Your system can support two internal diskette and two internal hard disk
drives and/or tape/disk cartridge systems. These devices can be 3½-inch
or 5¼-inch, and they can be high-capacity or standard-capacity.

As you plan the configuration of your disk drive system, consider that
3½-inch drives (whether diskette or hard drives) will be positioned on
the drive platform, and 5¼-inch drives will be positioned in the drive
tower. (You can also position 3½-inch drives in the drive tower using a
5¼-inch adapter.) You can install 5¼-inch or 3½-inch of the following
types:

* SCSI hard disk drives, and either SmartDrives or ST-506 hard disk
   drives.
* Tape or disk cartridge drives.

Additional Storage Devices - The computer supports:

DRIVE	CAT.NO.
52MB SmartDrive	25-4124
105MB SmartDrive	25-4130
40MB SCSI Hard drive	25-4159 (requires 25-4161 adapter)
80MB SCSI Hard drive	25-4160 (requires 25-4161 adapter)
170MB SCSI Hard drive	25-4162 (requires 25-4161 adapter)
440MB SCSI Hard drive	25-4167 (requires 25-4161 adapter)
20MB Hard Card	25-1032
40MB Hard Card	25-4059
160MB SCSI Tape backup	25-4166 (requires 25-4161 adapter)
60MB Tape backup	25-4079
20MB Disk Cartridge	25-4064A

NOTES TO HARD DISK OWNERS:

* Before installing a hard drive, record the following drive
   information on the worksheet at the end of your manual:
     * Drive type and type number
     * Number of heads and cylinders
     * Head and cylinder numbers of defective tracks

This information either is on a media error map attached to the hard
drive or is in the hard drive installation guide. You need the drive
type number when you configure your system and the head and cylinder
information when you format the hard disk.

* After installing the hard drive, position the computer as you plan to
   use it (on its side or flat) before you format the hard disk.

* After installing the drive, be sure the heads on your hard disk are
   parked before you move your computer. See the "Utilities Diskette"
   section or your operating system manual for more information.

INSTALLATION OVERVIEW

When installing internal options, be sure to:

*   Remove and replace the computer cover as directed.
*   Check the configuration of the serial or parallel adapter if you are
    connecting a serial or parallel device.
*   Run the Setup utility to complete the installation of drives, memory,
    serial/parallel adapters, or video expansion adapters.

When installing expansion adapters, be sure that:

*   The metal slot cover on the expansion adapter is seated correctly
    in the back panel slot.
*   The fastening screw is securely tightened.
*   The front end of the expansion adapter fits into the corresponding
    plastic expansion adapter guide (long expansion adapters only).
*   The expansion adapter is securely mounted in the expansion adapter
    slot.

REMOVING THE COVER

You must remove the cover to install internal options. Before removing
the cover, turn the computer off and disconnect all electrical cables
from the computer.

WARNING! Be sure the computer is in a safe work area before you remove
the cover.

To remove the cover:

1. If necessary, use the keylock key to unlock the cover.
2. Remove the 3 cover mounting screws from the back of the computer.
3. Slide the cover toward the front of the computer until it clears the
    base of the computer.
4. Lift the lid of the computer off.

REPLACING COVER

Replace the cover after installing options. Never operate the computer
while it is open. To replace the cover:

1. Carefully place the computer cover on the computer.
2. Slide the cover toward the back of the computer until it fits into
    place.
3. Replace and tighten the 3 cover mounting screws from the back of
    the computer.
4. Lock the cover, if necessary.
5. Connect the peripheral and power cables.

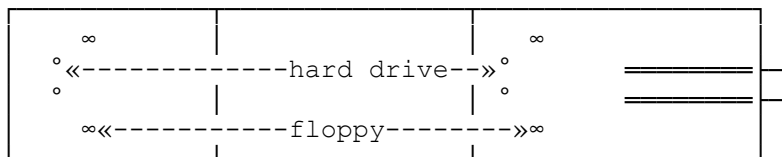INSTALLING A 3½-INCH DRIVE

Note: If you are installing a 3½-inch drive in a 5¼-inch drive, bay,
use a 5¼-inch mounting adapter.

1. Adjust the selector switches and terminating resistors on the drives
    as necessary. See the drive installation guide for more
    information.
2. If the drive is a tape or disk cartridge drive, remove the plastic

insert from the front of the computer cover.
3.   Select the appropriate mounting holes for your drive. See the drive
     installation guide for more information. Mount the drive on the
     drive platform, using the screws provided with the computer. Then,
     mount the drive platform in the computer.
4.   Connect the drive power and data cables. See the drive installation
     for more information.

INSTALLING A 5¼-INCH DRIVE

1.   Adjust the selector switches and terminating resistors on the drives
     as necessary. See the drive installation guide for more
     information.
2.   If the drive is a tape or disk cartridge drive, remove the
     appropriate plastic panel from the computer's cover. (the upper
     panel is held in place by two screws and can be replaced later if
     necessary. The lower panel breaks away and is not replaceable.)
3.   Remove the drive rails from the selected drive slot by pressing the
     drive rail latch tabs toward each other and sliding the rails out of
     the tower.
     To remove an installed drive, disconnect the drive cables and
     unlatch the drive by pressing the rail tabs toward each other.
     Then, pull on the drive to remove it from the tower.
4.   Check to be sure a metal grounding clip is attached to each rail.
     Then, using the appropriate holes, mount the rails onto the sides of
     the drive. The grounding clips must be present to ground the
     system.

```
 _____
|        |            |            |        |                |
|    ∞   |            |         ∞  |        |                |
| °«--------------hard drive--»°°  |        | ===========   ___
| °                              °°|        | ===========  |   |
|        |            |            |        |                |
|   ∞«-----------floppy--------»∞  |        |                |
|_____|_____|_____|_____|_____|
```

5.   Slide the drive into the drive tower until the rails lock into
     place.
6.   Connect the drive, power, and data cables. See your disk drive
     installation guide for more information.

IDE CONNECTORS

Sixteen-bit Integrated Drive Electronics (IDE) let you install up to two
hard drives without having to buy and install a hard drive controller.
The 16-bit IDE System requires SmartDrive (16-bit IDE-type) hard drives.
These drives can function the same as standard ST-506 type hard drives.

If you choose not to use the IDE system and to install a different type
of hard drive system, such as ESDI or ST-506, you will need to run the
Setup program.

Note: SCSI-type hard drives and devices can be used even while an IDE,
ESDI, or ST-506 system is installed.

A SmartDrive (IDE hard disk drive) is a hard disk drive with a built-in
controller, Because a hard disk controller usually occupies one of the
expansion slots in a computer, using a SmartDrive frees one of the

expansion slots for some other use and saves you the cost of a separate
controller. The SmartDrive is designed to work with its built-in
controller, so you get maximum performance and guaranteed compatibility
at a lower cost than with other drive/controller combinations.

To help you connect the SmartDrive cable correctly, the SmartDrive
connector on the main logic board is keyed; it has one pin fewer than an
unkeyed connector. Omitting a pin creates an empty slot on the
connector. This open area on the connector is called the key.

The connector on your SmartDrive data/controller cable might also be a
keyed connector. A keyed connector on a cable has one fewer hole than
an unkeyed connector, and again, the empty area on the connector is
called the key.

To connect a keyed SmartDrive cable, simply align the keys on the two
connectors and then firmly press the cable connector onto the main logic
board connector.

If your cable connector is not a keyed connector, you must locate Pin 1
on the cable connector and on the main logic board connector. On the
cable, one wire is a different color from the other wires. This wire is
connected to Pin 1 on the cable connector. On the main logic board, "1"
is printed next to Pin 1 of the main logic board connector.

To connect an unkeyed SmartDrive cable, align Pin 1 of the cable
connector with Pin1 of the main logic board connector and them press the
cable connector onto the main logic board connector.

After installing a SmartDrive (or any hard disk drive), run the Setup
Utility to update your system configuration. To run Setup, insert the
Utilities Diskette into Drive A and turn on the computer.

After you reset the computer, use the FDISK, FORMAT, and COPY commands
to partition the drive (if necessary), high-level format each partition,
and copy data and programs to the hard disk.

Caution: Do not use the Format Hard Disk utility on the utilities
diskette with a SmartDrive, any other IDE hard disk drive, or a SCSI
hard disk drive.

LOW LEVEL FORMAT THE DRIVE

Before you can use any hard disk drive the first time, the drive must be
low-level formatted. Once it is low-level formatted, you can then
partition the drive and high-level format it. The Format Hard Disk
Utility lets you low-level format certain types of hard drives.

CAUTION: Check the manual that came with your hard drive to see whether
a special low-level format utility is included. Carefully follow the
recommendations of the manual. IDE DRIVES and SCSI DRIVES ARE ALREADY
LOW-LEVEL FORMATTED!

To low-level format a hard disk, follow these steps:

1. At the utilities Diskette menu, type 5 and press ENTER. The
    following prompt appears:

```
        Which hard drive do you
        want to format (C/D)
        ?
```

2. To format the first hard disk drive, type C and press ENTER. To
    format the second hard disk drive, type D and press ENTER.

    After you make your selection, the following warning message is
    displayed on the screen:

```
        All data on drive X will be destroyed!!
        Do you want to continue (Y/N)
        ?
```

    This warning exists to prevent you from accidentally erasing any
    information on your hard disk. You can continue safely.

3. Type Y and press ENTER. The screen displays the following
    information about the disk you want to format:

```
        Hard drive x is type x
        Number of heads = x
        Number of cylinders = x
        Is this correct (Y/N)
        ?
```

4. If the displayed information matches your hard disk drive, type Y
    and press ENTER.

5. Type N and press ENTER if you want to change the interleave factor
    from the default of 3, or if you need to correct errors. To correct
    any errors made in the setup program, simply run the Setup program
    again to enter the correct data.

    After you verify or change the hard disk information, the following
    prompt appears:

```
        Do you want to flag defective tracks (Y/N)
        ?
```

    Refer to the hard disk media error map that came with the disk
    drive.

6. If the map shows no defective tracks, type N and press ENTER. It
    will then format the disk. If the map shows any defective tracks,
    type Y and press ENTER. The following prompt appears on the screen:

```
        Enter next head, cylinder pair or press ENTER
        to quit
        ?
```

    As an example, if your media error map lists Head 4, Cylinder 100
    and Head 5, Cylinder 100 as defective, type:
```
        4,100 [ENTER]
        5,100 [ENTER]
```

7. After you enter all the defective heads and tracks noted on the

media error map, press ENTER to begin the formatting procedure.

CAUTION: Do not interrupt the program while it is formatting the drive.
When the format is complete, the program returns to the main menu.

FDISK - PREPARING THE HARD DRIVE

Fdisk creates a partition for MS-DOS on the hard disk. CAUTION:
Reconfiguring the hard disk with fdisk destroys all existing files.
Be sure you have backed up your data!

   1. With the MS-DOS disk in drive A, at the dos A> prompt type:
       FDISK
   2. At the Disk Options menu, choose option 1, create DOS partition,
       and press ENTER.
   3. At the Create DOS Partition menu, choose option 1, create primary
       DOS partition, and press ENTER.
   4. At the Create Primary DOS Partition menu, press ENTER to accept
       the default (yes) answer to the question:
            "Do you wish to use the maximum size for a DOS partition and
            make the DOS partition active (Y/N).......? [Y]"

   Fdisk displays the message "System will now restart".

FORMAT - PREPARING THE HARD DRIVE

The format command prepares the hard disk to accept MS-DOS files. You
must use this command before you can use any disk (hard or floppy) with
the computer. CAUTION: Formatting destroys any previously existing data
on a disk.

   1. Place the MS-DOS disk in drive A, and at the A> prompt type:
       FORMAT C: /S

       In response, FORMAT displays the following:

     "WARNING, ALL DATA ON NON-REMOVABLE DISK DRIVE X: WILL BE LOST!"

       Proceed with the format by typing Y and pressing ENTER.