Safety & Comfort Guide
User Guide

Introduction
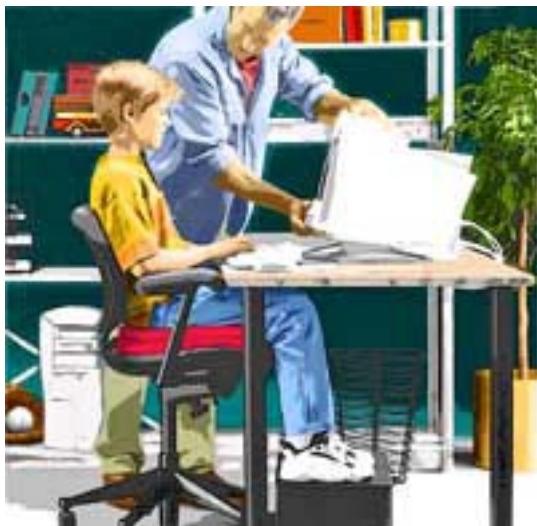
This guide describes proper workstation setup, posture, and health and work habits for computer users. In addition, this guide contains electrical and mechanical safety information applicable to all HP products.

Also available at http://www.hp.com/ergo.

WARNING

⚠ **WARNING!**   There may be a risk of serious physical injuries from working at your computer workstation. Read and follow the recommendations in this *Safety & Comfort Guide* to minimize the risk of injury and to increase your comfort.

Some studies have suggested that long periods of typing, improper workstation setup, incorrect work habits, stressful work conditions and relationships, or problems in your personal health may be linked to injuries. These injuries could include carpal tunnel syndrome, tendinitis, tenosynovitis, and other musculoskeletal disorders.

The warning signs of these disorders can occur in the hands, wrists, arms, shoulders, neck, or back, and can include:

- Numbness, burning, or tingling

- Soreness, aching, or tenderness

- Pain, throbbing, or swelling

- Tightness or stiffness

- Weakness or coldness

Symptoms may be felt during typing, while using a mouse, or at other times when no work with the hands is being performed, including during the night when these symptoms might awaken you. If you experience these symptoms, or any other persistent or recurring pain or discomfort that you think may be related to using a computer, you should promptly consult a qualified physician and, if available, your company's health and safety department. The earlier a problem is properly diagnosed and treated, the less chance there is that it will progress to a disabling condition.

The following pages describe proper workstation setup, posture, and health and work habits for computer users. In addition, this Guide contains product safety information applicable to all HP products.

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1   Promoting a safe and comfortable work environment

IMPORTANT

Some scientists believe that working intensely, or for a long time in uncomfortable or unnatural positions, may pose risks, such as those mentioned in the WARNING at the beginning of this Guide. The information included in this Guide is designed to help you work more safely by recommending ways to work more comfortably and effectively.

TIP

Self-check

After reviewing the information in this Guide, double-check your postures and habits using Your safety & comfort checklist on page 38.

Important choices

Whether you are an adult sharing a computer at work, or a student sharing a computer at school or at home, each time you sit down, adjust the environment to your needs. Adjust the tilt of your monitor, use a box as a footrest, a blanket on the seat to raise your chair height - whatever you need to adjust into your comfort zone.

Posture, lighting, furniture, work organization, and other work conditions and habits may affect the way you feel and how well you work. By adjusting your work environment and personal practices, you may

be able to minimize fatigue and discomfort, and reduce the risk of resulting strains that some scientists believe can lead to injury.

Whenever you use a computer, you make choices that can affect your comfort and potentially your safety. This is true whether you use a desktop keyboard and monitor in an office, notebook computer in a college dormitory, wireless keyboard on your lap, or handheld at the airport. In every case, you choose your working posture and your body's position relative to your computer, phone, reference books, and papers. You may also have some control over lighting and other factors.

Take action for safety & comfort

Many factors in our work environment determine whether we work efficiently and in a manner that promotes good health and safety. By considering, acting on, and periodically reevaluating the recommendations in this Guide, it is possible to create a safer, more comfortable, healthful, and efficient work environment.

Students and teachers

The recommendations in this Guide apply to students of all ages. Learning to adjust your work area and finding your comfort zone when you first learn to use a computer is a lot easier than trying to break incorrect work habits after years of computer use. Teachers, have your students work in teams to find inventive solutions when adjustable furniture designed for computer use is not available.

Key principles

To promote safety and comfort, follow these principles whenever you use your computer.

Adjust

- Adjust your body position and your work equipment.

- There is no one "right" position. Find your comfort zone, as described in this Guide, and when working at your computer, frequently adjust within this zone.

Move

- Vary your tasks so that you can move around; avoid sitting in one posture all day.

- Perform tasks that require walking.

Relax

- Build positive relationships at work and home. Relax and strive to reduce sources of stress.

- Stay aware of physical tension such as clenching your muscles and shrugging your shoulders.

- Take frequent, short breaks.

Listen

- Listen to your body.

- Pay attention to any tension, discomfort, or pain you may feel, and take immediate action to relieve it.

Remember

- Exercise regularly and maintain general fitness; this will help your body withstand the rigors of sedentary work.

- Respect any medical conditions you may have or other known health factors. Adjust your work habits to accommodate them.

2 Finding your comfort zone

A range of positions

AVOID!

- Do not sit in one fixed posture all day.

- Avoid slouching forward.

- Be sure not to lean back too far.

TIP

That afternoon slump

Pay particular attention to adjusting your posture in the afternoon when you may tend to get fatigued.

Vary your posture
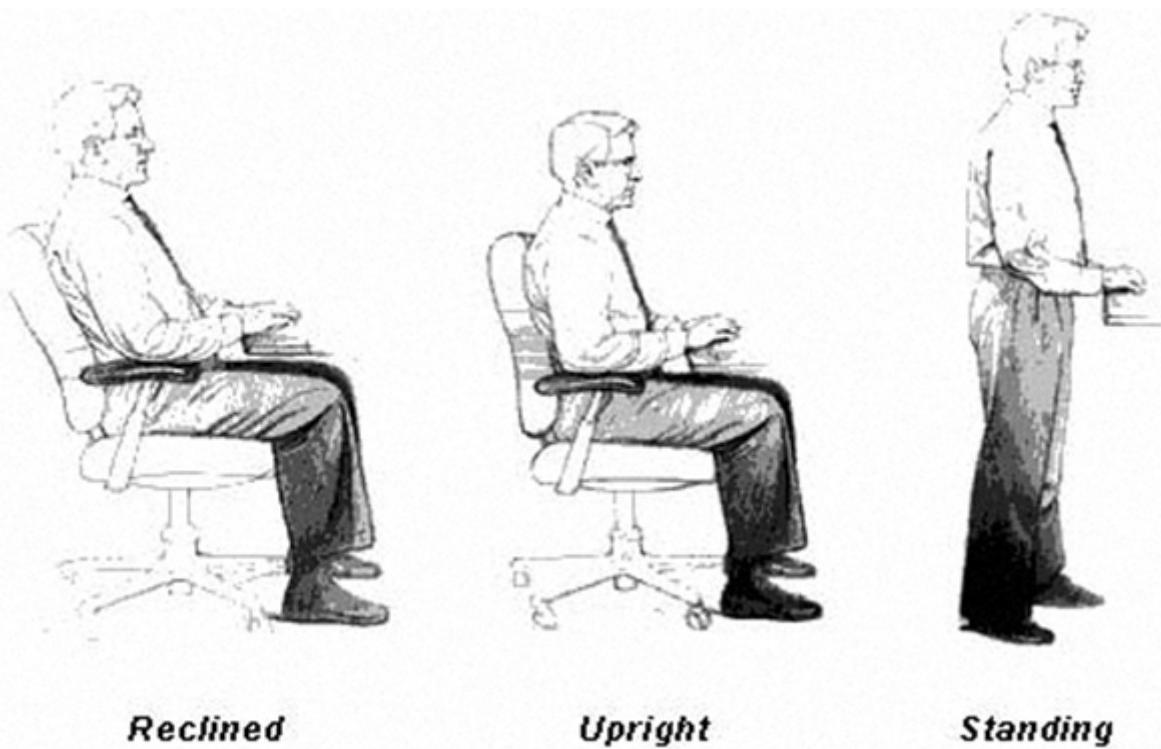
Reclined   **Upright**   **Standing**

Depending on your tasks, you may find a range of sitting and standing postures that are comfortable. Within your comfort zone, change postures often throughout the day.

Rather than working in a single posture, find your comfort zone. Your comfort zone is a range of positions that is generally appropriate and comfortable for your given work situation.

Move

Sitting still for long periods can cause discomfort and muscle fatigue. Changing postures is good for many parts of your body, including your spine, joints, muscles, and circulatory system.

- Within your comfort zone, change postures often throughout the day.

- Take frequent short breaks: stand up, carefully stretch, or walk around.

- Frequently switch to brief tasks that require getting up, such as retrieving output from a printer, filing paperwork, or consulting a colleague down the hall.

- If your furniture offers a wide range of adjustments, you might find it comfortable to switch back and forth between sitting and standing positions.

Different tasks, different postures

Your choice of posture within your comfort zone may vary with your task. For example, you may find a slightly reclined posture most comfortable for computer tasks, and a more upright posture more comfortable for tasks requiring frequent reference to papers or books.

Organizing your adjustments

The order in which you make various adjustments to your body position and work area may vary depending on the adjustability of your furniture. For tips on how to order your adjustments, refer to the Organizing your adjustments on page 35 section.

Feet, knees, and legs

AVOID!

Avoid placing boxes or other items under your desk that limit your leg room. You should be able to pull yourself all the way up to your desk without interference.

TIPS

- **Walk**

  Get up from your desk frequently and take brief walks.

- **Leg Comfort**

  Vary your leg positions throughout the day.

Make sure your feet can rest solidly and comfortably on the floor while sitting. Use an adjustable work surface and chair that allow your feet to rest firmly on the floor, or use a footrest. If you use a footrest, be sure it is wide enough to accommodate different leg positions within your comfort zone.

RIGHT

Rest your feet firmly on the floor or a footrest.

WRONG!

Do not dangle your feet and compress your thighs.

Providing enough leg room

Be sure you have sufficient space under your work surface for your knees and legs. Avoid concentrated pressure points along the underside of your thigh near the knee and the back side of your lower leg. Stretch your legs and vary your leg posture throughout the day.

Back

AVOID!

If you get a new adjustable chair, or if you share a chair with someone else, do not assume the settings are properly set for you.

TIP

Adjust often

If your chair is adjustable, experiment with the adjustments to find numerous comfortable positions, then adjust the chair frequently.

Use your chair to fully support your body. Distribute your weight evenly and use the entire seat and backrest to support your body. If your chair has adjustable low back support, match the contours of the chair's backrest to the natural curve of your lower spine.

RIGHT

Distribute your weight evenly and use the entire seat and backrest to support your body.

WRONG!

Do not slouch forward.

Getting comfortable

Always make sure your lower back is well-supported. Make sure it feels comfortable in the position in which you are working.

Shoulders and elbows

TIP

Relax

Remember to relax, particularly in areas where muscle tension often builds, such as your neck and shoulders.

To minimize muscle tension, your shoulders should be relaxed, not elevated or drooped (refer to the Supporting your forearms on page 21 section), and your elbows should be placed comfortably in relation to your keyboard height. Position your elbows in a zone that is near the height of your keyboard's home row (the row that includes the letter L). Some find it most comfortable to position their elbows slightly above the height of the home row and to set the keyboard slope to the lowest (most flat) position.

RIGHT

Turn your chair to the side to help determine if your elbow height is near the height of your keyboard's home row.

Forearms, wrists, and hands

AVOID!

Be sure not to rest your wrists on sharp edges.

TIPS

- **Split keyboards**

  If you find it difficult to type with a comfortable, neutral wrist position, you may want to try a split keyboard. Be aware, however, that improper setup or posture while using a split keyboard can increase marked bending in your wrists. So if you try using a split keyboard, set it up properly so your forearms, wrists, and hands are in a comfortable, neutral position.

- **Handhelds**

  The information in this section regarding comfortable, neutral forearm, wrist, and hand positions applies to users of handhelds as well, whether you are typing with a stylus or thumb keyboard.

While typing or using a pointing device, keep your forearms, wrists, and hands in their neutral comfort zone. You are the best judge of what feels comfortable to you. One way to find your comfort zone is to completely relax your arms, wrists, and hands at your sides and notice how they are positioned. When you lift them up to type, hold them at or near these same relative positions (their neutral comfort zone), avoiding bending your wrists markedly up, down, in or out to the sides, especially frequently or for long periods of time (refer to the Keyboard and pointing device on page 19 section). These recommendations apply wherever you are - in the office, at home, traveling - whether you are standing or sitting.

RIGHT

Maintain a comfortable, neutral wrist position.

WRONG!

Do not rest your palms or bend your wrists markedly down while typing.
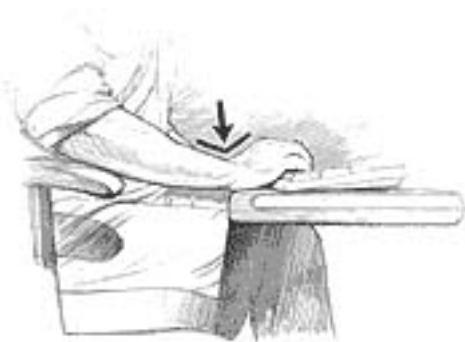
RIGHT

Maintain a comfortable, neutral wrist position.

WRONG!

Do not bend your wrists markedly inward.

Do not anchor your wrists

When typing, do not anchor or rest your wrists on your work surface, your thighs, or a palm rest (sometimes called a wrist rest). Resting your palms while typing may be harmful because it can cause you to bend and hold your wrists and fingers back. It can also apply pressure to the underside of your wrists. A palm rest is designed to provide support during pauses, when you are not typing (such as when you are reading from the screen).

Eyes

- **Think about your blink**

  While looking at your monitor, remember to blink. Although blinking your eyes is something you normally do without thinking, you may be blinking less often when using your computer (studies have indicated that, on average, people blink 1/3 as frequently at the computer). Blinking helps keep your eyes naturally protected and lubricated and helps prevent dryness, a common source of discomfort.

- **Eye Break**

  Give your eyes frequent rests by focusing them on a distant point.

Working at your computer for long periods can be a visually demanding task and may cause your eyes to become irritated and fatigued. Therefore, you should give special attention to vision care, including the following recommendations:

Resting your eyes

Give your eyes frequent breaks. Periodically look away from the monitor and focus at a distant point. This may also be a good time to stretch, breathe deeply, and relax.

Cleaning your monitor and glasses

Keep your display screen and your glasses or contact lenses clean. If you use a glare-reduction filter, clean it according to the manufacturer's directions.

Having your eyes examined

To be sure that your vision is adequately corrected, have your eyes examined regularly by a vision care specialist. If you wear bifocals, trifocals, or progressive addition lenses, you may find that you need to assume an awkward posture to use your glasses at the computer. Mention this to your vision specialist and consider having glasses prescribed that are specifically suited for working with a computer monitor. For more information, refer to the section.

3 Arranging your work area

Monitor

AVOID!

- If you look at the monitor more than you look at paper documents, avoid placing your monitor to the side.

- Avoid compromising your posture to compensate for glare or reflections.

- Try to avoid bright light sources in your field of vision. For example, do not face an uncovered window during daylight hours.

TIPS

- **Eye height**

  Your eye height will change considerably whether you use a reclining or upright posture, or some posture in between. Remember to adjust your monitor's height and tilt each time your eye height changes as you move through your comfort zone.

- **Adjusting brightness and contrast**

  Reduce the potential for eye discomfort by using brightness and contrast controls on your monitor to improve the quality of text and graphics.

- **Eliminating glare**

  Try positioning your monitor so that its side faces the windows.

You will reduce eye strain and muscle fatigue in your neck, shoulders, and upper back by properly positioning your monitor and adjusting its angle.

Positioning the monitor

You may find a range of monitor heights that allows your head to be balanced comfortably over your shoulders.

Place the monitor directly in front of you (refer to the Papers and books on page 23 section). To determine a comfortable viewing distance, stretch your arm toward the monitor and notice the location of your knuckles. Place your monitor near that location. If needed, move the monitor closer or farther away, until you can clearly and comfortably see the displayed text (refer to the Eyes on page 15 section).

Adjusting the monitor height

Your monitor position should allow your head to be balanced comfortably over your shoulders. It should not cause your neck to bend forward uncomfortably or backward to any degree. You may find it more comfortable to position the monitor so that the top line of text is just below your eye height. Your eyes should look slightly downward when viewing the middle of the screen.

Many computer designs allow you to place the monitor on top of the system unit. If this places the monitor too high, you may want to move the monitor to the desktop. On the other hand, if the monitor sits on your work surface and you feel any discomfort in your neck or upper back, the monitor may be too low. In that case, try using a block, book, or monitor stand to raise the monitor.

Tilting the monitor

Tilt the monitor so that it faces your eyes. In general, the monitor screen and your face should be parallel to each other. To check for correct monitor tilt, have someone hold a small mirror in the center of the viewing area. When sitting in your normal work posture, you should be able to see your eyes in the mirror.

Adjusting monitor height for bifocal, trifocal, and progressive addition lens users

If you wear bifocals, trifocals, or progressive addition lenses, it's especially important to properly adjust your monitor height. Avoid tilting your head back to view the screen through the lower portion of your glasses; this could lead to muscle fatigue in your neck and back. Instead, try lowering your monitor. If that does not work, you may want to consider obtaining glasses that are specially made for computer use.

WRONG!

If you wear bifocals, trifocals, or progressive addition lenses, do not position your monitor so high that you have to tilt your head back to view the screen.

Eliminating glare and reflections on your monitor

Take the time to eliminate glare and reflections. To control daylight, use blinds, shades, or drapes, or try other glare-reducing measures. Use indirect or reduced lighting to avoid bright spots on your display screen.

If glare is a problem, consider these actions:

- Move your monitor to a place where glare and bright reflections are eliminated.

- Turn off or reduce ceiling lights and use task lighting (one or more adjustable lamps) to illuminate your work.

- If you cannot control the ceiling lights, try positioning your monitor between rows of lights instead of directly beneath a row of lights.

- Attach a glare-reduction filter to your monitor.

- Place a visor on your monitor. This device may be as simple as a piece of cardboard extending out over the monitor's top front edge.

- Avoid tilting or swiveling your display in a way that leads to an uncomfortable head or upper back posture.

Keyboard and pointing device

TIPS

- **Switch hands**

  To give your pointing hand a break, you can periodically control your mouse or trackball with the opposite hand (using the device's software to switch the button assignments).

- **Listen to your body**

  Let your body be your guide when you place your keyboard and pointing device. Your shoulders should be relaxed, and your forearms, wrists, and hands should be in their neutral comfort zone.

Place your keyboard, mouse, and other input devices so that you can use them with your body in a relaxed, comfortable position. In this way, you do not have to reach or shrug your shoulders while working.

Positioning the keyboard

Position the keyboard directly in front of you to avoid twisting your neck and torso. This makes it possible to type with your shoulders relaxed and your upper arms hanging comfortably.

Adjusting the keyboard height and slope

Your elbow height should be near the height of your keyboard's home row (refer to Shoulders and elbows on page 12 section). Adjust your keyboard slope so that your forearms, wrists, and hands are in their neutral comfort zone. Some find it most comfortable to set the keyboard slope to the lowest (most flat) position, and to position their elbows slightly above the height of home row.

Aligning the mouse and keyboard

When using a mouse or detached trackball, position the device immediately to the right or left of your keyboard and close to the keyboard's front edge. Avoid positioning the device too far from the side of the keyboard or towards the keyboard's back edge, since these positions may cause you to markedly bend your wrists out to the sides or reach too far (refer to Pointing style on page 30 section).

You may also find it comfortable to position your mouse between your body and the keyboard's front edge-in this case, your desk needs to be deep enough to position your monitor and keyboard back so your forearms are fully supported on the work surface (refer to Supporting your forearms on page 21 section).

RIGHT

Position your pointing device immediately to the side of your keyboard and close to the keyboard's front edge.

WRONG!

Do not position your keyboard and pointing device at different levels and distances.

Using a keyboard tray comfortably

If you use a keyboard tray, make sure it is wide enough to accommodate your pointing device, such as a mouse or trackball. Otherwise, you will probably place the mouse on your desktop, higher and farther away than the keyboard. This will lead you to stretch forward repeatedly, and uncomfortably, to reach the mouse.

Arm supports and palm rest

AVOID!

Armrests should not cause you to:

- Elevate or droop your shoulders.

- Lean excessively onto one or both elbows.

- Extend your elbows out to the sides.

- Anchor your wrists, forearms, or elbows while typing.

- Markedly bend your wrists.

- Sit too far away from your keyboard or pointing device.

TIP

For pauses only

Palm rests should only be used during pauses, when you are not typing or not using your pointing device.

You may find that supports for your forearms or hands allow you to be more relaxed and comfortable.

Supporting your forearms

Some chairs provide padded areas for resting your arms. You may find it comfortable to support your forearms on these padded areas while typing, pointing, or pausing. If your work surface is deep enough, you also may find it comfortable to use your work surface as a support area (with your keyboard and monitor moved back to create a comfortable space for your forearms).

Chair or work surface forearm support is properly adjusted for typing when your shoulders are relaxed; each forearm is evenly supported and is still free to move while typing; and your wrists are in a comfortable, neutral position. The support is not adjusted properly if your shoulders are elevated or drooped; you feel pressure on one or both elbows; your elbows are extended out to your sides; your wrists, forearms, or elbows are anchored and fixed while typing; or your wrists are markedly bent.

RIGHT

Forearm supports are properly adjusted when your shoulders are relaxed, your forearms are supported (yet free to move while typing), and your wrists are in a comfortable, neutral position.

Another option is to use forearm supports only when pausing, allowing your forearms and hands to float freely while typing and pointing. In this case, the support is properly adjusted when it is slightly below your forearm typing position but close and available for pauses (such as when you are reading from the screen). Experiment with the height of your arm supports to find which approach is most comfortable for you. Let the comfort of your neck, shoulders, elbows, arms and wrists be your guide.

Using a palm rest

A palm rest (sometimes called a wrist rest) is designed to provide support during pauses, not during typing or pointing. While typing or while using a pointing device, keep your wrists free to move and not anchored or resting on a palm rest, the work surface, or your thighs. Resting your palms while typing may be harmful because it can cause you to bend and hold your wrists and fingers back. It can also apply pressure to the underside of your wrists. Refer to the section.

Papers and books

Select a work surface or surfaces that are large enough to hold the computer equipment and any additional items required for your work. To help minimize eye fatigue, position any materials to which you frequently refer at about the same viewing distance.

Minimizing your reach

Arrange your frequently used papers, books, or other items to minimize the distance you reach for them. If you frequently refer to books, papers, and writing materials, and if you use a keyboard tray, make sure the tray, when extended, doesn't cause you to lean forward or reach excessively. This can stress your shoulders and back. If you find that such stress occurs, you may want to consider a different type of work setup.

WRONG!

Do not arrange your work area in a way that causes you to repeatedly strain forward to see and reach frequently used items such as books, papers, or a phone.

Using a document holder

If you use a document holder, position it near the monitor at the same distance, height, and angle as the monitor. Positioning the holder in this way can increase your neck comfort as you refer back and forth between your papers and the display screen, by helping you keep your head balanced over your shoulders.

If your primary task is typing from paper documents, you may find it more comfortable to place your document holder directly in front of you and your monitor slightly to one side, or on a slant board between your monitor and keyboard. Consider this option only if you spend more time looking at the paper than at your monitor.

Phone

AVOID!

Avoid using an attachment for the phone receiver (a rubber or foam "shoulder rest" or "shoulder cradle") if it requires you to bend your neck to the side to cradle your phone between your ear and shoulder, especially for long phone calls.

TIP

Talking comfort

Keep your head balanced comfortably over your shoulders when talking on the phone, especially for long periods of time.

Cradling your phone between your ear and shoulder may lead to neck, shoulder, and back discomfort. If you use your phone a lot, try using a headset or positioning your phone so you pick it up with your non-dominant hand. This frees your dominant hand for note-taking.

When not in use, place the phone within easy reach.

RIGHT

Use a headset to free your hands and help you avoid uncomfortable positions.

WRONG!

Do not cradle your phone between your ear and shoulder.

4 Working in comfort

Using a notebook computer

TIPS

- **Notebook comfort**

  When you must work where proper seating or support may not be available, such as on airplanes or in wilderness areas, change your position often while working and take brief breaks more frequently.

- **Long periods of time**

  You may find it more comfortable to use a separate monitor, or to lift your notebook computer with a book or block while using an external keyboard and pointing device. These options give you a wider range of viewing distance and height options, which is especially important when working on your notebook computer for long periods of time.

The following strategies are intended to help you maintain comfort when using a notebook computer.

On the road

In a hotel room, use a blanket for padding your chair and a rolled towel as an inventive way to support your lower back area.

Seeking comfort

When working with a notebook computer, keep your shoulders and neck relaxed and your head balanced over your shoulders. If you must work with your notebook computer on your lap, place a support surface (your briefcase, a bed table, or a large book) under the computer. This will also raise the computer and may improve comfort.

⚠ **WARNING!**   To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Being inventive

Use pillows, blankets, towels, books, and blocks to:

- Raise the height of your seat.

- Create a footrest, if needed.

- Support your back.

- Raise your computer to elevate the display (while using a separate keyboard and pointing device).

- Provide arm supports, if you are working on a couch or bed.

- Provide padding wherever needed.

Transporting the computer

If you load up your carrying case with accessories and papers, avoid shoulder strain by using a cart or a carrying case with built-in wheels.

Typing style

AVOID!

Avoid banging on the keys or using more force than the keys require.

TIPS

● **Keep it light**

If your typing is on the heavy side, teach yourself to lighten up. Press the keys more gently.

● **"Hunt-and-peck" typing**

Non-touch-typing causes the neck to bend forward. Learn how to touch-type so you do not need to look down at the keyboard as often.

Observe your typing style and notice how you use your fingers and hands. Avoid keeping any unnecessary tension in your thumbs and fingers. Observe whether you have a heavy touch or a light touch while typing. Use the minimum amount of force needed to depress the keys.

RIGHT

Relax all of your fingers while typing and pointing; notice and release excess tension. This sounds simple, but it may take repeated effort and attention to turn this into a good habit.

WRONG!

Do not hold unnecessary tension in any of your fingers - including those not touching keys or the pointing device, as well as those actively typing or pointing.

Reaching for keys and key combinations

To reach keys that are not near your keyboard's home row, move your whole arm; avoid overstretching your fingers. When pressing two keys simultaneously, such as Ctrl+C or Alt+F, use two hands instead of contorting your hand and fingers to reach both keys.

Pointing style

AVOID!

Avoid gripping or pinching your mouse tightly.

TIPS

- **Pointing comfort**

  When using a mouse, trackball, or other pointing device, hold it loosely and click the buttons using a light touch. Keep your hand and fingers relaxed at all times - whether actively using or merely placing your hand on the device while pausing. For longer pauses, let it go and relax your hands and fingers.

- **Switch hands**

  To give your hand a break, you may choose to control your mouse or trackball with the opposite hand for awhile.

Use your whole arm and shoulder to move the mouse, not just your wrist. Do not rest or anchor your wrist while using your pointing device; keep your wrist, arm, and shoulder free to move.

RIGHT

Keep your wrist in a comfortable, neutral position and your pointing device aligned with your forearm.

WRONG!

Do not move your pointing device too far from the keyboard because it can cause you to markedly bend your wrist to the side.

Adjusting software controls

You can use the software control panel to adjust the properties of your pointing device. For example, to reduce or eliminate mouse-lifting, try increasing the cursor speed or acceleration settings. If you use a pointing device with your left hand, the software control panel will allow you to switch the button assignments for maximum comfort.

Clean frequently

Dirt can affect the performance of your pointing device, make pointing more difficult. Remember to clean your mouse or trackball frequently. An optical mouse or trackball has no moving parts on the underside, so it may not require cleaning as frequently.

Using a keyboard on a sofa or bed

AVOID!

When using a keyboard on a bed or sofa:

- Avoid reclining too far or slouching forward over your outstretched legs.

- Avoid sitting completely still and working without breaks for long periods.

TIP

Back comfort

On a sofa, chair, or bed, it is especially important to support your whole back. Be inventive and use blankets, towels, or pillows.

Even if you use your keyboard in a seemingly comfortable place such as a sofa, bed, or your favorite lounge chair, you can still experience discomfort by sitting in an awkward position or in one position for too long.

Be aware of your forearms, wrists, and hands

When working with a keyboard on your lap, sofa, or bed, be especially attentive to keeping your forearms, wrists, and hands in their neutral comfort zone. Avoid markedly bending your wrists up, down, in or out to the sides, especially frequently or for long periods of time.

RIGHT

Experiment with positioning pillows under your forearms; they may help keep your shoulders relaxed and your wrists in a comfortable, neutral position.

Taking breaks and varying your tasks

AVOID!

"Binge computing"

When working on a deadline that is near at hand-for example, when cranking out a report for work or for a class assignment - avoid "binge computing," working intensely for long periods of time without a break. It's during these times you should be especially mindful of tension in your body and taking frequent breaks. Switching from your work task to playing computer games is **not** a break for your body!

TIP

Try it and see

Contrary to what some may believe, several studies have found that *productivity does NOT decline when frequent, short breaks are added to the day*.

As noted earlier in this Guide, your furniture placement, office equipment, and lighting are only a few of the factors that determine comfort. Your work habits are also very important. Remember the following advice:

Take breaks

When you work at your computer for long periods, take short breaks at least once per hour and preferably more often. You may find that frequent, short breaks will benefit you more than fewer, longer breaks.

If you find that you forget to take breaks, use a timer or specialized software. Several software tools are available that remind you to take breaks at intervals you specify.

During your breaks, stand up and stretch, especially any muscles and joints you may have held in an extended static posture while using the computer.

Vary your tasks

Examine your work habits and the types of tasks you perform. Break up the routine and try to vary your tasks during the day. By doing so, you may avoid sitting in one position or performing the same activities continuously for several hours using your hands, arms, shoulders, neck, or back. For example, for variety, print out your work to proofread rather than proofing from your monitor.

Reduce sources of stress

Take an inventory of things at work that are stressful to you. If you perceive that your physical or psychological health is being affected, take time to evaluate what changes you can make to reduce or eliminate the sources of stress.

Breathe deeply

Breathe fresh air deeply and regularly. The intense mental concentration that may accompany computer use may tend to cause breath-holding or shallow breathing.

Monitoring your health habits and exercise

The comfort and safety of working at your computer can be affected by your general state of health. Studies have shown that a variety of health conditions may increase the risk of discomfort, muscle and joint disorders, or injuries.

These preexisting conditions include:

- Hereditary factors

- Arthritis and other connective tissue disorders

- Diabetes and other endocrine disorders

- Thyroid conditions

- Vascular disorders

- Generally poor physical condition and dietary habits or injuries, traumas, and musculoskeletal disorders

- Excessive weight

- Stress

- Smoking

- Pregnancy, menopause, and other conditions affecting hormone levels and water retention

- Advancing age

Monitoring personal tolerance levels and limits

Different users of computers have different levels of tolerance for intensive work over a long period. Monitor your personal tolerance levels and avoid regularly exceeding them.

If any of the listed health conditions apply to you, it is particularly important to know and monitor your personal limits.

Cultivating health and fitness

Additionally, your overall health and tolerance for the rigors of work typically can be improved by avoiding adverse health conditions and by exercising regularly to improve and maintain your physical fitness.

5 Organizing your adjustments

TIP

Be inventive

Adjustable furniture designed for computer use may not always be available. However, you can use towels, pillows, blankets, and books in many ways, such as to:

- Raise the height of your chair.

- Create a footrest.

- Support your back.

- Elevate the keyboard or display.

- Provide armrests if you are working on a couch or bed.

- Provide padding wherever needed.

The order in which you follow the advice in the previous sections depends on the adjustability of your work surface.

- If your work surface height adjusts, then systematically adjust yourself and your computer "from the ground up."

- If you have a fixed desk or table, systematically adjust yourself and your computer "from the top down."

From the ground up

1. Seat height: you should be able to plant your feet firmly on the floor.

2. Chair back angles and lower back support: your back should be well supported.

3. Keyboard height: home row should be near your elbow height.

4. Keyboard slope: wrists should be in a comfortable, neutral position.

5. Pointing device: should be placed to the immediate left or right of your keyboard.

6. Optional forearm support: shoulders should be relaxed and forearms evenly supported.

7. Monitor distance, height, and angle: should allow your head to be balanced comfortably over your shoulders.

8. Document holder, phone, and reference materials: frequently used items should be within easy reach.

From the top down

1. Seat height: elbow height should be near your keyboard's home row.

2. Footrest, if you need one.

3. Support your back.

4. Follow steps 2 through 8, in the previous section.

6   Your safety & comfort checklist

TIPS

- **Double-check**

  Periodically double-check your postures and habits using this checklist. If you've forgotten a tip or two, reread the previous sections of this guide.

- **Listen to your body**

  Any time you make changes to your tasks, work area, or posture, "listen" to your body. Its signals of comfort or discomfort will help you know whether your adjustments are right.

To increase your comfort and reduce potential safety risks, use this checklist to help you evaluate your work posture and habits.

Seated position

- Have you found a range of seated postures that are most comfortable for you?

- Are you changing postures within your "comfort zone" throughout the day, especially in the afternoon?

- Are your feet firmly planted?

- Are the undersides of your thighs near your knees free of pressure?

- Are the backs of your lower legs free of pressure?

- Is there sufficient space under your work surface for your knees and legs?

- Is your lower back supported?

Shoulders, arms, wrists, and hands

- Are your shoulders relaxed?

- Are your hands, wrists, and forearms in their neutral comfort zone?

- If you use arm supports, are they adjusted so that your shoulders are relaxed and your wrists are in a comfortable, neutral position?

- Are your elbows in a zone that is near the height of your keyboard's home row?

- Do you avoid resting your hands and wrists while typing or pointing?

- Do you avoid resting your hands and wrists on sharp edges?

- Do you avoid cradling the phone between your ear and shoulder?

- Are items you use frequently, such as your phone and reference materials, easy to reach?

Eyes

- Do you rest your eyes frequently by focusing on a distant point?

- Do you get your eyes examined regularly by a vision care specialist?

- Do you blink enough?

- If you wear bifocals, trifocals, or progressive addition lenses, do you avoid tilting your head back to see the monitor?

- Have you considered having glasses prescribed that are specially suited for working with a computer monitor to avoid awkward postures?

Typing style

- Are you training yourself to lighten up when you find you are pounding on the keys?

- If you are not a touch typist, have you been taking typing lessons?

- Are you training your fingers to relax when you find them tense, including those not touching the keys and pointing device, as well as those actively typing and pointing?

- Do you use your whole arm to reach for keys not located near the home row?

Keyboard and pointing device

- Is your keyboard positioned directly in front of you?

- Are your keyboard height and slope adjusted so that your wrists are in a comfortable, neutral position and your shoulders relaxed?

- If you are typing with the keyboard on your lap, are your shoulders relaxed and your wrists in a comfortable, neutral position?

- If you are using a mouse or detached trackball, is it placed to the immediate right, left, or directly in front of your keyboard?

- If you are using a pointing device, are you holding it loosely, with a relaxed hand?

- Do you let go of your pointing device when you are not using it?

- Are you using a light touch when you click the buttons on your pointing device trackball, touchpad, or pointing stick?

- Are you cleaning your mouse or trackball frequently?

Monitor

- Is your monitor positioned in front of you and at a comfortable viewing distance, about arm's length? Or if you look at a paper document more than your monitor, is your document holder in front of you with your monitor to one side?

- Have you eliminated glare and bright reflections on your monitor, without compromising your posture?

- Is your monitor's entire viewing area located just below your eye height?

- Is your monitor tilted so your face and the monitor are parallel?

- Have you adjusted the brightness and contrast controls to improve the quality of text and graphics?

- Is your document holder positioned near the monitor, at the same distance, height, and angle as the monitor?

Notebook computer

- Do you change postures frequently, seeking a balance between relaxed shoulders and a comfortable neck posture?

- Do you avoid resting your wrists on your thighs while typing?

- When using a keyboard on a couch or bed, do you avoid reclining too far to avoid neck fatigue?

- When computing for long periods, have you tried lifting your notebook computer with a block or book and using an external keyboard and pointing device?

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

General prevention

- Do you take breaks and walk around briefly, at least once per hour?

- Do you exercise regularly?

- Periodically, do you take inventory of the stress in your life and change what is within your control to change?

- If you experience any symptoms that you think may relate to your using a computer, whether you experience them during work or at other times, have you consulted a doctor and, if available, your company's health and safety department?

7 Electrical and mechanical safety information

HP products are designed to operate safely when installed and used according to the product instructions and general safety practices. The guidelines included in this section explain the potential risks associated with computer operation and provide important safety practices designed to minimize these risks. By carefully following the information contained in this section and the specific instructions provided with your product, you can protect yourself from hazards and create a safer computer work environment.

HP products are designed and tested to meet IEC 60950, the Standard for the Safety of Information Technology Equipment. This is the International Electrotechnical Commission's safety standard covering the type of equipment that HP manufactures. This also covers the national implementation of IEC 60950 based safety standards around the world.

This section provides information on the following topics:

● Product safety policy

● Product installation requirements

● General safety precautions for all HP products

If you have a serious concern regarding the safe use of your equipment that your service partner cannot address, call HP Customer Support for your area.

Product safety policy and general practice

HP products operate safely when used according to their marked electrical ratings and product usage instructions. They should always be used in accordance with the requirements of local and regional building and wiring codes intended for the safe use of IT equipment.

The IEC 60950 standards provide general safety design requirements that reduce the risk of personal injury to both the computer user and the service partner. These standards reduce the risk of injury from the following hazards:

- **Electric shock**

  Hazardous voltage levels contained in parts of the product

- **Fire**

  Overloads, temperature, material flammability

- **Mechanical**

  Sharp edges, moving parts, instability

- **Energy**

  Circuits with high energy levels (240 volt amperes) or potential as burn hazards

- **Heat**

  Accessible parts of the product at high temperatures

- **Chemical**

  Chemical fumes and vapors

- **Radiation**

  Noise, ionizing, laser, ultrasonic waves

Installation requirements

HP products operate safely when used according to their marked electrical ratings and product usage instructions. They should always be used in accordance with the requirements of local and regional building and wiring codes intended for the safe use of IT equipment.

IMPORTANT: HP products are intended for use in dry or sheltered environments unless otherwise stated in the product information. Do not use HP products in areas classified as hazardous locations. Such areas include patient care areas of medical and dental facilities, oxygen-laden environments, or industrial facilities. Contact your local electrical authority governing building construction, maintenance, or safety for more information regarding the installation of any product.

For more information, please consult the information, manuals, and literature provided with your product or contact your local sales representative.

General precautions for HP products

Retain the safety and operating instructions provided with the product for future reference. Follow all operating and usage instructions. Observe all warnings on the product and in the operating instructions.

To reduce the risk of fire, bodily injury, and damage to the equipment, observe the following precautions.

Damage requiring service

Unplug the product from the electrical outlet and take the product to a service partner under the following conditions:

- The power cord, extension cord, or plug is damaged.
- Liquid has been spilled or an object has fallen into the product.
- The product has been exposed to water.
- The product has been dropped or damaged in any way.
- There are noticeable signs of overheating.
- The product does not operate normally when you follow the operating instructions.

Servicing

Except as explained elsewhere in the HP documentation, do not service any HP product yourself. Opening or removing covers that are marked with warning symbols or labels may expose you to electric shock. Service needed on components inside these compartments should be done by a service partner.

Mounting accessories

Do not use the product on an unstable table, cart, stand, tripod, or bracket. The product may fall, causing serious bodily injury and serious damage to the product. Use only with a table, cart, stand, tripod, or bracket recommended by HP, or sold with the product.

Ventilation

Slots and openings in the product are provided for ventilation and should never be blocked or covered, since these ensure reliable operation of the product and protect it from overheating. The openings should never be blocked by placing the product on a bed, sofa, carpet, or other similar, flexible surface. The product should not be placed in a built-in apparatus such as a bookcase or rack unless the apparatus has been specifically designed to accommodate the product, proper ventilation is provided for the product, and the product instructions have been followed.

Water and moisture

Do not use the product in a wet location.

Grounded (earthed) products

Some products are equipped with a three-wire electrical grounding-type plug that has a third pin for grounding. This plug only fits into a grounded electrical outlet. This is a safety feature. Do not defeat the safety purpose of the grounding-type plug by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact your electrician to replace the obsolete outlet.

Power sources

The product should be operated only from the type of power source indicated on the product's electrical ratings label. If you have questions about the type of power source to use, contact your service partner or local power company. For a product that operates from battery power or other power sources, the operating instructions are included with the product.

Accessibility

Be sure that the power outlet you plug the power cord into is easily accessible and located as close to the equipment operator as possible. When you need to disconnect power to the equipment, be sure to unplug the power cord from the electrical outlet.

Voltage select switch

Ensure that the voltage select switch, if provided on the product, is in the correct position for the type of voltage in your country (115 VAC or 230 VAC).

Internal battery

Your computer may contain an internal battery-powered real-time clock circuit. Do not attempt to recharge the battery, disassemble it, immerse it in water, or dispose of it in fire. Replacement should be done by a service partner using the HP replacement part for the computer.

Power cords

If you have not been provided with a power cord for your computer or for any AC-powered option intended for use with your computer, you should purchase a power cord that is approved for use in your country.

The power cord must be properly rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 0.75 mm^2 /18AWG and the cord should be between 5 and 8 feet (1.5 and 2.5 meters) long. If you have questions about the type of power cord to use, contact your service partner.

Protective attachment plug

In some countries, the product cord set may be equipped with a wall plug having overload protection. This is a safety feature. If the plug needs to be replaced, be sure the service partner uses a replacement plug specified by the manufacturer as having the same overload protection as the original plug.

Extension cord

If an extension cord or power strip is used, make sure that the cord or strip is rated for the product and that the total ampere ratings of all products plugged into the extension cord or power strip do not exceed 80% of the extension cord or strip ampere rating limit.

Overloading

Do not overload an electrical outlet, power strip, or convenience receptacle. The overall system load must not exceed 80% of the branch circuit rating. If power strips are used, the load should not exceed 80% of the power strip input rating.

Cleaning

Unplug the product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

Heat

The product should be placed away from radiators, heat registers, stoves, or other pieces of equipment (including amplifiers) that produce heat.

Circulation and cooling

Allow sufficient air circulation around the computer and the AC adapter during use and while charging the battery to ensure adequate cooling of the device. Prevent direct exposure to radiant heat sources.

Replacement parts

When replacement parts are required, be sure the service partner uses replacement parts specified by HP.

Safety check

Upon completion of any service or repairs to the product, have your service partner perform any safety checks required by the repair procedure or by local codes to determine that the product is in proper operating condition.

Options and upgrades

Use only the options and upgrades recommended by HP.

Hot surfaces

Allow the equipment's internal components and hot-pluggable drives to cool before touching them.

Object entry

Never push a foreign object through an opening in the product.

Precautions for portable computer products

In addition to the general precautions described earlier, be sure to observe the following precautions when operating a portable computer product. Failure to observe these precautions could result in fire, bodily injury, and damage to the equipment.

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Monitor support cover

Do not place a monitor with an unstable base or a monitor heavier than the marked weight rating on top of a monitor support cover or stand. Heavier monitors should be placed on a work surface next to the docking base.

Rechargeable battery pack

Do not crush, puncture, or incinerate the battery pack or short the metal contacts. In addition, do not attempt to open or service the battery pack.

Docking base

To avoid pinching your fingers, do not touch the rear of the computer when docking it into a base.

Precautions for server and network products

In addition to the general precautions described earlier, be sure to observe the following precautions when operating server and network products. Failure to observe these precautions could result in fire, bodily injury, and damage to the equipment.

Safety interlocks and enclosures

To prevent access to areas containing hazardous energy levels, some servers are provided with safety interlocks that disable the power supply when the enclosure cover is removed. For servers provided with safety interlocks, observe the following precautions:

- Do not remove enclosure covers or attempt to defeat the safety interlocks.

- Do not attempt to repair accessories and options inside interlocked areas of the system while operating. Repair should be performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

Accessories and options

Installation of accessories and options in safety interlocked areas should performed only by individuals who are qualified in servicing computer equipment and trained to deal with products capable of producing hazardous energy levels.

Products with casters

Products provided with casters should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product to overturn.

Floor-standing products

Be sure the bottom stabilizers on the equipment are installed and fully extended. Ensure that the equipment is properly stabilized and supported before installing options and cards.

Rack-mountable products

Because the rack allows you to stack computer components vertically, you must take precautions to provide for rack stability and safety:

- Do not move large racks by yourself. Due to the height and weight of the rack, HP recommends a minimum of two people to accomplish this task.

- Re working on the rack, be sure the leveling jacks (feet) extend to the floor and that the full weight of the rack rests on the floor. Also install stabilizing feet on a single rack or join multiple racks together before starting work.

- Always load the rack from the bottom up, and load the heaviest item in the rack first. This makes the rack bottom-heavy and helps prevent the rack from becoming unstable.

- Ensure that the rack is level and stable before extending a component from the rack.

- Extend only one component at a time. The rack may become unstable if more than one component is extended.

- Use caution when pressing the component rail release latches and sliding a component into the rack. The slide rails could pinch your fingers.

- Do not extend the components from the rack too quickly as the moving weight may damage the supporting rails.

- Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80% of the branch circuit rating.

Precautions for products with hot-pluggable power supplies

Observe the following guidelines when connecting and disconnecting power to the power supplies:

- Install the power supply before connecting the power cord to the power supply.

- Unplug the power cord before removing the power supply from the server.

- If the system has multiple sources of power, disconnect power from the system by unplugging all power cords from the power supplies.

Precautions for products with external television antenna connectors

In addition to the general precautions described earlier, be sure to observe the following precautions when using external television antennas with your product. Failure to observe these precautions could result in fire, bodily injury, and damage to the equipment.

Compatibility

HP television tuner cards with antenna connections should be used only with HP personal computers that are intended for home use.

External television antenna grounding

If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is electrically grounded to protect against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information about proper electrical grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

Lightning protection

To protect your HP product during a lightning storm or when it will be unattended and unused for long periods of time, unplug the product from the electrical outlet and disconnect the antenna or cable system. This prevents damage to the product due to lightning and power line surges.

Power lines

Do not place an outside antenna system in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into power lines or circuits. When installing an outside antenna system, take extreme care to avoid touching power lines or circuits, as contact with them could be fatal.

Antenna grounding

This reminder is provided to call the CATV (cable television) system installer's attention to Section 820-40 of the NEC (National Electrical Code), which provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.
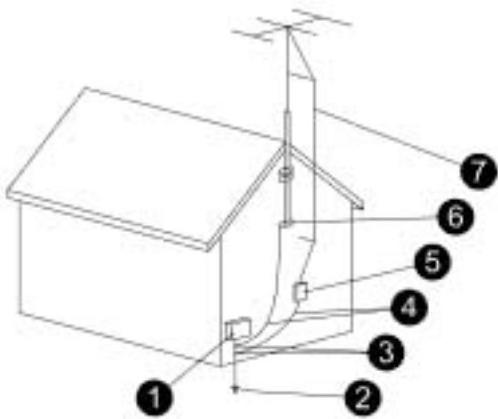
1. Electric Service Equipment

2. Power Service Grounding Electrode System (NEC Art 250, Part H)

3. Ground Clamps

4. Grounding Conductors (NEC Section 810-21)

5. Antenna Discharge Unit (NEC Section 810-20)

6. Ground Clamp

7. Antenna Lead-in Wire

Precautions for products with modems, telecommunications, or local area network options

In addition to the general precautions described earlier, be sure to observe the following precautions when operating telecommunications and network equipment. Failure to observe these precautions could result in fire, bodily injury, and damage to the equipment.

- Do not connect or use a modem, telephone (other than a cordless type), LAN product, or cable during a lightning storm. There may be a remote risk of electric shock from lightning.

- Never connect or use a modem or telephone in a wet location.

- Do not plug a modem or telephone cable into the Network Interface Card (NIC) receptacle.

- Disconnect the modem cable before opening a product enclosure, touching or installing internal components, or touching an uninsulated modem jack.

- Do not use a telephone line to report a gas leak while you are in the vicinity of the leak.

- If this product was not provided with a telephone line cord, use only No. 26 AWG or larger telecommunication line cord in order to reduce the risk of fire.

Precautions for products with laser devices

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 60825 and its relevant national implementations. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies for a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation.

Laser safety warnings

In addition to the general precautions described earlier, be sure to observe the following warnings when operating a product equipped with a laser device. Failure to observe these warnings could result in fire, bodily injury, and damage to the equipment.

⚠ **WARNING!** Do not operate controls, make adjustments, or perform procedures to a laser device other than those specified in the operators manual or in the laser device installation guide.

Allow only service partners to repair the laser equipment.

Compliance with CDRH regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with international regulations

All HP systems equipped with a laser device comply with appropriate safety standards including IEC 60825 and IEC 60950.

Laser product label

The following label or equivalent is located on the surface of your laser device. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.
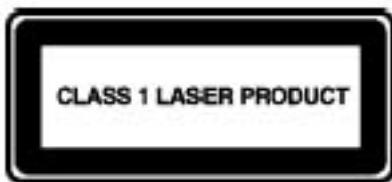
Symbols on equipment

The following table contains safety icons that may appear on HP equipment. Refer to this table for an explanation of the icons, and heed the warnings that accompany them.

	This symbol, when used alone or in conjunction with any of the following icons, indicates the need to consult the operating instructions provided with the product. **WARNING:** A potential risk exists if the operating instructions are not followed.
	This symbol indicates the presence of electric shock hazards. Enclosures marked with these symbols should only be opened by a service partner. **WARNING:** To avoid risk of injury from electric shock, do not open this enclosure.
	An RJ-45 receptacle marked with this symbol indicates a Network Interface Connection (NIC). **WARNING:** To avoid risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.
	This symbol indicates the presence of a hot surface or component. Touching this surface could result in bodily injury. **WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.
	This symbol indicates that the equipment is supplied by multiple sources of power. **WARNING:** To avoid risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

This symbol indicates the presence of a sharp edge or object that can cause cuts or other bodily injury.

WARNING: To prevent cuts or other bodily injury, do not contact sharp edge or object.

These symbols indicate the presence of mechanical parts that can result in pinching, crushing or other bodily injury.

WARNING: To avoid risk of bodily injury, keep away from moving parts.

This symbol indicates the presence of a potential tip over hazard that can result in bodily injury.

WARNING: To avoid risk of bodily injury, follow all instructions for maintaining stability of the equipment during transport, installation and maintenance.

8 More information

If you want more information about arrangement of work space and equipment or safety standards, refer to:

American National Standards Institute (ANSI)

11 West 42nd St.

New York, NY 10036

http://www.ansi.org

Human Factors and Ergonomics Society (HFES)

P.O. Box 1369

Santa Monica, CA 90406-1369

http://www.hfes.org

International Electrotechnical Commission (IEC)

Central Secretariat

3, rue de Varembé

P.O. Box 131

CH1211 GENEVA 20, Switzerland

http://www.iec.ch

International Organization for Standardization (ISO)

Central Secretariat

1, rue de Varembé, Case postale 56

CH-1211 GENEVA 20, Switzerland

http://www.iso.ch

National Institute for Occupational Safety and Health (NIOSH)

NIOSH Publications

4676 Columbia Pkwy, MS C13

Cincinnati, OH 45226-1998

http://www.cdc.gov/niosh

Occupational Safety and Health Administration (OSHA)

Publications Office

U.S. Department of Labor

200 Constitution Ave. NW, Room N3101

Washington, DC 20210

http://www.osha.gov

TCO Development

Linnégatan 14

SE-114 94 Stockholm, Sweden

http://www.tcodevelopment.com

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