Computer Hardware Engineers

SOC: 17-2061 • Career Profile Report

■ Key Facts

$155,020	**76,800**	**+7.0%**
Median Salary	Employment	Growth Rate

■ Requirements & Salary Range

Education: Bachelor's degree

■ Automation Risk Assessment

Low Risk - 16.0% probability of being automated in the next 10-20 years.

This job is relatively safe from automation due to its creative, social, or complex problem-solving requirements.

■■ Work-Life Balance

7.2/10 - Good work-life balance

■ Personality Fit (RIASEC)

Higher scores indicate better personality fit for this career type.

Realistic	8.2/10	**Investigative**	8.8/10
Artistic	6.4/10	**Social**	5.2/10
Enterprising	5.8/10	**Conventional**	6.6/10

■ Top Skills Required

Analytical skills, Critical-thinking skills, Problem-solving skills, Communication skills

✓ Strengths

• High Demand
• Flexible Work
• Continuous Learning

■ Challenges

• Burnout Risk
• Rapid Technological Change

■ What They Do

Computer Hardware Engineers research, design, develop, and test **computer systems and components, including processors, circuit boards, memory devices, and networks**. They ensure hardware functions efficiently and integrates with software systems. Their work is critical in technology development, manufacturing, and computing innovation.

This career is well suited for individuals who enjoy technology, problem-solving, and designing electronic systems.

What Do Computer Hardware Engineers Do?

These professionals develop, test, and maintain computer hardware to meet performance, reliability, and design specifications.

Common responsibilities include:

- Designing and developing computer hardware components and systems
- Testing and evaluating prototypes for performance and reliability
- Collaborating with software engineers to ensure hardware-software compatibility
- Researching emerging technologies and materials for hardware improvement
- Troubleshooting and diagnosing hardware issues
- Preparing technical documentation, specifications, and reports
- Ensuring compliance with industry standards and safety regulations

Key Areas of Computer Hardware Engineering

Computer hardware engineers may specialize in specific technologies or systems:

- Processor and Chip Design: Developing CPUs, GPUs, and microprocessors
- Circuit and Board Design: Designing printed circuit boards and integrated circuits
- Computer Systems Engineering: Integrating hardware components into functional systems
- Testing and Quality Assurance: Evaluating performance, reliability, and safety
- Research and Development: Innovating new technologies and hardware solutions

Skills and Abilities Needed

Computer hardware engineers combine technical, analytical, and problem-solving skills.

Core Professional Skills

Personal Qualities That Matter

Education and Career Pathway

This role typically requires formal education and technical training:

- Bachelor's Degree (minimum): Computer engineering, electrical engineering, or related field
- Internships or Co-op Programs: Hands-on experience in hardware development and testing
- Professional Development: Training in emerging technologies, software, and hardware tools
- Advanced Degrees (optional): Master's or PhD for research, development, or specialized roles
- Continuous Learning: Staying current on technology trends, hardware innovation, and industry standards

Where Do Computer Hardware Engineers Work?

They are employed in industries that design, manufacture, or utilize computer hardware:

- Computer and Electronics Manufacturers
- Research and Development Firms
- Telecommunications Companies
- Government and Defense Agencies

- Consulting and Technology Service Providers

Work environments include offices, laboratories, manufacturing facilities, and testing centers.

Is This Career Difficult?

This career requires strong technical knowledge, problem-solving skills, and attention to detail. Engineers must design complex systems, troubleshoot hardware issues, and innovate under technological and performance constraints.

Who Should Consider This Career?

This career may be a strong fit if you:

- Enjoy working with computer systems and electronics
- Are analytical, detail-oriented, and innovative
- Can collaborate with technical teams and communicate effectively
- Are committed to learning and adapting to new technologies
- Want a career developing cutting-edge computer hardware and systems

How to Prepare Early

- Take courses in computer science, electrical engineering, and mathematics
- Gain experience through internships, co-op programs, or personal projects
- Develop skills in circuit design, testing, and hardware troubleshooting
- Stay informed on emerging hardware technologies and industry standards
- Explore advanced degrees or certifications for specialization

Computer hardware engineers design, test, and improve computer systems and components, driving innovation and ensuring efficient, reliable technology solutions.