

**John Walt Childers, IPC CID\*, US Citizen**  
**Sr. PCB DESIGNER**

**An experienced, detail-oriented Printed Circuit Board Designer who lives by his motto:**

**"Create final products that really duplicate the client's intentions."**

\*IPC is Association Connecting Electronics Industries and CID stands for Certified Interconnect Designer. A "CID" is someone who has taken a course from IPC in printed circuit design and passed a final exam in order to receive this classification.

<b>SUMMARY</b>
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Possesses thirty years' experience in printed circuit board layout running a design service bureau.

Product development and business-to-business sales. Knowledgeable in many electronic technologies.

Works well with team members. Commands proficient communication skills. Will listen to directions and follow them to the letter.

<b>AREAS OF PCB LAYOUT and RELATED EXPERTISE</b>
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PCB Design using Altium Designer Assembly Drawings

Manufacturing Outputs

Schematic Capture using Altium Designer PCB Design Supervision

Manufacturing Procurement

<b>PCB Design Know How</b>		
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Antennas	BGA	Micro-BGA
Blind vias	Buried vias	Controlled impedance
DDR SDRAM	Design for Assembly	Design for Manufacturability
Decoupling strategies	Differential signaling	Slew control of differential pairs
EMC	High density	High frequency
High speed digital	PCI Express	RF, UHF and HF analog
Mixed technologies on same board (RF with High-Speed Digital)	High Voltage in two-sided boards	High voltage in multi-layer boards
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)

## **PROFESSIONAL EXPERIENCE with SELECT CUSTOMERS**

All of this work was done with Altium Designer as an independent contractor. The following represent a sampling of PCB design contracts with about one third of the customers over the past 12 years.

### **TRES (Transponder and Reader Engineered Systems). Jan 2018 – June 2021**

- **RFID devices for Parking Gate Control and other applications**

4 boards, analog and mixed, 1 to 6 layers. In addition to PCB layout and schematic capture:

- Parametric modeling of logarithmic spiral antenna 1-layer board using Python scripting.

### **Molex, Inc. Mar 2021**

- **Test Board:** 12 layers. Layout technologies used:

- BGA breakout, controlled differential impedance, asymmetric stripline, routing to avoid crosscoupling.

### **Cottonwood Creek Technology, Inc. Jan 2020 – Jan 2021 and Sep 2011 – Oct 2017**

- **Telephone with touchscreen and micro-cameras:** A durable system for monitoring prison inmates' external calls and Internet usage.

10 boards mixed analog and digital, 4-6 layers, AC/DC, switching regulators (switching frequencies 250-1500 kHz), digital 100 MHz ARM and 500 MHz USB. Layout technologies used:

- Switching power supplies,
- 2200-volt maximum high voltage clearance rules dividing a board into two sections
- 1 mm-pitch BGA
- differential pairs routing
- 3D vertical and horizontal clearance rules using accurate 3D bodies and simulating the enclosure and adjacent boards in 3D.
- 2200-volt maximum high voltage clearance rules dividing a board into two sections,
- 1 mm-pitch BGA
- POE (Power Over Ethernet)

### **Welkin Sciences. Jan 2021– Mar 2021 and Oct 2019 – Jan 2020 • Adapter Boards**

4 boards, one analog, one mixed and two digital, 4 layers. Layout technologies used: Differential signaling, matched lengths, duplicating circuit layouts.

### **LDG Electronics. Jun 2017 – Jan 2020**

- **Automatic Antenna Tuners for Amateur Radio**

5 boards, mostly analog, 2-layers. In addition to PCB layout and schematic capture:

- 3D modeling of case and all components, using Altium Designer's real-time clearance checking in three dimensions.

### **SCRAM Systems. Feb 2019 – Sep 2019**

- **Remote Breath portable alcohol monitor.**

1 board, HDI, mixed analog and digital, 12-layers. In addition to PCB layout and schematic capture:

- Complex 3D modeling of attached assemblies (camera, LCD, pump and fuel cell) using Altium Designer's real-time clearance checking in three dimensions.
- DDR3 memory routing, on-board SDRAM
- GSM (Global System for Mobile [tele]communications) multi-variant modules from 2G to 4G in one unit. Makes use of Altium Variants.

**Lockstate. Sep 2014 – Oct 2017 • IoT Exterior Door Locks**

Combination locks for condos reprogrammable via the Internet. 16 boards, mixed analog and digital, 4-6 layers. – Controlled depth laser drilling on one board to allow breakout of micro-BGA (0.5 mm ball pitch).

**Honeybee Robotics. Dec 2016 – Jun 2017**

• **Motor Controller Flight Board for space craft robotics**

1 board with mixed analog and digital, 8 layers.

**Aerojet Rocketdyne. Mar - May 2014 and Nov 2014 to Aug 2015**

• **Space Craft Flight Boards, Drive Controls for Ion Propulsion Thruster Technologies.**

6 boards with analog and a couple with high-voltage, up to 10 layers:

- 4000 Volt in multiple layers maximum creepage rules for one of these boards and 500 Volt for another.
- 3D vertical and horizontal clearance rules using accurate 3D bodies and simulating the enclosure and adjacent boards in 3D.

**RT Logic subsidiary of Integral Systems Sep 2002 to Feb 2010**

- **International Space Station telemetry:** "Crypto" board for telemetry data from space station. In service since 2003 with no hardware failures.
- Video data processing.
- Signal conversion projects, including legacy systems data converted to modern system. Layout technologies used (if not already mentioned above):
  - Skew control added to control of differential impedance over groups of low-voltage differential signals (LVDS) which involved matched-length design rules with daisy-chained routes extended over multiple components in series.
- **RF Analog signal processing and conditioning project.**
- **Space Shuttle to ground-facility telemetry communications interface.**

**Tel Instruments Electronics Mar 2014 to December 2018**

• **Radio testing equipment.**

14 boards RF analog and mixed analog and digital, 2-12 layers:

- RF frequencies to 12 GHz

**Design Group Circuit Design / Piranha PCB Design July 2009 to Oct 2012**

• **Laser-based alignment system for use in outer space.**

Mixed analog and digital, 8 layers. Layout technologies used (if not already mentioned above):

- Op amp layouts minimizing input net trace lengths,
- Copper designed into TO-3 op-amp footprints to match areas of contact with steel brackets, thus preventing traces from being routed under metal.

- **Biochemical diagnosis system for BiOptix Diagnostics, Inc.**

Mixed analog and digital, 4 layers, 5 switching regulators (switching frequencies 500-1250 kHz), digital with 18mHz clock. Layout technologies used (if not already mentioned above):

- Careful control by trace widths of temperature rise and voltage drop on power supply distribution.

- **Vascular surgery simulation system for Medical Simulation Corporation.**

5 boards. mixed analog and digital, 2-4 layers. (Examples of a portion of this layout are available online by request.) Layout technologies used (if not already mentioned above):

- Double-track routing between connector pins.
- Placement of sensor for interaction with external moving object.

- **High-output LED and related boards for TerraLUX Inc.**

Mixed analog and digital, 4 layers, 5 switching regulators (switching frequencies 500-1250 kHz), digital with 18mHz clock. Layout technologies used (if not already mentioned above):

- Maximizing copper for high current and heat dissipation.
- Conversion of Gerber files to Altium Designer. PcbDoc files.

**Colorado Power Electronics    May 2012 to July 2012**

- **Flight-ready switching power supplies for NASA:** Boost Converter (64 amps/800 volts multilayer) and Buck Converter (64 amps/300 volts multilayer) Mixed analog and digital, 4-6 layer.

**Boulder Systems Design    Oct 2011 to Jan 2012**

- **Martian Atmosphere 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 layers.

**Nexergy (née AVT ElectriTek)    Jan 2005 to Feb 2008**

- Over 30 board designs - **Smart** Battery Chargers and related boards for a dozen organizations including GE, Layer 3 Communications, Sanmina, Sun StorageTek and US military.  
Layout technologies used (if not already mentioned above):
  - AC current and transformers
  - Various custom batteries

**Welkin Sciences, LLC    June 2007 to Oct 2007**

- Strategic electronic warfare application: Simulating robust continuity of radio communication during nuclear blast electromagnetic interference.

<b>CAREER ACHIEVEMENTS</b>
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- Started a business with a \$5,000 investment and made it successful.

- Built Internet marketing techniques into web site design and maintenance that generates a continuous flow of prospects. • Obtained new business prospects and clients continually while providing existing clients with excellent service.
- Developed electronic products: Negotiated contracts; managed electrical engineers and contract manufacturing vendors.
- Developed new, more reliable methods in printed circuit design and am re-writing a book (not yet published) to be used for instructing others.
- Developed and simplified printed circuit design procedures, eliminating errors while speeding turnaround.

### **PROFESSIONAL PROFILE**

- Oversaw strategic planning, marketing, sales, production, quality control and customer service for a business.
- Helped develop electronic products from concept through electrical and mechanical engineering, CAD design and manufacturing, finding ways to streamline the process from the viewpoint of PCB design.

### **EDUCATION**

**CID—Certified Interconnect Designer**, IPC (Association Connecting Electronics Industries)  
March 12, 2016

**DFX—Design for Excellence** IPC Professional Development Courses (January 27-30, 2019)  
Bachelor of Science, Engineering, Colorado School of Mines

Have studied in many fields including sales, investing, Internet marketing, PCB design and electronics manufacturing.

### **WILLING TO TRAVEL—REFERENCES AVAILABLE UPON REQUEST**

### **WORK HISTORY**

Owner	Golden Gate Graphics	1990— Present
Independent Designer	Golden Circuits	1987-1989

### **BUSINESS SOFTWARE EXPERTISE**

Microsoft Office – Word, Excel

Libre Office and OpenOffice.org - Calc and Writer

Quickbooks Pro

Adobe - Acrobat and InDesign

### **PCB DESIGN SOFTWARE EXPERTISE**

**Have created printed circuit board layouts, schematics, cable assemblies** and mechanical drawings with Altium **Designer**.

More information on PCB Design Expertise is available at

[http://www.goldengategraphics.com/ee\\_intro.php](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>

Did parametric modeling using FreeCAD.