



Your name: _____ Lab Section: _____

Lab partner's name: _____ Lab PC Number: _____

S-5. Lab instructor signature (when complete): _____

Part I. Installing a CD ROM drive

Objectives: Install a CD drive; install an O/S on the hard disk drive; check DMA
Equipment: PC, monitor, keyboard, mouse, cables, CD ROM drive, Lab Toolkit (screwdriver, wrist-strap, etc.), one or two floppy diskettes

Read the entire lab first before starting. Follow all the Lab Procedures!

- Ensure you have the anti-static wrist strap attached to your wrist and grounded to the PC when working inside the PC.
- Remove the strap before you plug in or switch on the AC power for the PC.

1. Pre-installation:

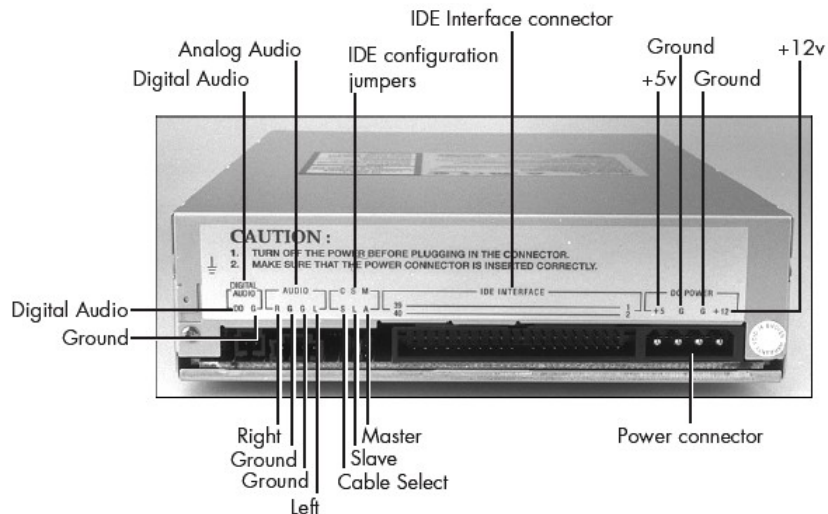
- a) Connect keyboard, mouse, and monitor *before* you power on your PC. (You must never plug/unplug PS/2 keyboards or mice with the power on!)
- b) Power on your PC. If your computer boots into Windows, verify that the CD ROM drive works before erasing Windows from the hard disk.
- c) If you have Windows 98 installed on your PC you need to erase it. Shutdown/restart your Windows 98 machine into MS DOS and type: **FORMAT C:** Before you continue, ensure you have removed Win 98 from your PC.
- d) After erasing Windows, shut down your PC and unplug it from AC (wall) power.
- e) Using proper lab procedures, unplug and disconnect all the CD ROM drive cables.
- f) Unscrew and remove the CD ROM drive from the PC. Remember the cable and screw locations (make notes in your lab book) and save the screws.

Get the instructor sign off before you continue. If you begin this lab without the sign off you will need to do it again.

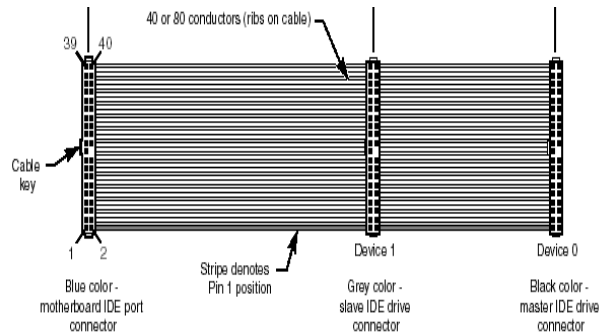
S-1. Instructor sign off for Win 98 and CD ROM removal _____

2. Installing a CD ROM Drive:

Ensure that the 110 volt AC mains power cable is disconnected from the PC. If your computer does not have a CD ROM, obtain one and a *second* IDE data cable from your instructor. Set the jumper on the CD ROM drive so that it is the master. (It will become the master on the second IDE interface.)



3. Connecting cables to the CD ROM drive: Connect the new IDE cable to the secondary IDE interface and to the CD ROM. Make sure the red wire on the IDE cable is connected to pin 1 on the CD ROM and pin 1 on the Secondary IDE connector on the motherboard. Always connect pin 1 to pin 1. Connect the four-wire power connector to the CD ROM. (The plug only inserts one way.) You do not need to make any other connections to the CD ROM.



- Remove your anti-static connection to the case.
- Connect the video, keyboard and mouse and plug in the main power cable. Do not touch anything inside the computer while the power is connected.
- Turn on the power and configure the BIOS (see below):

4. Configuring the BIOS: As the PC is booting up, press the DEL key. You will now see the BIOS setup screen. Choose BIOS setup. Change the boot sequence to CDROM, C, A. Select the *save and exit* option. Remember this step – you will need to undo it later.

5. Installing Win 98 SE: Insert the Win 98 SE CD ROM and boot your PC. You may have installed some O/S before. These options will guide you in the installation process:

- Choose “typical” setup for Win 98
- Install the most common components
- Enter a computer name and workgroup
- Enter your name and for the company name enter ‘Algonquin College’
- Enter the 25 character Windows 98 license key.

After Win 98 is installed, before you can reboot directly from the hard drive, you must change the BIOS boot sequence back to back to C, A in the BIOS settings. Do this now.

Remove the Win 98 CDROM and ensure that you can boot directly from the hard drive.

When Win 98 finally boots from the hard drive and you are prompted for your password, choose ‘Cancel’. Windows will detect new hardware. Install the video driver.

5-b. Alternate Win 98 installation procedure (from hard disk):

Do not use this procedure unless your instructor asks you to do it.

- Boot from a Win 98 Startup disk provided by your instructor
- Create a directory, call it **WIN98** on the **C:** drive. Use the **mkdir** command.
- copy** all files from the CD ROM’s **\WIN98** directory to the hard drive **C:\WIN98**
- Run the **setup** program

Windows 98 will now install from the hard disk drive.

6. Check DMA configuration:

- Right click on My Computer, select Properties
- Select the Device Manager tab
- Select and expand the CDROM line; select the CDROM
- Select Properties; select the Settings tab for the CDROM
- Is the DMA option selected? **Yes or No** _____

S-2. Instructor sign off for Win 98 installation and DMA _____

Part II. Installing a new hard disk drive

Objectives: Installing a new hard disk drive; installing MS DOS 6.2
Equipment: PC, monitor, keyboard, mouse, cables, second hard disk drive, Lab Toolkit (screwdriver, wrist-strap, etc.), one or two floppy diskettes

Read the entire lab first before starting. Follow all the Lab Procedures!

- Ensure you have the anti-static wrist strap attached to your wrist and grounded to the PC when working inside the PC.
- Remove the strap before you plug in or switch on the AC power for the PC.

This lab has these five steps:

Step 1: Disconnect the existing hard drive

Step 2: Verify settings and connect another hard disk drive; verify drive in BIOS

Step 3: Install MS DOS 6.2 from floppy disks onto the new disk drive

Step 4: Undo all the changes made during this lab; reboot Windows 98

Step 5: Clean up

Step 1: Disconnect the the existing hard disk drive from the Primary IDE; but, do not unscrew or remove the drive. You may re-use the IDE cable for your new drive.

Step 2: Get a second hard disk drive from your instructor and follow these steps:

2.1: Setting the drive jumper for Master

- *Verify the jumper settings for the second hard disk:* Each IDE channel can have only one master and one slave. Two masters, or two slaves, or one slave, on the same channel will not work. It must be master only or master plus slave.
- The new drive must be configured as a Master or Single drive. The side of the drive where the controller is visible (the printed circuit board side) will have a set of jumper pins with such markings as '**SP, CS, ...**'. (On newer drives, these jumpers are on the rear of the drive, not the bottom.) The printed label side should have a diagram indicating the proper jumper settings for a Master or Single drive. Use this information to set the jumpers appropriately for a Master (or Single).

2.2: Finding the drive geometry

- Look for the drive geometry values – Cylinder/Head/Sector or **C/H/S** info – on the outside case of the new hard drive and write them down. Look for a small table, with the markings **C/H/S**, which will provide this information for this model of drive. (You may not see this printed on all drives. You may need to refer to the BIOS drive auto-detection information to get the correct **C/H/S** values.)

Cylinders:_____ Heads:_____ Sectors:_____

2.3: Installing the new hard drive (as Master on the Primary IDE)

- a) Balance the drive on the power supply with a sheet of paper underneath.
- b) Use an IDE cable (perhaps the existing cable) to connect the new hard drive to the Primary IDE. Install the motherboard end first, and then plug the cable into the drive. Before you insert the IDE cable into a motherboard or drive interface, verify the cable orientation (pin 1 to pin 1). Forcing a cable onto an interface can damage it.
- c) Install the light-coloured four-wire Molex power connector onto the hard drive. The power connector will only fit in one direction. Ensure the orientation of the connector is correct before pushing it into the drive.

2.4: Verifying the hard drive installation:

- a) Ensure the IDE cable and power connector are securely attached to the hard drive.
- b) Ensure the IDE cable is properly attached to the motherboard, with pin 1 on the new hard drive connected to pin 1 on the Primary IDE interface.

2.5: Detecting the hard drive in the BIOS

- a) Do not put the case back on. Connect the power cord, keyboard, and display.
Remove your wrist strap. Switch on the power to the system.
- b) When the startup screen appears, press the DEL key, you should see the BIOS configuration screen.
- c) The easiest method to configure the drive is to use the *Autodetect* option in the BIOS. Find the configuration screen for the IDE interfaces. Select Autodetect for the Primary IDE interface, first device. The configuration details on Cylinders, Heads and Sectors should automatically appear when you autodetect the drive. *Write this information down* (above) if you haven't already.
- d) Once you've detected the geometry of the hard disk drive, configure the BIOS to boot from the floppy disk (drive A), so that you may install MS DOS from floppy disks.

Step 3: Configure the BIOS to boot your machine from the floppy disk ("A") first. Install MS DOS 6.2 on the hard disk drive using the three supplied floppy disks. Remove the floppy disks and reboot into MS DOS from the hard drive.

S-3. Instructor sign-off for geometry and MSDOS install: _____

Step 4: Putting things back the way they were

- a) Shut down and unplug your PC.
- b) Disconnect and remove the new hard drive. Return the drive to your instructor.
- c) Reconfigure the CDROM as a Slave device using the jumpers at the back and attach it back into position (where it came from) using the saved screws.
- d) Remove the second IDE cable and return it to your instructor. Reconnect the CDROM and the original hard disk drive to the Primary IDE using the same IDE cable. (The CDROM must be jumpered as Slave; the hard drive is Master on the Primary IDE.)
- e) Reboot, and ensure that the PC boots correctly to Win 98 and that the CDROM drive also works. Is the CDROM secure? Make sure no parts are left over!

S-4. Instructor sign-off for drive/cable return and Win98 reboot: _____

Step 5: Cleanup procedure:

- a) Shut down your PC and disconnect the AC and all peripherals.
- b) Return the extra hard disk and cables to your instructor (if you haven't done so).
- c) Wrap the keyboard's power cord; put it neatly on the shelf.
- d) Disconnect the power from the monitor.
- e) All cables on the desk should be neatly coiled.
- f) Push in the chair.
- g) Sign off with your instructor (five signatures, marked **S-1** through **S-5**) and make sure your attendance is marked.

Homework: Start looking for the answers to these questions in Chapter 1:

1. Your CPU at home runs at a clock speed of 2 GHz. Does it mean that it can execute 2 billion compute instructions per second. Explain why or why not. (p.8)
2. Name and describe the main characteristics of the von Neumann architecture. (p.31)
3. The von Neumann architecture, which is the basis for most digital computers today, suffers from the von Neumann bottleneck. What is it? Why is it a problem? (p.31)