READ THIS FIRST

INSTALLATION GUIDE

WDXT-GEN2 PLUS
Winchester Disk Controller Board

WESTERN DIGITAL

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INTRODUCTION

The WDXT-GEN2 PLUS board is easy to install. The following is a summary of the installation steps.

1. **Preliminary:** set jumpers, drive configuration
2. **Install hardware:** drive, board, connect cables
3. **Install software:** use debug, low level format, etc.
4. **Check installation:** start system, use new board & drive

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.

ABOUT THIS GUIDE

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

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

About Menu Screens:

Because computer manufacturers are always updating their products, and this installation guide covers installing WDXT-GEN2 PLUS controller boards in many XT-compatible computers, some of the menu screens may not be exactly the same on your system. Always follow the instructions on your computer screen.

1

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 the following tools and supplies.

- screwdriver
- XT-compatible computer with space to hold the internal drive(s)[†]
- MFM hard disk drive(s) with ST506 interface
- interface cables (20-pin data cables & 34-pin control cable)
- DOS version 2.0 or later (DOS 3.1 or later recommended)
- installation manual for XT-compatible computer
- installation manual for hard disk drive(s)

[†]The WDXT-GEN2 PLUS board supports 2 hard disk drives.

IDENTIFY DRIVE

The WDXT-GEN2 PLUS board works with any hard disk drive that has the ST506/412 drive interface and no more than 1024 cylinders and 16 heads. The Seagate 225 hard disk drive unit is such a drive.

Look in your drive manual to verify that you have an ST506/412 MFM drive or check with your dealer.

Then check the drive manual for the drive parameters, such as those listed in Table 1-1. You'll need this information for the low level format.

Table 1-1. WDXT-GEN2 PLUS Default Drive Parameters

Formatted Capacity	Number of Heads	Number of Cylinders	Pre-Comp/ RWC	Step Rate
21MB	4	615	307/616	75µsec

This board can work with RLL drives, but does not provide 26 sectors/track. If you have an RLL drive, the WD1004-27X is a better choice.

IDENTIFY BOARD

Figure 1-1 shows the connector locations (J1, J2, J3, J4, and J5) on the WDXT-GEN2 PLUS board and the location of the jumpers (W17 to W22 and W25 to W28). The (J4) drive power connector is on the WDXT-GEN2 PLUS board to connect power to FileCard® drives.

Look at Figure 1-1 and your WDXT-GEN2 PLUS board. Compare the locations of the jumpers and connectors on your board with the diagram.

AT&T COMPUTERS

If you have an AT&T model 6300 or 6300 PLUS computer, you **MUST** disable the hard disk controller BIOS on your AT&T motherboard. *See your AT&T system manual for details or call your AT&T computer representative.*

This is necessary for the WDXT-GEN2 PLUS board to operate correctly with these AT&T computers.

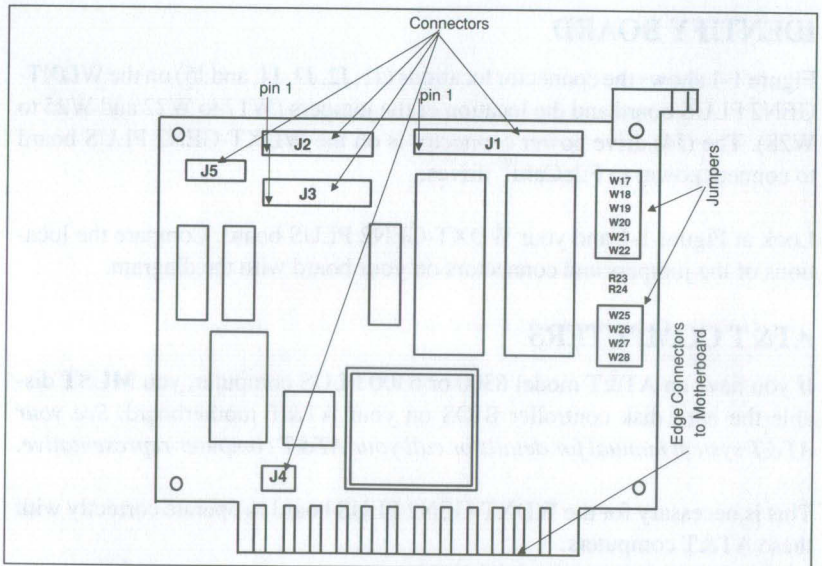


FIGURE 1-1. WDXT-GEN2 PLUS CONNECTOR&JUMPER LOCATIONS

JUMPERS

Jumpers allow you to change certain functions on your controller board. Western Digital set the jumpers for the most common applications. It is unlikely that you will need to change any of the jumper settings.

Appendix B contains a complete explanation of jumpers.

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.

Do I Need To Change Any Jumpers?

No. Do **NOT** change any jumpers on the WDXT-GEN2 PLUS board, **unless** you have one of the following conditions:

- The WDXT-GEN2 PLUS board is your second hard disk controller in the system.

- You have a host system which uses interrupt signal IRQ2 for the hard disk drive.
- You have a drive whose parameters are the same as one of the non-default drive parameters in Table B-1.

Change Jumpers

When you have one of the special conditions listed above, you need to add a jumper. In all other cases, do NOT add a jumper.

- If the WDXT-GEN2 PLUS board is the second controller, change the controller address at W21 & W22. Check the first controller manufacturer's manual for the addresses and also see Appendix B.
- If your host system requires IRQ2, add a jumper at W27.
- If the drive parameters match one of the non-default settings in Table B-1, change the jumpers at W17 thru W20.

See Appendix B for information before you change any jumpers.

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 WDXT-GEN2 PLUS controller. Since the WDXT-GEN2 PLUS 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 on the hard disk unit.

Drive Settings

The two settings that you can change are:

- drive number
- drive termination resistor

You frequently don't have to modify the factory settings. The exact number of settings that you change depends on your disk drive(s) and computer.

Control Cables (34-pin Connectors)

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

- without a twisted section
- with a twisted section

Do NOT use cables from floppy drives. Hard disk cables are different!

First identify which cable you are going to use. Look at the control cable and determine whether it is twisted. The control cable has the 34-pin connectors.

If you already have one hard disk attached to your WDXT-GEN2 PLUS board and you plan to use the existing cable in your computer, you **must** open the computer case. *See your computer manufacturer's instructions.*

Set Drive Number

When the 34-pin control cable has a twisted section, set the jumpers or switches on both drives for drive select 2. See Figure 1-2, page 1-9.

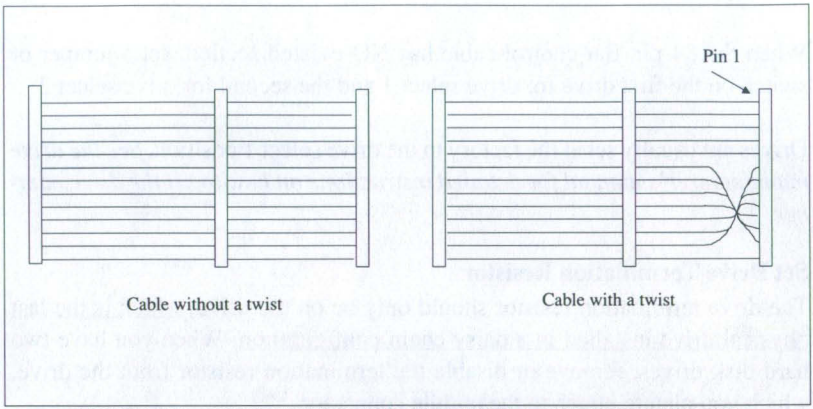


FIGURE 1-2. CABLES WITH AND WITHOUT A TWISTED SECTION

When the 34-pin flat control cable has NO twisted section, set a jumper or switch on the first drive for drive select 1 and the second for drive select 2.

Drives are usually set at the factory to the drive select 1 position. *See the drive manufacturer's manual for detailed instructions on how to set the drive number.*

Set Drive Termination Resistor

The drive termination resistor should only be on the drive, which is the last physical drive installed in a daisy chain configuration. When you have two hard disk drives, remove or disable the termination resistor from the drive, which you plan to attach to the middle connector .

If you have only one fixed hard disk drive, do **NOT** change the termination resistor.

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

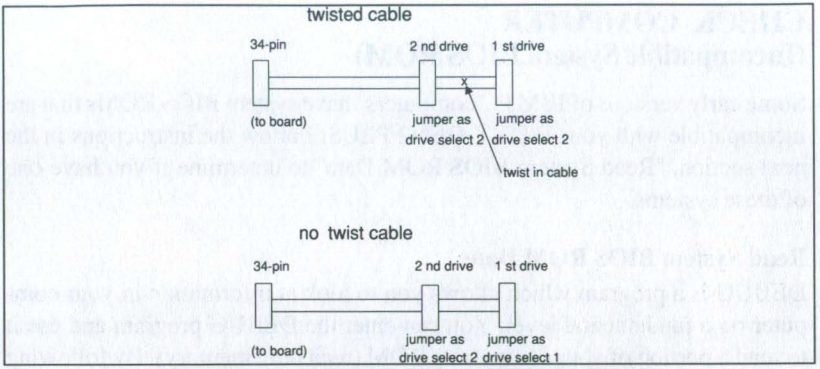


FIGURE 1-3. DRIVE SELECT CONFIGURATIONS

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

CHECK COMPUTER
(Incompatible System BIOS ROM)

Some early versions of IBM PC computers† have system BIOS ROMs that are incompatible with your WDXT-GEN2 PLUS. Follow the instructions in the next section, "Read System BIOS ROM Date" to determine if you have one of these systems.

Read System BIOS ROM Date

DEBUG is a program which allows you to look at information in your computer on a fundamental level. You can enter the DEBUG program and use it to read a portion of your computer's ROM (read only memory). By following the steps below, you can determine the date the system BIOS ROM was created for your computer.

The DEBUG program should be supplied on your DOS diskette. See your DOS system manual for complete instructions on how to use the DEBUG program.

† This test **ONLY** works for IBM model PC computers.

Place the diskette containing the DEBUG program in drive A, then

1. At the prompt (A>),

   Type: **DEBUG**
   Press **<Enter>**

2. At the DEBUG prompt (-),

   Type: **d f000:fff5 fffc**
   Press **<Enter>**

3. Date returned is (10/27/82) OR LATER†

†Only a date of 10/27/82 OR LATER is acceptable. If the date returned is earlier than 10/27/82, you need to update your system BIOS ROM before you can install your WDXT-GEN2 PLUS board. Contact your computer dealer for information on upgrading your system BIOS ROM.

4. To exit DEBUG:

   Type: **q**
   Press **<Enter>**

2
HOW TO INSTALL YOUR HARDWARE

This section tells you how to install the hardware portion of your WDXT-GEN2 PLUS controller board. You will install the controller board in an XT-compatible expansion slot.

Do not attempt to install your hardware unless you have set the hard disk drive configuration as explained on page 1-7 and set the WDXT-GEN2 PLUS board jumpers, if required.

The installation requires you to remove the cover from your computer. See your PC 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.

If you want two hard disks on one controller, use a daisy chain cable to connect them onto one WDXT-GEN2 PLUS board. A daisy chain cable has 3 connectors.

1. Turn your computer power switch to OFF and unplug the power cord.
2. Use a screwdriver to loosen the cover screws. Then remove the computer cover, so that you can see the expansion slots.
3. Locate the drive media defect list which is on top of your drive case. Copy the media defect list (cylinder # and head #) to a piece of paper. You will need this list when you do the low level format in the next chapter.

   If you can't locate the media defect list, contact the drive manufacturer.

4. Place your hard disk drive unit(s) into the computer case and mount per the manufacturer's installation instructions.†

† You may have to leave the fastening screws loosely connected, so that you can attach the cables.

5. Look and see which expansion slots are empty. You can use any empty slot that has the same type of edge connectors as the WDXT-GEN2 PLUS board, except as noted below.

Note: For IBM XT owners: DO NOT use the slot closest to the power supply. Use an expansion slot at least one position removed from the power supply.

Or if you are removing a controller, locate the slot which has the old controller in it. Use this expansion slot.

Note: You can also install a new fixed hard disk drive on an existing WDXT-GEN2 PLUS controller. See Appendix A.

6A. If you are removing an old controller, loosen the screw which holds the old controller board in place. Then slide the old board out of the expansion slot and remove the cables. Locate the old rear slot cover and place it on your computer case. (You probably removed this old slot cover when you installed your old controller board.)

6B. If you are using a "new" expansion slot, remove the screw, but keep the rear slot cover in place. Save the screw to hold the new controller board.

7. Connect the 34-pin wide control cable to the WDXT-GEN2 PLUS board. Follow steps A or B. These instructions are for one or two drives on the same controller.

   A. (for 1 drive only) Connect the 34-pin (wide control cable) connector to J1 on the controller board. Attach Pin 1 of the cable connector to Pin 1 on the controller board. See Figure 1-1 on page 1-4.

      Pin 1 of the cable connector is marked and is on the color coded edge of the cable. Do NOT force the cables and connectors.

   B. (for 2 drives only) If you are installing two hard disk drives on one controller, use a daisy chain cable. A daisy chain cable has 3 connectors.

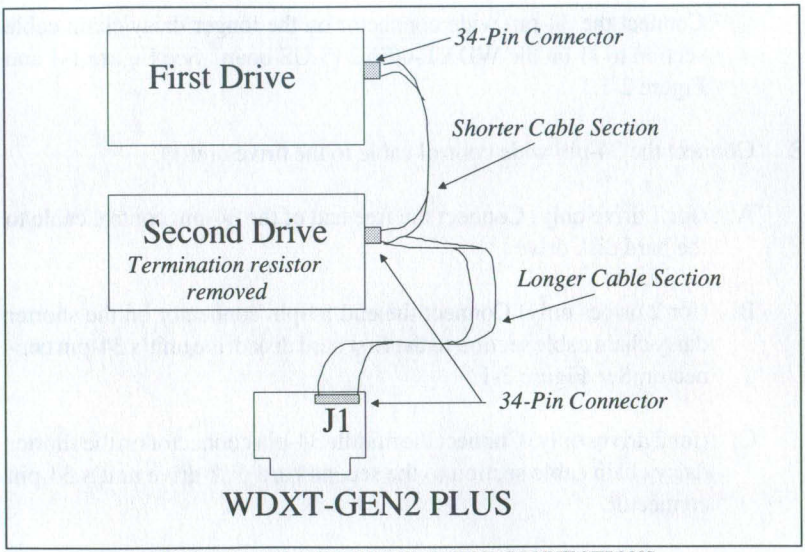


FIGURE 2-1. DAISY CHAIN CABLE CONNECTIONS

Connect the 34-pin wide connector on the longer daisy chain cable section to J1 on the WDXT-GEN2 PLUS board. See Figure 1-1 and Figure 2-1.

8. Connect the 34-pin wide control cable to the drive unit(s).

   A. (for 1 drive only) Connect the free end of the 34-pin control cable to the hard disk drive.

   B. (for 2 drives only) Connect the end 34-pin connector on the shorter daisy chain cable section to the first hard disk drive unit's 34-pin connector. See Figure 2-1.

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

Remember: The second hard disk drive unit is the unit from which you removed or disabled the termination resistor and changed the drive number. See page 1-10.

9. Connect the 20-pin data cable(s) to the drive unit(s) 20-pin connectors. Attach one 20-pin data cable to the first hard disk drive unit. If you are installing a second drive attach the second 20-pin data cable to the second hard disk drive unit.

   Attach Pin 1 of the cable connector to Pin 1 on the drive unit. Pin 1 of the cable connector is marked and is on the color coded edge of the cable. Do NOT force the cables and connectors.

10. Connect 20-pin data cable(s) to the WDXT-GEN2 PLUS board as described below.

    A. Connect the 20-pin data cable from the first drive to J2 on the controller board. Attach Pin 1 on the cable to Pin 1 on the controller board. See Figure 1-1 on page 1-4.

B. (for 2 drives only) If you install a second hard disk drive, connect the second 20-pin data cable from the second drive to J3 on the controller board. See Figure 1-1 on page 1-4.

11. Connect power from your computer's internal power supply to the drive(s). Follow instructions for either A or B.

A. Locate the internal 4-pin power connector(s) on your computer. *See your computer manual.* Connect this internal 4-pin power connector to your new fixed hard disk drive unit's power connector plug.

B. (for 2 drives only) If you are installing 2 drives, you need either two internal power connectors on your computer or you need a "Y" adapter, which splits the power cable. *See the manufacturer's manual.*

Connect the second drive unit to the second power connector plug or to the "Y" adapter.

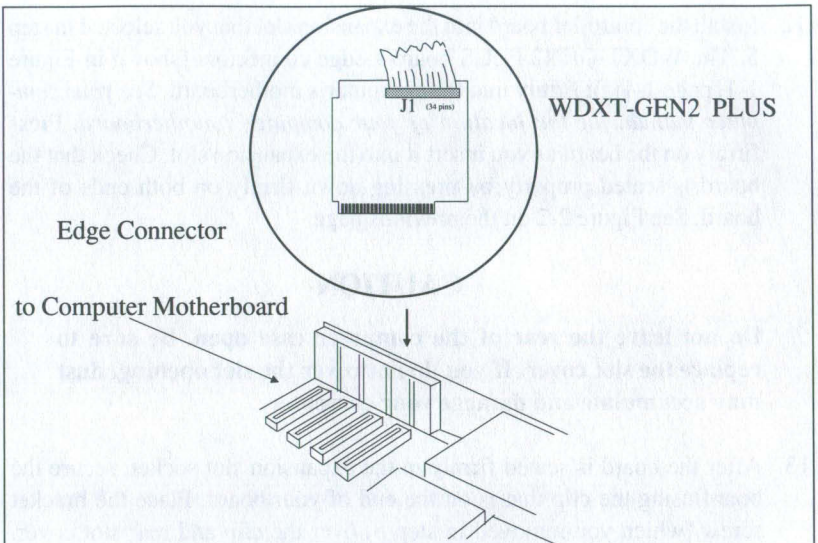


Figure 2-2. INSTALLING WDXT-GEN2 PLUS BOARD

12. Install the controller board into the expansion slot that you selected in step 5. The WDXT-GEN2 PLUS board's edge connectors (shown in Figure 1-1, page 1-4) fit firmly into the computer's motherboard. *See your computer manual for the location of your computer's motherboard.* Press firmly on the board as you insert it into the expansion slot. Check that the board is seated properly by pressing down firmly on both ends of the board. See Figure 2-2 on the previous page.

CAUTION

Do not leave the rear of the computer case open. Be sure to replace the slot cover. If you do not cover the slot opening, dust may accumulate and damage your computer.

13. After the board is seated firmly in the expansion slot socket, secure the board using the clip that is on the end of your board. Place the bracket screw (which you removed in step 6) over the clip and rear slot cover. Then screw the clip and slot cover to the computer case.

CAUTION

When routing cables, be careful not to pinch them. Cables must not get caught between the cover and the boards nor should they obstruct any air flow path from fans or vents.

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

15. Replace the computer cover. Then plug the power cord back into your computer and wall outlet.

Your hardware controller installation is complete. However, your WDXT-GEN2 PLUS 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 4.

NOTES

3
HOW TO INSTALL YOUR SOFTWARE

Now that you have installed the WDXT-GEN2 PLUS hardware, you need to install the software that tells your computer how to use the hardware.

Software Installation Summary

The software installation consists of the following three procedures:

- Low Level Format
  use either pre-selected configurations (drive tables) or dynamic configuration
- Partition Hard Disk
  use DOS FDISK utility program
- High Level Format
  use DOS FORMAT utility program

You will find it easier to install the WDXT-GEN2 PLUS software, if you first read the complete set of instructions and **determine beforehand** which instal-

lation path you are going to use. During the low level format, you decide whether to use the pre-selected configurations or the dynamic configuration.

The pre-selected configurations use factory supplied drive tables. A drive table contains characteristics, which describe the hard disk to the computer. The factory supplied drive tables for the WDXT-GEN2 PLUS board have the characteristics listed in Table B-1. See Table B-1 on page B-2.

Alternately, during the low level format, you can choose the dynamic configuration. The dynamic configuration is a process whereby you type the disk characteristics of your hard disk drive into the computer rather than using a pre-set drive table.

If you use the dynamic configuration, you need to locate and enter parameters for the drive(s). You will also need to decide whether to do a virtual split. Your software installation ends by using the DOS utilities: FDISK and FORMAT.

Where the instructions require you to shift between the text in this chapter and the Appendix, step numbers are kept consistent in both sections.

CAUTION

Do NOT start the low level format until you have a backup copy of the information on your hard disk. This warning 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 has installed some applications software on your unit.

START LOW LEVEL FORMAT

Before you start, place a DOS startup diskette in your computer and turn the power to your computer ON. Then proceed to the A> prompt.

See your DOS manual if you need help getting to the A> prompt.

1. At the A> prompt, place a diskette with the DEBUG program in drive A, then

Type: **DEBUG**

Press **<Enter>**

2. At the DEBUG prompt (-),

   Type: **g=c800:5**

   Press **<Enter>**

3. The low level format program displays the following:

   ```
   Super Bios Formatter II Rev.1.0 (C) Copyright Western Digital Corp.1988
   Current Drive is C:, Select new Drive or RETURN for current.
   ```

   Go to either step 3A or step 3B.

3A. Drive C is your first drive. To remain at C

Press **<Enter>**

Now go to step 3C.

3B. Drive D is your second drive. To change the drive from C to D

Type: **D**
Press **<Enter>**

This changes the drive you will format. Now go to step 3C.

3C. The system displays the following:

```
Current Interleave is 3, Select new Interleave or RETURN for current.
```

Press **<Enter>**

Go to either step 3D or 3E. See Appendix A for explanation of interleave.

3D. To change the current interleave value, type a new value and

Press **<Enter>**

3E. To keep the current interleave value

Press **<Enter>**

4. The following displays:

```
Are you dynamically configuring the drive - answer Y/N
```

At this point you need to make a selection.

- If you have a drive with parameters that are the same as those in TableB-1 or you changed jumpers W17-W20 to match your drive, then go to section "Use Pre-Selected Configurations."
- All other drives, go to section "Use Dynamic Configuration."

USE PRE-SELECTED CONFIGURATIONS

To use the pre-selected configuration, follow the instructions below.

4. When the prompt appears:

Are you dynamically configuring the drive - answer Y/N

Type: **N**

Press **<Enter>**

The following prompt appears,†

Press "y" to begin formatting drive C with interleave 03

CAUTION

Do NOT start the low level format until you have a backup copy of the information on your hard disk. This warning 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 has installed some applications software on your unit.

† Drive letter and interleave value will vary; they reflect the values that you entered

5. To start the format for drive C with interleave 3,

   Type: **Y**

   Press **<Enter>**

   Then follow the instructions on your computer screen. When the format starts several messages may appear or you may see the word "formatting..."

6. The format process takes several minutes. The pre-selected configurations do not allow you to select the virtual split option.

7. At the prompt,

Do you want to format bad tracks - answer Y/N

Go to "Dynamic Configuration" step 7 on page 3-12 in this chapter.

USE DYNAMIC CONFIGURATION

To use the dynamic configuration and enter the disk drive parameters yourself, follow the instructions below.

4. When the prompt appears:

```
Are you dynamically configuring the drive - answer Y/N
```

Type: **Y**

Press **<Enter>**

The following prompt displays:

```
Key in disk characteristics as follows: ccc h rrr ppp ee o

where:

ccc = total number of cylinders (1-4 digits)
h = number of heads (1-2 digits)
rrr = starting reduced write current cylinder (1-4 digits)
ppp = write precomp cylinder (1-4 digits)
ee = max correctable error burst length (1-2 digits), range (5-11 bits), default 11 bits
o = ccb option byte, step rate select, (1 hex digit), range = 0 to 7, default = 5
refer to controller and drive specifications for step rates
```

The values for total number of cylinders, number of heads, starting reduced write current cylinder, write precomp cylinder, and maximum correctable error burst length which you will enter are available from your hard disk drive manufacturer. *Check the literature supplied by your hard disk drive manufacturer for these values.*

Table 3-1. Select ccb Option Byte

ccb	Step Rate	ccb	Step Rate
0	3 msec/step	4	207 µsec/step
1	51 µsec/step	5	75 µsec/step
2	63 µsec/step	6	27 µsec/step
3	12 µsec/step	7	12 µsec/step

To determine the ccb option byte value, find the step rate from your drive literature and compare that step rate with Table 3-1. The ccb value is the single digit (between 0 and 7) that corresponds to your drive's step rate as listed in Table 3-1. When in doubt, use the default ccb value of 5.

5. Enter each value separated by a space and follow the completed entry by pressing the **<Enter>** key.

   EXAMPLE:
   For a ST 225 (Seagate model 225 hard disk drive)
   Type: **615 4 616 300 11 7**
   Press **<Enter>**

After you enter these values, you have to make another choice.

- do a virtual split
- skip the virtual split

6. When the following prompt displays:

   ```
   Are you virtually configuring the drive - answer Y/N
   ```

   See Appendix A section "Virtual Split" for more information on a virtual split and instructions to select the virtual split.

   To ignore the virtual split configuration,

Type: **N**

Press **<Enter>**

The system displays the following prompt:

```
Press "y" to begin formatting drive C with interleave 03
```

Type: **Y**

Press **<Enter>**

Then follow the instructions on your computer screen. When the format starts several messages may appear or you may see the word "formatting..."

7. At the prompt,

```
Do you want to format bad tracks - answer Y/N
```

The bad track list is usually located on the top of the disk drive case. You located this list and recorded the information in Chapter 2 step 3.

Western Digital **strongly recommends** that you map your bad tracks to maintain data integrity.

To map the bad tracks,

Type: **Y**

The system displays the following prompt:

```
Key in bad track list as follows: ccc h...
```

where:

ccc=bad track cylinder number
h=bad track head number

Enter each value separated by a space and follow the completed entry by pressing the **<Enter>** key.

EXAMPLE:

For a disk with a bad cylinder 160 on head 1 and bad cylinder 161 on head 3

Type: **160 1 161 3**
Press **<Enter>**

The bad tracks program displays the following prompt:

```
More? Y/N
```

To enter additional bad tracks.

Type: Y

Press **<Enter>**

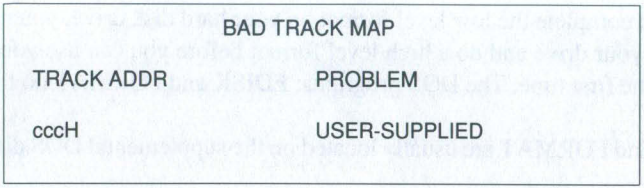
and enter more bad tracks.

To terminate the bad tracks program,

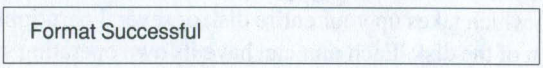
Type: **N**

Press **<Enter>**

Then the following displays:



When the format is complete, the following message displays:



If you want to format a second drive, repeat the low level format steps. When you format the second drive, be sure to follow step 3B to switch the current drive from C to D.

Otherwise you are done with this phase of the installation and can go to the next section, "Final Steps."

FINAL STEPS

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 DOS programs: FDISK and FORMAT do this.

FDISK and FORMAT are usually located on the supplemental DOS diskette.

Partition Drive

The FDISK program divides the drive into areas called partitions 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.

FDISK Utility

If you just completed the low level format, the DOS diskette is in your computer and the A> prompt is on your screen.

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

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

2. At the A> prompt,

   Type: **FDISK**

   Press **<Enter>**

FDISK displays a series of menus. *See your operating system manual for details*. If in doubt, use the default values.

Partition Second Disk Drive

If you have two hard disk drives or created a virtual disk on your hard disk drive, then you must partition each drive or virtual disk.

After you partition drive C, repeat the above steps. To partition drive D, select partition second hard disk from the menu.

High Level Format

As the final step to the software installation, you need to use the DOS FORMAT utility, which prepares the hard disk to accept MS-DOS files. Be sure that you format all drive partitions.

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 disk in the default drive (or the A drive) to the newly formatted disk.

This allows you to start your operating system from your hard disk.

To use the FORMAT utility and load the operating system onto your first installed hard disk drive, follow the steps below.

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

2. At the A> prompt

Type: **FORMAT C:/S**

Press **<Enter>**

Follow the instructions on the screen to complete the process. *See your operating system manual for details.*

At this point your hard disk is fully initialized and the system can start DOS from your hard disk. Or if you have just installed a second hard disk drive, you must also format the second hard drive.

High Level Format Second Disk Drive

If you partitioned your hard disk drive into more than one virtual disk, you must format each virtual disk.

After you format drive C, repeat the above steps to format drive D, except for the following instructions:

At the A> prompt,

Type: **FORMAT D:**

Press **<Enter>**

Follow the instructions on the screen to complete the process. *See your operating system manual for details.*

High Level Format Multiple Disk Drives

If you partition your drive with FDISK into more than two drives, then you need to high level format each drive. Follow the instructions for the D drive, except type **E:**, **F:**, etc.

You are now ready to go to the next chapter.

4

HOW TO CHECK YOUR INSTALLATION

After you complete the hardware installation, software installation, and use the FDISK and FORMAT 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(s) and WDXT-GEN2 PLUS board.

Remember: You must remove the diskette from drive A or else the system will start from drive A.

To start the system

1. Simultaneously press the **<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.

Final Check

As a final check, you will start the system after the power has been turned off.

1. Turn the computer OFF and wait 30 seconds.

2. Turn the computer power ON.

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

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

Installation Complete

You are now done. You can now start your system from the hard disk.

NOTES

5
HOW TO HANDLE PROBLEMS

If you had a problem with your system, first re-read the instructions to be sure that you followed them correctly. Check that you typed the 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. Check for reversed cables, an overloaded system power supply, incorrect drive selection, etc.

CAUTION

Turn the power OFF before you open the computer case and attempt to reverse the cables, etc.

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

PROBLEM: No response or blank screen during installation.

SOLUTION: Change cables. Do **NOT** use floppy cables.

PROBLEM: Winchester activity LED on front of drive is always on.

SOLUTION: Check cable connections. Check that pin 1 is connected to pin 1. Replace cables. Check whether the drive has malfunctioned.

PROBLEM: "Nothing done exit" appears when you start the low level format program.

SOLUTION: You did not press the **<Y>** key. Restart low level format at step 1.

PROBLEM: "Error Reading Fixed Disk" when starting the system.

SOLUTION: DOS partition not active. See FDISK instructions in your DOS manual.

PROBLEM: "Hard Disk Drive Not Ready" or "01" Error Code.

SOLUTION: System BIOS ROM does not support Winchester (WDXT-GEN2 PLUS) controller and drive. Update system BIOS ROM. Overloaded power supply. Update system power supply.

PROBLEM: Error code "80" while doing the low level format.

SOLUTION: Drive select jumper on the hard disk drive unit is set incorrectly (see Chapter 1), or the cables are backwards, i.e., Pins 1 & 34 switched or connector cables J2 & J3 switched. Also bad cables, no power to drive, or bad drive. Correct these problems.

PROBLEM: Error code "40" or "20" appears on screen.

SOLUTION: Check cable connections. Check that pin 1 is connected to pin 1. Replace cables. Check whether the drive has malfunctioned.

PROBLEM: After you do a high level format (Format), the message "Insert disk and press ENTER." appears. The system thinks drive C is a floppy disk drive.

SOLUTION: Computer motherboard switches are set for the incorrect number of floppy disk drives. Check to see if RAM disk drivers are present.

PROBLEM: "Bad Track 0" using DOS 3.1.

SOLUTION: Make a config.sys file with BUFFERS=99. Reboot to load the configuration.

PROBLEM: "Bad Track 0" using DOS 2.1. (DOS 2.1 cannot support bad tracks beyond the 16.7 MB segment.)

SOLUTION: Upgrade system to DOS 3.1 or LATER.

PROBLEM: I changed the interleave factor on my system from 3 to 6 during the low level format, step 3C. But when I returned to the start of the low level format to check, the interleave value still shows 3. What's wrong?

SOLUTION: Nothing. Notice that this is a pre-programmed question. The default value will always be 3. However, if your system completed the low level format, then the interleave value will be 6. See Appendix A for more information on interleave.

PROBLEM: None of the suggestions seem to help.

SOLUTION: Call your dealer.

A

INSTALL A SECOND DRIVE ON AN EXISTING CONTROLLER

This section tells you how to install a second fixed hard disk drive on an existing WDXT-GEN2 PLUS controller board. You do not have to remove the existing WDXT-GEN2 PLUS 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 compared your drive against the default drive parameters on page 1-2, and set the drive number and removed a termination resistor as explained starting on page 1-7.

This installation requires you to remove the cover from your computer. *See your computer manual for exact instructions on how to remove the cover.*

You need a 34-pin hard disk control cable in a daisy chain configuration and you also need a second 20-pin data cable.

[†] XT hardware limits you to two fixed hard disks. If you are installing a second drive on the WDXT-GEN2 PLUS board, then the WDXT-GEN2 PLUS board must be the only hard disk controller in your system.

1. Turn your computer power switch to OFF and unplug the power cord.

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

3. Locate the drive media defect list which is on top of your drive case. Copy the media defect list (cylinder # and head #) to a piece of paper. You will need this list when you do the low level format in the Chapter 3. *If you can't locate the media defect list, contact the drive manufacturer.*

4. Place the new hard disk drive unit into the computer case and mount per the manufacturer's installation instructions.†

5. Look and see which expansion slot has the WDXT-GEN2 PLUS board. You may have to lift the WDXT-GEN2 PLUS board out of the slot to access the connectors.

6. 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 WDXT-GEN2 PLUS 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 the board and the existing drive unit.

† You may have to leave the fastening screws on the drive case loose to connect the cables.

7. Connect the cables to the new hard disk drive unit. Follow steps A, B, and C.

   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 1-1.

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

   B. Connect the 34-pin middle connector on the shorter daisy chain cable section to the second hard disk drive unit's 34-pin connector.

      The longer cable section is unattached for now.

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

8. Locate the internal 4-pin power connector(s) on your computer. *See your computer manual.* You need either two internal power connectors on your computer or you need a "Y" adapter to split the power cable.

   Connect the second drive unit to the second power connector plug or to the"Y" adapter.

9. Connect the free end of the 34-pin (wide control cable) connector to J1 on the 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 1-1.

10. Connect the free end of the 20-pin data cable from the second drive to J3 on the WDXT-GEN2 PLUS controller board. Attach Pin 1 on the cable to Pin 1 on the controller board.

11. 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.

12. Replace the computer cover, then the power cord. Your hardware controller installation is complete. However, your WDXT-GEN2 PLUS 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 Chapter 3 for the software installation steps.

† Tighten hard disk unit to computer case, if not already done so in step 4.

INTERLEAVE FACTORS

Interleave is a technique that allows the computer to read or write more than one sector per track during a single disk rotation. **Example:** An interleave factor of 3:1 means that after the disk rotates 3 times, the computer has accessed all the information on a track.

The interleave factor is system dependent. For WDXT-GEN2 PLUS boards and XT-compatible computers an interleave factor of 3 is the default. Do not select an interleave value less than 3 with the WDXT-GEN2 PLUS board.

VIRTUAL SPLIT

A virtual split is an "imaginary" dividing of the disk drive. When you do a virtual format, you make one physical drive appear as two disks to the system.

DOS 2.0 allows a maximum of 16 megabytes per drive and DOS 2.1 permits 32 megabytes per drive. No DOS version under 4.0 recognizes a drive greater than 32 megabytes. Therefore a 40 megabyte drive must be virtually split in order to use all 40 megabytes.

If you have two physical hard disks, do not use the virtual split format.

Select Virtual Split

6. To select the virtual configuration for your drive, answer the prompt,

```
Are you virtually configuring the drive - answer Y/N
```

Type: **Y**

Press **<Enter>**

The following prompt displays:

```
Key in cylinder number for virtual drive split as vvvv...
where:vvvv = number of cylinders for drive C: (1-4 digits)
```

Enter the number of cylinders for drive C. (To calculate the cylinders, see page A-8.)

Follow the completed entry by pressing the **<Enter>** key.

The number you entered represents the number of cylinders on drive C. The remaining cylinders are assigned to drive D during the virtual split process.

The system displays the following prompt:

```
Press "y" to begin formatting drive C with interleave 03
```

Type: **Y**

Press **<Enter>**

7. When the prompt to enter bad tracks displays, return to Chapter 3, step 7 on page 3-12.

CAUTION

Do not use the low level format program on the second "virtual" drive. The virtual drive is formatted when you select the virtual format option.

CALCULATE CYLINDER NUMBER (VIRTUAL SPLIT)

Frequently, when you do a virtual split on a drive you have the desire to control the size of each virtual drive. In order to do this, you need to know the number of cylinders in each drive. But since you plan to divide the drive into only two sections, you only need to know the size of the first drive.

The size of the first disk or disk drive capacity is defined as the number of bytes available for a disk drive. Mathematically the drive capacity is defined as follows:

drive capacity = (#cyl)(#heads)(#sectors/track)(sector size)

where:

cyl = determined from the manufacturer or is calculated for virtual drives
heads = determined from the manufacturer
#sectors = 17
sector size = 512 bytes

EXAMPLE:

To split a 30 megabyte disk drive with 615 cylinders and 6 heads into a 20 megabyte drive and a 10 megabyte drive, you need to calculate the number of cylinders in a 20 megabyte drive.

For a 20 megabyte drive:

drive capacity = 20 megabytes = (20 megabytes) (1,048,576 bytes/ 1 megabyte)
drive capacity = 20,971,520 bytes

To calculate the number of cylinders for a drive, solve the drive capacity formula shown above for the number of cylinders. Be sure to use the correct units when you do your calculations.

Calculation:

$$(\#cyl) = \frac{\text{drive capacity}}{(\#heads)(\#sectors/track)(\text{sector size})}$$

For the example 20 megabyte drive with 6 heads, 17 sectors/track, and 512 bytes/sector

$$(\#cyl) = \frac{(20)(1,048,576)}{(6)(17)(512)}$$

$$= 402$$

Thus to split the example 30 megabyte drive into a virtual 20 megabyte drive, enter 402 as the number of cylinders. It is not necessary to enter the number of cylinders for the 10 megabyte drive; they are automatically calculated.

CAUTION

Do NOT run IBM Diagnostics on the first logical drive. If you do, then you will DESTROY all information on the second logical drive.

NOTES

B
JUMPERS

The WDXT-GEN2 PLUS board has a row of jumper posts at W17 to W22 and W25 to W28. Adding a jumper shorting plug or bar at any of these locations, selects a hardware configurations that is different from the default value selected by Western Digital.

Thus you can change these jumper settings to match your special hardware configuration.

Jumper Functions (W17 to W22 and W25 to W28)

The following list explains the jumper functions.

- W17 & W18 selects factory drive tables for the first hard disk
- W19 & W20 selects factory drive tables for the second hard disk
- W21 and W22 select the controller and BIOS address ranges
- W25 and W26 always OUT
- W27 sets the hardware interrupt (IRQ) value for the WDXT-GEN2 PLUS controller board
- W28 allows the controller to operate with an XT computer when the jumper is OUT

Default Values

Tables B-1 through B-3 list the jumper settings. Default factory settings are marked with a "†" symbol.

Table B-1. Pre-selected Drive Tables

Table Number	First Drive W17	First Drive W18	Second Drive W19	Second Drive W20	Capacity	Heads	Cylinders
0	in	in	in	in	21MB	4	612
1	out	in	out	in	10MB	4	306
2	in	out	in	out	10MB	2	615
3†	out	out	out	out	21MB	4	615

Table B-2. Select Controller and BIOS Ranges

W21	W22	Controller	BIOS
out†	out†	320-323	C8000-C9FFF
in	out	324-327	CA000-CBFFF
out	in	328-32B	CC000-CDFFF
in	in	32C-32F	CE000-CFFFF

Table B-3. Select Hardware Interrupt (IRQ)

W27	Select IRQ
in	selects IRQ2
out†	selects IRQ5

How To Change Jumpers

To change a jumper, you need to either add or remove a tiny jumper plug or bar.

These jumper plugs or bars are not supplied by Western Digital. You need to purchase them separately. The jumper plugs are available at most electrical suppliers. A typical jumper plug is Berg P/N 76438-101.

Note that the factory default settings have the jumpers out (i.e., not installed).

EXAMPLE

The WDXT-GEN2 PLUS controller board is set for IRQ5. If you have a system that requires IRQ2† for the hard disk controller, then you will have to change the WDXT-GEN2 PLUS board's IRQ value. You do this by changing the W27 jumper setting from the default value IRQ5 to IRQ2. See Table B-3.

To change the jumper setting to select IRQ2 rather than the default IRQ5 value, requires that you first obtain a tiny jumper plug.

To change the jumper setting from the default value at W27(out), take the jumper plug and place it across the jumper posts at W27 (in).

† See your computer hardware and peripheral manuals. Most XT-compatible computers reserve IRQ5 for the hard disk controller.

C
WESTERN DIGITAL BULLETIN BOARD

Western Digital has an electronic bulletin board for your convenience. The bulletin board contains additional product information.

To access the bulletin board you need:

- Hayes compatible modem
- 1200 or 2400 baud rate
- format: 8 data bits, 1 stop bit, no parity

The Bulletin Board number is (714) 756-8176. The Bulletin Board will ask you some preliminary questions about your modem setup and the type of system you are calling from before sending you to the main menu.

Refer to your modem manual for instructions on proper modem setup.

On screen Help (H) is available, if you have problems using the Bulletin Board. For live assistance, contact Technical Support at (800) 832-4778.

NOTES

LIMITED WARRANTY

WESTERN DIGITAL CORPORATION (WDC) expressly warrants that it will either repair or replace, on the terms described below, this WDC Peripheral Product, if it proves to be defective in design, material, or workmanship in the course of its normal use, within one (1) year from the Buyer's date of purchase from an authorized WDC dealer.

For warranty repair or replacement, the defective Product must be returned within one (1) year to the WDC service center either in person or by insured mail, packaged in the original container and accompanied by proof of purchase. A repaired or replacement Product shall be warranted as above for the balance of the original product Warranty Period or thirty (30) days, whichever is longest.

The normal intended use of the Product is as computer peripheral equipment in accordance with the functional, environmental, and operational standards published by WDC or generally accepted in the industry. WDC shall have no obligation with respect to any Product which has been modified or altered, or with respect to lost data or data contained in any Product placed in its possession. WDC's liability to Buyer or anyone claiming through or on behalf of Buyer with respect to any claim or loss arising out of this transaction or alleged to have resulted from an act or omission of WDC shall in no

event exceed the purchase price of the Product with respect to which such liability is claimed. IN NO EVENT SHALL WDC BE LIABLE FOR CONSEQUENTIAL DAMAGES, LOSSES, OR EXPENSES ARISING OUT OF THIS TRANSACTION. THE RETURN OF THE PURCHASE PRICE OR THE REPAIR OR REPLACEMENT OF THE PRODUCT SHALL BE THE BUYER'S SOLE REMEDY HEREUNDER. All claims hereunder must be presented to WDC within ninety (90) days following discovery of an alleged defect in the Product.

THIS LIMITED WARRANTY IS WDC'S SOLE WARRANTY. WDC MAKES NO OTHER WARRANTY OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED BY WDC.

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitation above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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 B 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.

This digital apparatus does not exceed the Class B limits for radio noise for digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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WD0107S-9/89

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