# How Companies Manufacture PCs

Although it's possible to set up a computer manufacturing center in your garage, most companies put a bit more planning into an assembly line than storing the motherboards with the garden equipment and the hard drives with parts for the lawnmower. According to the PC manufacturers we interviewed, a typical manufacturing facility may range from 75,000 to 200,000 square feet. And there typically are numerous system configurations being built at the same time in these facilities.

On these pages we've illustrated how a basic PC is built. For additional information on the building process, see "Producing The PC: How Manufacturers Turn A Pile Of Components Into Your Next Computer."

3 CD-ROM Drive

2 Hard Drive

RAM

1

Motherboard

CPU

6 Video Card
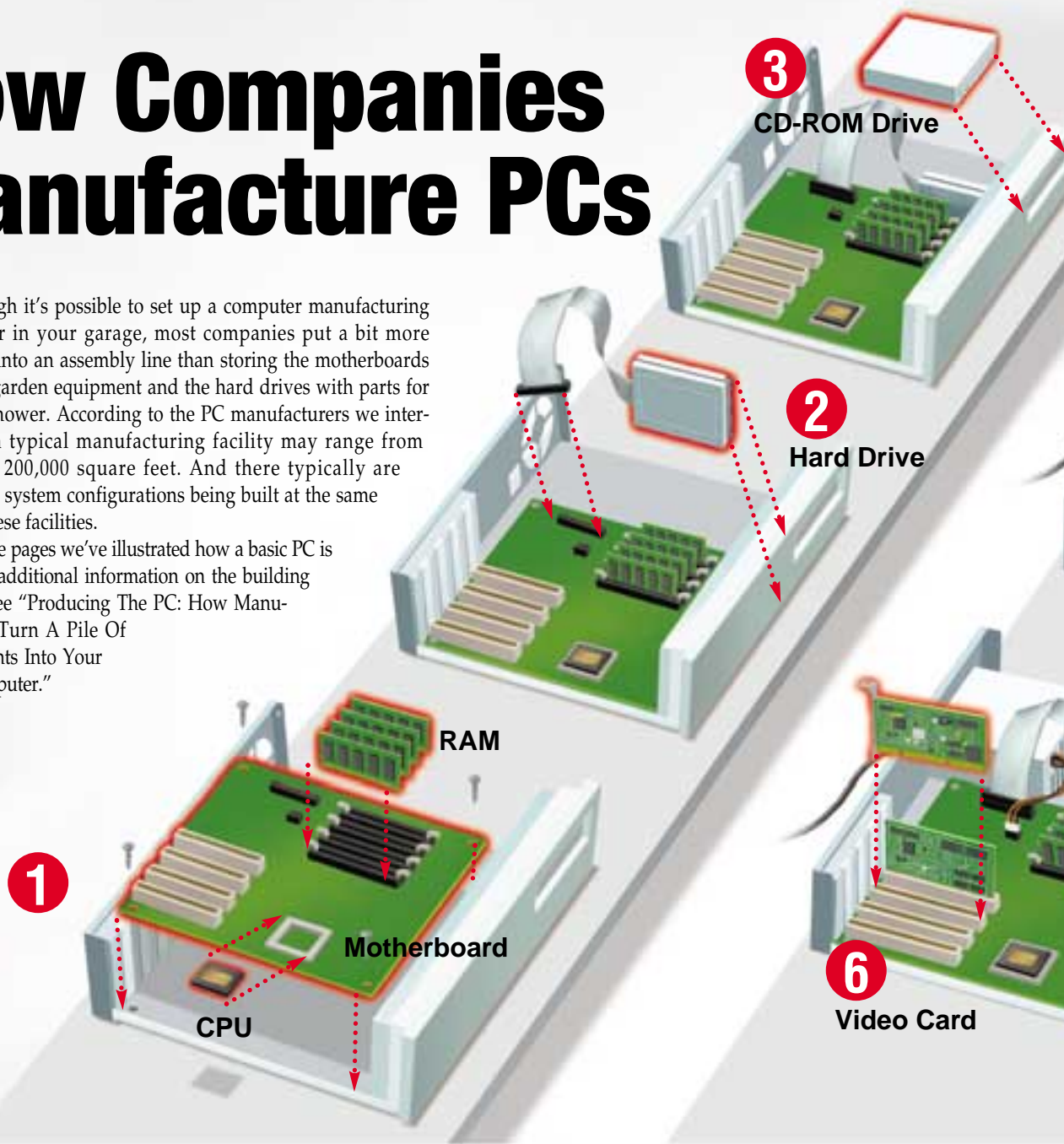
1 The first stage involves installing the motherboard in the case (shell) assembly. Workers inspect these parts, apply labels where necessary, set the CPU switch settings, and insert the CPU if it didn't ship preinstalled on the motherboard. They then place the RAM in the DIMM (dual in-line memory module) or SIMM (single in-line memory module) slots on the motherboard and install the internal speakers along with the sound card (if it isn't integrated).

2 Next, manufacturers place the hard drive into its appropriate bracket and attach it to the motherboard using IDE cables.

3 The CD-ROM drive or DVD-ROM drive is installed into the chassis. If the system will include a Zip drive or an additional CD-RW drive, those also are installed at this time.

4 Workers then attach the cables to the components and install and connect the power supply.
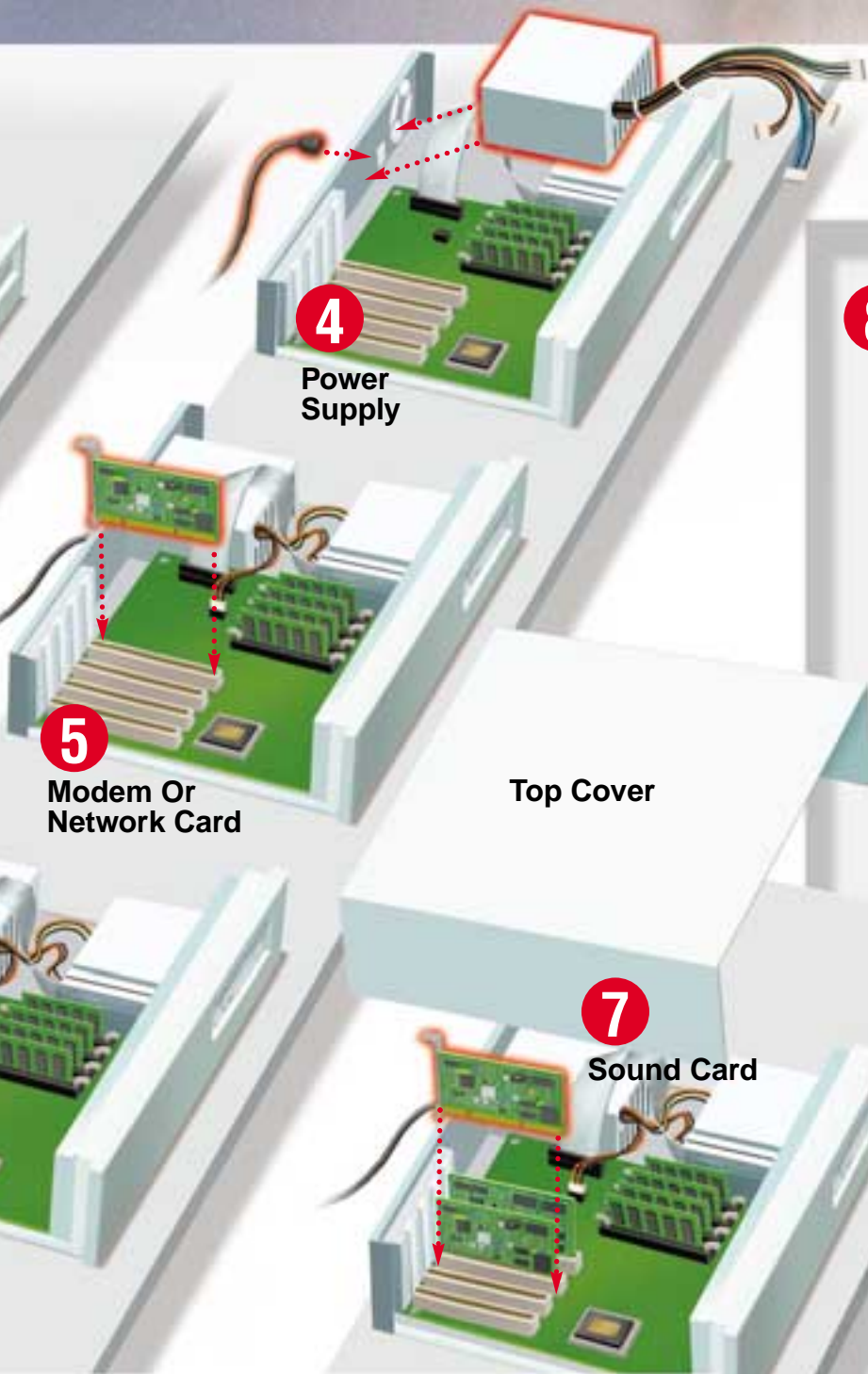
4

Power Supply

5

Modem Or Network Card

Top Cover

7

Sound Card

8 Once the main assembly is complete, it moves to a testing area where workers test the system, starting with a recheck of all the cables and components. Manufacturers examine the system for defects or scratches and to make certain all the assembly screws are secure. When the PC arrives in the testing area, the CMOS (complementary metal-oxide semiconductor) is set up, and all of the components are checked again.
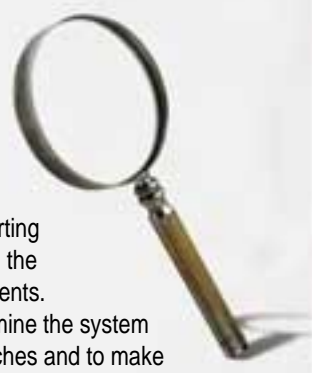
9 Next, the system is put through a burn-in period that may last between four and 48 hours. Workers manually test the PC to make certain all of the components work properly (for example, the CD-ROM drive and speakers work).

5 The modem or network card comes next. Both attach to the motherboard via a PCI (Peripheral Component Interconnect) slot.

6 If an additional video card is required, this is installed into an AGP (Accelerated Graphics Port) or PCI slot.

7 Any additional cards, such as a sound card or a SCSI (Small Computer System Interface) card, are attached to either PCI or ISA (Industry Standard Architecture) ports. Workers inspect the system before replacing the top cover.

10 The unit then goes to the warehouse distribution center where it may be randomly inspected. (About 5% of any configuration sample may be pulled for testing.) Once the system passes these tests, it is sent to the shipping area, where it's ready for distribution to the consumer.