



## WAGE DATA

| Rate Type / Statistical Type | Entry level | Mean     | Experienced |
|------------------------------|-------------|----------|-------------|
| Annual wage or salary        | \$60,124    | \$86,522 | \$97,457    |
| Hourly wage                  | \$28.01     | \$59.99  | \$46.01     |

## JOB DESCRIPTION

Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components.

## DUTIES

- Update knowledge and skills to keep up with rapid advancements in computer technology.
- Build, test, and modify product prototypes using working models or theoretical models constructed with computer simulation.
- Write detailed functional specifications that document the hardware development process and support hardware introduction.
- Specify power supply requirements and configuration, drawing on system performance expectations and design specifications.
- Confer with engineering staff and consult specifications to evaluate interface between hardware and software and operational and performance requirements of overall system.
- Design and develop computer hardware and support peripherals including central processing units (CPUs), support logic, microprocessors, custom integrated circuits, and printers and disk drives.
- Select hardware and material assuring compliance with specifications and product requirements.
- Monitor functioning of equipment and make necessary modifications to ensure system operates in conformance with specifications.
- Test and verify hardware and support peripherals to ensure that they meet specifications and requirements, by recording and analyzing test data.
- Direct technicians, engineering designers or other technical support personnel as needed.

## TOOLS and TECHNOLOGY

Tools used in this occupation:

Circuit tester — Circuit memory testers; Circuit testers  
 Electronic measuring probes — Logic probes; Probe card devices; Probe stations  
 Integrated circuit testers — Digital analysis systems DAS; Logic analyzers  
 Network analyzers — Communications analyzers; Traffic generators  
 Signal generators — Function generators; Pattern generators; Universal source generators

Technology used in this occupation:

Analytical or scientific software — Cadence Dracula; SAS software; The MathWorks MATLAB; Xilinx Synthesis Technology XST  
 Computer aided design CAD software — Allegro software; Cadence Concept; Mathsoft Mathcad; Xilinx ISE Foundation  
 Development environment software — C; Microsoft Visual Basic; Register transfer language RTL; SystemVerilog  
 Object or component oriented development software — C++; Microsoft Visual C# .NET; Practical extraction and reporting language Perl; SKILL  
 Operating system software — Linux; Shell script; UNIX

## KNOWLEDGE

**Computers and Electronics** — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

**Engineering and Technology** — Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

**Design** — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

**Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**Physics** — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

## SKILLS

**Critical Thinking** — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Reading Comprehension** — Understanding written sentences and paragraphs in work related documents.

**Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Speaking** — Talking to others to convey information effectively.

**Active Learning** — Understanding the implications of new information for both current and future problem-solving and decision-making.

**Writing** — Communicating effectively in writing as appropriate for the needs of the audience.

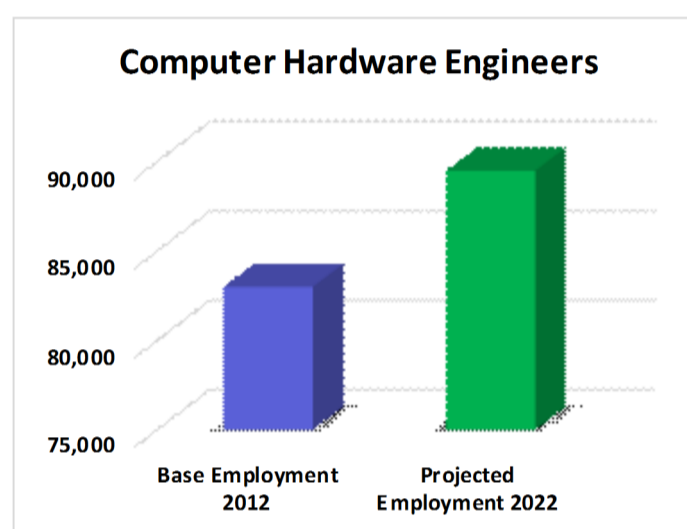
**Complex Problem Solving** — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

**Judgment and Decision Making** — Considering the relative costs and benefits of potential actions to choose the most appropriate one.

**Science** — Using scientific rules and methods to solve problems.

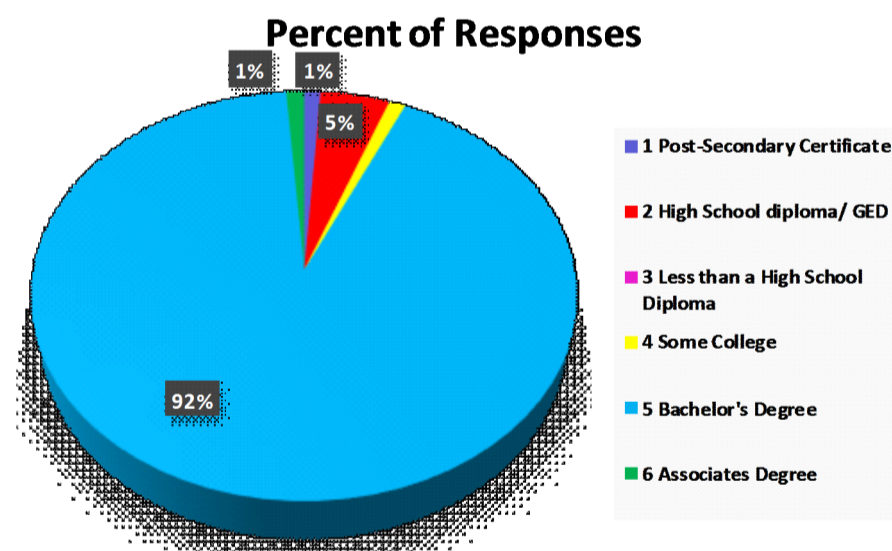
**Operations Analysis** — Analyzing needs and product requirements to create a design.

## EMPLOYMENT PROJECTION



## EDUCATION

The graph below shows the results of a national survey listing the most common required level of education for Computer Hardware Engineers.



## EDUCATION FOR THIS JOB

- 2014 Catalogue of Colorado Advanced Manufacturing Program and Skill Resources  
<http://www.coloradomanufacturingcareers.com/>
- Approved Colorado Community College Manufacturing Cluster education programs  
<http://www.coloradocommunitycolleges.com/go/programs/skilled-trades-technical-sciences/>  
<http://www.coloradocommunitycolleges.com/go/>
- Colorado Four Year Colleges and Universities  
<http://higherred.colorado.gov/academics/colleges/public4year.asp>
- Locations to Get Manufacturing Certificates  
<http://www.coloradomanufacturingcareers.com/>

