle and the take-up spool on the right spindle.

5) Thread the ribbon from the feed spool around the rollers, reverse control levers, and frame sides.

6) Tighten the ribbon by manually turning one of the spools. The ribbon installation is now complete.

2.4.2 Periodic Lubrication

In order to insure proper operation, certain points of the MP must be lubricated at specific intervals. Three different lubricants are required.

Code	Description
02	Light Machine Oil
G2	Light Grease
G11	Light Moly Grease

NOTE:

It is strongly suggested that in order to maximize printer life, only lubricants purchased from Vector Graphic be used. Any substitution will result in shortened printer life.

For first and second interval lubrication, see appendix in MP manual. For third interval lubrication, it is suggested that your MP dot matrix printer be overhauled by your Vector Graphic dealer every 5 million lines of use to assure dependable long life.

APPENDIX

SPRINT 3 UNPACKING INSTRUCTIONS

Each Sprint 3 printer is shipped in an individual carton. The following items should also be found in the carton: a power cable with a 12-pin molex connector on one end, a printwheel, a ribbon, and four round metal plugs.

Remove the printer from its shipping carton as follows:

1) Inspect the container for any external signs of damage. If any damage is observed, have the delivery agent note the damage on the shipping document and file a claim with the carrier immediately.

2) Open the outer container and remove the inner carton.

3) Open the inner carton from ther top and remove the cardboard spacer. The printer wrapped in plastic may now be withdrawn.

4) Remove the plastic bag containing the printer. Remove any other plastic bags inside the carton as they will contain additional equipment.

5) Using a screwdriver, remove the four screws attaching the metal strips to the bottom of the printer; remove the metal strips.

6) Install the round hole plugs in the holes vacated by the screws holding the metal strips on the bottom of the printer.

7) Remove any paper wrapped around the platen.

8) Remove the top fron cover by lifting up under the edge at the front of the printer.

9) Using cutting pliers, cut and remove the two plastic ties securing the paper bail during shipping.

10) Using cutting pliers, cut and remove the plastic ties securing the carriage asssembly to the printer chassis.

11) Examine the packing material to ensure that any small items have been removed.

12) Retain all packing materials for possible reshipment.