

INSTALLATION AND
OPERATION MANUAL

(P/N 100654)

Revision C

Xebec Hard Disk Kit
for
Apple II Microcomputers

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PREFACE

This manual describes how to assemble your Xebec hard disk kit, prepare it for use with your Apple][,][+, or //e microcomputer. It assumes that you already know how to use the computer. If you have just purchased it at the same time as the Xebec hard disk kit, you should set the kit (and this manual) aside until you have inspected, installed, and learned how to use the computer. Resist the temptation of trying to do everything at once.

If you already know how to use the Apple, you're ready to assemble the kit and prepare it for operation. Read this manual from cover to cover, then turn back to Section 1 and follow the instructions carefully.

Section 1 of this manual describes how to assemble the kit and cable it to your Apple.

Section 2 describes how to format and configure the hard disk, partitioning it for Apple DOS, CP/M, and Pascal use.

Section 3 describes how to relocate the host adapter card so you can boot directly from the hard disk. The same procedure is used whenever you add, move, or remove any card in your Apple.

Section 4 describes how to expand the system to two hard disk drives.

Appendix A shows technical specifications for the kit.

Appendix B contains warranty information.

Appendix C describes several potential problems and their possible causes and solutions.

D I S C L A I M E R

Due to the rapid proliferation of software packages and peripheral cards for the Apple II, Apple II+ and Apple //e, Xebec cannot guarantee that all will work with the Xebec Hard Disk Kit. THEREFORE, XEBEC HEREBY DISCLAIMS ANY WARRANTY EXPRESSED OR IMPLIED THAT THE XEBEC HARD DISK KIT WILL BE COMPATIBLE WITH YOUR APPLE AS PRESENTLY CONFIGURED. Xebec recommends that all non-essential cards be removed during installation. Upon a successful completion of the installation, refer to Section 3 of this manual for instructions on adding your other peripheral cards back into your Apple.

Currently, Xebec offers the following Utilities:

Apple DOS 3.3

Apple Pascal 1.1

Microsoft CP/M 2.20B

Since, due to this rapid proliferation of Apple compatible products, it would be impossible for Xebec to evaluate all software packages and Apple peripheral cards. To assist us in determining other software and peripheral compatibility, please complete the form at the end of this manual and return the form to:

XEBEC
432 Lakeside Drive
Sunnyvale, CA 94086
Attn: Marketing

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SECTION 1

ASSEMBLY

In assembling and using this or any hard disk, remember that the disk drive is an electronic and mechanical device with motors and moving parts, some of which have very small physical tolerances. For example, the actual data recording surface is a magnetic material coated on flat disks and the reading and writing of data is performed by heads floating on a tiny air cushion above the disk surfaces.

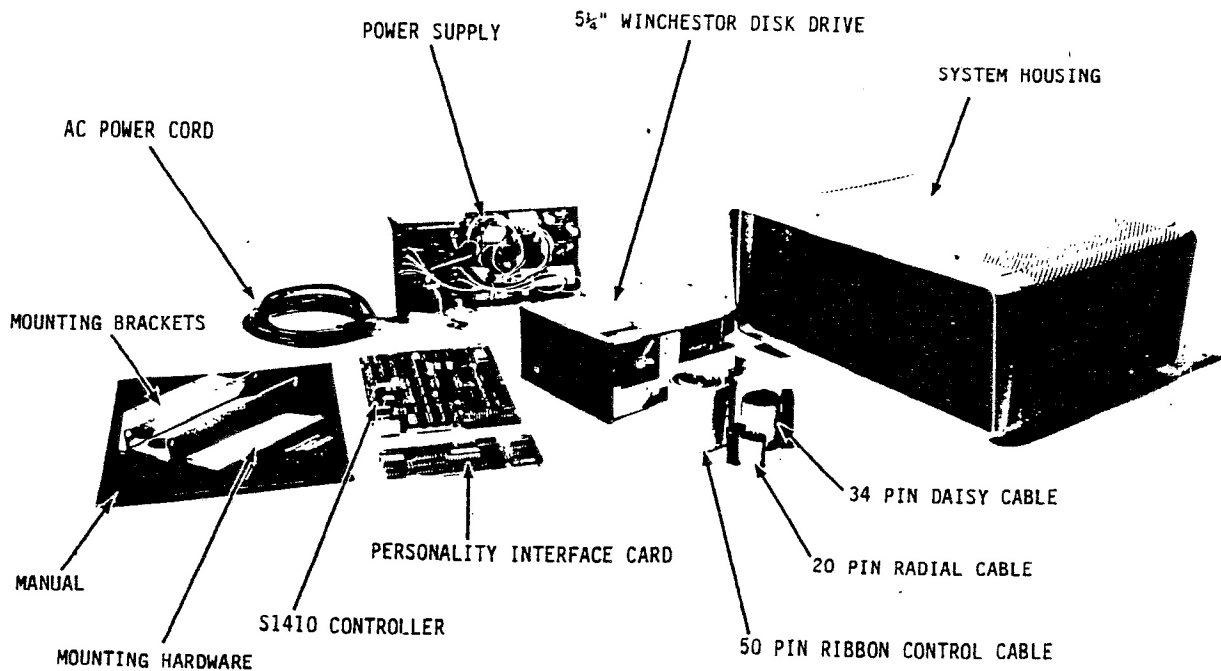
- o Take care not to jar, drop, or shock any of the kit's components.
- o Never place the disk drive closer than one foot from a strong magnetic field (as can be found near a television set, a monitor, or a large electric motor). Strong magnetic fields can cause data stored on the disks to be lost and, if the magnetic field is strong enough, can cause permanent damage to the drive.

CHECKING FOR DAMAGED OR MISSING PARTS

Before assembling anything, you should ensure that you have removed all parts from the carton. The parts are listed below. Spread out all the parts on a flat surface, as illustrated in Figure 1-1, and check them off against the list, one by one. If anything is missing, check the carton one more time. If anything is still missing, contact Xebec. You should have:

- o this manual;
- o a power supply with an AC power cord;
- o a "34-pin" ribbon cable;
- o a "20-pin" ribbon cable;
- o a "50-pin" ribbon cable;
- o a Xebec host interface card for the Apple II;
- o a Xebec S1410 hard disk controller card;
- o a 5 1/4-inch hard disk drive;
- o two drive-mounting brackets;
- o mounting hardware, including
 - four standoffs
 - four split lock washers
 - four Teflon washers
 - 12 Phillips-head screws;
- o a cabinet; and
- o one or more of these software diskettes:
 - Xebec Apple DOS Utilities
 - Xebec CP/M Utilities
 - Xebec Pascal Utilities;

Figure 1-1: Contents of the Xebec Hard Disk Kit



In addition, you will need these tools:

- o a Phillips screwdriver;
- o a drill and bits; and
- o a hacksaw.

You may want to install a switch in the AC power cord, so you will not have to plug it in and unplug it to turn power on and off. If you choose to install a switch, be certain that the switch you obtain is rated for at least 15 amperes.

The Xebec hard disk kit has been carefully inspected, both electrically and mechanically, to ensure that the components operate properly and that there was no damage before shipment. Look at everything you unpacked to be certain that there has been no damage in shipment. For example, ascertain that the cabinet is not dented, the cable connectors are not cracked or damaged, the diskettes are not bent, and the printed circuit cards have no visible damage. If you see or suspect any damage, notify Xebec immediately and do not attempt to install the kit into your Apple system.

PHYSICALLY ASSEMBLING THE KIT

As the Preface states, you should know how to run your Apple microcomputer before you attempt to install the Xebec kit. If you do not, stop here and spend some time learning the Apple's ins and outs, then return to this point.

Now follow these steps carefully:

1. Mount two standoffs to each mounting bracket, using four of the smaller screws (4-40), as shown in Figure 1-2.
2. Find the left-hand side mounting bracket and match it to the corresponding side of the drive, as shown in Figure 1-2.
3. Align the lower two screw holes in the bracket with the holes in the drive. Install a split-lock washer and a large Phillips-head screw in each hole and, using your screwdriver, screw them snugly into place.
4. Fit the right-hand mounting bracket to the opposite side of the drive and screw into place as you did for the left bracket.
5. Place the S1410 controller card over the four standoffs and align the four screw holes, as shown in Figure 1-3.
6. Install a Teflon washer and Phillips-head screw in each screw hole and, using your screwdriver, screw them snugly into place.

Now the disk drive assembly is complete. Take a few moments to double-check that you've properly installed all the washers and screws and that the connections are snug. You are now ready to connect the controller to the drive assembly.

Figure 1-2: Mounting the Brackets

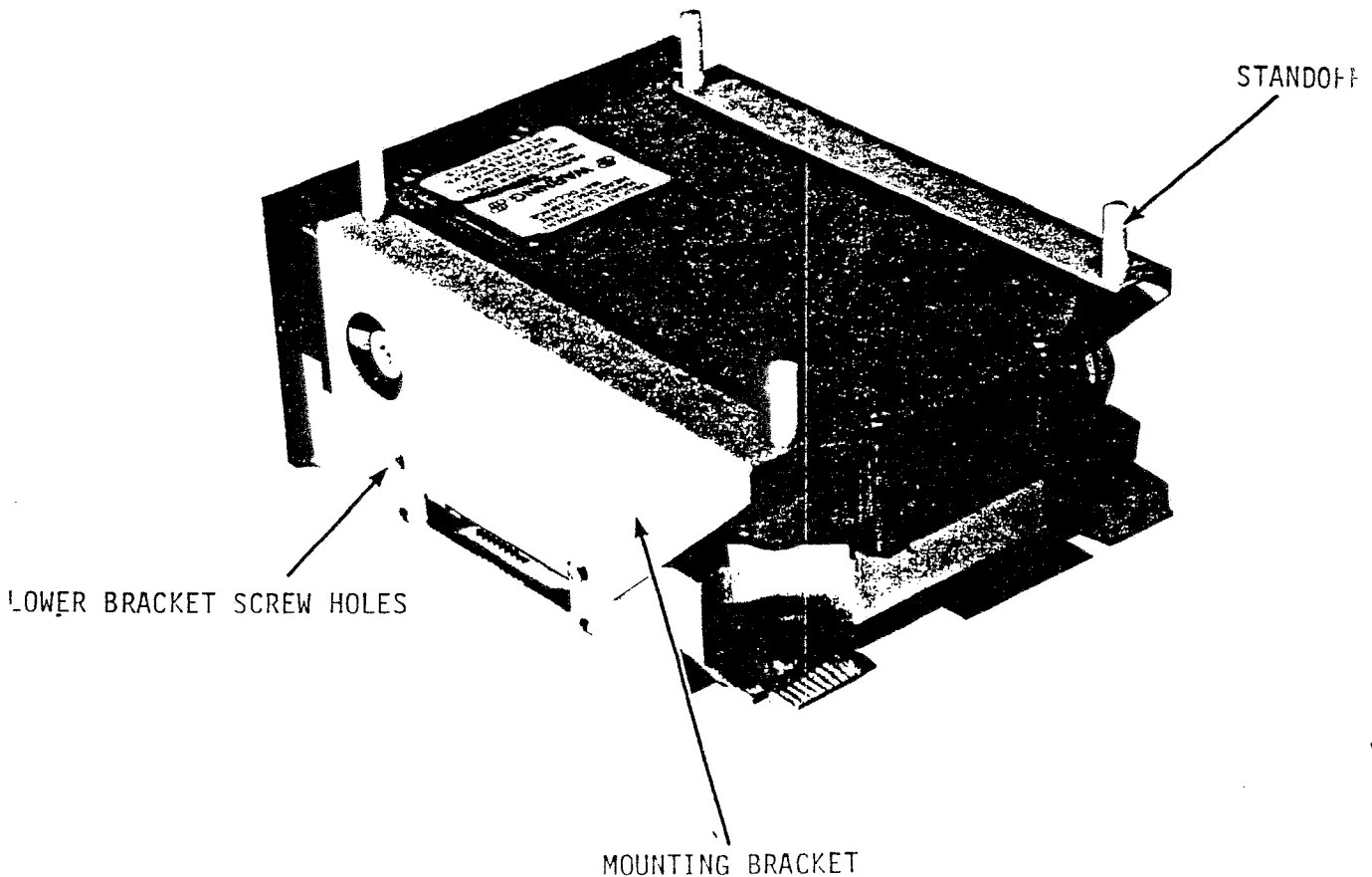


Figure 1-3: Mounting the Controller Card

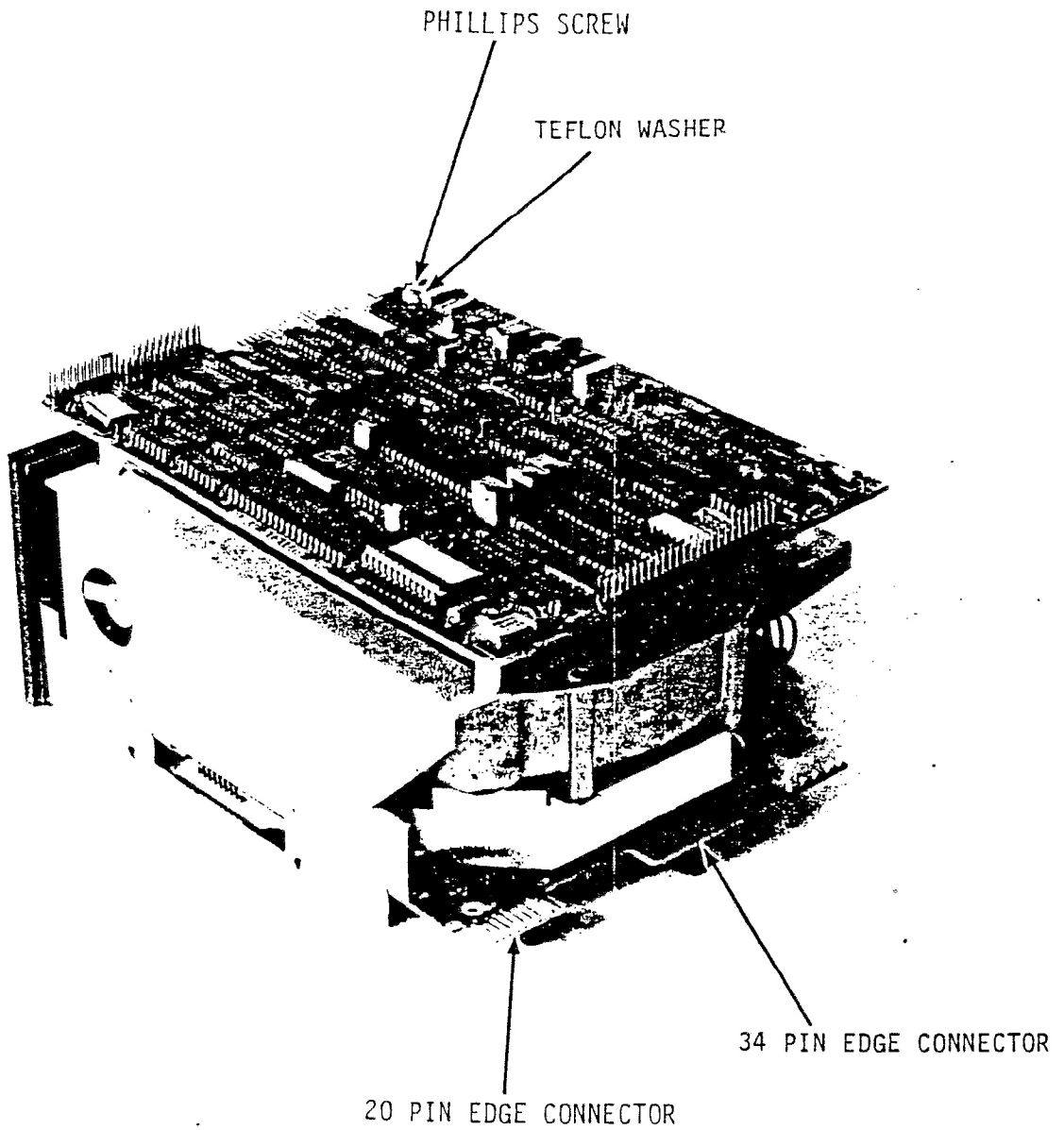


Figure 1-4: S1410 Controller Card

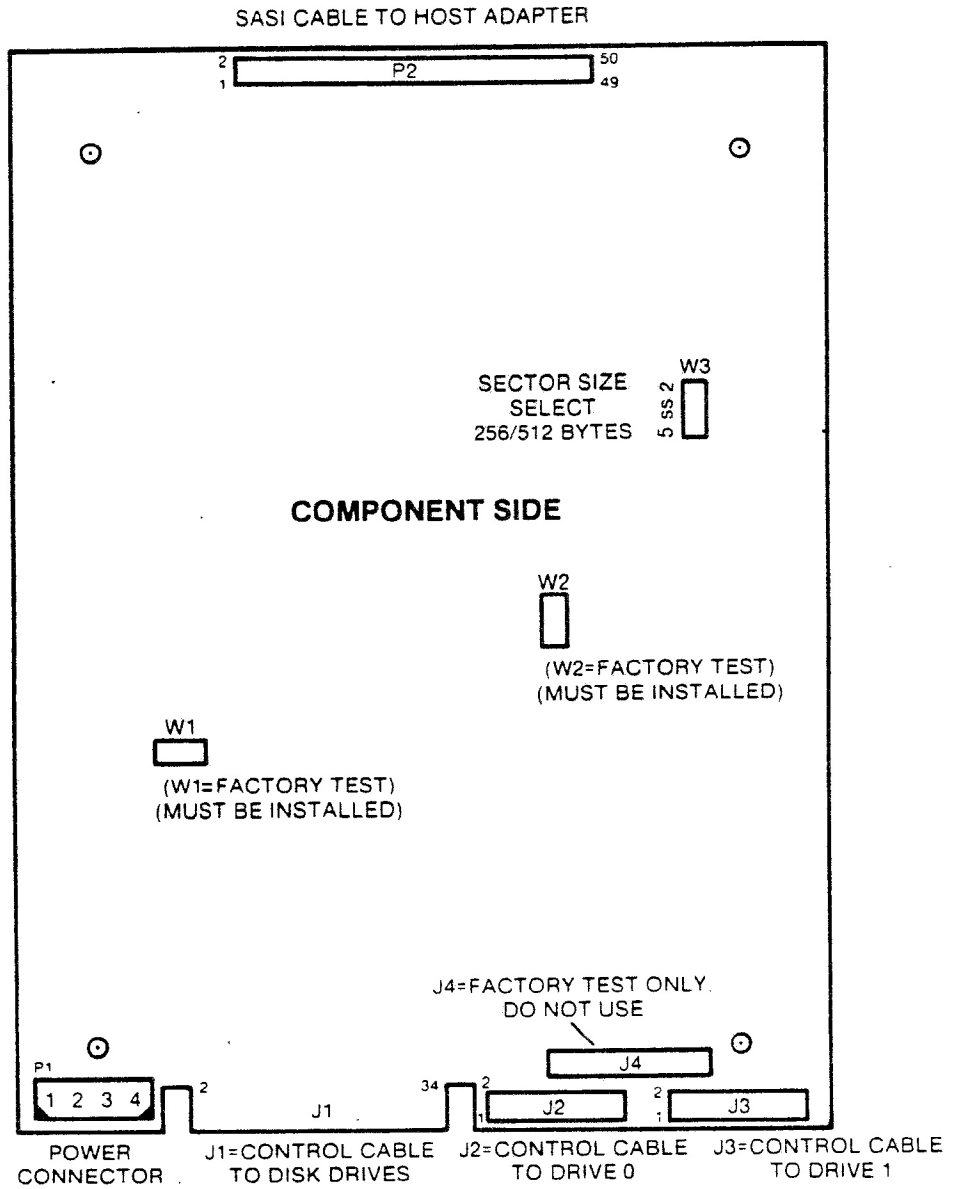
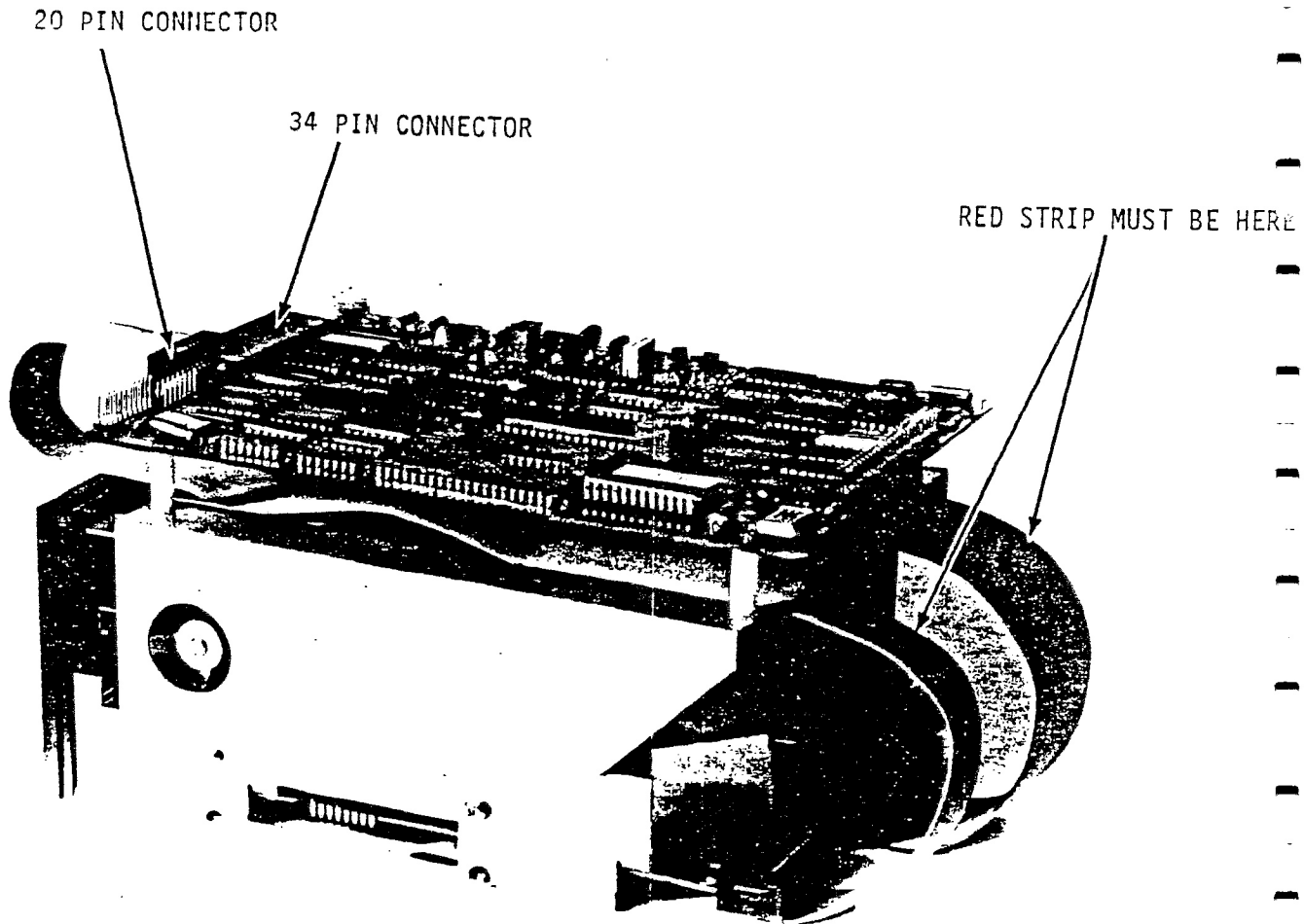


Figure 1-5: Connecting the Data and Control Cables



CONNECTING THE CONTROLLER TO THE DISK DRIVE

Connecting the controller card to the disk drive requires a "20-pin" ribbon cable and a "34-pin" ribbon cable. You will use the remaining, "50-pin" cable later. The "34-pin" cable has an edge connector at each end. The other cable has an edge connector at one end but a "20-pin" socket at the other end. An arrow, either printed or molded on one end of each connector, marks "pin" 1. You must be very careful not to install either cable backwards.

Figure 1-4, illustrating the controller card, may help you determine where to connect the cables as you follow these steps:

1. Connect one end of the "34-pin" cable to the controller card, by sliding the plastic edge connector over the corresponding edge of the disk drive's card as shown in Figure 1-5. Be certain that "pin" 1 of the connector is aligned with "pin 1" of the card edge.

2. Slide the "20-pin" cable's edge connector over the corresponding edge of the disk drive's card as shown in Figure 1-5. As in step 1, be certain that "pin" 1 of the connector is aligned with "pin 1" of the card edge.
3. Carefully feed both cables between the controller and the drive, as shown in Figure 1-5.
4. Connect the free end of the "34-pin" cable to the corresponding edge of the controller card, being certain that "pin" 1 of the cable--the side with the red stripe--is aligned with "pin 1" of the card edge.
5. Slide the "20-pin" cable's socket over pin terminal J3 on the controller card. Again, be certain that "pin" 1 of the cable's connector (with the red edge) is on pin 1 of the terminal (pin 1 is on the end nearest the "34-pin" connector). J3 is the pin terminal closest to the corner of the card. Be sure not to use the pin terminal labeled MFG. TEST ONLY; this terminal is for factory testing purposes only.
6. On the disk drive's printed circuit card, find a 14-pin chip socket, probably near the edge connectors. This socket must contain a terminator chip. If it is empty, contact Xebec.
7. Near the terminator socket, find a 12-pin terminal (similar to the controller-card pin terminal to which the "20-pin" cable is connected) with a jumper slipped over one pair of pins. This jumper must be on pins 1 and 2 (at one end of the 12-pin terminal). This jumper determines whether the drive recognizes signals sent to drive 1. (Note: some drives have a "DIP switch" instead of a pin terminal for this function. If yours has a switch, set it for drive 1 according to its manufacturers instructions.

Now the controller is connected to the drive.

CONNECTING THE POWER SUPPLY

Now that you have finished assembling and cabling the disk and controller, you are ready to connect them to the power supply, following these steps:

1. Place the power supply behind the disk drive, as shown in Figure 1-6.
2. Locate the various wires attached to the power supply. The larger black one is the AC power cord. The others are for DC distribution.
3. The DC wiring splits into two sets of wires, each of which terminates in a plastic socket. One of these sets includes a green wire; plug this set of wires into the corresponding male

connector on the disk drive's printed circuit card.

4. Using your Phillips screwdriver, attach the green wire's lug to the disk drive's mounting bracket as shown in Figure 1-6.

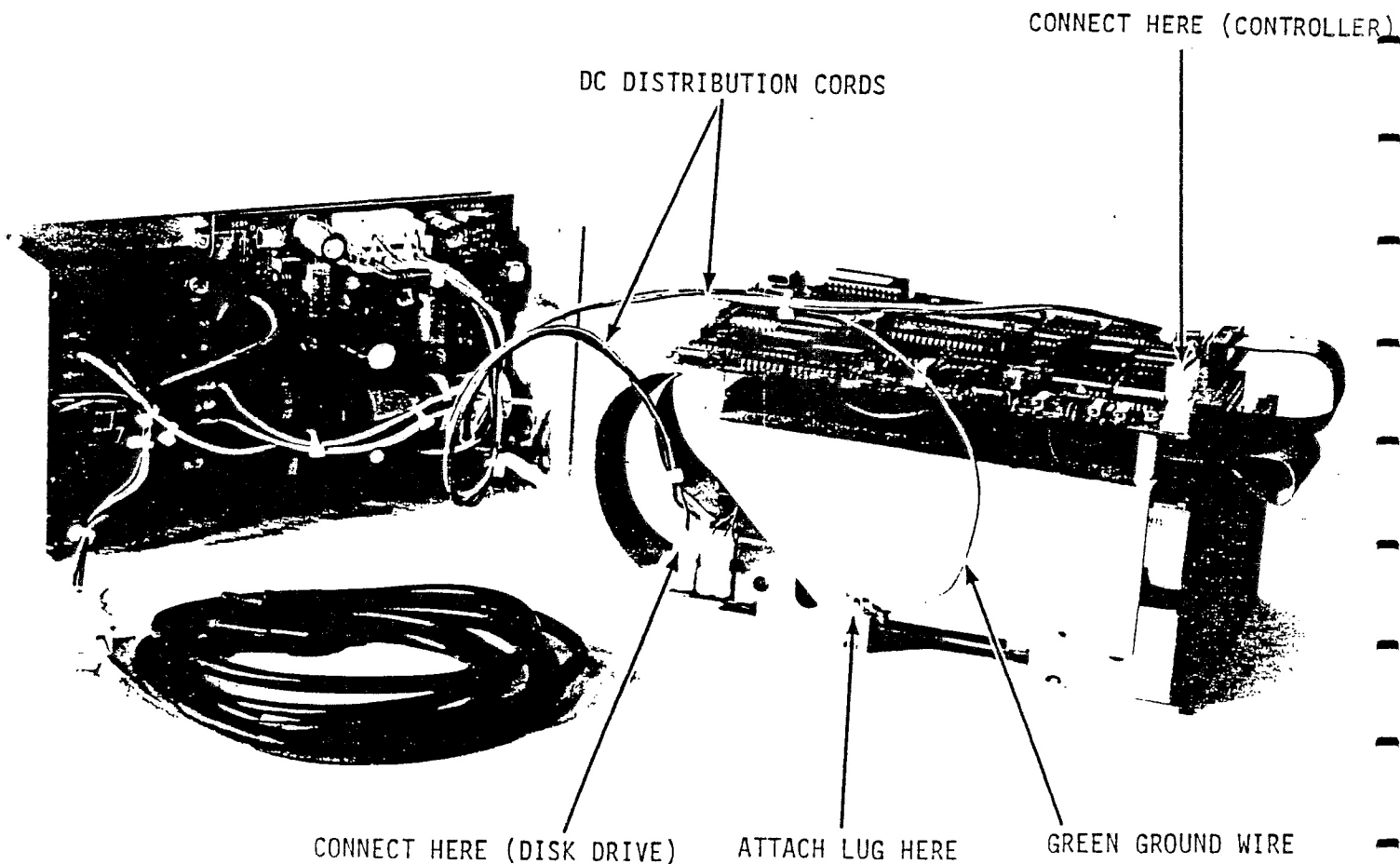
5. Plug the other DC socket into the corresponding male connector on the controller card.

6. Optionally, install a switch in the AC power cord. If you choose to do this, be certain that the switch is rated for at least 15 amperes. If you do not feel comfortable with electrical wiring, have a competent electrician install a switch for you. If you do not install a switch, you will have to turn it on and off by plugging it in and unplugging it, respectively.

7. DO NOT PLUG THE AC CORD INTO THE WALL OR OTHER AC SOURCE YET; you will do this later.

Now that the kit is wired to its power supply, you are ready to connect it to the Apple.

Figure 1-6: Connecting the Power Cables

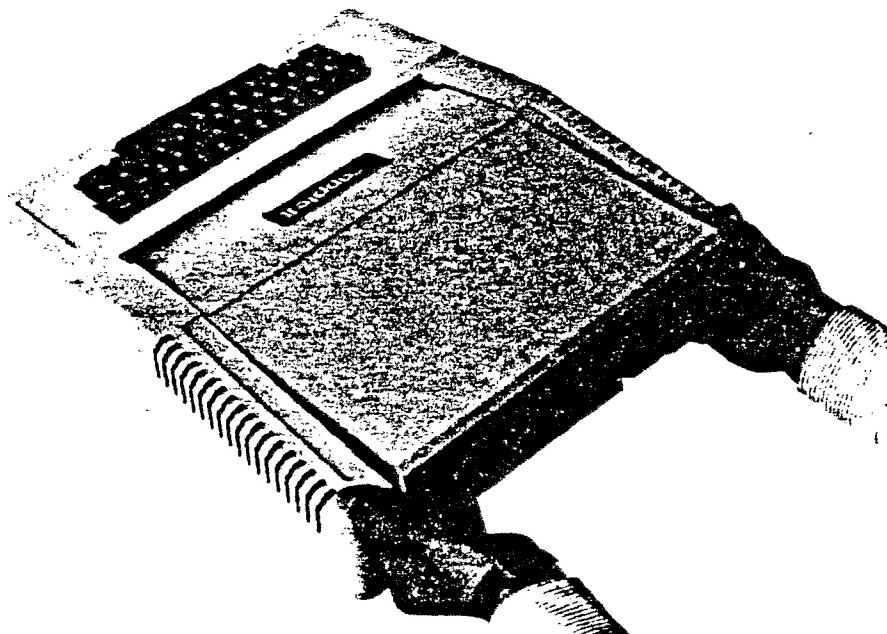


CONNECTING THE KIT TO YOUR APPLE

Before you can connect the kit to your Apple, you must be certain that the Apple's power is turned off. The best way to do this is to unplug the Apple's AC power cord. If power should accidentally be turned on while you are performing this connection task, both the Apple and the Xebec hardware could be seriously damaged.

With the power off, remove the cover from the Apple case, as shown in Figure 1-7. Use both hands to pry the back of the cover up from the case until you disengage the snaps holding it in place. (Sometimes this requires a fair amount of force). When the snaps come loose, pull the cover back until the front lip of the cover is free from the case, then set the cover aside.

Figure 1-7: Removing the Apple II Cover



Inside the Apple is a large circuit board with eight edge connectors, or "slots," mounted along the back end of the computer. These slots are numbered 0 through 7, counting from left to right when you are facing the front of the computer. Some of these slots probably contain printed circuit cards already. Table 1 lists some common cards you may see there, and the slots where they are likely to be (although most cards can function in slots other than those listed in the table). There are, however, hundreds of cards manufactured for use in Apples.

Table 1: Printed Circuit Cards Likely to Inhabit the Apple

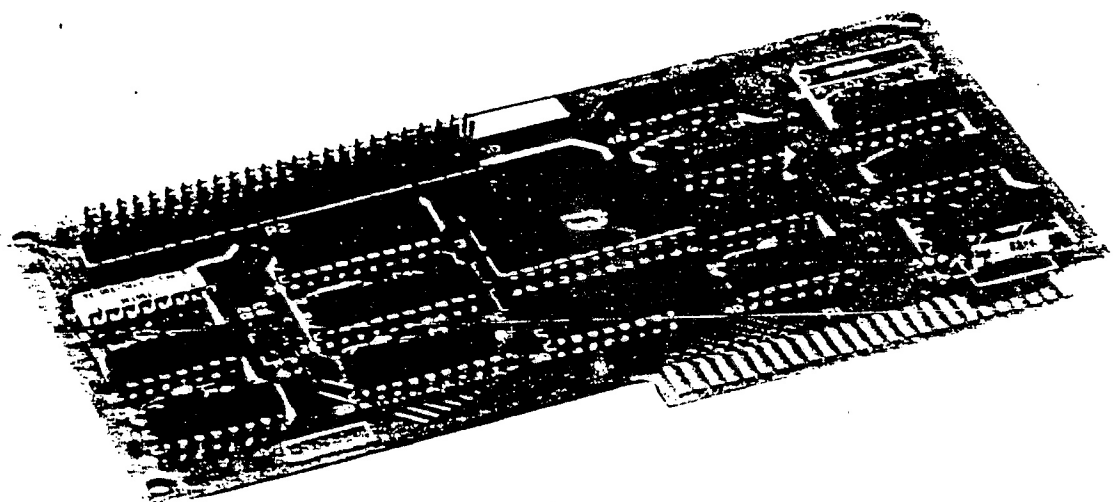
If the Apple has...	they are likely to be in slots...
A 16K RAM card or language card	0
Printer interface card	1
80-column display card	3
Other serial data interfaces	1, 2, and/or 3
A controller for one or two floppy-disk drives	6
Controllers for three or four floppy-disk drives	5 and 6
Controllers for five or six floppy-disk drives	4, 5, and 6
A Microsoft SoftCard with CP/M operating system	4, 5 or 7
Other peripheral controller cards	any but 0

For the interim, while you are bringing up the Xebec hard disk system, remove all cards other than the 16K RAM card (or language card), the floppy-disk drive controller in slot 6, and the SoftCard. Later, you can put the other cards back into your Apple (Section 3 describes how to do this). If by some chance one of your cards is incompatible with the Xebec system, it would be easier to determine this after you know your hard disk system is operational.

To connect the hard disk kit to your Apple, follow these steps:

1. Locate the "50-pin" ribbon cable and the Apple host interface card supplied with the kit. Each end of this cable has a socket connector designed to mate with the pin terminals on the controller card and the host interface card.

Figure 1-8: Host Interface Card



When handling the card, be careful to not touch the gold "fingers" of its edge connector because your skin's natural oils can easily contaminate the connector. This contamination can cause a poor electrical connection.

2. Plug the ribbon cable's connector onto the host interface card's pin terminal (see Figure 1-8) so "pin" 1 of the cable (marked by the red edge) matches with terminal pin 1. On some cards, pin 1 is identified by a square pad on the soldered side of the card and "PIN 1" printed on the component side. The cable should exit towards the bottom of the card; if it does not, you must attach the other end of the cable instead.

3. Pick up the host interface card with both hands holding the top edges of the card. Using a gentle downward pressure and a forward-and-backward rocking motion, insert the card into slot 4 as shown in Figure 1-9.

Figure 1-9: Plugging In the Host Interface Card



All examples in this manual assume that the Xebec host interface card is in slot 4. The card can function in any of slots 1 through 7 of the Apple II, Apple II+, or Apple //e (except that you cannot use slot 3 in an Apple //e which is equipped with the special Apple 80-column card), but you should start with it in slot 4. Later, after you have configured the hard disk, Section 3 of this manual will show you how to move the host interface card to a different slot.

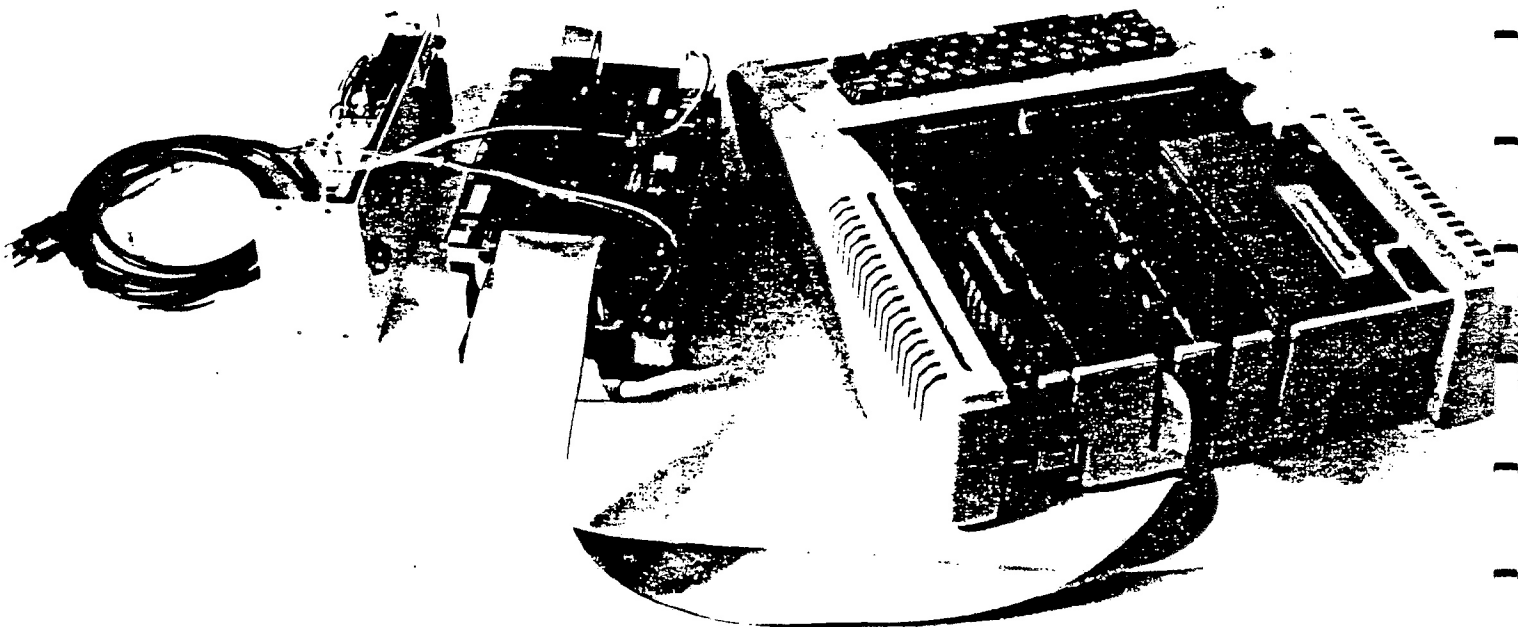
The Xebec software will support only one through four floppy-disk drives, with one or two controllers; therefore, slot four will usually be free anyway.

If some other card is in slot four, you should move it (or remove it) at this time.

4. By bending the ribbon cable at a right angle (you can make a moderate crease with your fingers), route the cable around the front of the card and then back through one of the long slots in the back of the Apple case as shown in Figure 1-10. In an Apple //e, bring the cable out through the cover opening.

5. Plug the other end of the ribbon cable onto the pin terminal of the controller card, so "pin 1" (the red stripe on the cable) corresponds with the designation P2 on the controller card. The ribbon cable should extend away from the card, rather than over it.

Figure 1-10: Correctly Connected Xebec Hard Disk Kit and Apple



The kit and the Apple should now be connected as shown in Figure 1-10. Before you replace the cover on the Apple case, double-check these items:

- o Make certain that all cards plugged into slots 0 through 7 are still seated all the way.
- o Check that the ribbon cable is still securely plugged into the host interface card and that "pin" 1 on the ribbon cable mates with pin 1 on the card. The red edge on the cable should be facing toward the power connector.

INSTALLING THE DISK DRIVE IN THE CABINET

Now that the cabling is completed, you can see the spatial relationships among the elements of the assembled Xebec hard disk kit. This should give you a good idea of how to arrange them in the cabinet.

The disk drive assembly can be mounted with the Xebec controller card on top or on either side. It must NOT be mounted upside down, with the controller card on the bottom; that position will damage the disk. If you expect to add a second disk drive later, a side-down orientation may allow you to fit both drives in the same cabinet.

Whatever the orientation, the red light at the bottom left of the disk drive's front panel should be as close as possible to the cabinet's front panel.

The power supply should be mounted as far as possible (within the cabinet) from the disk drive, to minimize the effect of the heat it will generate.

Before you can actually mount the disk assembly and power supply in the cabinet, you will need to cut several holes in the cabinet:

- o In the front panel, drill or cut a 0.5-inch hole where the disk drive's red light will be. If you intend to mount the disk drive bottom-side-down, this hole should be 0.75 inches from the bottom of the panel. If you mount it on its side, the hole should be 1.25 or 4.5 inches from the bottom (depending on your orientation of the disk).

- o Near the power supply, cut a hole or slot for the AC power cord. You will have to thread one end of the power cord through this hole, so be sure to allow for the size of the connector or plug.

- o Behind the disk drive, cut a slot for the "50-pin" ribbon cable. This slot must be at least 0.375 by 2.75 inches, because you will have to fit one of the cable's edge connectors through it.

- o Beneath the power supply and the disk drive, you may have to drill screw holes for mounting those units.

When all the holes have been made, disconnect the disk drive from the power supply and the Apple before mounting the drive and supply to the cabinet. When both are mounted securely, reconnect everything and admire your work.

TURNING ON THE SYSTEM

You are now ready for the acid test--plugging in the system and turning it on:

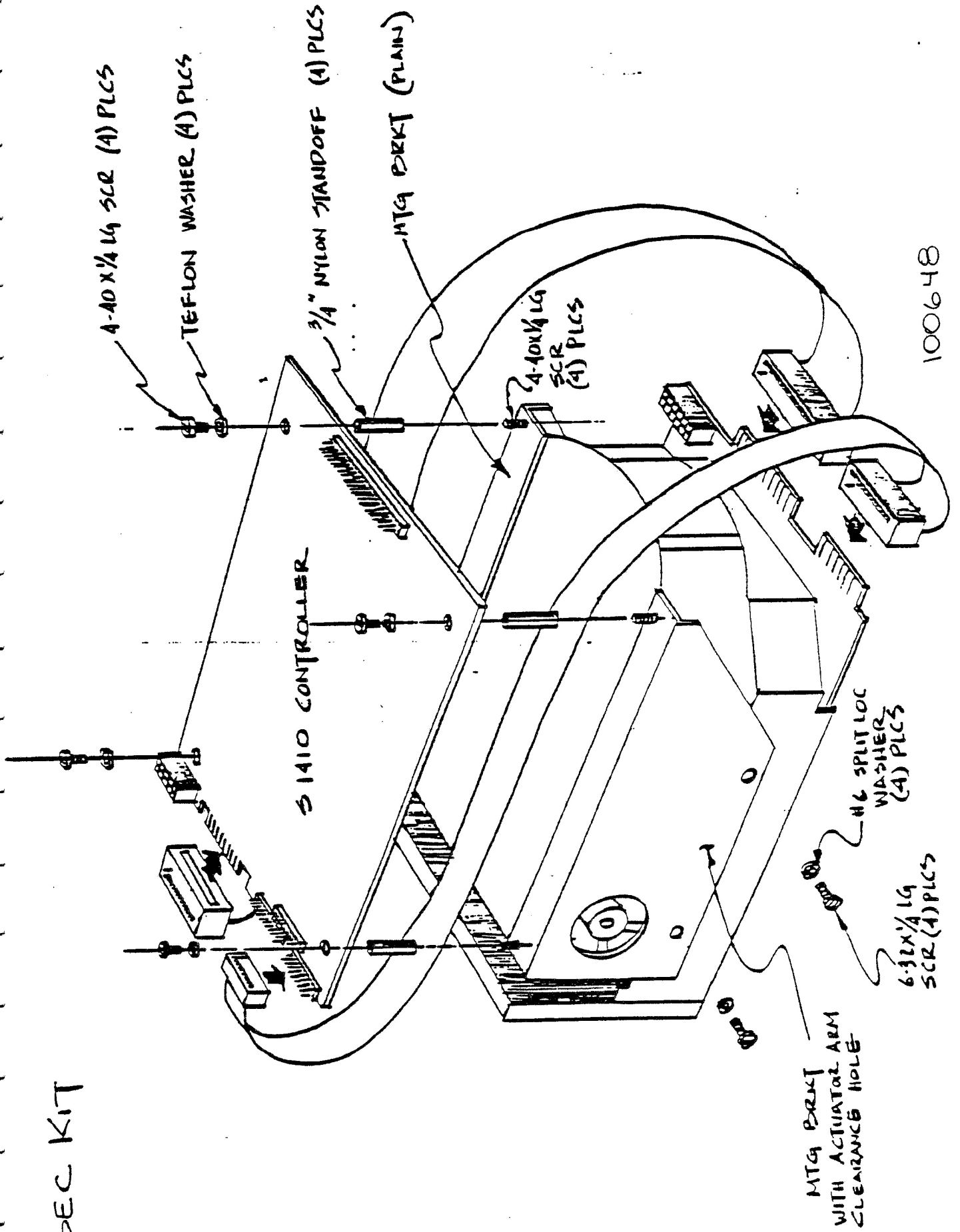
1. Plug the AC power cords of the Xebec kit, the Apple II, and your monitor (CRT) into a wall plug or other AC power outlet. If

you installed a switch in the Xebec Kit's AC power cord, switch it on. The hard disk should make a soft whirring noise; the disk will spin as long as power is applied to it, whether it is idle, writing, or reading.

2. Turn on the monitor.

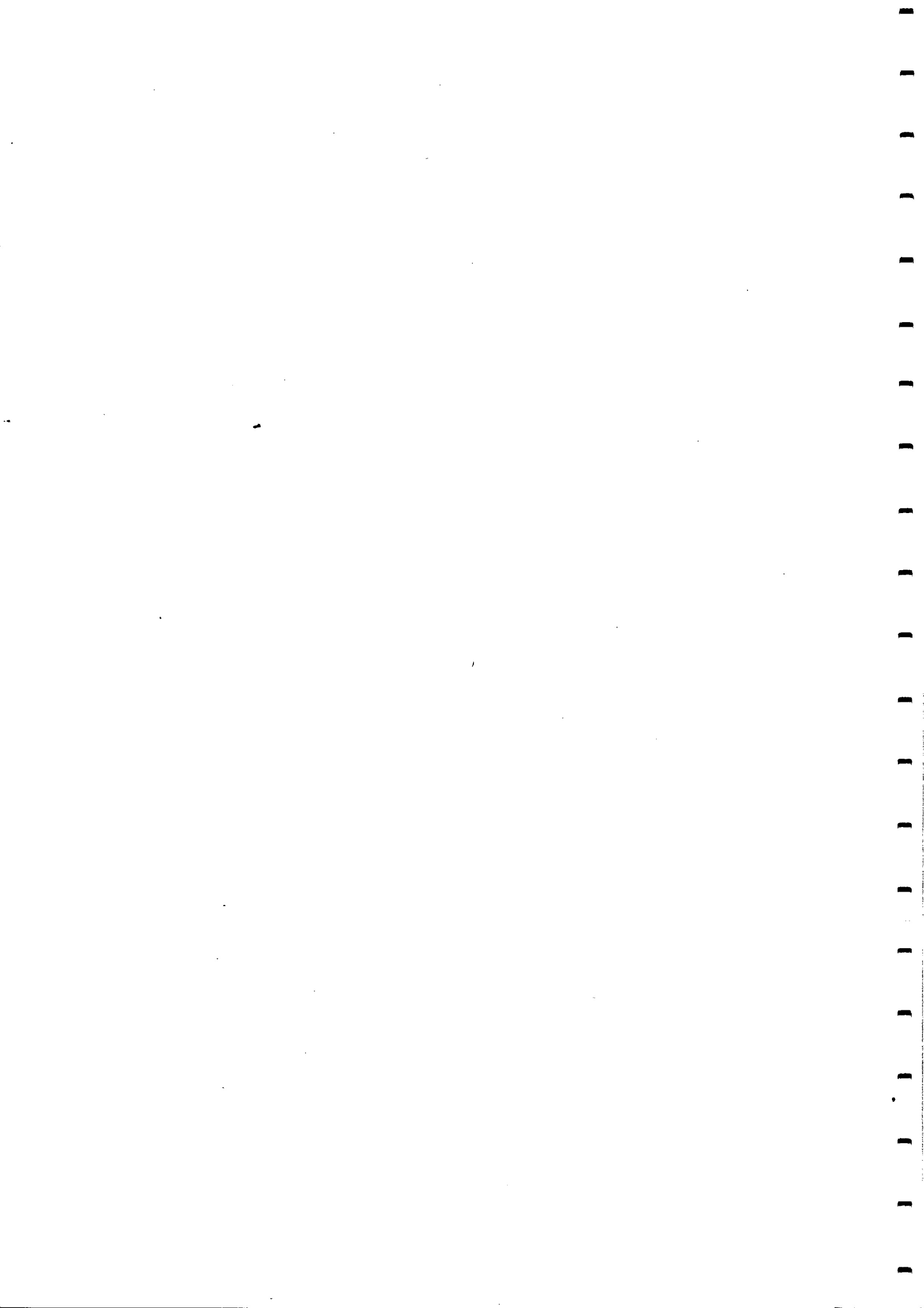
3. Turn on the Apple and observe a normal bootstrap sequence as described in your Apple manuals.

XEDEC KIT



100648

MTG DETAIL
S-1410 To 5/4" DISK DRIVE



SECTION 2

FORMATTING AND CONFIGURATION

The software supplied with the Xebec hard disk system lets you format one or two hard disks to be used with the Apple DOS, CP/M, and Pascal operating systems.

On each disk, space equivalent to at least one 5.25-inch floppy disk must be formatted in the Apple DOS format, to provide storage of certain Xebec utility programs. Other than that, you can specify precisely how much of each disk is to be in Apple DOS format, how much in CP/M format, and how much in Pascal format. If you have no need of Pascal or CP/M space, each of these can be configured for zero percent of the disk's space.

Broadly, the steps described in this section are:

1. Run the HELP CONFIGURE program to calculate various configuration parameters.
2. Run the DISK CONFIGURE program to format, configure, and initialize the hard disk.
3. Run the Apple FUTIL program to copy utility programs to the hard disk.
4. If you have a CP/M system for your Apple, perform these steps:
 - run the APXFER program to patch the BIOS (Basic I/O Subroutines);
 - run the HARDA program to make CP/M consider the hard disk volumes to be drives A: and B:;
 - run the XBOOT program to copy a CP/M system image to the hard disk's boot track; and
 - run the PIP program to copy utility programs to the hard disk.
5. If you have a Pascal system for your Apple, perform these steps:
 - use the filer to copy utilities to a Pascal-formatted diskette;
 - zero out the hard disk's Pascal directories;
 - use the filer to copy utilities to the hard disk;
 - run the DISK CONFIGURE program again to change the hard disk's Pascal unit number;
 - use the filer to change volume names; and
 - run the XBOOT.COM program to save a Pascal system image on the hard disk.

When you have completed these steps, you can use the hard disk as an auxiliary device, or you can relocate the host interface card to slot 7 so it will boot from the hard disk whenever you turn on your Apple. Section 3 describes how to do this.

CALCULATING CONFIGURATION PARAMETERS

The first step in preparing your hard disk is to determine the numbers which you will plug into the formatting program. Slip the Apple DOS 3.3 System Master diskette into drive 1 and the Xebec DOS 3.3 Utilities diskette into drive 2, turn on the Apple, then type the command

RUN HELP CONFIGURE, S6, D2

After the program loads, you should see this display:

```
-----  
: XEBEC HARD DISK CONFIGURATION HELPER :  
:                                     :  
:           VER 2.0                   :  
:                                     :  
:   COPYRIGHT XEBEC, 1983             :  
:                                     :  
: THIS PROGRAM WILL AID YOU IN SELECTING :  
: THE VARIOUS PARAMETERS REQUIRED TO     :  
: COMBINE MULTIPLE OPERATING SYSTEMS ON :  
: A SINGLE HARD DISK DRIVE            :  
:                                     :  
: TYPE <RETURN> TO CONTINUE          :  
:                                     :  
-----
```

Press the <RETURN> key, and this display will ask you to specify the type of drive you are configuring:

```
-----  
: WHAT TYPE OF DRIVE DO YOU HAVE? :  
:                                     :  
:   1) XEBEC'S 5MB DRIVE             :  
:   2) XEBEC'S 10MB DRIVE            :  
:   3) RESERVED                       :  
:   4) NONE OF THESE                 :  
:                                     :  
:   =>                                :  
:                                     :  
-----
```

To specify the 5-megabyte drive that comes with the Xebec system, type 1 and <RETURN>. This tells the program that the drive has 153 cylinders and four heads.

To specify the Xebec-supplied 10-megabyte disk, type 2 and <RETURN>. This tells the program that the drive has 306 cylinders and four heads.

For any other disk drive, consult the documentation supplied with that drive to determine how many cylinders and heads it has, then type 4 and <RETURN>. The display then asks you to enter the number of cylinders and the number of heads.


```
-----  
| WHAT TYPE OF DRIVE DO YOU HAVE? |  
|  
| 1) XEBEC'S 5MB DRIVE |  
| 2) XEBEC'S 10MB DRIVE |  
| 3) RESERVED |  
| 4) NONE OF THESE |  
|  
| => 4 |  
|  
| HOW MANY CYLINDERS ? => 612 |  
| HOW MANY HEADS ? => 2 |  
|-----|
```

For the rest of this section, the examples will be based on the standard Xebec-supplied, 5-megabyte drive, with 153 cylinders and four heads.

Once you have specified the drive characteristics, this display asks you how much of the disk you want to devote to Apple DOS files:

```
-----  
| WHAT PERCENTAGE OF THE DISK IS |  
| TO BE RESERVED FOR DOS? |  
|  
| (MINIMUM = 3%) => |  
|-----|
```

If you want to use the whole hard disk for Apple DOS files, type 100 and <RETURN>. If you want to use as much as possible for CP/M and/or Pascal, type the minimum amount shown in the display (this will vary with the size of the drive).

Next, the display will ask how much of the DOS space should be partitioned into "small volumes":

```
-----  
| WHAT PERCENTAGE OF THE DISK IS |  
| TO BE RESERVED FOR DOS? |  
|  
| (MINIMUM = 3%) =>33 |  
| THIS IS ENOUGH SPACE FOR UP TO |  
| 11 SMALL VOLUMES ...OR |  
| 4 LARGE VOLUMES |  
|  
| HOW MANY SMALL VOLUMES? => |  
|-----|
```

A small volume covers 146 kilobytes, roughly the same as a standard DOS 3.3 diskette; a large volume covers 418 kilobytes. The display tells that 33 percent of a 5-megabyte disk is large enough for four large volumes or 11 small volumes. You can specify the whole DOS space to be small volumes, or all large volumes, or some intermediate combination. Large volumes help to avoid segmentation if you plan to have large files, but their catalogs can get very cluttered if a lot of small files are stored in them. Small volumes, being about the size of diskettes, can facilitate backup procedures.

Now, if you tell the program to provide two small volumes:

```

-----
| WHAT PERCENTAGE OF THE DISK IS
| TO BE RESERVED FOR DOS?
|
| <MINIMUM = 3%>    =>33
|
| THIS IS ENOUGH SPACE FOR UP TO
|
| 11  SMALL VOLUMES ...OR
| 4   LARGE VOLUMES
|
| HOW MANY SMALL VOLUMES? => 2
|
| WHAT PERCENTAGE OF THE DISK IS
| TO BE RESERVED FOR CP/M
| <MAXIMUM = 69.3>
|
-----

```

the program calculates how much space two small volumes require, how many large volumes will fit into the remaining Apple DOS space, and how much of the hard disk is left over.

In this example, 69.3 percent of the disk remains to be allocated. The prompt asks you how much to use for CP/M. If you want all of it for CP/M use, type 69.3 (in this example) and <RETURN>. If you want the entire remaining space for Pascal use, type 0 and <RETURN>. This example splits it between the two:

```

-----
| HOW MANY SMALL VOLUMES? => 2
|
| WHAT PERCENTAGE OF THE DISK IS
| TO BE RESERVED FOR CP/M
| <MAXIMUM = 69.3> 34
|
| 206 TRACKS ARE RESERVED FOR CP/M
| HOW MANY SHOULD BE IN CP/M VOLUME 1?
|
| <MINIMUM = 3, MAX = 206>  =>
|
-----

```

Now the display shows that the 34 percent you specified gives 206 tracks. On a 5-megabyte disk, you can allocate the entire space as a single volume or you can give any portion of it to one volume and the unspecified remainder to a second volume.

The maximum size of any one CP/M volume is 5 megabytes, regardless of how big your disk is. Therefore, a 10-megabyte disk cannot be left as one large volume, but it could be configured to have one volume with 5 megabytes and a second with all the remaining disk space.

If you want two equal-sized CP/M volumes, each with 103 tracks (half of 206), type 103 and <RETURN>. Whatever number you give, the second CP/M volume will get the remaining CP/M space.

The program now displays the calculated results:

```

-----
                FINAL VALUES
-----
D   O   S           (30.23%)
SMALL VOLS => 2           LARGE VOLS => 3
DOS BOUNDS => 5
C. P. / M.         (33.66%)
VOL 1 START => 193       VOL1 SIZE => 102
VOL 2 START => 296       VOL2 SIZE => 102
P A S C A L        (34.64%)
VOL 1 START => 399       VOL 2 START => 505
VOLUME SIZE => 1696 BLOCKS

SPACE RESERVED
<BOOT BLOCK, ETC.> 1.3%
]
-----

```

Note that the HELP CONFIGURE program does not actually configure the disk, but merely calculates the numbers you will need for the actual configuration. Copy the numbers from your screen onto one of the blank forms on the next page.

If you want to see the numbers for a different configuration, or if you have two hard disk drives, rerun the program as many times as necessary until you are comfortable with the partition sizes you see. For instance, you might want to try having two different-sized CP/M volumes. If you have two hard disk drives, you might want to try putting all of your CP/M on one drive and all of the Pascal on the other. Be sure to write down the numbers for the configuration you like.

The form on the next page also has spaces for drive characteristics: the number of cylinders, number of heads, reduced-write cylinder, precompensation cylinder, and control byte.

Hard Disk Drive #1

```

-----
D O S      (<____%>)
SMALL VOLS =>  ___    LARGE VOLS =>  ___
DOS BOUNDS =>  ___
C. P. / M.  (<____%>)
VOL 1 START =>  ___    VOL1 SIZE =>  ___
VOL 2 START =>  ___    VOL2 SIZE =>  ___
P A S C A L (<____%>)
VOL 1 START =>  ___    VOL 2 START =>  ___
VOLUME SIZE =>  ___    BLOCKS
SPACE RESERVED
<BOOT BLOCK, ETC.> ____%
-----

```

Hard Disk Drive #2

```

-----
D O S      (<____%>)
SMALL VOLS =>  ___    LARGE VOLS =>  ___
DOS BOUNDS =>  ___
C. P. / M.  (<____%>)
VOL 1 START =>  ___    VOL1 SIZE =>  ___
VOL 2 START =>  ___    VOL2 SIZE =>  ___
P A S C A L (<____%>)
VOL 1 START =>  ___    VOL 2 START =>  ___
VOLUME SIZE =>  ___    BLOCKS
SPACE RESERVED
<BOOT BLOCK, ETC.> ____%
-----

```

Drive Characteristics:

	Drive #1	Drive #2
Number of Cylinders	_____	_____
Number of Heads	_____	_____
Reduced-Write Cylinder	_____	_____
Precompensation Cylinder	_____	_____
Control Byte	_____	_____

For the Xebec-supplied drive, you won't need these data. Table 2-1 lists the characteristics of some common hard disk drives. If your drive is not listed, check the documentation supplied by the drive's manufacturer. If the manufacturer does not supply a "reduced-write cylinder" number or a "precompensation cylinder" number, then you can write the number of cylinders in these blanks.

Table 2-1: Characteristics of Several Brands of Hard Disk

Disk Drive	Cylinders	Heads	Reduced-Write Cylinder	Precomp. Cylinder
CMI CM-5205	256	2	256	256
CMI CM-5410	256	4	256	256
CMI CM-5616	256	6	256	256
MS 1-006	306	2	153	0
MS 1-012	306	4	153	0
OLI HD561	180	2	128	180
OLI HD562	180	2	128	180
RMS 503	153	2	77	77
RMS 506	153	4	77	77
RMS 512	153	8	77	77
RO 101	192	2	96	0
RO 102	192	4	96	0
RO 103	192	6	96	0
RO 104	192	8	96	0
RO 201	321	2	132	0
RO 202	321	4	132	0
RO 203	321	6	132	0
RO 204	321	8	132	0
SEA ST-506	153	4	128	64
SEA ST-412	306	4	128	64
TAN TM602S	153	4	128	153
TAN TM603S	153	6	128	153
TAN TM603SE	230	6	128	128
TI 5 1/4+	153	4	64	64

In this table, CMI = Computer Memories Inc.
 MS = Miniscribe
 OLI = Olivetti
 RMS = Rotating Memory Systems Inc.
 RO = Rodime Ltd.
 SEA = Seagate Technology Inc.
 TAN = Tandon Inc.
 TI = Texas Instruments

The control byte tells the controller how fast the disk drive can seek. Table 2-2 gives the control bytes for some popular disk drives and some common step options. For example: if your drive is not listed in the table but the disk manufacturer's documentation tells you that the drive uses a 15-microsecond buffered step option, you would use control byte 7.


```
-----  
                VERSION 2.0  
                COPYRIGHT 1982  
                CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
                (1)  FORMAT ENTIRE DRIVE  
                (2)  PATCH DOS 3.3  
                (3)  SET DOS BOUNDS  
                (4)  INITIALIZE DOS VOLUMES  
                (5)  CREATE DOS BOOT TRACK  
                (6)  SET UP CP/M PARTITION  
                (7)  SET UP PASCAL PARTITION  
                (8)  RESET SLOT AND DRIVE  
                (9)  CHANGE DRIVE CHARACTERISTICS  
                (10) QUIT  
  
                WHICH WOULD YOU LIKE? 1  
-----
```

When you select option 1, you see this display:

```
-----  
                | DRIVE (1 OR 2)? => |  
-----
```

After you enter the drive number, the display asks you what type of drive it is. As in the previous program, a response of 1 says you are configuring the 5-megabyte drive that comes with the Xebec system. A response of 2 says you are configuring the Xebec-supplied 10-megabyte disk.

A response of 4 causes the program to prompt you for the disk characteristics you entered on the configuration data sheet, as shown in this example:

```
-----  
                | DRIVE (1 OR 2)? => 1 |  
                | WHAT TYPE OF DRIVE DO YOU HAVE ? |  
                | 1) XEBEC'S 5MB DRIVE |  
                | 2) XEBEC'S 10MB DRIVE |  
                | 3) RESERVED |  
                | 4) NONE OF THESE |  
  
                | PICK ONE OF THE ABOVE 4 |  
                | MAXIMUM NUMBER OF CYLINDERS => 306 |  
                | MAXIMUM NUMBER OF HEADS => 4 |  
                | REDUCED WRITE CYLINDER => 306 |  
                | PRECOMPENSATION CYLINDER => 306 |  
  
                | CONTROL BYTE => 7 |  
-----
```

When you have specified the drive, you see this display:

```

-----
|               F O R M A T               |
| CURRENT DRIVE => 1                       |
|                                           |
| NUMBER OF SMALL VOLUMES? 4             |
|                                           |
|-----|

```

After you enter the drive number, the program prompts you for the number of small DOS volumes. Find the "SMALL VOLLS" number on your data sheet, type it, and press <RETURN>. Now the display looks like this:

```

-----
|               F O R M A T               |
| CURRENT DRIVE => 1                       |
|                                           |
| NUMBER OF SMALL VOLUMES? 4             |
|                                           |
| FORMATTING WILL OVERWRITE DATA ON     |
| DRIVE 1                                |
|                                           |
| PRESS RETURN TO FORMAT, ESCAPE TO ABORT |
|-----|

```

This warning could be important if, for example, you are reformatting an previously formatted disk and you have forgotten to back up your existing files. For now, however, this manual assumes you are formatting a fresh disk. Press <RETURN> and the program should access the hard disk drive for at least two minutes.

If the specified hard disk drive is not turned on, or if the disk drive's unit-selection jumper (or switch) is not set for the same disk number as the cable to the controller card's pin terminal (see "Connecting the Controller to the Disk Drive" in Section 1), the program will display this error message:

I/O ERROR! SENSE BYTES = 84 00 00 00

If the disk is humming (thereby indicating that its power is on), turn its power off and check the cabling and the jumper (or switch), then rerun the DISK CONFIGURE program.

When the formatting is completed, the program tells you to press <RETURN> and returns to the Initialization Utilities display.

CONFIGURING THE PARTITIONS

The next step is to tell the program how many volumes it will be configuring on the hard disk. Type 3 and <RETURN>, as shown on the next page:

```

-----
XEBEC INITIALIZATION UTILITIES
      VERSION 2.0

      COPYRIGHT 1982

CHOOSE ONE OF THE FOLLOWING OPTIONS

      (1)  FORMAT ENTIRE DRIVE
      (2)  PATCH DOS 3.3
      (3)  SET DOS BOUNDS
      (4)  INITIALIZE DOS VOLUMES
      (5)  CREATE DOS BOOT TRACK
      (6)  SET UP CP/M PARTITION
      (7)  SET UP PASCAL PARTITION
      (8)  RESET SLOT AND DRIVE
      (9)  CHANGE DRIVE CHARACTERISTICS
      (10) QUIT

WHICH WOULD YOU LIKE? 3
-----

```

When you select option 3, you see this display:

```

-----
      S E T   D O S   B O U N D S
CURRENT DRIVE => 1
LAST ACCESSIBLE VOLUME?
-----

```

Locate the "DOS BOUNDS" entry on your configuration data sheet and type that value and <RETURN>. The display then gives you a chance to back out if you have mistyped either of the data on this display:

```

-----
      S E T   D O S   B O U N D S
CURRENT DRIVE => 1
LAST ACCESSIBLE VOLUME? 5

PRESS RETURN TO COMPLETE FUNCTION
PRESS <ESC> TO ABORT
-----

```

If all is well, press <RETURN>. The program then returns to the Initialization Utilities display.

The next task is to initialize the DOS volumes, just as you would initialize freshly formatted diskettes. Type 4 and <RETURN>, as shown on the next page.

```

-----
XEBEC INITIALIZATION UTILITIES
VERSION 2.0

COPYRIGHT 1982

CHOOSE ONE OF THE FOLLOWING OPTIONS

(1)  FORMAT ENTIRE DRIVE
(2)  PATCH DOS 3.3
(3)  SET DOS BOUNDS
(4)  INITIALIZE DOS VOLUMES
(5)  CREATE DOS BOOT TRACK
(6)  SET UP CP/M PARTITION
(7)  SET UP PASCAL PARTITION
(8)  RESET SLOT AND DRIVE
(9)  CHANGE DRIVE CHARACTERISTICS
(10) QUIT

WHICH WOULD YOU LIKE? 4
-----

```

When you select option 4, you see this display:

```

-----
INIT.  DOS  VOLUMES
CURRENT DRIVE => 1

FIRST VOLUME TO INITIALIZE?
-----

```

Type 1 and <RETURN>, then the program asks you for the last volume to be initialized:

```

-----
INIT.  DOS  VOLUMES
CURRENT DRIVE => 1

FIRST VOLUME TO INITIALIZE? 1
LAST VOLUME TO INITIALIZE?
-----

```

Type the "DOS BOUNDS" number from your configuration data sheet, then press <RETURN>. The display then gives you a chance to back out if you have mistyped either of the data on this display:

```
-----  
      I N I T .   D O S   V O L U M E S  
CURRENT DRIVE => 1  
  
FIRST VOLUME TO INITIALIZE? 1  
LAST VOLUME TO INITIALIZE? 5  
  
DOS VOLUME DIRECTORIES WILL BE ERASED ON  
  
DRIVE 1  
  
PRESS <RET> TO CONTINUE, <ESC> TO ABORT  
-----
```

If all is well, press <RETURN>. The program displays a period (.) as it initializes each volume, so you can watch its progress. When finished, it tells you to press <RETURN> again, then returns to the Initialization Utilities display.

The next task is to copy the Apple disk operating system (DOS), as it now exists in your Apple's memory, to the hard disk so the disk will have a copy to boot from. Type 5 and <RETURN>, as shown below.

```
-----  
      XEBEC INITIALIZATION UTILITIES  
      VERSION 2.0  
  
      COPYRIGHT 1982  
  
      CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
      (1)  FORMAT ENTIRE DRIVE  
      (2)  PATCH DOS 3.3  
      (3)  SET DOS BOUNDS  
      (4)  INITIALIZE DOS VOLUMES  
      (5)  CREATE DOS BOOT TRACK  
      (6)  SET UP CP/M PARTITION  
      (7)  SET UP PASCAL PARTITION  
      (8)  RESET SLOT AND DRIVE  
      (9)  CHANGE DRIVE CHARACTERISTICS  
      (10) QUIT  
  
      WHICH WOULD YOU LIKE? 5  
-----
```

When you select option 5, you see this display:

```

-----
:          C R E A T E   D O S   B O O T          :
: CURRENT DRIVE => 1                               :
: NAME OF HELLO PROGRAM                            :
-----

```

The hard disk, like diskettes, will automatically run a specified program when it boots Apple DOS. This example assumes that you will name yours HELLO. Type HELLO and <RETURN>, and the program will ask you for some information about the location of the HELLO file. You can locate it in any volume you want, even on a diskette. Most users, however, should answer the program's questions as shown below.

If you have been following these instructions, your Xebec host interface card is in slot 4 of your Apple. The drive number is 1 (unless you are now configuring a second drive). The volume number is also 1. After you enter this information, the program asks you if you want to save the RAM card:

```

-----
:          C R E A T E   D O S   B O O T          :
: CURRENT DRIVE => 1                               :
: NAME OF HELLO PROGRAM HELLO                     :
:   SLOT   => 4                                     :
:   DRIVE  => 1                                     :
: VOLUME  => 1                                     :
: SAVE THE RAM CARD? =>                            :
-----

```

If you have an Apple //e (which has 64 kilobytes of resident memory and therefore no RAM card), type N and <RETURN>. If you have a 48-kilobyte Apple II or Apple II+ with a 16-kilobyte RAM card, type Y and <RETURN> so the card's memory will be saved along with the resident memory. The display then gives you a chance to back out if you have mistyped any of the data in this display:

```
-----  
      C R E A T E   D O S   B O O T  
-----  
CURRENT DRIVE => 1  
NAME OF HELLO PROGRAM HELLO  
  SLOT => 4  
  DRIVE => 1  
  VOLUME => 1  
  
SAVE THE RAM CARD? => Y  
  
PRESS RETURN TO COMPLETE FUNCTION  
PRESS <ESC> TO ABORT  
-----
```

If all is well, press <RETURN>. While writing the boot track, the program displays

SAVING IMAGE OF MEMORY

When it has finished, it tells you to press <RETURN> again, then returns to the Initialization Utilities display.

The next task is to configure the CP/M partitions, even if you do not plan to use CP/M with this hard disk. Type 6 and <RETURN>, as shown below.

```
-----  
      XEBEC INITIALIZATION UTILITIES  
      VERSION 2.0  
-----  
      COPYRIGHT 1982  
-----  
      CHOOSE ONE OF THE FOLLOWING OPTIONS  
-----  
      (1)  FORMAT ENTIRE DRIVE  
      (2)  PATCH DOS 3.3  
      (3)  SET DOS BOUNDS  
      (4)  INITIALIZE DOS VOLUMES  
      (5)  CREATE DOS BOOT TRACK  
      (6)  SET UP CP/M PARTITION  
      (7)  SET UP PASCAL PARTITION  
      (8)  RESET SLOT AND DRIVE  
      (9)  CHANGE DRIVE CHARACTERISTICS  
      (10) QUIT  
-----  
      WHICH WOULD YOU LIKE? 6  
-----
```

When you select option 6, you see this display:

```

-----
      C P / M   P A R T I T I O N
-----
CURRENT DRIVE => 1

DO YOU WANT TO

      1) SET PARTITION SIZE
      2) INITIALIZE CP/M PARTITION
      3) TURN UNITS ON/OFF LINE

=>
-----

```

Type 1 and <RETURN>. The program then asks you for information about the first CP/M volume:

```

-----
      C P / M   P A R T I T I O N
-----
CURRENT DRIVE => 1

DO YOU WANT TO

      1) SET PARTITION SIZE
      2) INITIALIZE CP/M PARTITION
      3) TURN UNITS ON/OFF LINE

=> 1

FIRST VOLUME 1...

CP/M START TRACK =>
-----

```

Type the "VOL 1 START" number from the CP/M section of your configuration data sheet, then <RETURN>. The program then asks you for the partition size:

```

-----
=> 1

FIRST VOLUME 1...

CP/M START TRACK => 193
PARTITION SIZE =>
-----

```

Type the "VOL 1 SIZE" number from the CP/M section of your configuration data sheet, then <RETURN>. The program then asks you whether you want this CP/M volume to remain online:

```

=> 1
:
: FIRST VOLUME 1...
: CP/M START TRACK => 193
: PARTITION SIZE => 102
: VOLUME ON LINE? (0=YES, 1=NO) =>
-----

```

Type 0, then <RETURN>. The program then asks for the starting track of the second CP/M volume:

```

=> 1
:
: FIRST VOLUME 1...
: CP/M START TRACK => 193
: PARTITION SIZE => 102
: VOLUME ON LINE? (0=YES, 1=NO) => 0
:
: NOW VOLUME 2...
:
: CP/M START TRACK =>
-----

```

Type the "VOL 2 START" number from the CP/M section of your configuration data sheet, then <RETURN>. The program then asks you for the partition size:

```

: NOW VOLUME 2...
:
: CP/M START TRACK => 296
: PARTITION SIZE =>
-----

```

Type the "VOL 2 SIZE" number from the CP/M section of your configuration data sheet, then <RETURN>. The program then asks you whether you want this CP/M volume to remain online:

```

: NOW VOLUME 2...
:
: CP/M START TRACK => 296
: PARTITION SIZE => 102
: VOLUME ON LINE? (0=YES, 1=NO) =>
-----

```

Type 0, then <RETURN>. The program then gives you a chance to back out if you have mistyped any of the data in this display:

```
| NOW VOLUME 2...  
| CP/M START TRACK => 296  
| PARTITION SIZE => 102  
| VOLUME ON LINE? (0=YES, 1=NO) => 0  
  
| PRESS RETURN TO COMPLETE FUNCTION  
| PRESS <ESC> TO ABORT
```

If all is well, press <RETURN>. When the program has finished this configuring this CP/M volume, it tells you to press <RETURN> again, then returns to the Initialization Utilities display.

The next task is to initialize the first CP/M partition. Type 6 and <RETURN> again, as shown below.

```
-----  
XEBEC INITIALIZATION UTILITIES  
VERSION 2.0  
  
COPYRIGHT 1982  
  
CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
  (1)  FORMAT ENTIRE DRIVE  
  (2)  PATCH DOS 3.3  
  (3)  SET DOS BOUNDS  
  (4)  INITIALIZE DOS VOLUMES  
  (5)  CREATE DOS BOOT TRACK  
  (6)  SET UP CP/M PARTITION  
  (7)  SET UP PASCAL PARTITION  
  (8)  RESET SLOT AND DRIVE  
  (9)  CHANGE DRIVE CHARACTERISTICS  
  (10) QUIT  
  
WHICH WOULD YOU LIKE? 6
```

When you select option 6, you see this display again:


```

-----
      C P / M   P A R T I T I O N
CURRENT DRIVE => 1

DO YOU WANT TO

    1) SET PARTITION SIZE
    2) INITIALIZE CP/M PARTITION
    3) TURN UNITS ON/OFF LINE

=>
-----

```

This time, type 2 and <RETURN>. The program then asks you which CP/M volume you want to initialize:

```

-----
      C P / M   P A R T I T I O N
CURRENT DRIVE => 1

DO YOU WANT TO

    1) SET PARTITION SIZE
    2) INITIALIZE CP/M PARTITION
    3) TURN UNITS ON/OFF LINE

=> 2

INITIALIZE VOLUME 1 OR 2? =>
-----

```

Type 1 and <RETURN>. The program then gives you a chance to back out:

```

-----
      => 2

INITIALIZE VOLUME 1 OR 2? => 1

ALL CP/M INFORMATION ON

DRIVE 1   VOLUME 1

WILL BE ERASED!
PRESS RETURN TO CONTINUE
PRESS <ESC> TO ABORT
-----

```

If all is well, press <RETURN>. When the program has finished initializing the first CP/M volume, it tells you to press <RETURN> and returns to the Initialization Utilities display.

The next task is to initialize the second CP/M partition. Type 6 and <RETURN> one more time, as shown below.

```
-----  
XEBEC INITIALIZATION UTILITIES  
VERSION 2.0  
  
COPYRIGHT 1982  
  
CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
  (1)  FORMAT ENTIRE DRIVE  
  (2)  PATCH DOS 3.3  
  (3)  SET DOS BOUNDS  
  (4)  INITIALIZE DOS VOLUMES  
  (5)  CREATE DOS BOOT TRACK  
  (6)  SET UP CP/M PARTITION  
  (7)  SET UP PASCAL PARTITION  
  (8)  RESET SLOT AND DRIVE  
  (9)  CHANGE DRIVE CHARACTERISTICS  
  (10) QUIT  
  
WHICH WOULD YOU LIKE? 6  
-----
```

When you select option 6, you see this display again:

```
-----  
C P / M   P A R T I T I O N  
  
CURRENT DRIVE => 1  
  
DO YOU WANT TO  
  
  1) SET PARTITION SIZE  
  2) INITIALIZE CP/M PARTITION  
  3) TURN UNITS ON/OFF LINE  
  
=>  
-----
```

This time, type 2 and <RETURN>. The program then asks you which CP/M volume you want to initialize:

```
-----  
C P / M   P A R T I T I O N  
CURRENT DRIVE => 1  
  
DO YOU WANT TO  
  
1) SET PARTITION SIZE  
2) INITIALIZE CP/M PARTITION  
3) TURN UNITS ON/OFF LINE  
  
=> 2  
  
INITIALIZE VOLUME 1 OR 2? =>
```

This time, type 2 and <RETURN>. As it did with the first volume, the program now gives you a chance to back out:

```
=> 2  
  
INITIALIZE VOLUME 1 OR 2? => 2  
  
ALL CP/M INFORMATION ON  
DRIVE 1   VOLUME 2  
WILL BE ERASED!  
PRESS RETURN TO CONTINUE  
PRESS <ESC> TO ABORT
```

If all is well, press <RETURN>. When the program has finished initializing this CP/M volume, it tells you to press <RETURN> and returns to the Initialization Utilities display.

The next task is to configure the Pascal partitions, even if you do not plan to use Pascal with this hard disk. Type 7 and <RETURN>, as shown below.

```
-----
XEBEC INITIALIZATION UTILITIES
VERSION 2.0

COPYRIGHT 1982

CHOOSE ONE OF THE FOLLOWING OPTIONS

(1)  FORMAT ENTIRE DRIVE
(2)  PATCH DOS 3.3
(3)  SET DOS BOUNDS
(4)  INITIALIZE DOS VOLUMES
(5)  CREATE DOS BOOT TRACK
(6)  SET UP CP/M PARTITION
(7)  SET UP PASCAL PARTITION
(8)  RESET SLOT AND DRIVE
(9)  CHANGE DRIVE CHARACTERISTICS
(10) QUIT

WHICH WOULD YOU LIKE? 7
-----
```

When you select option 7, you see this display:

```
-----
PASCAL PARTITION

CURRENT DRIVE => 1

DO YOU WANT TO

1)  SET PARTITION SIZE
2)  CHANGE UNIT ASSIGNMENT

=>
-----
```

Type 1 and <RETURN>. The program then asks you for information about the first Pascal volume:

```
-----  
P A S C A L   P A R T I T I O N  
CURRENT DRIVE => 1  
DO YOU WANT TO  
    1) SET PARTITION SIZE  
    2) CHANGE UNIT ASSIGNMENT  
=> 1  
START TRACK OF FIRST VOLUME =>  
-----
```

Type the "VOL 1 START" number from the Pascal section of your configuration data sheet, then <RETURN>. The program then asks you for the second volume's starting track:

```
-----  
=> 1  
START TRACK OF FIRST VOLUME => 399  
START TRACK OF SECOND VOLUME =>  
-----
```

Type the "VOL 2 START" number from the Pascal section of your configuration data sheet, then <RETURN>. The program then asks for a Pascal unit number:

```
-----  
=> 1  
START TRACK OF FIRST VOLUME => 399  
START TRACK OF SECOND VOLUME => 505  
PASCAL UNIT NUMBER (4,9,11) =>  
-----
```

Type 9, then <RETURN>. The program then gives you a chance to back out if you have mistyped any of the data in this display:

```
      => 1  
START TRACK OF FIRST VOLUME => 399  
START TRACK OF SECOND VOLUME => 505  
PASCAL UNIT NUMBER (4,9,11) => 9  
PRESS RETURN TO COMPLETE FUNCTION  
PRESS <ESC> TO ABORT
```

If all is well, press <RETURN>. When the program has finished this task, it tells you to press <RETURN> again, then returns to the Initialization Utilities display. Type 10 and <RETURN> to quit the program.

COPYING APPLE UTILITY FILES

The next step is to move the Apple utility files onto the hard disk. After quitting the DISK CONFIGURE program, you should now have the Applesoft prompt (>). The Apple DOS 3.3 System Master diskette should still be in drive 1 and the Xebec DOS 3.3 Utilities diskette should still be in drive 2. This example assumes that you have configured at least two Apple DOS volumes on the hard disk.

Now type the command

```
BRUN FUTIL,S6,D2
```

to get the File Utility display. All you want to do at this point is to copy some files, so type 1 and <RETURN>, as shown below. (Note: At any time in the FUTIL program, if you have mistyped any of the data on the current display, you can press the <ESC> key to abandon the task and return to this display, so you can restart that task.)

```
-----  
XEBEC FILE UTILITY  
VERSION 1.2  
  
COPYRIGHT 1982  
  
CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
  (1) COPY FILES  
  (2) CATALOG  
  (3) SPACE ON DISK  
  (4) UNLOCK FILES  
  (5) LOCK FILES  
  (6) DELETE FILES  
  (7) RESET SLOT & DRIVE  
  (8) VERIFY FILES  
  (9) QUIT  
  
WHICH WOULD YOU LIKE ? 1  
-----
```

When you select option 1, you see this display:

```
-----  
COPY FILES  
  
SOURCE SLOT?  
-----
```

As this display continues to prompt you, respond as shown below to copy files from the Apple DOS 3.3 System Master diskette onto volume 1 of the hard disk:

```
-----  
COPY FILES  
  
SOURCE SLOT? 6  
DRIVE? 1  
VOLUME?  
  
DESTINATION SLOT? 4  
DRIVE? 1  
VOLUME? 1  
  
FILENAME? =  
DO YOU WANT PROMPTING?  
-----
```

Notice that the response for the source volume was just a carriage return. This is because the diskette-oriented Apple DOS uses volume numbers as a security device only, but the Xebec hard disk system uses volume numbers to identify the "virtual floppy-disk drives" you have just finished configuring.

At this point, if you want to copy everything from the

System Master diskette, type N and <RETURN>. However, you will more likely want to avoid copying some of the files there, such as the demonstrations or the redundant Applesoft and Integer Basic programs. (For example, you will not need to have both COPY and COPYA on the disk.) In that case, type Y and <RETURN> so you can make a decision on each file when the program prompts you.

The program then tells you to insert the disks. The Master Diskette should already be in drive 1. If you have not mistyped any of the responses, just press <RETURN> now.

Whether you use the prompting or not, the program displays the name of each file as it is copied. When it has finished, it tells you to press <RETURN> and returns to the File Utility display. Now you want to copy the Xebec utility files, so once again type 1 and <RETURN>, as shown below:

```
-----  
XEBEC FILE UTILITY  
VERSION 1.2  
  
COPYRIGHT 1982  
  
CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
  (1) COPY FILES  
  (2) CATALOG  
  (3) SPACE ON DISK  
  (4) UNLOCK FILES  
  (5) LOCK FILES  
  (6) DELETE FILES  
  (7) RESET SLOT & DRIVE  
  (8) VERIFY FILES  
  (9) QUIT  
  
! WHICH WOULD YOU LIKE ? 1  
-----
```

This time, when you see the COPY FILES display, respond as shown below to copy files from the Xebec Apple DOS Utilities diskette onto volume 2 of the hard disk:


```
-----  
                        COPY FILES  
-----  
SOURCE SLOT? 6  
      DRIVE? 2  
      VOLUME?  
  
DESTINATION SLOT? 4  
      DRIVE? 1  
      VOLUME? 2  
  
FILENAME? =  
DO YOU WANT PROMPTING? N  
  
INSERT DISKS.  PRESS <ESC> TO RETURN TO  
MAIN MENU OR ANY OTHER KEY TO BEGIN  
-----
```

(This time, you need not incur the delay of the prompting, because you will want all the files copied. There aren't nearly as many as there are on Apple's Master Diskette, and all of them are needed for full operation of this hard-disk operating system.)

The Xebec Apple DOS Utilities diskette should already be in drive 2. If you have not mistyped any of the responses, just press <RETURN> now.

As before, the program displays the name of each file as it is copied. When it has finished, it tells you to press <RETURN> and returns to the File Utility display. Now type 9 and <RETURN> to exit the program.

The Apple DOS portion of your hard disk is now ready to use. If you do not have CP/M or Pascal systems for your Apple, you can skip the rest of this section and go straight to Section 3, which tells how to set up your system so you can boot directly from your hard disk. If you have Pascal but not CP/M, skip the next subsection and follow the instructions in the next one, "Preparing the Pascal Space."

PREPARING THE CP/M SPACE

Before you start preparing the disk for CP/M, make a copy of the MicroSoft SoftCard diskette, using the COPY utility on a CP/M-formatted diskette as described in the MicroSoft documentation. From here on, when we refer to the CP/M system diskette we mean that copy, not the original. You should never use that original diskette for any purpose other than making copies of it.

If you are a previous Xebec user upgrading to the new software release, you still must start with a fresh copy of the MicroSoft diskette; the procedure you are about to follow does not work on a bootable diskette modified for any previous Xebec release.

Now that you have been sufficiently warned, insert the CP/M system diskette (the copy) into drive A: and boot the system from

it. Now remove that diskette, slip the Xebec CP/M Utilities diskette into drive A:, and type the command

APXFER <RETURN>

to get this display:

```

-----
: Name: INSTALL      V1.1  10-11-82      :
: Function:         Query the user and install :
: the appropriate Basic-I/O :
: Subroutines (BIOS) in CP/M system tracks :
: Minimum Requirements :
:   - Apple-II with 48K RAM; :
:   - MicroSoft SoftCard 280 CPU; :
:   - Apple language card :56K CP/M :
:   - One floppy disk drive; :
: <More: Press return> :
-----

```

Press <RETURN> to get this continuation:

```

: Insert diskette to be WRITTEN ON      :
: and enter its CP/M unit:  <A thru P>  :
-----

```

Now remove the Xebec CP/M Utilities diskette and re-insert the CP/M system diskette copy. Type the letter A and <RETURN>. The program then asks you to be sure you have the right diskette in drive A: and have specified that drive:

```

: Please double-check your answers...   :
: WRITE ON disk A: ?                    (y/n) :
-----

```

If all is well, type Y and <RETURN>. (If you want to abort execution of this program, type N and <RETURN>.) While the program is working, it displays

```

: Installing new BIOS/BOOT/IOCB on disk A: :
: A> :
-----

```

When it has finished, it displays

```

: Done. :
: A> :
-----

```

You now have, in drive A:, a newly modified Xebec CP/M system diskette. Turn the Apple's power off, then turn it on again, to boot the new system software. Now you see this display:

```

-----
| Apple ][ CP/M
| 56K Ver. 2.20B
| XEBEC V2.0(C) 1980 Microsoft
|
| A>
-----

```

Remove the Xebec CP/M system diskette, slip the Xebec CP/M Utilities diskette into drive A:, and type the command

HARDA

to produce this display:

```

-----
| PROGRAM NAME: HARDA.COM
|
| FUNCTION: MAP DRIVES A AND B TO THE
| HARD DISK
|
| COPYRIGHT XEBEC - APRIL, 1983
|
| TYPE <RETURN> TO CONTINUE OR ....
|
| ANY OTHER KEY TO ABORT
-----

```

Press <RETURN> to change the CP/M system in memory so the floppy-disk drives (which were drives A: and B:) become drives C: and D: and the hard disk's volumes (which were C: and D:) become A: and B:. When this has been completed, the program displays

```

-----
| TYPE <RETURN> TO CONTINUE OR ....
|
| ANY OTHER KEY TO ABORT
|
| BIOS HAS BEEN PATCHED
|
| A>
-----

```

To confirm that the drive identifiers have indeed been swapped, you can execute a DIR command. Note that it displays the directory for the hard disk's volume. CP/M still considers drive A: to be the current drive, but drive A: is now the hard disk volume.

If you have two hard disks in your system, you may want to use the ONOFF program to specify which volumes are online. ONOFF is described in Section 4.

Use the PIP utility, as described in the MicroSoft documentation, to copy to drive A: (the first CP/M volume of the hard disk) all files on the CP/M system diskette and the Xebec CP/M Utilities Disk.

HARDA changed the unit designations only in the CP/M system as currently kept in the Apple's memory; the change was not stored permanently. Your next task is to store it in the hard disk's boot track, so the hard disk will be A: the next time you boot it. Type the command

XBOOT <RETURN>

to get this display:

```

-----
: Name: MAKEBOOT V2.0
: Copyright Xebec, January 1983
:
: Function: Move an image of the current
: CP/M system to the boot area of the
: XEBEC hard disk
:
: Type <RETURN> to continue or...
: Any other key to abort
-----

```

Press <RETURN> to install a CP/M boot track on the hard disk. While the program is working, it displays

```

: <SAVING IMAGE OF SYSTEM>
-----

```

When it has finished, it displays

```

: Boot image created
:
: A)
-----

```

Now type a control-C (hold the <CTRL> key down while you type the letter C) to warm-boot the CP/M system.

The CP/M portion of your hard disk is now ready to use. If you do not have the Pascal system for your Apple, you can skip the rest of this section and go straight to Section 3, which tells how to set up your system so you can boot directly from your hard disk. If you do have Pascal, continue to the next subsection.

PREPARING THE PASCAL SPACE

Before you start preparing the disk for Pascal, you should have made a copy of the original APPLE1: diskette. If you have not done so, make a copy now.

Slip the copy into drive 1. Turn the Apple's power off,

then turn it on again, to boot the Pascal system. Now you see this display:

```

-----
| Command: E<dit, R<un, F<ile, C<omp, L<in |
|
| Welcome APPLE1, to Apple II Pascal 1.1 |
| Based on UCSD Pascal II.1 |
| Current date is 14-Aug-80 |
|
| (C) Apple Computer Inc. 1979, 1980 |
| (C) U. C. Regents 1979 |
-----

```

Now you are going to modify the APPLE1: diskette by transferring four files from the Xebec Pascal Utilities diskette. Slip the Xebec Pascal Utilities diskette into drive 2. Type F (the <RETURN> key is not needed) to get into the Pascal filer and see this display:

```

-----
| Filer: G, S, N, L, R, C, T, Q, G, [1.1] |
-----

```

Type T to tell Pascal to transfer a file. When you see this display:

```

-----
| Transfer ? |
-----

```

Tell the system to transfer the SYSTEM.ATTACH file, as shown below:

```

-----
| Transfer ? XEBEC:SYSTEM.ATTACH |
| To where ? APPLE1: |
-----

```

While the system is transferring the file, it displays this acknowledgement:

```

-----
| XEBEC:ATTACH.DATA |
| --> APPLE1:SYSTEM.ATTACH |
-----

```

When the file has been transferred, the system returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1] !
-----
```

Type T again and, this time, tell the Pascal system to transfer the ATTACH.DATA file, as shown below:

```
-----
! Transfer ? XEBEC:ATTACH.DATA           !
! To where ? APPLE1:$                   !
-----
```

Again, the system displays an acknowledgement and returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1] !
-----
```

Type T a third time and, this time, tell the Pascal system to transfer the ATTACH.DRIVERS file, as shown below:

```
-----
! Transfer ? XEBEC:ATTACH.DRIVERS        !
! To where ? APPLE1:$                   !
-----
```

Again, the system displays an acknowledgement and returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1] !
-----
```

Type T one more time and, this time, tell the Pascal system to transfer the XBOOT.COM.CODE file, as shown below:

```
-----
! Transfer ? XEBEC:XBOOT.COM.CODE       !
! To where ? APPLE1:$                   !
-----
```

Again, the system displays an acknowledgement and returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1] !
-----
```

Now that you have transferred all four files from the Xebec Pascal Utilities diskette, use a control-reset (hold the <CTRL> key down while you press the reset key) to warm-boot the modified

Pascal system and see this display:

```

-----
| Command: E<dit, R<un, F<ile, C<omp, L<in |
|
| Welcome APPLE1, to Apple II Pascal 1.1 |
| Based on UCSD Pascal II.1 |
| Current date is 14-Aug-80 |
|
| (C) Apple Computer Inc. 1979, 1980 |
| (C) U. C. Regents 1979 |
-----

```

Now you are going to initialize (zero) the directories on the hard disk's Pascal volumes. Type F to get into the Pascal filer and see this display again:

```

-----
| Filer: G, S, N, L, R, C, T, Q, G, [1.1] |
-----

```

Type Z to get this display:

```

-----
| Zero dir of ? |
-----

```

Type #9 and <RETURN>, and the system asks if there is a duplicate directory:

```

-----
| Zero dir of ? #9 |
| Duplicate dir ? |
-----

```

Type N, and the system asks how much space is on the disk:

```

-----
| Zero dir of ? #9 |
| Duplicate dir ? N |
| # of blocks on the disk ? |
-----

```

Type the "VOLUME SIZE" number from the Pascal part of configuration data sheet, and the system asks you to name the new hard-disk volume:

```

-----
| Zero dir of ? #9
| Duplicate dir ? N
| # of blocks on the disk ? 1696
| New vol name ?
-----

```

You can name the volumes whatever you want, but these examples assume the names HARD1: and HARD2: for the two Pascal volumes. Type the first volume name and press <RETURN>.

The system then gives you a chance to back out if you have mistyped the name:

```

-----
| Zero dir of ? #9
| Duplicate dir ? N
| # of blocks on the disk ? 1696
| New vol name ? HARD1:
| HARD1: correct ?
-----

```

When the directory for HARD1: has been initialized, the system returns you to the filer display:

```

-----
| Filer: G, S, N, L, R, C, T, Q, G, [1.1] |
-----

```

Again, type Z to get the directory-zeroing display. Answer its questions for volume #10 just as you did for volume #9, but choose a different name, as shown here:

```

-----
| Zero dir of ? #10
| Duplicate dir ? N
| # of blocks on the disk ? 1696
| New vol name ? HARD2:
| HARD2: correct ?
-----

```

When the directory for HARD2: has been initialized, the system returns you to the filer display:

```

-----
| Filer: G, S, N, L, R, C, T, Q, G, [1.1] |
-----

```

Now type T and transfer all the files from the modified APPLE1: diskette to HARD1:, as shown below:


```
-----
! Transfer ? APPLE1:=,HARD1:⌘
-----
```

For each file transferred, the system displays an acknowledgement. When all files have been copied, it returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1]
-----
```

Now remove the modified APPLE1: diskette and slip the APPLE2: diskette into drive 2. Type T again, this time to transfer all the files from the APPLE2: diskette to HARD1:, as shown below:

```
-----
! Transfer ? APPLE2:=,HARD1:⌘
-----
```

Again, as each file is transferred, the system displays an acknowledgement. If the system asks you for permission to replace an old file ("REMOVE OLD ..."), type N.

When all files have been copied, the system returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1]
-----
```

Now remove the APPLE2: diskette and slip the APPLE3: diskette into drive 2. Type T one more time, this time to transfer all the files from the APPLE3: diskette to HARD1:, as shown below:

```
-----
! Transfer ? APPLE3:=,HARD1:⌘
-----
```

Again, as each file is transferred, the system displays an acknowledgement. If the system asks you for permission to replace an old file ("REMOVE OLD ..."), type N.

When all files have been copied, it returns to the filer display:

```
-----
! Filer: G, S, N, L, R, C, T, Q, G, [1.1]
-----
```

This time, type Q to exit from the filer.

Open the door of drive 1 and use control-reset again to reboot the system. Use one more control-reset to leave Pascal and return to the Applesoft prompt (J). Use the command

IN#4

to boot the Apple DOS system from the hard disk. Next, use the command

```
BRUN DISK CONFIGURE, V2
```

and tell the program that the controller is in slot 4, as shown below:

```
-----  
: SLOT CONTAINING XEBEC CONTROLLER? => 4 :  
: DOS HAS BEEN PATCHED :  
: YOU ARE NOW OPERATING WITH A NON :  
: STANDARD VERSION OF DOS :  
: <PRESS RETURN TO CONTINUE> :  
-----
```

Press the <RETURN> key and you will see the same main Initialization Utilities menu you were using in the original configuration procedure. Type 7 and <RETURN>, as shown on the next page:

```
-----  
: XEBEC INITIALIZATION UTILITIES :  
: VERSION 2.0 :  
: COPYRIGHT 1982 :  
: CHOOSE ONE OF THE FOLLOWING OPTIONS :  
: (1) FORMAT ENTIRE DRIVE :  
: (2) PATCH DOS 3.3 :  
: (3) SET DOS BOUNDS :  
: (4) INITIALIZE DOS VOLUMES :  
: (5) CREATE DOS BOOT TRACK :  
: (6) SET UP CP/M PARTITION :  
: (7) SET UP PASCAL PARTITION :  
: (8) RESET SLOT AND DRIVE :  
: (9) CHANGE DRIVE CHARACTERISTICS :  
: (10) QUIT :  
: WHICH WOULD YOU LIKE? 7 :  
-----
```

When you select option 7, the program asks which drive you are configuring and what type of drive it is, as shown below:

```

-----
DRIVE (1 OR 2)? => 1

WHAT TYPE OF DRIVE DO YOU HAVE ?
  1) XEBEC'S 5MB DRIVE
  2) XEBEC'S 10MB DRIVE
  3) RESERVED
  4) NONE OF THESE

PICK ONE OF THE ABOVE
-----

```

You answered this question earlier, when you first ran the DISK CONFIGURE program. Remember that a response of 1 says you are configuring the 5-megabyte drive that comes with the Xebec kit; a response of 2 says you are configuring the Xebec-supplied 10-megabyte disk; and a response of 4 causes the program to prompt you for the disk characteristics you entered on the configuration form. Answer the question just as you did that first time.

When you have specified the drive, you see the Pascal Partition display again. This time, type 2 and <RETURN>. The program then asks you for a unit number, as shown below:

```

-----
      P A S C A L   P A R T I T I O N
CURRENT DRIVE => 1

DO YOU WANT TO

    1) SET PARTITION SIZE
    2) CHANGE UNIT ASSIGNMENT

=> 2

PASCAL UNIT NUMBER (4,9,11)   =>
-----

```

Type 4 and <RETURN> so the HARD1: volume, which you configured as Pascal unit #9, will become unit #4. The program gives you a chance to back out, in case you have mistyped. If all is well, press <RETURN> again. When the unit assignment has been modified, the program tells you to press <RETURN> once more and returns to the Initialization Utilities display. Type 10 and <RETURN> to exit the program and return to the familiar Applesoft prompt (]).

Now remove the modified APPLE1: diskette and slip the original APPLE1: diskette into drive 1, then open the door to drive 2. Use the command

IN#6

to boot the system from that diskette, producing the standard Pascal logon display:

```

-----
| Command: E<dit, R<un, F<ile, C<omp, L<in |
|
| Welcome APPLE1, to Apple II Pascal 1.1 |
| Based on UCSD Pascal II.1 |
| Current date is 14-Aug-80 |
|
| (C) Apple Computer Inc. 1979, 1980 |
| (C) U. C. Regents 1979 |
-----

```

Remove the original APPLE1: diskette and re-insert the modified APPLE1: diskette into drive 1. Press F to enter the filer:

```

-----
| Filer: G, S, N, L, R, C, T, Q, G, [1.1] |
-----

```

Press C to change the volume name and see this display:

```

-----
| Change |
-----

```

Type APPLE1: and <RETURN>. When the display asks what the new name should be, type the same name as you gave the hard disk volume, then <RETURN>. The program will acknowledge the action as shown below:

```

-----
| Change APPLE1: |
| Change to what ? HARD1: |
| APPLE1:          --> HARD1: |
-----

```

When this action is finished, use control-reset to reboot Pascal from the newly renamed HARD1: diskette, again producing the standard Pascal logon display:

```

-----
| Command: E<dit, R<un, F<ile, C<omp, L<in |
|
| Welcome HARD1, to Apple II Pascal 1.1 |
| Based on UCSD Pascal II.1 |
| Current date is 14-Aug-80 |
|
| (C) Apple Computer Inc. 1979, 1980 |
| (C) U. C. Regents 1979 |
-----

```

Remove the diskette from drive 1 and store it away in a safe place.

Now you will save an image of the modified Pascal system in the boot area of the hard disk. Press X and run the XBOOT.COM program, as shown below:

```

-----
| Execute what file ? XBOOT.COM |
-----

```

XBOOT produces this display:

```

-----
| XEBEC Pascal Boot Module |
| Version |
|
| Function: Save an image of the |
| current Pascal system on the boot |
| area of the hard disk. |
|
| Do you wish to continue ? Y |
-----

```

Now enter the letter Y; while the program is working, it displays

```

-----
| Saving image of system |
-----

```

When it has finished, it displays

```

-----
| Boot track created |
-----

```

When this program finishes installing the boot track, your hard disk is ready for Pascal use.

USING THE HARD DISK

When your disk is completely formatted and configured, you use it by the same kind of references as you would employ for diskettes, except that the volume number is meaningful with the hard disk. With diskettes, the volume number is primarily a security device; with the hard disk, it indicates a specific "virtual floppy" among those you configured.

When you are using the hard disk, you can easily shift from one operating system to another. If you are in Apple DOS, one way to boot into any system is to run the Applesoft HELLO program you stored on volume 2 (according to the examples above). That program generates this display:

```
-----  
| XEBEC HARD DISK SYSTEM FOR THE APPLE II |  
|                                     |  
|           VERSION 2.0/2.0           |  
|                                     |  
|           WHICH SYSTEM WOULD YOU LIKE ?           |  
|                                     |  
|           1) BOOT INTO PASCAL           |  
|           2) BOOT INTO CP/M           |  
|           3) BOOT INTO DOS           |  
|                                     |  
|           ?           |  
|                                     |  
|-----|
```

Type 1, 2, or 3, then <RETURN>, to boot whichever operating system you prefer. Another way to change systems, from Apple DOS, is to use the command

```
BRUN HELLO CPM,V2
```

to enter CPM (if you followed the examples above) or the command

```
BRUN HELLO PASCAL,V2
```

to enter Pascal.

If you are in Pascal, you can boot Apple DOS by using control-reset twice, then IN#4 (assuming your host interface card is still in slot 4). To boot from Pascal into CP/M, boot Apple DOS and then boot CP/M from that point.

If you are in CP/M, run the REBOOT.COM program (just type

```
C:REBOOT
```

if the CP/M utilities are in unit C:). This boots Apple DOS, from which you can boot Pascal.

SECTION 3

MOVING OR ADDING CARDS IN YOUR APPLE

Having carefully followed all the instructions in Section 2, you now have a hard disk with some combination of Apple DOS, CP/M, and Pascal space ready for your use. After you boot Apple DOS from your floppy-disk drive, you can reboot from the hard disk by issuing the IN#4 command. If this is sufficient for your needs, you can skip this section.

However, if you would rather be able to skip the floppy-disk stage and boot directly from the hard disk whenever you turn the power on, follow the instructions below.

For CP/M users, a similar procedure is necessary whenever you move cards in your Apple, or add new cards, if the change means CP/M has to be patched.

MOVING THE HOST INTERFACE CARD

First, make sure the Apple's power is off. Otherwise, you may seriously damage both the Apple and the Xebec host interface card.

Open the Apple's cover, as described in Section 1, and grasp the upper corners of the Xebec host adapter card with both hands. Carefully rock the card back and forth, lifting gently, until you have removed it from the slot. Place it in slot 7, again rocking it back and forth as you carefully press it into the slot.

Make certain that you get the card all the way into the slot; a partially inserted card may result in damage or malfunction. Also check that the ribbon cable is still attached securely.

RECREATING THE APPLE DOS BOOT TRACK

Now you have to copy the Apple DOS, modified to show the Xebec card in slot 7, onto the hard disk's DOS boot track. Turn the Apple on and use the command

BRUN DISK CONFIGURE, S7, D1

Tell the program that the controller is in slot 7, as shown below:

```
-----  
SLOT CONTAINING XEBEC CONTROLLER? => 7  
DOS HAS BEEN PATCHED  
YOU ARE NOW OPERATING WITH A NON  
STANDARD VERSION OF DOS  
<PRESS RETURN TO CONTINUE>  
-----
```

Press the <RETURN> key and you will see the same main Initialization Utilities menu you were using in the original configuration procedure. Type 5 and <RETURN>, as shown below:

```
-----  
XEBEC INITIALIZATION UTILITIES  
VERSION 2.0  
COPYRIGHT 1982  
CHOOSE ONE OF THE FOLLOWING OPTIONS  
  
  (1)  FORMAT ENTIRE DRIVE  
  (2)  PATCH DOS 3.3  
  (3)  SET DOS BOUNDS  
  (4)  INITIALIZE DOS VOLUMES  
  (5)  CREATE DOS BOOT TRACK  
  (6)  SET UP CP/M PARTITION  
  (7)  SET UP PASCAL PARTITION  
  (8)  RESET SLOT AND DRIVE  
  (9)  CHANGE DRIVE CHARACTERISTICS  
  (10) QUIT  
  
WHICH WOULD YOU LIKE? 5  
-----
```

When you select option 5, the program asks which drive you are configuring and what type of drive it is, as shown below:

```
-----  
DRIVE (1 OR 2)? => 1  
WHAT TYPE OF DRIVE DO YOU HAVE ?  
  1) XEBEC'S 5MB DRIVE  
  2) XEBEC'S 10MB DRIVE  
  3) RESERVED  
  4) NONE OF THESE  
  
PICK ONE OF THE ABOVE  
-----
```

You answered this question earlier, when you first ran the DISK CONFIGURE program. Remember that a response of 1 says you

are configuring the Xebec-supplied 5-megabyte drive; a response of 2 says you are configuring the Xebec-supplied 10-megabyte disk; and a response of 4 causes the program to prompt you for the disk characteristics you entered on the configuration form. Answer the question just as you did that first time.

When you have specified the drive, you see this display:

```

-----
|           C R E A T E   D O S   B O O T           |
| CURRENT DRIVE => 1                                 |
| NAME OF HELLO PROGRAM                             |
|-----|

```

Assuming that that you used the name HELLO when you created a DOS boot track in Section 2, you should now type HELLO and <RETURN>. The program will ask you for some information about the location of the HELLO file. Answer its questions as shown below.

Your Xebec host interface card is in slot 7 of your Apple. The drive number is 1 (unless you are now configuring a second drive). The volume number is also 1. After you enter this information, the program asks you if you want to save the RAM card:

```

-----
|           C R E A T E   D O S   B O O T           |
| CURRENT DRIVE => 1                                 |
| NAME OF HELLO PROGRAM   HELLO                     |
|   SLOT   => 7                                           |
|   DRIVE  => 1                                           |
| VOLUME  => 1                                           |
| SAVE THE RAM CARD? =>                                 |
|-----|

```

If you have an Apple //e, type N and <RETURN>. If you have a 48-kilobyte Apple][or Apple][+ with a 16-kilobyte RAM card, type Y and <RETURN>. The program then gives you a chance to back out if you have mistyped any of the data in this display:

```

-----
      C R E A T E   D O S   B O O T
-----
CURRENT DRIVE => 1

NAME OF HELLO PROGRAM HELLO
  SLOT  => 7
  DRIVE => 1
  VOLUME => 1

SAVE THE RAM CARD? => Y

PRESS RETURN TO COMPLETE FUNCTION
PRESS <ESC> TO ABORT
-----

```

If all is well, press <RETURN>. While writing the boot track, the program displays

SAVING IMAGE OF MEMORY

When it has finished, it tells you to press <RETURN> again, then returns to the Initialization Utilities display.

RECREATING THE CP/M BOOT TRACK

In Section 2, you made a copy of the MicroSoft SoftCard diskette and modified it for the Xebec system. Slip that diskette into drive A: and use the IN#6 command to boot the modified CP/M system from it. Now remove that diskette and store it in a safe place. At this point, the system considers the floppy-disk drive to be drive A:, so type the command

C:HARDA

to produce this display:

```

-----
PROGRAM NAME:  HARDA.COM
-----
FUNCTION:      MAP DRIVES A AND B TO THE
                HARD DISK
-----
COPYRIGHT XEBEC - APRIL, 1983
-----
TYPE <RETURN> TO CONTINUE OR ....
ANY OTHER KEY TO ABORT
-----

```

Press <RETURN> to change the CP/M system in memory so the floppy-disk drives (which were drives A: and B:) become drives C: and D:

and the hard disk's volumes (which were C: and D:) become A: and B:. When this has been completed, the program displays

```

: TYPE <RETURN> TO CONTINUE OR ....
: ANY OTHER KEY TO ABORT
: BIOS HAS BEEN PATCHED
: A>

```

To confirm that the drive identifiers have indeed been swapped, you can execute a DIR command. Note that it displays the directory for the hard disk's volume. CP/M still considers drive A: to be the current drive, but drive A: is now the hard disk volume.

If you have two hard disks in your system, you may want to use the ONOFF program to specify which volumes are online. ONOFF is described in Section 4.

This change has taken place only in the CP/M system as currently kept in the Apple's memory, however; it has not been stored permanently. Your next task is to store it in the hard disk's boot track, so the hard disk will be A: the next time you boot it. Type the command

XBOOT

to produce this display:

```

-----
: Name: MAKEBOOT V2.0
: Copyright Xebec, January 1983
:
: Function: Move an image of the current
: CP/M system to the boot area of the
: XEBEC hard disk
:
: Type <RETURN> to continue or...
: Any other key to abort
-----

```

Press <RETURN> to install a CP/M boot track on the hard disk. While the program is working, it displays

```

: <SAVING IMAGE OF SYSTEM>
-----

```

When it has finished, it displays

```

: Boot image created
: A>
-----

```

RECREATING THE PASCAL BOOT TRACK

Now, having finished recreating the CP/M boot track, use the CP/M command

REBOOT

to return to the Apple DOS system. REBOOT produces this display:

```

-----
|           R E B O O T           |
| TYPE SLOT NUMBER TO REBOOT FROM OR... |
| TYPE <RETURN> TO ABORT.         |
-----

```

Slip the Pascal HARD1: diskette into drive 1 and press <RETURN> to boot the Pascal system from it. This produces the standard Pascal logon display:

```

-----
| Command: E<dit, R<un, F<ile, C<omp, L<in |
|                                         |
| Welcome HARD1, to Apple II Pascal 1.1 |
| Based on UCSD Pascal II.1           |
| Current date is 14-Aug-80           |
|                                         |
| <C> Apple Computer Inc. 1979, 1980  |
| <C> U. C. Regents 1979              |
-----

```

Remove the diskette from drive 1 and store it away in a safe place.

Now you will save an image of the modified Pascal system in the boot area of the hard disk. Press X and run the XBOOT.COM program, as shown below:

```

-----
| Execute what file ? XBOOT.COM      |
-----

```

XBOOT produces this display:

```
-----  
|           XEBEC Pascal Boot Module           |  
|           Version                             |  
|  
| Function: Save an image of the               |  
| current Pascal system on the boot           |  
| area of the hard disk.                       |  
|  
| Do you wish to continue ?                   |  
|-----|
```

While the program is working, it displays

```
| Saving image of system |  
|-----|
```

When it has finished, it displays

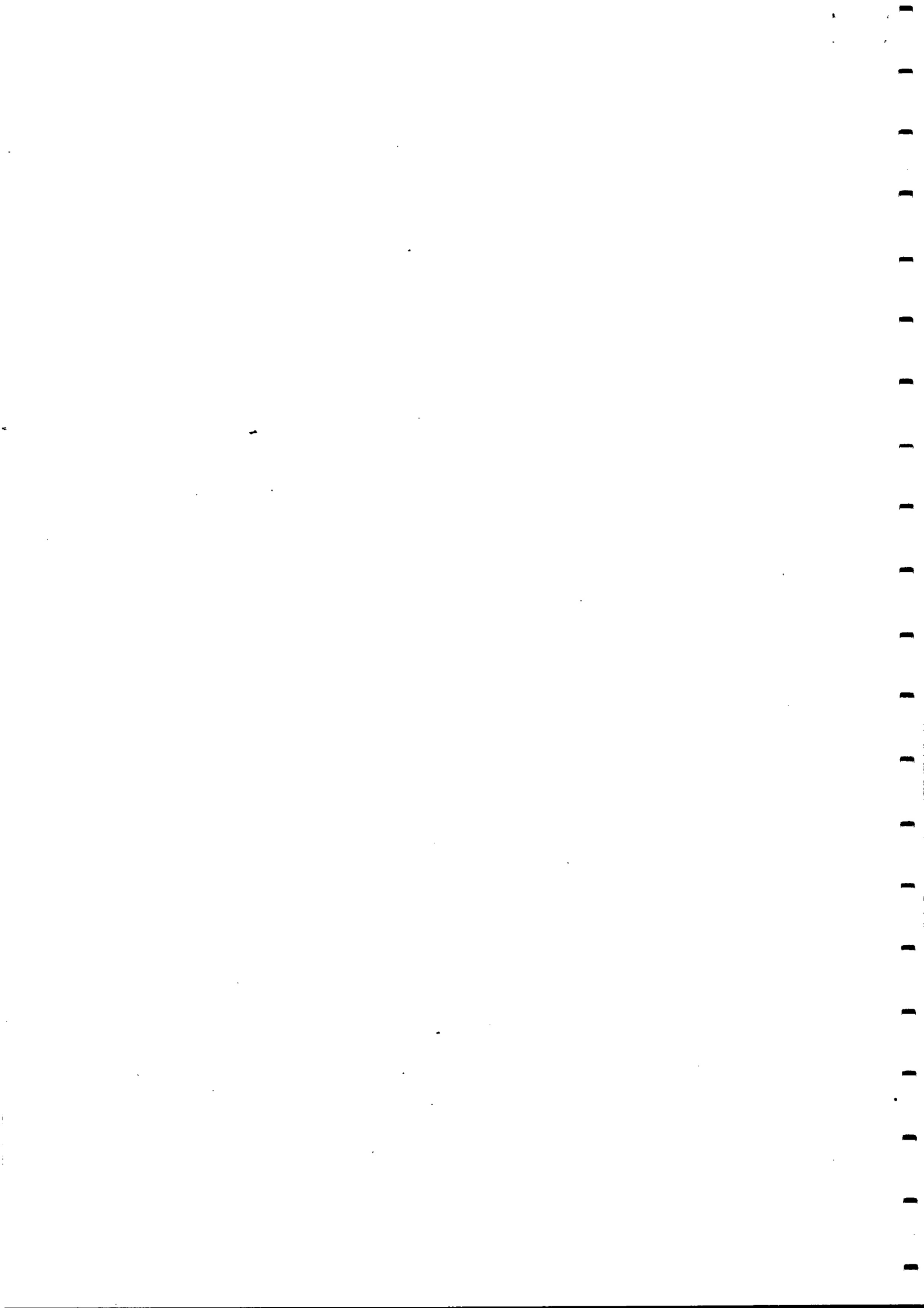
```
| Boot track created |  
|-----|
```

When this program finishes installing the boot track, your hard disk is ready for Pascal use in its new slot.

OTHER CHANGES OR ADDITIONS OF CARDS

Unlike Apple DOS, the CP/M operating system keeps track of what devices are in what slots of the Apple. When you add a modem card to your system, for example, you must patch CP/M to tell it what is in that slot. Whenever you patch CP/M, you must run XBOOT (as described above) to install that patch permanently in the hard disk's boot track.

This rule applies whenever you move a card or add a new card to the system, regardless of whether that change requires patching CP/M. Follow the procedures described in this section whenever you remove, add, or change a card in your Apple system.



SECTION 4

EXPANSION TO A TWO-DRIVE SYSTEM

This section describes how to add a second hard disk drive to your system. All of the warnings in Section 1, particularly about handling the equipment carefully and being sure the cables are installed correctly, also apply here.

CONNECTING THE SECOND DISK DRIVE TO THE CONTROLLER

As you might suspect, connecting a second disk drive to the controller card requires a second "20-pin" ribbon cable. It also requires a new "34-pin" ribbon cable. The "20-pin" cable is just like the one on drive 1, with an edge connector at each end. The "34-pin" cable must be longer than the one supplied with the kit. Also, the "34-pin" cable for two drives must have three edge connectors (so it can go from the controller card to one drive to the other drive).

As with the cables for drive 1, a printed or molded arrow on one end of each connector marks line 1 and you must be very careful not to install either cable backwards. Each time you make a cable connection, be certain that line 1 of the connector is aligned with pin 1 of the pin terminal or card edge.

Now follow these steps:

1. Remove and discard the two-connector, "34-pin" cable.
2. Connect one end of the new three-connector, "34-pin" cable to the controller card, by sliding the plastic edge connector over the corresponding edge of the controller card.
3. Similarly, connect the free end of the "34-pin" cable to the corresponding edge of the previously configured disk drive's printed circuit card.
4. Now attach the middle connector of the "34-pin" cable to the corresponding edge of the new disk drive's printed circuit card.
5. Slide the "20-pin" cable's edge connector over the corresponding edge of the disk drive's card as shown in Figure 5.
6. Slide the "20-pin" cable's socket over pin terminal J2 of the controller card, which is directly between J3 (to which drive 1 is connected) and the "34-pin" connector. Be sure not to use the pin terminal labeled MFG. TEST ONLY; this terminal is for factory testing purposes only.
7. Now one end of the "34-pin" cable should be attached to the controller card and the middle and other end to the disk drives. Inspect the printed circuit card of the disk drive at the end of

the cable; find a 14-pin chip socket, probably near the edge connectors. This socket must contain a terminator chip. On the other disk drive's card--the drive attached to the cable's middle connector--the corresponding socket must not contain a terminator chip.

8. Near the terminator socket of each disk drive, find a 12-pin terminal (similar to the controller-card pin terminal to which the "20-pin" cable is connected) with a jumper slipped over one pair of pins. On drive 1 (the drive connected to controller-card pin terminal J2), this jumper must be on pins 1 and 2 (at one end of the 12-pin terminal). On drive 2 (the drive connected to pin terminal J3), the jumper must be on the pins adjacent to 1 and 2. This jumper determines whether the drive recognizes signals sent to drive 1 or drive 2. (Note: some drives have a "DIP switch" instead of a pin terminal for this function. If yours has a switch, set it for the proper drive number according to its manufacturer's instructions.)

Now the controller is connected to both drives.

PROVIDING A NEW POWER SUPPLY

The power supply you got with the Xebec hard disk kit does not have enough power output for two disk drives and the controller, so you must obtain either a second power supply or a single, larger one. If you use a single power supply, it must provide 2.5 amperes of +5 volts DC and 66 milliamperes of +12 volts DC, plus the maximum requirements for both disk drives.

FORMATTING AND CONFIGURATION

When drive 2 is cabled and powered, you must follow a procedure similar to that described in Section 2 for the first hard disk:

1. Run the HELP CONFIGURE program to calculate the configuration parameters of the second disk, and write the results onto the remaining data sheet provided in Section 2.
2. Run the DISK CONFIGURE program to format, configure, and initialize the new hard disk.
3. If you have a CP/M system for your Apple, perform these steps:
 - run the APXFER program to patch the BIOS;
 - run the ONOFF program to specify which two CP/M volumes will be online;
 - run the HARDA program to make CP/M consider the hard disk volumes to be drives A: and B:; and
 - run the XBOOT program to copy a CP/M system image to the hard disk.

4. If you have a Pascal system for your Apple, perform these steps:

- zero out the hard disk's Pascal directories;
- run the XBOOT.COM program to save a Pascal system image on the hard disk.

Essentially, this set of tasks is identical to the set described in Section 2, except that you specify drive 2 and you don't have to copy the various utility programs because they already exist on the previously configured hard disk.

ONLINE VOLUMES IN CP/M

For CP/M users, another major difference is the ONOFF program. At any given time, you can only have two CP/M volumes (A: and B:) online, although you may have as many as four configured on the two disks. Therefore, some of your volumes may have to be offline at times.

When you take a disk offline, any files on that volume remain as safe as they were when online--maybe safer, because you cannot then accidentally erase or write on those files.

To take a volume online or offline, boot the CP/M system and type the command

ONOFF

to generate this display:

```

-----
| NAME:  ON/OFF LINE  VER 2.0
|       Copyright Xebec, April, 1983
|
| FUNCTION:
|       Mark CP/M volumes on (or off) line
|
| Type <RETURN> to continue ...
| or any other key to abort
-----

```

When you press <RETURN>, the program asks you in turn for decisions on the two volumes of drive 1:

```

| Type <RETURN> to continue ...
| or any other key to abort
|
| First drive #1...
|
| Volume 1 online? (0=yes, 1=no) => 0
| Volume 2 online?                               => 1
-----

```

When you have responded for both volumes of drive 1, the program gives you a chance to quit, in case you only have one hard disk drive in your system:

```

: Volume 1 online? (0=yes, 1=no) => 0
: Volume 2 online? => 1
:
: Now drive #2 ...
: <Use <RETURN> for 1 drive systems)
:
: Volume 1 online? =>
-----

```

When you have responded for both volumes of drive 2, the program gives you a chance to abort, in case you have made some error:

```

: Now drive #2 ...
: <Use <RETURN> for 1 drive systems)
:
: Volume 1 online? => 1
: Volume 2 online? => 0
:
: Type <Return> to make changes
: Any other key to abort
-----

```

When you press <RETURN>, the program patches CP/M to specify the online volumes.

Any changes you make via ONOFF are effective for that CP/M session only, unless you use XBOOT to write the current system arrangement as the CP/M boot track. XBOOT is explained thoroughly in Sections 2 and 3.

PREPARING THE PASCAL SPACE

To prepare the second drive's Pascal space, boot the Pascal system from Apple DOS, by running the HELLO PASCAL program. Press F to get into the Pascal filer, then press U to check that units #4 and #5 are known to the system as HARD1: and HARD2:.

Now press Z to initialize (zero) the directories of units #11 and #12, just as you did for what were then units #9 and #10, in Section 2, with one difference: use the Pascal volume size given for drive 2.

XEBEC APPLE KIT
SOFTWARE & PERIPHERAL USER SUMMARY

NAME : _____
 ADDRESS : _____
 TELEPHONE NO. : _____

- Which computer are you using with your Xebec Kit?
 Apple][Apple][+ Apple //e
- What is the S/N of your Apple Computer ? _____
- What is the REV level of the mother board ? _____
- What peripheral cards are you using in your Apple:

Slot #	Vendor	Board Rev	Functional Description
0	_____	_____	_____
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____

- Software packages which you are currently using with the Kit:

VENDOR	REVISION	DESCRIPTION
-----	----	-----
-----	----	-----
-----	----	-----
-----	----	-----
-----	----	-----

- If you have experienced problems supporting certain Software Packages or peripheral cards on your Xebec Kit, please provide specific information to assist us in duplicating the problem.

VENDOR	REVISION	DESCRIPTION OF CARD/SOFTWARE
-----	----	-----
-----	----	-----
-----	----	-----

- If necessary please attached additional pages to describe the circumstances under which the failure occurred.