Chapter7 System Upgrading and Optimizing

- This chapter examines typical options and procedures for upgrading and improving the operation of existing computer systems. Devices in a PC compatible that are typically considered upgradeable components include microprocessors, RAM memory modules, the ROM BIOS, and hard disk drive units.
- upgrade portable computer systems include batteries, hard drives, PC cards, and RAM memory modules

SYSTEM BOARD UPGRADING

- upgrade the entire system board is usually done to bring faster microprocessors and memory units together with newer chipsets and faster front side buses and I/O connections.
- There are typically five serviceable components on the system board. These include the following:
- The microprocessor The RAM modules
- The CMOS Backup battery
- The ROM BIOS IC The cache memory
- Great care should be taken when exchanging these parts to avoid damage to the ICs from *electrostatic discharge (ESD).*

Upgrading Microprocessors

- Upgrading the processor is a fairly easy operation after gaining access to the system board. Simply remove the microprocessor from its socket and replace it with the upgrade.
- In older Pentium systems, such as Socket 7 system boards, you must configure the *Core Voltage*, *Bus Speed*, *and Bus Frequency Ratio configuration jumpers to the correct* settings for the processor being installed. These settings can be found in the system board's installation manual.

Four key items must be observed when changing the microprocessor:

- Make sure that the replacement microprocessor is hardware compatible (pin configuration, socket, or slot) with the original. otherwise, the system board will not support the new microprocessor type.
- Make certain to properly orient the new processor in the socket or slot so that its pin #1 (usually identified by a notch in one corner of the socket) matches the socket's/slot's pin #1.
- The system board must be configured correctly for the new processor type (manually or automatically).
- Verify that the existing BIOS can be upgraded to support the new microprocessor specifications.

Microprocessor Configuration

- Newer systems have the capability to auto-detect the proper configuration settings for the new microprocessor. These microprocessors exchange information with the system's PnP BIOS during the configuration portion of the boot procedure to obtain the optimum settings

Microprocessor Upgrade

Number	*Pins*	*Voltages*	*Microprocessors*
Socket 7	321 SPGA	VRM (2.5v-3.6v)	Pentium (75MHZ-200MHz)

Number	*Pins*	*Voltages*	*Microprocessors*
Socket 478	478 FC-PGA	VRM (1.5v/1.7v)	Pentium IV (1.4GHz-2.2GHz)
Socket 603	603 INT-PGA	VRM (1.5v/1.7v)	Pentium IV Xeon (1.4GHz-2.2GHz)

Microprocessor not have auto-detect function

- *you must make sure* that :
- The BIOS version will support the new processor.
- The Core Voltage, Bus Frequency, and Bus Ratio settings are properly configured for the new processor.

If these items are not set correctly, you might

- Burn up the new microprocessor
- Not get the system to start at all
- Encounter random errors during normal operations
- Fail to start the operating system
- Show an incorrect processor type or incorrect processor speed during the POST routines power on self test

Upgrading the BIOS

- If the microprocessor is upgraded, the BIOS should also be upgraded to support it.
- In newer system boards, this can be accomplished by *flashing (electrically altering) the information* in the BIOS
- Now the flash download operation can be conducted from the manufacturer's Web site.
- If the system BIOS doesn't support the new microprocessor, it will be necessary to obtain an updated BIOS IC that is compatible with the new processor .
- it is a good idea to make a backup copy of your BIOS settings on a floppy disk.

Upgrading Memory

- Normally, upgrading memory amounts to installing new memory modules in vacant SIMM or DIMM slots.
- When upgrading memory in a newer PC, you must be aware of the following concerns:
- The types of memory that can be installed on the existing system board.
- The makeup of the new modules (number and type of ICs on the modules).
- The speed rating of the memory module.

Upgrading Memory

- RAM and other memory devices are rated in access time rather than clock speed. Therefore, a 70 nS RAM device is faster than an 80-nS device.
- consult the manual to verify the types and arrangements of memory modules that can be used with the existing board.
- Finally, the guide should be checked for any memory configuration settings that must be made to accept the new memory capacity.
- Never mix memory types when upgrading a system board
- Upgrading the cache on these boards normally requires that additional cache ICs be installed in vacant sockets

HDD UPGRADING

- One guideline suggests that the drive should be replaced if the percentage of unused disk space drops below 20%.
- its capability to deliver information to the system efficiently
- If the system is constantly waiting for information from the hard drive, replacing it with a faster drive should be considered as an option.
- HDD speed can be optimized through software configurations, such as a disk cache.

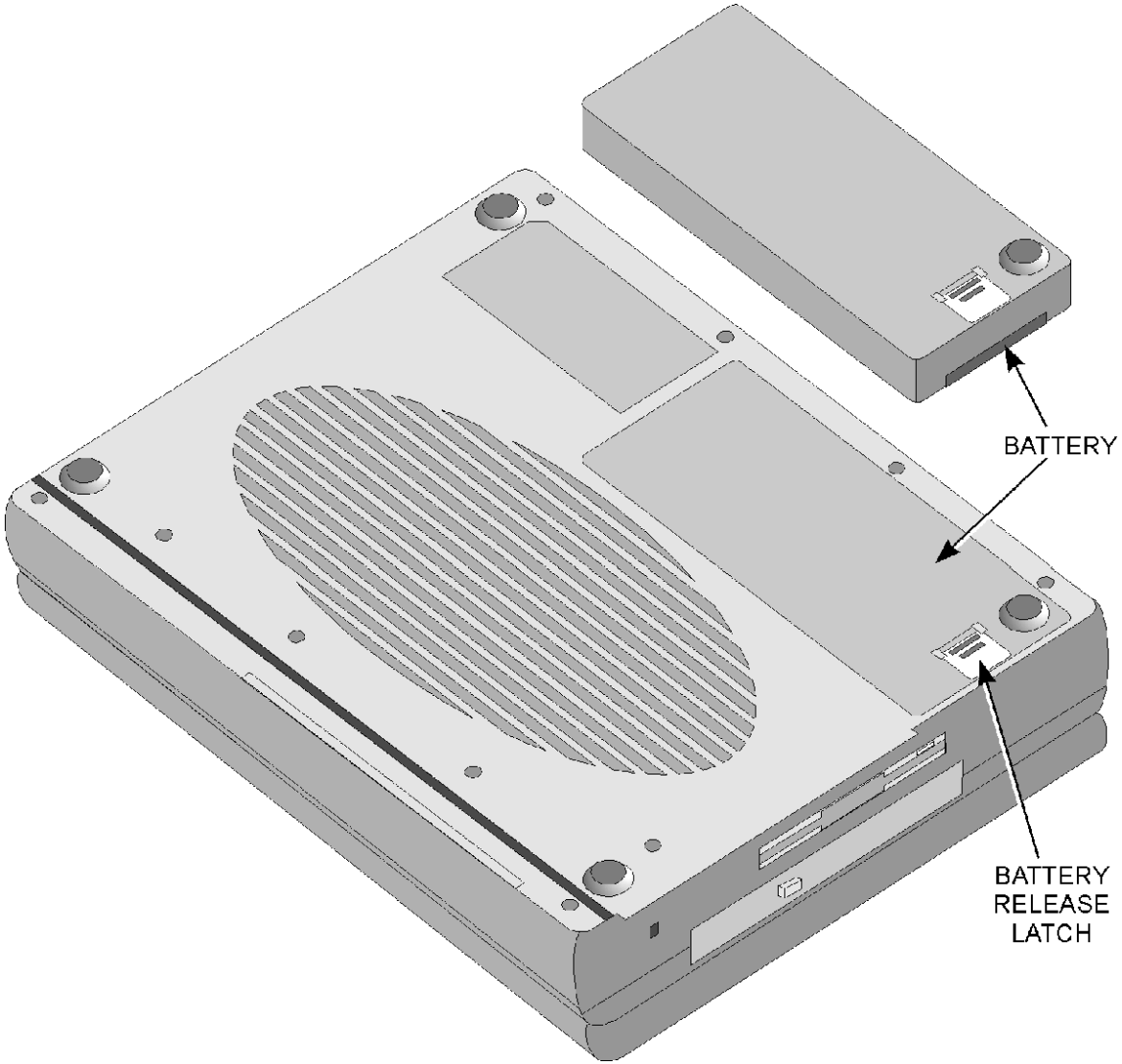
- Critical HDD specifications of performance include the following:
- *Access time—The average time, expressed in milliseconds,* required to position the drive's R/W heads over a specified track/cylinder and reach a specified sector on the track.
- *Track seek time—The amount of time required for the drive's* R/W heads to move between cylinders and settle over a particular track following the seek command being issued by the system.
- *Data transfer rate—The speed, expressed in megabytes per second* (Mbps), at which data is transferred between the system and the drive.

PORTABLE SYSTEM UPGRADING

Batteries

- normally contained rows of *Nickel Cadmium (Ni-Cad) batteries* wired together to provide the specified voltage and current capabilities for the portable. The housing was constructed to both hold the Ni-Cads and to attach to the portable case.
- Newer portable designs have switched to *nickel metal-hydride* (*NiMH), lithium-ion (Li-ion), or lithium-ion polymer batteries. These* batteries are often housed in a plastic case that can be installed inside the portable's case

Portable computer battery



Upgrading/Replacing Portable Drives

Three basic considerations should be observed when replacing disk drives in a portable computer:

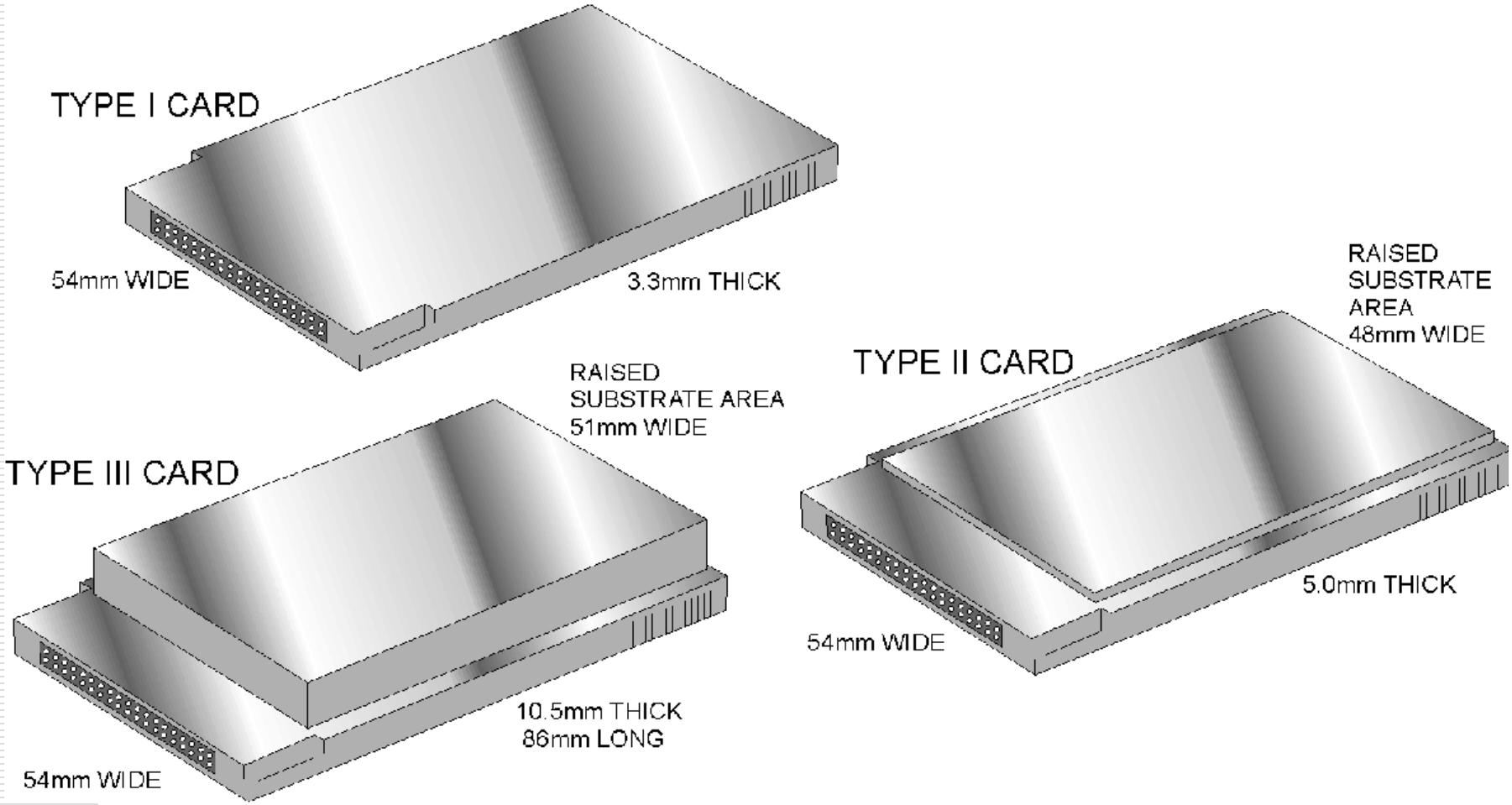
- Their physical size and layout
- Their power consumption
- Whether the BIOS supports the new drive or not

PC Cards

Three types of PCMCIA cards currently exist:

- Type I—The PCMCIA *Type I cards*, *are* 3.3mm thick and work as memory-expansion units.
- Type II—In 1991, *PCMCIA Type II cards were introduced.* They are 5mm thick (typically a modem or LAN card), except removable hard drive units.
- Type III—Currently, *PCMCIA Type III cards are being produced.* These cards are 10.5mm primarily for use with removable hard drives.

All three PC Card types employ a 68-pin



- Most portable designs only include two Type II–sized PC-Card slots
- These slots can physically accommodate two Type I or Type II cards, or a single Type III card.

Portable Memory

- Two standard SIMM or DIMM modules for RAM.
- if only the new RAM type is installed, the system could present a number of different symptoms, including
  - Not working at all
  - Giving beep coded error messages
  - Producing soft memory errors
  - Producing short memory counts in the POST
  - Locking up while booting the operating system

Small Outline DIMM (SODIMM) modules,