

Sr. PCB Designer

Innovative and detail-oriented PCB Designer with extensive expertise in high-quality, reliable circuit board layouts. Specializing in multi-layer high-voltage designs, I also bring a sophisticated understanding of impedance-controlled stack-ups, advanced signal integrity, and efficient design-to-manufacture processes. Adept at collaborating with cross-functional teams to ensure flawless first-pass success and seamless manufacturing integration, I consistently deliver designs that meet stringent industry standards. Skilled in the use of Altium Designer and other industry-leading tools, I excel in managing electronic component libraries and driving efficiency across the design cycle to reduce costs and iterations.

Skills

- PCB Design with Altium Designer, Altium 365, PADS-PCB
- High voltage in multi-layer boards (up to 2200V)
- Multi-layer, impedance-controlled stack-up.
- Fine pitch BGA and Micro-BGA routing.
- DFM/DFA/DFT for IPC Class 3 standards. (Design for Manufacturing, Assembly and Test. Class 3 requires high reliability.)
- ECAD Library Component-Management using Altium 365.
- State-of-the-art analog and digital signal routing
- IPC standards 2221, 6012 and 7351
- Assembly drawings
- Manufacturing outputs and manufacturing procurement
- Blind and Buried vias
- Design for Reliability
- LVDS – Low Voltage Differential Signaling with slew control
- Decoupling strategies
- EMC - Electromagnetic Compatibility
- High density
- 3D Modeling with real-time clearance checking
- High speed digital
- MS Teams
- Radio Frequency (RF), UHF, HF analog and antenna layouts
- Mixed technologies on same board
- High voltage in two-sided boards
- PCB Design Supervision
- Matched lengths of routes
- Matched lengths of branches (xSignals)
- Opto-isolators
- Rigid/Flex circuits
- Shielded audio
- Embedded components
- Switching power supplies
- Transmission line routing
- POE - Power Over Ethernet
- Regulatory Compliance
- Arena PLM
- OTA (Over-the-air) circuits

Experience

In the projects listed below, companies that have been acquired after the work was done are shown with their current name in [Brackets]. Where applicable, end-users within space or defense related sectors are shown in {Braces} after the organization's location. Examples include U.S. aerospace agencies or corporations and U.S. military or other Department of Defense (DoD) agencies. Where a specific military branch such as {US Army} is unknown, this is shown as {US DoD}. All work not shown as W-2 employment was done as an independent contractor using the trade name Golden Gate Graphics.

OWNER / SENIOR PCB DESIGNER | 02/1089 - Current

Golden Gate Graphics

- Managed all aspects of PCB design, focusing on high-voltage and high-reliability designs for aerospace, medical, and industrial sectors.
- Currently authoring a step-by-step guide on using Altium Designer for PCB layout, aimed at advancing industry practices.
- Customer testimonials confirm the effectiveness of my methods, reducing design iterations and smoothing manufacturing processes.
- Collaborated with global teams to streamline design reviews and ensure IPC Class 3 and Class 2 compliance.
- Transitioned design team from PADS to Altium Designer, optimizing workflows and improving productivity.
- Launched and scaled a business from a \$5,000 initial investment, driving significant growth through strategic planning and market analysis.

SR. PCB DESIGNER | 10/2024 – 01/2025

Ametek (through Mobiveil agency), Remote {US DoD}

Designed complex mixed analog and digital PCB in VME 6U form factor for aerospace client. Made use of heavy copper (2 oz/sq ft on some inner layers).

SR. PCB DESIGNER | 05/2022 - 07/2024

SCRAM Systems (W-2 employment), Littleton, CO

- Enhanced legacy designs by transitioning outdated file-based components to Altium 365 managed component libraries using Arena PLM data for input.
- Used high-frequency RF layout and analog signal processing techniques to integrate GNSS, Cellular, Wi-Fi, and short-range radio technologies into compact, high-performance devices.
- Developed high-density, fine-pitch BGA components that adhere to IPC standards and ensure manufacturability.
- Provided DFM/DFA assistance to international manufacturing locations, optimizing production yields and reducing errors.
- Provided DFT assistance to test engineers, including analysis of test point accessibility and **proving analytically** that test point locations had remained unchanged between revisions.
- Laid out circuits for components that included OTA (Over-the-air) functionality.

SR. PCB DESIGNER | 08/2021-11/2021

AEI (Advanced Energy Industries, Inc.) (W-2 employment through Actalent agency), Fort Collins, CO

- Expertly designed 800 KHz Buck converter circuits for high-efficiency power management, incorporating advanced analog and mixed-signal design techniques across multilayer boards.
- Delivered precision PCB layouts for AC and DC circuits, successfully managing high-voltage requirements up to 250V, while optimizing component placement and routing for manufacturability and performance.

The following represent a sampling of PCB design contracts done as an independent designer (dba Golden Gate Graphics), showing about one third of the customers over the past 14 years.

SR. PCB DESIGNER | 02/2022 - 05/2022

TenX Precision LLC, Austin, TX

- Adapted and redesigned PCB layouts to mitigate the impact of the 2021-2022 IC shortages, ensuring seamless production continuity by leveraging alternative components and strategic design modifications.
- Expertly managed BGA components with a 0.8 mm pitch and 289 balls, achieving high-density interconnects and enhancing signal integrity in complex PCB assemblies.

SR. PCB DESIGNER | 01/2018 - 06/2021

TRES (Transponder and Reader Engineered Systems), Peachtree City, GA

- Executed advanced parametric modeling and optimization of a logarithmic spiral antenna on a 1-layer PCB, utilizing Python scripting to enhance signal integrity and performance.

SR. PCB DESIGNER | 03/2021

Molex, Inc., Camarillo, CA

- Micro BGA breakout with blind and buried vias, controlled differential impedance, asymmetric stripline, routing to avoid cross-coupling.

SR. PCB DESIGNER | 01/2021 – 03/2021 & 10/2019-01/2020

Agile RF Systems, Berthoud, CO {US DoD}

- Designed RF power distribution board with 3-way Wilkinson Power Splitters, via-fenced RF traces, and controlled impedance layout; supported GHz-class signal integrity for DoD-aligned transmission systems (2021).
- Laid out several other RF boards

SR. PCB DESIGNER | 01/2021 – 03/2021 & 10/2019-01/2020

Welkin Sciences, Colorado Springs, CO {US DoD}

- Utilized industry-standard best practices in duplicating circuit layouts and incorporating cutting-edge design techniques, resulting in highly reliable and efficient PCB designs tailored for specific application requirements.

SR. PCB DESIGNER | 01/2020 - 01/2021 & 09/2011-10/2017

Cottonwood Creek Technology, Inc., Centennial, CO

- Expertly managed PCB layout for advanced switching power supplies with strict high-voltage clearance rules (2200V) and precise differential pair routing, while adhering to complex 3D modeling requirements for enclosure and adjacent board integration.

SR. PCB DESIGNER | 06/2017 - 01/2020

LDG Electronics, St. Leonard, MD

- Designed and optimized 5 high-frequency, 2-layer analog PCBs for automatic antenna tuners, ensuring superior signal integrity and minimal interference.

SR. PCB DESIGNER | 02/2019 - 09/2019

SCRAM Systems, Littleton, CO

- Executed intricate 3D modeling of multi-assembly components, including camera, LCD, pump, and fuel cell, utilizing Altium Designer's real-time 3D clearance checking to ensure precise fit and functionality in confined spaces.

SR. PCB DESIGNER | 3/2014 – 12/2018

Tel Instruments Electronics, East Rutherford, NJ {US DoD}

- Laid out radio testing equipment and mixed analog and digital boards (2-12 layers) up to 12 GHz.
- Laid out BGA designs with 1 mm pitch / 484 balls and 0.8 mm pitch / 169 balls.

SR. PCB DESIGNER | 09/2014 - 10/2017

Lockstate, Denver, CO

- Engineered and optimized 4-6 layer mixed analog and digital circuit boards for IoT exterior door locks, delivering cutting-edge security solutions for reprogrammable condo locks. This included Wi-Fi, BLE and implementation of secure OTA (Over-The-Air) remote provisioning of lock combinations, enabling real-time updates via Internet connectivity.

SR. PCB DESIGNER | 12/2016 – 06/2017

Honeybee Robotics [Blue Origin], Fort Collins, CO {NASA}

- Collaborated with cross-functional engineering teams to design a high-reliability Power Distribution Electronics (PDE) PCB for the **Orbiting Carbon Observatory-3 (OCO-3)** instrument. This board supported this mission-critical hosted payload mounted on the **Japanese Experiment Module – Exposed Facility (JEM-EF)** of the **International Space Station (ISS)**, enabling precise measurements of atmospheric CO₂ from low Earth orbit.

SR. PCB DESIGNER | 03/2014-08/2015

Aerojet Rocketdyne [L3 Harris], Canoga Park, CA {NASA}

- Pioneered 3D modeling techniques to optimize vertical and horizontal clearance rules, meticulously integrating accurate 3D bodies to simulate enclosures and adjacent boards, enhancing design precision for space craft flight boards.
- Designed high-voltage PCBs and collaborated with cross-functional teams to deliver cutting-edge PCB designs for the Power and Propulsion Element (PPE) of NASA's Gateway, contributing to mission-critical advancements in electric propulsion systems for lunar orbit.

SR. PCB DESIGNER | 05/2012-07/2012

Colorado Power Electronics, Fort Collins, CO {US DoD and NASA}

- Designed multi-layer flight-ready 800-Volt boost converter and 300-Volt buck converter for NASA.
- Discovered new ways to use the nuances in Altium Designer's query syntax for effective high voltage design rules and wrote a white paper entitled "Design Rules for High Voltage in Multilayer with Altium Designer."

SR. PCB DESIGNER | 10/2011-01/2012

Boulder Systems Design, Boulder, CO {NASA}

- Laid out "Martian Acoustic Anemometer" to operate in low-density atmosphere of Mars for possible future exploration of that planet. Two boards, mixed analog and digital, both 6 layer.

SR. PCB DESIGNER | 1/2003 - 09/2010

RT Logic [Kratos Defense & Security Solutions, Inc.], Colorado Springs, CO {US DoD and NASA}

- Laid out International Space Station telemetry boards and video data processing systems.
- Managed skew control and controlled impedance for differential signals.
- High-frequency RF layout and analog signal processing.

A NOTE ABOUT SECURITY CLEARANCES:

The PCB designs done for the U.S. Defense sector did not require security clearances, because I was not exposed to the embedded software code.

ADDITIONAL ADVANCED RADIO LAYOUTS

- Secure and commercial radio systems at Lexycom Technologies (military training SDRs - 2006-2011), Longmont, CO {US Army}
- NavRadio (wireless telemetry base station - 1996), Golden, CO {ARINC [Collins Aerospace, now part of Raytheon Technologies]}

OTHER MILITARY AND SPACE SECTOR PROJECTS

- Mustang [L3 Harris] and RSS. Smart bomb DSP and FPGA boards – 2003-2004, joint engineering project with Mustang Technology Group, Allen, TX and Remote Sensing Systems, Inc., Monument, CO {US Air Force}
- Welkin Sciences (simulation of electromagnetic spectrum disturbances from nuclear explosions in order to develop robust communication systems in the event of nuclear war, June-September 2007), Colorado Springs, CO {US Missile Defense Agency}
- ElectriTek AVT [Inventus Power] (30+ battery management boards for many companies, including L-3 Communications [L3 Harris] and Sanmina. Designed a lithium-sulfur battery management board for drone helicopters {US Army} – 2005 - 2008

OTHER MEDICAL PROJECTS

Additional contract roles include advanced layouts for Tetrad (invasive ultrasound, 5/1990 - 5/1997), dBMEDx (bladder scanner, 10/2010 - 9/2011), Erbttech Engineering (1kV power supplies for MRI with 2 oz+ outer copper, including negative voltage rails, 9/1997 - 4/1999), MedSim (simulation of surgery 9/2011 - 2/2012)

(Additional contract roles include advanced layouts for many organizations. Details available upon request; all projects demonstrable except Welkin Sciences work for MDA and NavRadio projects.)

Education

Colorado School of Mines - Colorado | Bachelor of Science Engineering

- CID—Certified Interconnect Designer, IPC (Association Connecting Electronics Industries) March 12, 2016
- DFX—Design for Excellence IPC Professional Development Courses (January 27-30, 2019)
- Have studied in many fields including communication skills, study skills, business organization, sales, investing, Internet marketing, PCB design and electronics manufacturing.

Additional Information

More information on PCB Design Expertise is available at http://www.goldengategraphics.com/ee_intro.php Example boards at

<http://www.goldengategraphics.com/example-PCBs.php> and 3D Modeling of PCBs at <http://www.goldengategraphics.com/example-PCBs/3D/index.php>

Pcb Design Software Expertise

- Altium Designer
- Parametric modeling using FreeCAD

Business Software Expertise

- **Altium Designer:** Expert in creating and managing complex PCB layouts, including high-voltage, multi-layer, and impedance-controlled designs.
- **Arena PLM and Altium 365:** Proficient in managing electronic component libraries, streamlining design revisions, and ensuring version control in collaborative environments.
- **Microsoft Office Suite:** Skilled in creating professional presentations, technical reports, and project documentation.

Career Achievements

- Developed high-voltage design rules for Altium Designer and used them to design prototype PCBs for NASA's lunar Gateway electric propulsion system. This system passed rigorous hot fire testing at JPL in Pasadena with flying colors, representing a breakthrough in electric propulsion flight systems.
- Developed and implemented efficient, high-quality design processes that reduced errors and improved first-pass success rates.
- Built and maintained long-term relationships with clients by providing exceptional technical solutions, resulting in a high percentage of repeat business.

Portfolio & More Information

goldengategraphics.com/ee_intro.php

goldengategraphics.com/example-PCBs.php

goldengategraphics.com/example-PCBs/3D