READ THIS FIRST

QUICK REFERENCE GUIDE

WD1007V-MC1
Fixed Hard Disk Controller Board

JANUARY 1989

Radio Frequency Interference Statement

This Western Digital product has been verified to comply with the limits for a Class B computing device pursuant to subpart J of Part 15 of FCC rules. This does not guarantee that interference will not occur in individual installations. Western Digital is not responsible for any television, radio, or other interference caused by unauthorized modifications of this product.

If interference problems do occur, please consult the system equipment owner's manual for suggestions. Some of these suggestions include relocation of the computer system away from the television or radio or placing the computer AC power connection on a different circuit or outlet.

If you require further information or other technical support, please contact your authorized dealer.

****
INTRODUCTION
****

You probably have an IBM* PS/2* personal computer and have decided to upgrade it by adding a larger hard disk drive and a WD1007V-MC1 board.

Or you may already have a WD1007V-MC1 board in your system and you have decided to add a second hard disk drive. You can use your WD1007V-MC1 board to control a second hard disk, provided that the WD1007V-MC1 board is the only hard disk controller in your computer system. Check your system components and verify that you do not have another hard disk controller before installing a second hard disk into your system.

Each WD1007V-MC1 board can support two hard disk drives; however, when you install two controllers into one computer, the PS/2 system design limits you to a maximum of two fixed hard disk drives.

This document tells you how you can install your WD1007V-MC1 board and hard disk drive and then start your system from the hard disk.

Don't be worried. This document will take you through the process, step by step.

* IBM and PS/2 are registered trademarks of International Business Machines Corporation.

The WD1007V-MC1 board is easy to install. The following is a summary of the installation steps, which are completely explained in this document.

1. Preliminary: identify drive, set drive configuration

2. Install hardware: drive, board, connect cables

3. Install software: use Reference Diskette, etc.

4. Check installation: start system, use new board & drive

You do not need to disassemble your current hard disk drive nor remove the hard disk controller. Your other drive will still work after you have installed your WD1007V-MC1 board and hard disk drive unit.

CAUTION

Handle the controller board by the ends of the board. Some of the chips are
static sensitive and damage may occur if the board is incorrectly handled.

Exception, the PS/2 system will NOT support two of the same type controller. Therefore, if you already have an ESDI controller installed, you cannot install a second ESDI controller. If you are replacing an existing controller, then you need to remove the old controller.

****
ABOUT THIS GUIDE
****

The following term is used in throughout this document.

Reference Diskette – A generic term used to refer to the diskette supplied by a computer manufacturer, which contains the system configuration program. Used here the term is capitalized to refer to your manufacturer's diskette.

Other Notations

Angle brackets < > refer to a key. Therefore the symbol <Enter> refers to the Enter key.

This may be marked differently on your keyboard, typically other notations are <CR> for Carriage Return or RETURN or <Return> for the Return key.

This guide was written using the IBM PS/2 computers as a model. Sometimes specific examples, such as errors, refer to the IBM error code numbers. Therefore if you have a PS/2 compatible computer, your error numbers may be different.

For example on page 6-2, error codes 162, 163, 165, and 166 refer to the IBM error codes. These numbers may not be the same if you have a PS/2 Micro Channel* compatible computer.

* Micro Channel is a trademark of International Business Machines Corporation.

About Menu Screens:

Because manufacturers are always updating their software, and this installation guide covers installing WD1007V-MC1 controller boards in many PS/2 compatible computers, as well as IBM PS/2 computers, the menu screens used here represent the best available information.

Do not be concerned if your screens don't match those documented here. Always follow the manufacturer's instructions for their compatible computer (i.e. if you have an Apricot computer, use the Apricot Reference Diskette).

MICRO CHANNEL ARCHITECTURE

Since Micro Channel Architecture is new and different from XT and AT* architecture, this section explains some of its basic concepts and the way in which the Micro Channel architecture implements computer programs.

What is Micro Channel?

Micro Channel is a set of standards, which contain (among other items) hardware and firmware standards that define the physical arrangement of personal computer peripheral devices, such as hard disk drives.

POS Register

The POS (Programmable Option Select)register is a basic conceptual shift from AT and XT technology. In those systems, jumpers and DIP switches told the computer what type of peripheral hardware was attached. With Micro Channel architecture, no jumpers or DIP switches are needed on the controller.

Instead the system setup program along with a system manufacturer supplied reference diskette and the POS registers tell the computer what is connected to the system.

The POS registers present to the system a unique ID number for each adapter installed. See section ID# below.

CMOS Memory

Micro Channel computers use a CMOS (complementary metal-oxide semiconductor) memory chip and a battery back-up, so that each PS/2 computer can remember its own configuration, including which board is in each of its expansion slots.

ID#

Each Micro Channel expansion board has a unique ID# coded into its firmware, which the PS/2 compares with its CMOS memory. The ID# identifies each Micro Channel board to files that contain its configuration information. The ID# is automatically incorporated into the computer's setup software.

Therefore a Micro Channel computer knows what type of board is located in each expansion slot and can detect when a change is made to the hardware and a different type board is placed in an expansion slot. See section 165 Error.

Universal Expansion Installation

Since the board ID# is in the computer's setup software, one simple installation procedure can be used for ANY expansion board, regardless of what function it performs.

* AT is a registered trademark of International Business Machines Corporation.

165 Error

If the computer detects a change with the previous ID#, a 165 Error occurs. The 165 Error indicates that the system configuration has been changed.

To correct Error 165, use the Reference Diskette. See Chapter 4 or your manufacturer's Micro Channel hardware manual for instructions.

The 165 Error does not occur when you place the Western Digital controller into the same expansion slot as the one that the IBM controller occupied previously.

Besides the 165 Error, other errors are possible when you place a different board in an expansion slot.

Two beeps indicate that the error is related to and can be corrected by the IBM Reference Diskette. Among the more frequent errors that occur are the following: 162, clock; and 163, calendar.

****
DRIVE STANDARDS
****

The ESDI standard defines the interface for hard disk drives connected to personal computers. The WD1007V-MC1 board works with drives that follow the ESDI standards.

ESDI

The ESDI interface defines a drive interface that contains a set of standards that include a relative location for the defect map in a prescribed format.

Block Address

An ESDI controller (WD1007V-MC1) interface does not define the hard disk drive in the same way an ST506 interface (WD1006V-MC1). Rather than using ST506 type cylinder information, an ESDI controller uses relative block addresses. Therefore hard disk drives controlled by an ESDI controller board (WD1007V-MC1) don't need drive tables.

By eliminating the drive tables and essentially hiding the physical characteristics of the ESDI drive from the operating system, the relative block address scheme provides greater flexibility when configuring an ESDI drive and permits a computer with a Western Digital ESDI controller to be compatible with most ESDI drives.

ESDI Defect Management

The ESDI specifications define a standard ESDI defect map and locates this map at the maximum cylinder. The specifications also define a standard format for this map. The format and location are both a part of the standard ESDI drive interface.

Standard ESDI Interface

Western Digital uses the standard ESDI interface, but IBM does not define their drives according to standard ESDI specifications. Therefore you can't use the IBM Reference Diskette to format an IBM drive with a Western Digital controller. However, you can use the IBM Reference Diskette, if you have a Western Digital controller board.

But since you can't use the IBM Reference Diskette to format non-IBM drives with the IBM controller; you also need to use the Western Digital controller.

Thus, you can use the IBM Reference Diskette when you are using a WD1007V-MC1 controller board with a non-IBM manufactured ESDI disk drive.

SOME PRELIMINARY STEPS

Before you begin the actual installation of the hardware and software, there are some preliminary steps that you need to do.

```
************************************************************************************************
```
GATHER SUPPLIES
```
************************************************************************************************
```

The installation requires that you gather some tools and supplies before you begin. You'll need the following items:

- screwdriver

- PS/2 or Micro Channel compatible computer

  ○ space to hold the internal drive

- hard disk drive(s)

  ○ with ESDI interface
    See next section," System Limitations."

- interface cables (hard disk cables <B>NOT floppy disk cables)

  ○ 20-pin data cable (1 or 2)

  ○ 34-pin control cable (for 1 or 2 drives)

- DOS version 3.3 or later or OS/2* or other operating system

- IBM Reference Diskette or other configuration diskette

- installation manual for PS/2 compatible computer

- installation manual for hard disk drive

```
************************************************************************************************
```
SYSTEM LIMITATIONS
```
************************************************************************************************
```

Each WD1007V-MC1 board can support two hard disk drives; however, when you install two controllers into one computer, the PS/2 system design limits you to a maximum of two fixed hard disk drives.

Thus you can have EITHER one WD1007V-MC1 board with two hard disks attached to the WD1007V-MC1 board OR one WD1007V-MC1 board and one non-ESDI controller with only one hard disk attached to each board.

* OS/2 is a trademark of International Business Machines Corporation.

****

YOU CANNOT HAVE TWO WD1007V-MC1 BOARDS EACH HAVING TWO HARD DISKS ATTACHED IN A PS/2 SYSTEM.

****

Dual Controllers

Mix Controller Types: Although the PS/2 system will support two fixed disk controllers, it will NOT support two controllers with the same type interface. Therefore, if you already have an ESDI controller installed, your new controller cannot have the ESDI interface.

ESDI Always Drive C

If you have one ESDI and one ST506 drive connected to your computer, the Micro Channel architecture ALWAYS selects the ESDI drive as Drive C, regardless of the order in which you installed or identified them.

****

IDENTIFY BOARD

****

The WD1007V-MC1 works with ESDI drives. Table 2-1 lists the computers that are compatible with the WD1007V-MC1 board.

Locate your board in Table 2-1 and make sure that your computer model is compatible with your controller board.

TABLE 2.1 COMPUTERS COMPATIBLE WITH WD1007V-MC1

COMPUTER

- IBM Model 50

- IBM Model 50z

- IBM Model 60

- IBM Model 70/16MHz

- IBM Model 70/20MHz

- IBM Model 80/16MHz

- IBM Model 80/20MHz

- Non-IBM computer check with dealer

Space limitations may prevent installing drive unit inside computer case.

Note: The IBM Models 25 & 30 do not support Micro Channel and are therefore incompatible with the WD1007V-MC1 board; however, you can use Western Digital's XT controllers in your IBM Models 25 & 30.

****

IDENTIFY DRIVE

****

Since the WD1007V-MC1 board is only compatible with the ESDI drive interface, BE SURE YOU HAVE AN ESDI DRIVE!!!

Look in the drive manufacturer's literature and check that you have an ESDI drive interface. Contact the drive vendor to verify current models and revision level capacity.

When you configure the system, your computer will identify that you have an ESDI controller installed and tell you its slot location.

Do I Need To Configure Any Jumpers?

No jumpers are set on the WD1007V-MC1 board because the Micro Channel looks at the hardware installed and knows the configuration of the boards. Micro Channel can detect address conflicts and move hardware to different addresses using software.

****

SET HARD DISK DRIVE CONFIGURATION

****

This section "Set Hard Disk Drive Configuration" refers to procedures that you do to your hard disk drives and not to your WD1007V-MC1 controller. Since the WD1007V-MC1 board works with many hard disk drives, you need to consult your drive manufacturer's manual for exact details.

You need to set the configuration for your hard disk drive unit before you install the unit into your computer. You set your hard disk configuration by adjusting jumpers, switches, or termination resistors.
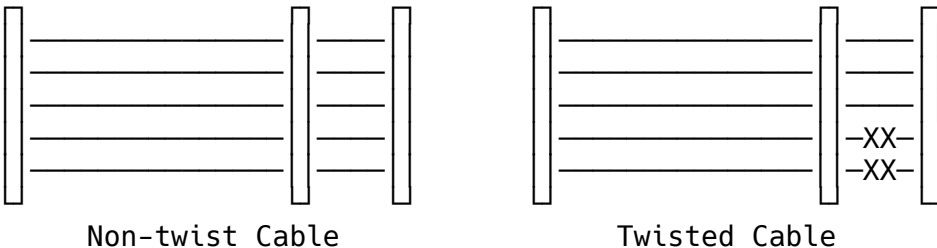
Drive Settings

The two settings that you change are:

- drive number

- drive termination resistor

The exact number of settings that you change depends on your disk drive and computer.

Figure 2-1. CONTROL CABLES

Non-twist Cable   Twisted Cable

Control Cables

Setting the drive number depends on the type of cable that you use to connect your drive to your controller board. The two types of cables are listed below.

- flat, non-twist (ribbon) cable
- flat, twisted (ribbon) cable

First identify which cable you are going to use. Figure 2-1 illustrates the two types of cables. In the twisted ribbon cable several wires have been cut and twisted to form new connections.

If you plan to use the existing cable in your computer, you may have to open the computer case. See your computer manufacturer's instructions.

Set Drive Number (Twisted Cable)

When the 34-pin control cable is a twisted cable, set (jumper) both hard disk drives for drive select 2. If you have only one hard disk drive, set your single hard disk drive for drive select 2.

See the drive manufacturer's manual for detailed instructions on how to set the drive number.

When you install your hardware as explained in Chapter 3, and you have only one hard disk drive, that single hard disk drive will be placed at the end of the daisy chain cable. WAIT UNTIL CHAPTER 3 TO ATTACH YOUR HARD DISK DRIVE TO THE CABLE.

Set Drive Number (Non-twist Cable)

When the 34-pin control cable has NO twisted section, set (jumper) one drive for drive select 1 (i.e., drive 0) and the other drive for drive select 2 (i.e., drive 1).

When you install your hardware as explained in Chapter 3, the drive set for drive select 1 (i.e., drive 0) will be placed at the end of the daisy chain cable. WAIT UNTIL CHAPTER 3 TO ATTACH YOUR HARD DISK DRIVE TO THE CABLE.

Mark the drives, so that you know which drive you set for drive select 1 and which drive you set for drive select 2. If you have only one drive, set your single drive for drive select 1 (i.e., drive 0). When you install your hardware as explained in Chapter 3, place the single hard disk drive unit at the end of the daisy chain cable.

See the drive manufacturer's manual for instructions on how to set the drive number.

Note: A daisy chain cable has three connectors. The electrical signal in a daisy chain configuration moves from one connection to the next in sequence.

Set Drive Termination Resistor

The drive termination resistor must be present only on the drive, which is the last physical drive installed in a daisy chain configuration. If you have two hard disk drives, remove the termination resistor from the drive, which will be attached to the middle connector. See Figure 2-2.

If you have only one fixed hard disk drive, do not change the termination resistor. Drives are set at the factory as the first hard disk drive (i.e., to be the only drive in the system).

See the drive manufacturer's manual for instructions on how to remove the termination resistor.

HOW TO INSTALL YOUR HARDWARE

This section tells you how to install the hardware portion of your WD1007V-MC1 controller board. You can install the controller board in any available Micro Channel compatible expansion slot.

Do not attempt to install your hardware unless you have set the hard disk drive configuration as explained starting on page 2-6.

The installation requires you to remove the cover from your computer. See your PS/2 manual for exact instructions on how to remove the cover.

If you are replacing an existing controller, then you also have to remove your old hard disk controller.

<div align="center">CAUTION</div>

The IBM PS/2 system does NOT support two of the same type controller.

Therefore, if you already have an ESDI controller installed, your new controller requires another type interface.

If you want two of the same type of hard disk, daisy chain them onto one WD1007V-MC1 controller board.

1. Turn your computer power switch to OFF.

2. Use a screwdriver to loosen the cover screws. Then remove the computer cover, so that you can see the expansion slots and internal space to place the fixed disk drive unit.

    This is an IBM limitation. See IBM manual for more information.

3. Place your hard disk drive unit(s) into the computer case and attach to the case according to the manufacturer's installation instructions.

4. Look and see which expansion slots are empty. Select one that has the same type of connectors as those on the WD1007V-MC1 board.

    Or if you are removing a controller, locate the one which has the old controller in it. Use this expansion slot.(no 165 error)

    Note: You can also install a new fixed hard disk drive on an existing WD1007V-MC1 controller. See Appendix.

    You may have to leave the drive case loose to connect the cables. Look and determine whether to tighten the connections from the position of the cable connectors.

5A. If you are removing an old controller, loosen the plastic screw which holds the old controller board in place. Then slide the old board out of the expansion slot and remove the cables.
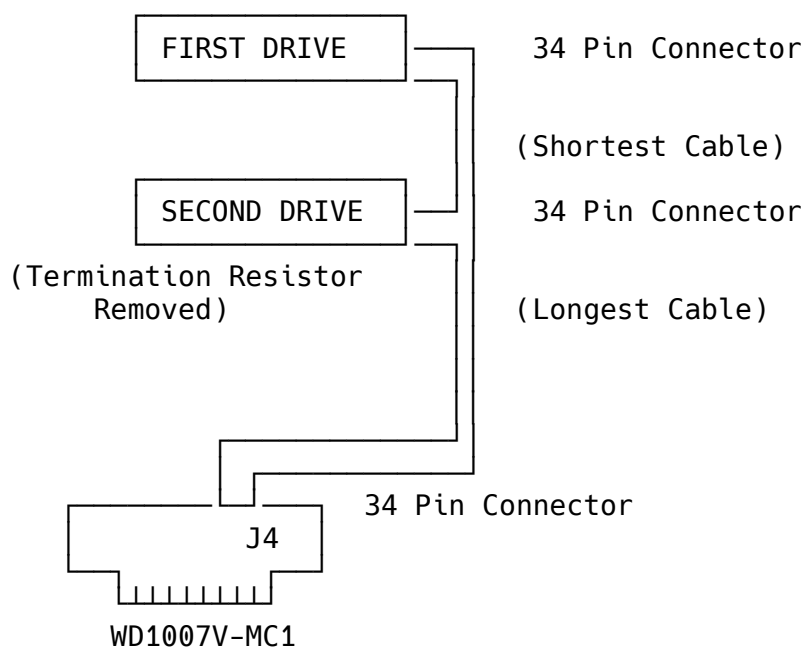
5B. If you are using a "new" expansion slot, loosen the plastic screw that holds the expansion slot cover you selected in step 4. The plastic screw is located at the rear. Slide the expansion slot cover up, and remove it.

6. Connect cables to hard disk drive unit. Follow steps A, B, C, and D. These instructions are for both one or two drives on the same controller.

   Cable connectors have an orientation. Pin 1 is not the same as Pin 34. Each carries a different electrical signal. Therefore your unit will not work properly, if you do not connect Pin 1 of the cable connector to Pin 1 on the drive.

   Pin 1 of the cable connector is marked and is on the color coded edge of the cable. Pin 1 on the controller board is shown in Figure 3-2.

FIGURE 3-1. DAISY CHAIN CABLE CONNECTORS

```
   ┌─────────────────┐
   │   FIRST DRIVE   │───┐       34 Pin Connector
   └─────────────────┘   │
                         │       (Shortest Cable)
   ┌─────────────────┐   │
   │  SECOND DRIVE   │──┐│       34 Pin Connector
   └─────────────────┘  ││
   (Termination Resistor ││
        Removed)         ││      (Longest Cable)
                         ││
                         ││
                        ┌┴┴──────────
              ┌─────────┴─┴──┐   34 Pin Connector
              │     J4       │
              └─┌────────┐───┘
                │││││││││
              WD1007V-MC1
```

A. (for 1 drive only) Connect the 34-pin (wide control cable) connector to the hard disk drive unit's 34-pin (card edge type) connector. Attach Pin 1 of the cable to Pin 1 on the hard disk drive connector.

   (for 2 drives only) If you are installing two hard disk drives on one controller, use a daisy chain cable. Connect the end connector on the shorter cable length to the first drive unit. See Figure 3-1 for daisy chain cable connections.

   The longer length cable is unattached for now.

B. (for 2 drives only) Connect middle 34-pin connector on the shorter length daisy chain cable to the second hard disk drive unit's 34-pin connector.

   Remember: The second hard disk drive is the unit from which you removed the termination resistor. See page 2-11.

   The longer length cable is unattached for now.

C. Connect the 20-pin (data cable) to the first hard disk drive unit's 20-pin connector. Attach Pin 1 of the cable to Pin 1 on the hard disk drive.

D. (for 2 drives only) Connect the second 20-pin (data cable) to the second hard disk drive unit's 20-pin connector.

7. Locate the internal four pin power connector(s) on your computer. See your computer manual. Connect this internal four pin power connector to your new fixed hard disk drive unit's power connector plug.
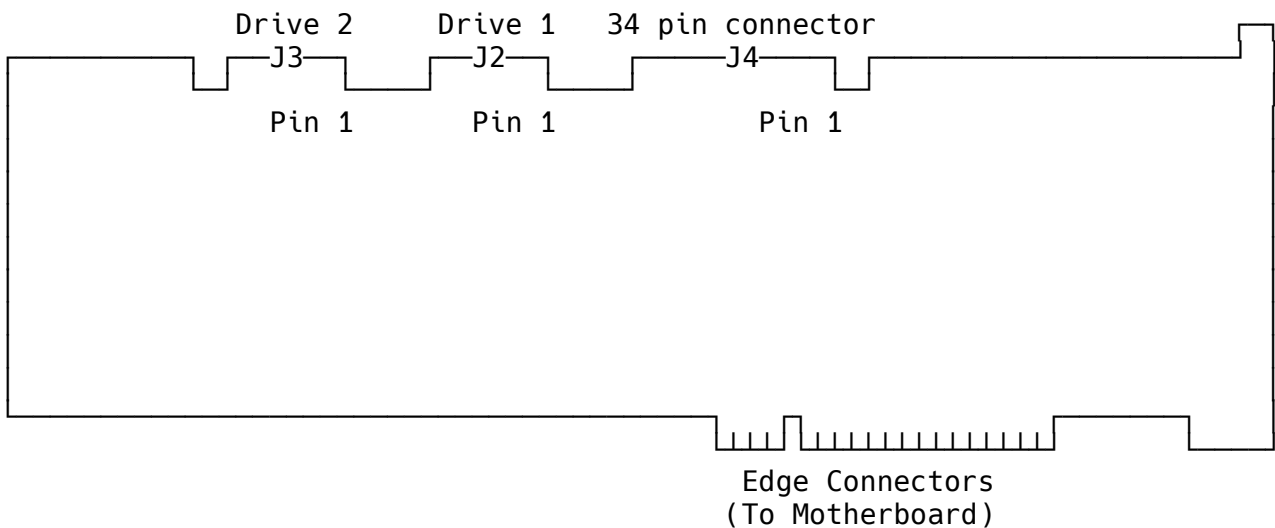
(for 2 drives only) If you are installing 2 drives, you need either two internal power connectors on your computer or you need to split the power connector. See the manufacturer's manual.

Connect the second drive unit to the second power connector plug.

8. Place the controller board into the expansion slot that you selected in step 4. Slide the edge of the board into the expansion slot at the rear of your computer and press firmly on the plastic edges of the board as you insert it into the expansion slot. You will feel the board slip into place and fit snugly. The WD1007V-MC1 edge connectors fit snugly into the slot. Check that the board is seated properly, it should NOT wobble freely.

9. After the board is seated firmly in the expansion slot socket, fasten the end of your board to the computer rear panel. Tighten the plastic screw (which you loosened in step 5) to the computer chassis.

10. Connect the free end of the 34-pin (wide control cable) connector to J4 on the WD1007V-MC1 board. Attach Pin 1 of the cable connector to Pin 1 on the controller board.

Note: Pin 1 on the controller board is shown in Figure 3-2.

FIGURE 3-2. WD1007V-MC1 BOARD

11. Connect the free end of the 20-pin (data cable) to J2 (first drive data connector) on the WD1007V-MC1 controller board.

    Attach Pin 1 on the cable to Pin 1 on the controller board.

12. (for 2 drives only) If you installed a second hard disk drive, connect the second 20-pin (data cable) to J3 (second drive data connector) on the WD1007V-MC1 controller board.

13. Place extra cable lengths so that they are out of the way.

CAUTION

Do NOT pinch the cables when you arrange them inside your computer case. Do not let the cables lay between the cover and an internal board. Do not obstruct air flow from fans or vents.

14. Replace the computer cover. Your hardware controller installation is complete. However, your WD1007V-MC1 controller board is really a complex circuit composed of both hardware and software, so that while the hardware installation is complete, you still need to install the software. Proceed to the next section for the software installation steps.

    Tighten hard disk unit(s) to computer case, etc. if not already done so in step 3.

HOW TO INSTALL YOUR SOFTWARE

Now that you have installed the WD1007V-MC1 hardware, you need to install the software that tells your computer how to use the hardware.

Installation Summary

The software installation consists of doing the four procedures listed below.

- Configure Computer

- Low Level Format

    ○ using Reference Diskette

- Partition Hard Disk

    ○ using FDISK utility program

- High Level Format

    ○ using FORMAT utility program

You may find it easier to install the WD1007V-MC1 software if you first look over the complete set of instructions and locate any materials that you are going to use.

After you complete the low level format on your hard disk drive, you need to partition your drive and do a high level format before you can use your hard disk for the first time. The programs: FDISK and FORMAT accomplish these functions.

The low level format program is done with either the IBM Reference Diskette or the diskette supplied by your system manufacturer. FDISK and FORMAT are located on either the DOS diskette or the OS/2 installation diskette.

The following sections give detailed instructions on how to perform these procedures.

CAUTION

Western Digital uses the standard ESDI interface, but IBM does not define their drives according to standard ESDI specifications. Therefore do NOT use the IBM Reference Diskette to format any IBM drive that is controlled by a Western Digital controller.

Also you can't use the IBM Reference Diskette to format non-IBM drives with the IBM controller; you need to purchase the Western Digital controller.

These instructions are documented for an IBM PS/2 computer. If you have a compatible computer, your menu screens may not match those documented here. Always follow the manufacturer's instructions for their compatible computer (i.e., use their reference diskette).

****
CONFIGURE COMPUTER
****

1.   With the power to the computer off, turn the power on and immediately insert the Reference Diskette into drive A.

      One of the following occurs:

            165 Error

            Other Error Codes (2 beeps)

            IBM Logo

      You get the 165 Error if the system configuration has been changed (i.e., installed board in new expansion slot). However, you get the IBM logo, if you place the new board in the same slot. Other errors accompanied by 2 beeps, indicate that the Reference Diskette can correct the problem.

      Follow the instructions 1A or 1B for your system. If you first get the IBM logo and then the 165 error occurs, go to the instructions for the 165 error.

      Instructions for IBM PS/2 computer only. Your screens may be different.

      If another error occurs (2 beeps), first correct it with the Reference Diskette, then proceed with steps 1A or 1B. To correct a 10490 or 10491 error, perform a low level format on the hard disk(s).

1A.   The 165 Error message appears.

```
Adapter Configuration Error - 00165            Page 1 of 2

The computer's internal self-tests found an option adapter
that is different from the option adapters indicated in the
computer's configuration.

This error occurs if option adapters are added, removed, or
are not working properly.

If you have added or removed an adapter, run automatic
configuration. To view or change the results of automatic
configuration, go to the Main Menu of this diskette and select
"Set configuration."

Automatically configure the system? (Y/N)
PageDown
```

      Press Y <Enter>

      After the Automatic Configuration is complete, the system reboots. Now go to step 1B.

1B. The IBM logo screen appears

Press <Enter>

The main menu appears:

```
Main Menu

1. Learn about the computer
2. Backup the Reference Diskette
3. Set configuration
4. Set features
5. Copy an option diskette
6. Test the computer

Up or Down Arrow to select. Press Enter.
ESC=Quit F1=Help
```

You do not need to make a selection here.

CAUTION

Do NOT start the low level format until you have a backup copy of the information on your hard disk. This warning usually applies to previously used hard disks.

When you have a new hard disk, you usually do not have information to backup except in the case where your dealer installs some applications software on your unit.

****
LOW LEVEL FORMAT
****

1. At the main menu

Press <Ctrl> <A>

The Advanced Diagnostic Menu appears:

```
Advanced Diagnostic Menu

1 System checkout
2 Format fixed disk

Up or Down Arrow to select. Press Enter.
ESC=Quit F1=Help
```

2. Select the "Format fixed disk" option

Press Up or Down Arrow keys to highlight "2. Format fixed disk" option

Press <Enter>

A menu similar to the one below appears:

```
WHICH DRIVE TO PREPARE FOR DOS

1 Prepare Drive C for DOS
2 Prepare Drive D for DOS
3 Return to control program

Press Up or Down Arrow to select. Press Enter.
ESC=Quit F1=Help
```

3.   Select "Prepare Drive C for DOS" option

Press <Enter>

4.   The system asks the questions:

```
Question                                        Page 1 of 1

Preparing the fixed disk will ERASE ALL information from your
fixed disk.
Are you SURE you want to continue?

Press Y or N
```

To continue press <Y>

```
Question                                        Page 1 of 1

Preparing the fixed disk takes between 20 minutes and 2 hours
depending on the size of your fixed disk.
Do you want to STOP now?

Press Y or N
```

To continue press <N>

```
Question                                        Page 1 of 1

This will DESTROY all previous data on your fixed disk drive.

This is your LAST chance to stop.

ARE YOU POSITIVE YOU WANT TO CONTINUE?

Press Y or N
```

CAUTION

The low level format destroys all information on the hard disk. If you need any information from this hard disk, you should have already made a backup copy. If this is a new unused disk, then you won't have any information to backup.

5.   To continue press <Y>

This starts the hard disk format.

Messages appear and are updated as the disk is formatted:

```
Message                                          Page 1 of 1

Preparing drive X
...
Defective Sectors: 0
```

When the format is completed, the following displays:

```
Instructions                                     Page 1 of 1

Drive C has the following parameters
....................
Approx. Size: 80MB
Enter=Continue
```

This message may be slightly different for your system.

The capacity of your drive depends on the drive that you installed.

6.   Exit the Reference Diskette program. You are done with the low level format.

If you have a second drive to format, go to the section, "Format Second Drive" in the Appendix. Otherwise, continue with steps below.

****
DOS OR OS/2 OPERATING SYSTEM
****

The installation is slightly different and depends on whether you install DOS or OS/2.

If you are installing the OS/2 Operating system, go to section "OS/2 Operating System."

If you are installing the DOS Operating system, go to section "Partition Drive."

If you are installing another operating system, go to section "Other Operating Systems."

****
OS/2 OPERATING SYSTEM
****

Before you can use a new hard disk, the hard disk must be partitioned with FDISK and have a high level format done with FORMAT. However, these steps are done automatically when you install OS/2. Therefore, you do not have to run these programs separately, UNLESS OS/2 is already installed on your computer system and you are now adding a second fixed hard disk drive.

If this is your first hard disk, install OS/2. Then go to the next chapter.

If this is your second hard disk, and OS/2 is already installed, see the Appendix.

****

OTHER OPERATING SYSTEMS

****

Before you can use a new hard disk, you need to partition your hard disk and perform a high level format on the disk. How these functions are accomplished depends on your operating system.

Look at the operating system installation manual for instructions on how to partition your hard disk and how to do a high level format.

After you complete the disk partition and high level format, go to the next chapter.

****

PARTITION DRIVE (DOS)

****

A partition divides the drive into units and prepares your hard disk for use with an operating system, such as MS-DOS*. You can select one partition which takes up your entire disk or several partitions, each occupying a portion of the disk. Each unit can have its own operating system.

To partition your hard disk with DOS, follow the instructions below.

1. With the power to the computer off, turn the power on and immediately insert a DOS diskette into drive A.

2. Use FDISK to create a partition.

    To use the FDISK utility to partition your drive, first make sure that the diskette with FDISK is in drive A.

    > At the A prompt,

    > Type:FDISK

    > Press <Enter>

    > FDISK displays a series of menus. See your MS-DOS manual for details. If in doubt, use the default values.

****

HIGH LEVEL FORMAT (DOS)

****

As the final step to the software installation, you need to use the FORMAT utility, which prepares the hard disk to accept files.

FORMAT Switch "/S"

FORMAT allows you to set certain "switches" which control various aspects of the procedure. The /s switch copies the operating system from the diskette in drive A to the newly formatted hard disk.

* MS-DOS is a registered trademark of Microsoft Corporation.

This is a simple way to get your operating system onto your hard disk.

To run the FORMAT utility and load the MS-DOS operating system onto your newly installed hard disk drive, follow the steps below.

1. Make sure that the DOS diskette with FORMAT is in drive A.

2. Simultaneously press <Ctrl> <Alt> <Del> keys.

3. At the A prompt

        Type:FORMAT C:/S

        Press <Enter>

Follow the instructions on the screen to complete the process. See your MS-DOS manual for details.

At this point your hard disk is initialized and the system can read MS-DOS from your hard disk, when you have only one partition.

High Level Format Second Drive (DOS)

If you partitioned your drive into more than one partition, you must format each logical drive.

After you format drive C, repeat the above steps to format drive D, except

    At the A prompt,

        Type:FORMAT D:

        Press <Enter>

You are now ready to go to the next chapter.

HOW TO CHECK YOUR INSTALLATION

After you completed the hardware installation, software installation, and run the FDISK and FORMAT C:/S utilities, you are ready to start using your system.

Start System From Hard Disk

You are ready to start your system using your newly installed hard disk drive and WD1007V-MC1 board.

Remember: Remove the diskette from drive A or else your system will use the operating system on drive A.

To start the system

1. Simultaneously press <Ctrl> <Alt> <Del> keys.

2. The system should respond, several screens may flash, and finally the C: prompt will appear.

You may have to enter the date and time, before the C prompt appears. This depends on how your system is set.

Note: AN ESDI DRIVE WILL ALWAYS BE DRIVE C

Installation Complete

You are now done. The next time you start your system you can use the hard disk.

HOW TO HANDLE PROBLEMS

If you had a problem with the system, first re-read the instructions to be sure that you followed them correctly. Check that you typed information EXACTLY as instructed.

Repeat the procedure a second time to verify that you get the same error, then check the next section, "If You Have a Problem."

****
If You Have a Problem
****

First check your physical installation. Look for cables and connections that are loose or reversed, a computer power supply that is overloaded, or an incorrectly jumpered hard disk drive.

This section lists some common problems and possible solutions to try if you have problems after you install your controller.

PROBLEM: "Adapter Configuration Error – 00165" or Error Codes, 162, 163, or 166.

SOLUTION: The system configuration has changed. Use the Reference Diskette to set the new configuration. See Chapter 4.

PROBLEM: Winchester activity LED always on.

SOLUTION: Check cable connections. Try to reverse cables or replace cables. Also possibly the drive has malfunctioned.

PROBLEM: "Drive Not Ready" Error Code.

SOLUTION: Cables reversed, bad cables, or drive malfunction. Check cable connections and drive.

PROBLEM: "Hard disk verification failed" or Error Codes 10480, 10482, or 10483.

SOLUTION: Drive select jumper on the hard disk drive unit is set incorrectly (see Chapter 2), or the cables are backwards, i.e., Pins 1 & 34 switched or connector cables J2 & J3 switched (see Chapter 3).

PROBLEM: "Hard disk verification failed" or Error Codes 10490 or 10491.

SOLUTION: The Error Codes 10490 or 10491 are normal and are expected when the drive does not have a low level format. Do a low level format. (See Chapter 4.)

PROBLEM: The low level format doesn't begin after you complete step 5 on page 4-10. Instead the screen returns a message beginning with "Which Drive to Prepare for DOS." Repeatedly answering this question sends you in a circle and the low level format never begins.

SOLUTION: The defect list on your ESDI drive was erased. You'll have to re-enter this information. Contact Western Digital Technical Support at 1-800-777-4787 and ask for WDLL7FMT.

PROBLEM: None of the suggestions seem to help.

SOLUTION: Call your dealer.

APPENDIX

INSTALL A SECOND DRIVE ON AN EXISTING CONTROLLER

This section tells you how to install a second fixed hard disk drive on an existing WD1007V-MC1 controller board. You do not have to remove the existing controller board, but you may have to remove the fixed hard disk so that you can remove the termination resistor. (This depends on the location of the fixed disk and the termination resistor.)

Do not attempt to install your hardware unless you have set the hard disk drive configuration as explained starting on page 2-6.

The installation requires you to remove the cover from your computer. See your PS/2 manual for exact instructions on how to remove the cover.

You need a wide control cable in a daisy chain configuration and you need to connect another 20-pin data cable.

1. Turn your computer power switch to OFF.

2. Use a screwdriver to loosen the cover screws. Then remove the computer cover, so that you can see the expansion slots.

3. Place the new hard disk drive unit into the computer case and attach per the manufacturer's installation instructions.

4. Look and see which expansion slot has the WD1007V-MC1 board.
    You may have to leave the drive case loose to connect the cables. Look and determine whether to tighten the connections from the position of the cable connectors.

5. Check if your existing 34-pin wide control cable is a daisy chain cable. A daisy chain cable has 3 connectors. If the cable is not a daisy chain cable, then remove the 34-pin wide control cable from the WD1007V-MC1 board and the existing hard disk drive unit. You will replace this cable with a daisy chain cable in the next step.
    Leave the 20-pin cable attached to both the drive and the controller board.

6. Connect cables to new hard disk drive unit. Follow steps A, B, and C.
    Use a daisy chain cable. Connect the middle connector to the second drive unit. See Figure 3-1 for a drawing of the daisy chain cable and follow the steps below.
    Remember: Connect Pin 1 to Pin 1. Pin 1 of the cable connector is marked and is on the color coded edge of the cable. Pin 1 on the controller board is shown in Figure 3-2.

    A. (Omit this step if you are using an existing daisy chain cable.)
        Connect the 34-pin wide control cable end connector on the shorter length cable to the first hard disk drive unit's 34-pin connector.

    B. Connect the 34-pin middle connector to the second hard disk drive unit's 34-pin connector. The longer length cable is unattached for now.

    C. Connect the additional 20-pin (data cable) connector to the second hard disk drive unit's 20-pin connector.

7. Locate the internal four pin power connector(s) on your computer. See your computer manual. You need either two internal power connectors on your computer or you need to split the power connector.
   Connect the second drive unit to the second power connector plug.

8. Connect the free end of the 34-pin (wide control cable) connector to J4 on the WD1007V-MC1 controller board. Attach Pin 1 of the cable connector to Pin 1 on the controller board.
   Note: Pin 1 on the controller board is shown in Figure 3-2.

9. Connect the free end of the second 20-pin (data cable) to J3 (second data connector) on the WD1007V-MC1 controller board. Attach Pin 1 on the cable to Pin 1 on the controller board.

10. Place extra cable lengths so that they are out of the way.

<center>CAUTION</center>

> Do NOT pinch the cables when you arrange them inside your computer case. Do not let the cables lay between the cover and an internal board. Do not obstruct air flow from fans or vents.
>
> Tighten hard disk unit to computer case, if not already done so in step 3.

11. Replace the computer cover. Your hardware controller installation is complete. However, your Micro Channel controller board is really a complex circuit composed of both hardware and software, so that while the hardware installation is complete, you still need to install the software. Proceed to the next section for the software installation steps.

****
FORMAT SECOND DRIVE
****

This section explains how to format a second drive.

To format a second drive, you must return to the low level format (See Chapter 4.)

1. With the power to the computer off, insert the IBM Reference Diskette into drive A and turn the power on. See Chapter 4 for a review of details.

   When the main menu appears

   Press <Ctrl> <A>

2. When the Advanced Diagnostic menu appears,

   Select "Format fixed disk"

   Press <Enter>

   The next menu appears:

   Select: "Prepare Drive D for DOS" option

   Press <Enter>

3. Continue with instructions in main body of text on page 4-9.

****

PARTITION/FORMAT SECOND DRIVE WITH OS/2 ALREADY INSTALLED

****

If you install a second hard disk, and OS/2 is already installed, you need to partition the new hard disk with FDISK and do a high level format with FORMAT.

These were done automatically the first time you installed OS/2. See your OS/2 manual for instruction on how to use FDISK and FORMAT.