Basic Computer Assembly Process -- rev. 7 1/5/08 (Xeon servers)

Hardware and Software Components

- PC-70 Aluminum PC case integrated power supply with 3 external 3.5-inch bays, 5 external 5.25-inch bays, and 6 internal 3.5-inch drive bays (contains power cord and mounting hardware)
- http://www.dansdata.com/pc70.htm (Lian Li premium server case – may be out of stock)
- Intel SE7500CW2SCSI dual Xeon motherboard with 512KB L2 cache, 400 MHz system bus, built-in ATI Rage XL video controller with 8 MB, four DIMM sockets for up to 4 GB of ECC DDR200/266 RAM, 2 Pro 100+ Ethernet RJ-45 connectors, floppy controller, IDE controller (for CD-ROM), 3 USB ports, 1 serial port, ribbon cables for SCSI, IDE hard drive, and floppy drive, 5 PCI slots (2 32-bit/33 MHz, 2 64-bit/64 MHz, 1 64-bit/100 MHz)
  http://www.intel.com/support/motherboards/server/se7500cw2/
- Intel Quick Start User Guide, CD with drivers and manuals in Adobe Acrobat PDF format
- Ultra 160 SCSI controller 64-bit/66 MHz PCI card (LSI Logic 53C1000 controller)
- Intel Xeon 2.4GHz processor and cooling fan (one per server)
- 18 GB SCSI hard drive (Western Digital)
- 32x CD-ROM with separate IDE cable
- 3.5-inch floppy drive
- 2 512 MB (or 2 256 MB) DDR200 registered EEC DIMM (install 2 same size per server)
- Keyboard with PS/2 style connector
- PS/2 mouse
- Windows XP Professional, Windows 2003 Server CDs
- Monitor – Dell Ultra 15” LCD

Documentation

- The Quick Start User Guide is packaged with the motherboard.
- To download drivers/BIOS from Intel:
  http://support.intel.com/support/motherboards/server/se7500cw2/
- Motherboard installation and use web site from Intel:
  http://support.intel.com/support/motherboards/server/se7500cw2/howto.htm
- There was an Installation Guide packaged with the case, but those documents might not be saved at your work site.
- Web site about building a PC: http://www.motherboards.org/articles/guides/924_1.html. Some of it is dated but lots of it is useful for those who have never tried to build a computer!

Assembly Steps

1. Open the motherboard box and carefully examine the components, including the documentation, motherboard, and cables. You should ground yourself by touching some metal frame where you are working. Only handle the motherboard by its edges. Examine the board itself, including the ports (serial, parallel, USB, keyboard, and mouse) at the
2. Locate the CPU ZIF socket closest to the corner of the motherboard. These are two white square devices with lots of pin holes. Unlock the locking arm by rotating it away from the board. Notice that the ZIF socket has two corners with a pin missing; orient the Xeon processor so that the corners with missing pins line up, and carefully drop it into the socket. **Do not force it into the socket.** When it lines up, slowly and carefully return the locking arm to its original position – it will make the electrical connection between the processor and the motherboard. **[Already done. Study the instructions.]**

3. Install the heat sink and cooling fan on top of the Xeon processor. **[Already installed – we have done this so often I am worried about parts breaking. Study the instructions instead.]**

4. Configure the core voltage and clock speed switches to match the CPU. (already done) Always double check these with a partner!

5. Insert the DIMM memory module vertically into the DIMM 1 slot. Carefully work it into place until the eject handles are vertical and locked into place. Always double-check these with a partner!

6. Set any other configuration switches and jumpers. **[This should not be necessary with these motherboards.]** Put the motherboard back into its anti-static wrapper and set it aside.

7. Open the case carton and remove the case. Put the plastic and foam inserts back into the box and put it aside. **[Case is already unpacked.]**

8. Remove the thumbscrews from the back of the case and remove the side panel for easy access to the interior of the case. Undo the twister holding the power cable and set it aside. Undo the twister holding the small multicolored cables coming from the front of the case.

9. Remove the rest of the outer case from the computer by removing the screws from the back panel. This gives you access to the other side of the drive cages.

10. Temporarily remove the motherboard mounting plate from the side of the computer, giving access to a screw holding the lower drive cage in place. Remove this screw and don’t replace it. Now reinstall the motherboard plate with its three screws. By doing this it will be possible later on to remove the lower drive cage (to replace or update your floppy or hard drive) without removing any more hardware. **[Ignore this step and the following four steps – the motherboard is already installed in your computer.]**

11. Open the hardware bag and remove the motherboard mounting hardware. You will need the brass spacers and the mounting screws and orange washers that attach the motherboard to the side of the case. Examine the screws -- there should be three different sizes. The smallest screws are drive mounting screws; the next larger size should fit into the brass spacers -- test fit them to see; the largest size are to hold the expansion cards in place or to use to attach the case cover. There will be several screws and brass spacers left over after the installation is complete.

12. Insert the 7 spacers into the motherboard plate, starting at the top with the two holes marked ATX. Test fit the motherboard in the case. Remember that it must be oriented so that the ports fit the openings in the back of the case. Make sure that the board is well supported on all four corners (and at some places on the interior of the board) and that it lies flat in the case. Make sure the front panel multicolored cables are free and not caught underneath the motherboard. When ready, screw in the brass standoff spacers **tightly into**
the motherboard plate. Fasten the motherboard with screws and the orange washers; use a loose fit until all 7 screws are threaded, then tighten but not overly tight. Make sure you insert the same amount of screws as the spacers; i.e.; make sure that neither spacer nor screw is left by itself touching the motherboard. This can lead to a short.

13. Connect the power supply to the motherboard at the ATX connector – there are two connectors, a rectangular one and a smaller red one. See guide for details.

14. Connect various front panel multicolored cables to the appropriate connectors at the front edge of the board. Connections include internal speaker, reset button, power switch, HDD LED, power LED, front USB, and so forth. Each cable connector has the purpose printed on it; you can find the proper headers in the documentation. Double-check these connections with a partner! **There is no place to plug in the Suspend switch cable so just put it aside.** Hint: You may need to reverse these connections when you finally start your computer since there is no sure way of telling which way of inserting the connectors is the right way.

15. Install hard drive and floppy drives above the swing-out drive bay. To open bay, remove small screw and slide retainer clips to left, then rotate the drive bay out. Retain the small screw! The floppy drive goes into the space where the case is open and the 3.5-inch hard drive goes next to it in a closed slot. Attach each drive with 4 small screws (2 per side) through the sides of the drives. (When mounting the hard drive, pay attention to the switches on the side that say Master, Slave and Cable Select. It should be set to default to Master, so don’t change any of the settings.)

16. Attach the white nylon power cable to the back of each drive and to the cable from the CPU cooling fan. The hard drive power connector is keyed, so make sure it is oriented in the proper direction. Remember that the floppy power connector is smaller than all the rest.

17. Attach the flat ribbon data cables from the motherboard box to the back of each disk drive. The floppy uses the narrow cable and the hard drive the wider one. The red stripe of the cable goes with pin 1 of the connector on the drive, usually closest to the power connector. Always double-check these with a partner! Note: the floppy data cable can be (incorrectly) inserted upside down, so check it.

18. Attach the other end of the flat ribbon cable to the IDE connector on the motherboard, again aligning the red stripe with pin 1. The floppy cable is obvious -- it goes in the narrower socket. The CDROM drive plugs into the primary IDE channel connector, IDE 1 closest to the front of the board. **CAUTION:** When connecting the IDE ribbon cable to the motherboard, do not apply too much pressure. You could possibly harm the board.

19. Repeat the process by installing the hard drive. **Carefully remove the face plate from the middle 5.25-inch slot of the case.** Then attach the small mounting screws to the sides of the drive, securing it in place. Attach the power supply to the drive and connect the extra SCSI flat ribbon cable to the back of the drive, aligning the red strip with pin 1, closest to the power connector.

20. Attach the monitor cable to the video card connector, and plug the monitor power into the wall outlet.

21. Take your SCSI card and note the position of the switches on the card. **Remove the slot cover from the middle PCI slots** (You want the 64-bit/100 MHz slot) Install the PCI card in that slot, screwing it down with the same screw into the slot cover rail. Retain the slot
cover you removed. Note: some cases may not have a removable slot cover there but rather a metal punch out. Be sure you are removing the correct punch out!

22. Before you reattach the covers, attach the mouse and the keyboard to the PS/2 connectors in the back of the case. At this time, double-check everything you have done so far.

23. Turn on the monitor. Attach the power supply cable at the back of the server case to the wall, and press the power button on the front. The system should come alive, and do a power on self-test (POST). **Troubleshooting: if your system doesn't power up (mine didn't) make sure that the power switch cable is placed on the proper posts.**

24. There are a few CMOS setup configuration things that must be done before the operating system is installed. To start setup during the POST (power-on self test) press the Del key when prompted. At the minimum, you must enter the standard CMOS settings including the date/time and the boot drive settings: set your computer to CD-ROM, A: C: boot order. You will learn more about the actual configuration in class or with a handout. **Do not set a supervisor or user password!** When finished, press Esc to return to the main menu. **Select Save & Exit Setup.**

25. Now it is time to reboot and install **Windows XP Professional** to test the equipment. Insert the Microsoft Windows XP Professional CD-ROM into the D: drive as your system reboots. After the POST your computer should read the CD-ROM and begin the process to install Windows.

26. You will need the Windows CD product key. Make sure you enter it carefully when asked -- it is easy to make a mistake with so many characters to enter. When you are asked for the computer name and company information, use the information given to you when you check out your parts. Leave the company name blank.

27. **After Windows 2000 Professional is installed, you should insert the CD that came with the motherboard box.**

28. We will work on Windows 2003 Server later in the semester. Enjoy Windows XP Professional for now.

**Computer Identification.** When the teams are established, you will be given a team number and a computer name. This is the same host name that will be used to give your server an entry in the host table when we install Windows 2003 Server later this semester. You should prepare note the small plastic tag on the front of your computer giving its host name and IP address when that is known later on.

Computers will be called: Mercury, Titan, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Gemini, Apollo, Orion, Voyager, and Pioneer. IP addresses for these machines are 139.102.31.xx where xx ranges from 31 for Mercury to 43 for Pioneer. These names are registered in the ISU DNS table – ping any of them and you should see its IP address return. If it is not on it will not respond to the Ping. You will enter this as a static IP address in Windows.

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