



Electrical Design Engineer Job Description

For inquiries, write Jonathan Bohannon at:
jbohannon@cartell.com or call 717-917-4468.

I. Principal

Our Need

At Cartell, we believe a smart home begins with the driveway. As a global leader in smart home, vehicle detection security, we are looking for the next great engineering team member to help invent the future of the industry.

Our Company

Preferred Security Components, Inc. of PA (DBA: Cartell) is an inventive, manufacturing company serving the security, home automation, building, electrical, and gate markets.

Our Forecast

The physical security market is forecast to grow worldwide to \$292.4 billion by 2025¹, with a CAGR of 9.4%². The need for physical security to mitigate crime or vandalism is pushing growth, led by an increasing awareness of risk³. Some of the highest areas of growth will be intrusion and access control, two markets in which Cartell is highly competitive and resourceful.

Our Vision

We exist to glorify God by facilitating safety, supporting Christian endeavors, and enabling employee growth

Our Mission

To create and build the best vehicle detection equipment in the world

Our Strategy

To use innovative engineering and process-driven manufacturing techniques to create and build highest quality products with 100% product testing to ensure reliability and longevity

Our Culture

Cartell is a place of professional excellence, collaborative teamwork, and gracious hospitality

Our Core Values

1. Family. Being a family makes us passionate for the safety of others; after all, they're part of the family. This promotes trust, loyalty, and love. It's the glue that binds us to customers, community, and co-workers.

2. Honesty. Honesty demands we create useful and quality-rich products. We believe inferior products are dishonest. Integrity rules our relationship with customers before and after the sale.

3. Drive. At Cartell, we are enthusiastic, responsive, and intuitive. We are driven to create solutions and remove obstacles. We listen to customers' needs and innovate to meet them with proven reliability.

Our History

Cartell was the first in the market to combine magnetometer technology and home automation. We did that in 1975 when we bought rights to the name and product originally invented by Dr. William Flook. In the 1990's we expanded into the gate industry.

Our Selling Model

We sell through over four hundred distribution channels. All our installers are independent. They purchase from distributors and sell to the end user.

Our Future

We are a financially sound, debt-free company. We occupy part of a 65,000 sq. ft. facility into which we envision incremental and realistic growth. We believe with the right team members—those who embrace our vision, mission, and culture—we have endless opportunities.

II. Position

Skillsets Required with Descriptive Behaviors

- Concentration – Can design and develop complex electrical systems and electronic components and products. Is able to keep track of multiple design elements and technical characteristics when performing these tasks.
- Initiative – Is able to apply academic knowledge to new tasks in every project undertaken. In addition, engages in continuing education to keep up with changes in technology.
- Interpersonal skills – Is able to work with others during the manufacturing process to ensure that plans are implemented correctly. This collaboration includes monitoring technicians and devising remedies to problems as they arise.
- Math skills – Can use the principles of calculus and other advanced topics in math in order to analyze, design, and troubleshoot equipment.
- Speaking skills – Can work closely with other engineers and technicians. Is able to explain his/her designs and reasoning clearly and to relay instructions during product development and production. May also need to explain complex issues to customers who have little or no technical expertise.
- Collaborative skills – Can work closely with team members to design products that are customer-driven, marketable, and production-worthy. This means collaboration with management, sales, marketing, production, and technical/support teams.

- “Eat the Products” – Loves the customer more than his/her own creations and willing to change, improve, modify, and discard any and all products that do not meet the advanced needs of customers. This takes humility, servanthood, collaboration, and professional will.
- Confidence & Growth – Can manage a team with little or no supervision and make wise, independent decisions based on company values; sees change as an opportunity to grow.
- Time management skills – Uses time efficiently and teaches others the same.
- Problem solving skills – Even-tempered rather than panic-driven; can thwart problems before they occur; does not place blame; emphasizes solutions, not problems; uses problems as a means for growth of company and personnel.
- Team working skills – Can create trust in people; unites people around a common goal; allows healthy debate in a respectful atmosphere; loud with praise; loves to celebrate; recognizes what is right more than who is right and what is wrong more than who is wrong; positive attitude, not negative; always searches for and applies the best ideas regardless of their source.
- Continuous quality improvement – Never takes shortcuts; insists on perfection; excellent product diagnosis/problem solving; finds best solutions at minimum cost.
- MS Word, MS Excel, PowerPoint proficiency

Technical Requirements

- At least five years field experience designing/developing new electronic products
- LoRa radio family, which includes:
 - Radio/Antenna design in the 915 and 868 MHz range
 - Frequency hopping/spread spectrum knowledge up to 20 dbm power output in the 915 and 868 MHz range
 - Power supply design/knowledge
- Analog amplifier design
- C/C++ programming and embedded system design
- UL, CE, and FCC certification knowledge (optional, but a bonus)
- Surface mount assembly and PCB layout, Altium Designer and Diptrace PCB software
- 3D mechanical design (optional)
- Automated test set design (optional)
- Knowledge of or willing to learn:
 - Magnetometer technology sensing and other forms of sensing devices
 - Satellite and GPS
 - Bluetooth/WIFI
 - Smart Phone app creation
 - Audio applications

Responsibilities

- Design electronic components, software, products, or systems for residential, commercial, industrial, and government applications
- Meet customer needs by determining new product requirements, capacity, and cost
- Develop maintenance and testing procedures for electronic components and equipment
- Evaluate systems and recommend design modifications or equipment repair
- Inspect electronic equipment, instruments, and systems to make sure they meet safety standards and applicable regulations
- Plan and develop applications and modifications for electronic properties used in parts and systems to improve technical performance
- Interact with professionals (FCC, accountants, patent lawyers, etc.)
- Collaborating respectively with a staff of professional engineers

III. Particulars

Compensation

Compensation will be commensurate with employee's attitude, quality of work, experience, achievements, and output. This includes base salary, raises, holidays, five PTOs (personal time off), vacation, profit sharing, possible IRA investing and stock value options (see Handbook).

Evaluations

Official assessments and evaluations will be conducted. These assessments will be used as a basis for differentiation, meritocracy, compensation, and profit sharing. Assessed by supervisor.

Non Disclosure/Non-Compete Forms

NDA and non-compete forms will be provided by management as instructed by our legal team. Required signatures will be maintained.

¹ Grand View Research, Inc. USA (2019). *Physical Security Market: Market Estimates and Trend Analysis*. San Francisco: Grand View Research, Inc. USA.

² Ibid.

³ Ibid