

Zachary Arnold - Systems Integrator, Controls Engineer

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Seeking a position for Sr. Level Controls Engineer/Systems Integrator.

I have strong background in industrial control systems design and integration. Including PLC integration, programming, HMI designs, data acquisition and scada systems with over 20 years of experience in designing equipment and control solutions! Implementation of electrical motor controls, vfd's , pneumatic and hydraulic system integration as well as multiple sensor types using various bus-networks with a robust set of PLC controllers.

I've been self employed for the last 27 years drawing heavily on my skills in manufacturing, and PLC integration in the design of products and services my company sold. I was responsible for the start up and management of a UL508a panel shop, and controls division. Over my career I have been responsible for sales and direct customer point of contact. I enjoy interfacing with clients, assessing their needs, and designing a solution for them. My unique experiences and depth of skills make me effective in understanding the client's needs, ascertaining the scope of a project recognizing aspects of the project that they may not have seen.

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Experience in years

27

Self Employed
Technical Sales
Equipment Design,
Engineering, and
Manufacturing
Office Management
Business Development

25

Journeyman - Electrician
Journeyman - Plumber
Hydraulic system design
Pneumatic system design
Marketing- Advertising
Project Management

22

Control Systems Design
PLC Programming
Electro-Mechanical
systems intergration

20

Electrical Engineering
Control Panel Designs
HMI design
DC Motor Drive
Control

15

Client Consultation
Custom Panel Design
Custom Project
intergration and
programming

12

Networking
Peripheral integration
Remote I / O
UL508a Panel Designs

8

Industrial Networking
Industrial Sensor
networks
PC Based integration
Embedded Control

2

Zigbee networking
C# Programming
Data base Sql

Career Accomplishments

- 27 years - as owner of a car wash equipment manufacturing company. Responsibilities included product design, sales, proposals and project cost analysis. Additional responsibilities included business development, marketing and advertising as well as management of office employees.
- 27 years - of high dollar technical sales. Sales ranged from turn key car wash projects from \$1.5 million to smaller equipment hardware sales \$5k in size. Work included dealing with municipalities for approvals as well as procurement of government contracts.
- 25 years - in all phases of mechanical manufacturing, design, and engineering of all car wash types, bus, truck and train washes, as well as industrial water treatment system for washing and reclamation. Development of entire product lines providing significant product enhancement and industry improvements. Mechanical engineering and design included sheet metal and tube steel fabrication, flat layout design, laser cut-out plots, bending, forming and welding with a focus on stainless materials. Engineering profiles for CNC machine parts, designed from stainless, brass and plastic components.
- 25 years - Journeyman electrician in the car wash industry. Low voltage to high voltage systems to 480v 3ph., Control wiring (low voltage) systems AC and DC. Field trouble shooting of control panels, and control equipment. Technical support in the field and on the phone to trouble shoot equipment failures.
- 25 years - Journeyman plumber in the car wash field. Designing various plumbing systems for car wash industry often integrated with electrical control panels. Work included waste water system, reclamation systems, reverse osmosis systems, high pressure pumping, fluid transfer, tank washers, as well as full site plumbing design. System designs included Hydraulic, and Pneumatic designs.
- 22 years - Electrical control design using standard motor control technology (fv contactors) cam / drum timers, multi function timers, relays, rotary switches, transformers. Systems ranged from 24v control voltages up to 240v 3 phase systems. Electrical engineering and equipment control design. Including complete electrical site blueprints, and load schedules. Supervision of electrical contractors in connection installation and implementation of equipment designs.
- 20 years - of experience analysing, developing, programming and integrating PLC technology solutions with a focus on the car wash industry. Hardware included HMI's, master and slave systems. Data acquisition, process and automation control. Designs include, hardware specification (BOM's), PLC programming, site control wiring and fabrication of control panels. Typical panel designs included multiple PLC's HMI interfaces, motor speed controls in DC and later AC VFD's. Panel design and integration included high and low voltages, and localized PLC communications.
- 15 years-custom hardware design and consulting services for non company projects.
- 12 years- industrial networking including conventional TCP/IP, IPX/SPX Protocols, Modbus IP and RTU, serial rs232, rs485. Remote I/O, analog controls, data bus networks and other peripheral hardware integration, including sensor networking. Began the design of control panels that meet UL508a and NEC specifications.
- 8 years - designing PC based software application for integration using RTU's (remote terminal units). System design included SQL databases, C##, as well as data acquisition protocols DDE ,OPC communication with PLC's using excel as a daq O/I services. Designed a Card system with integration to multiple car wash control system. System design included working with RFID ,barcode and magnetic swipe technologies. During this time I began working with other industrial networking protocols including Device Net, Ethernet IP as well as industrial wireless networking solutions and sensor networks and PID controls.
- 2 years- embedded controllers with database operations and pc software . Designing an embedded controller solution as an enhancement to an existing product. Design included c# , and SQL database programming, mesh networking design using ZigBee (80211.15).

Technical Proficiencies

PLC Controllers

- Allen Bradley / Rockwell
SLC-series
MicroLogix
CompactLogix
ControlLogix
- Automation Direct PLC
05, 06, 205, 405
Click
Productivity
- Eaton
Easy 500, 700, 800
Compact PLC
- Idec
MicroSmart
Pentra
- Mitsubishi
FX series
FXon series
- Siemens PLC
S7-1200 series

PLC Remote Hardware

- Allen Bradley / Rockwell
Flex I/O
- Automation Direct
Terminator I/O
- Festo
CPX Remote I/O
Pneumatic valves
- Nematron
Optilogic RTU's
- Digi
Embedded Controllers

HMI's Operator Interfaces

- Allen Bradley
PanelView
Panel PC's
- Automation Direct
C-More Full function
C-More Mico Panels
- Nematron
Opti-mate series
- Idec O/I series of Panels

VFD's

- Allen Bradley
Powerflex 40, 523, 525
- Automation Direct
GS VFD's
Dura Pulse VFD's
- DanFoss
VLT drives
- Eaton
M-Max,
PowerXL DC1
PowerXI DG1
- Siemens
V20, G120, G123 series

PLC Peripheral's and Controls

- Analog 4-20ma PID Controllers
- RTD's & Thermocouplers
- Transducers
- Encoders
- Bar Code Scanners
- RFID tag readers
- Saftey Control Relays
- Remote Access Routers
- Industrial Network Switches

Protocols / Networking

- TCP/IP
- IPX / SPX
- Device Net
- Ethernet IP
- Modbus RTU
- Modbus TCP
- ProfiNet
- RS Linx
- AS-I
- Foundation Field Bus
- Hart
- RS285
- Rs486
- 4-20 ma

PLC, Intergration Software

- Allen Bradley
Factory Talk SE
Factory Talk ME
RSlogix 500
Rslogix 5000 Studio
Connected Components
- Automation Direct
Direct Soft v 5 v6
Ds Data DDE
C-More HMI Software
- Siemens
TiA Step 7 V13
Starter
- Kepware
Kep Direct OPC DDE
- Think n Do - Cursory
- Wonderware – Cursory
- Digi-Dynamic –C

Design ,Operational Software

- Auto-Desk AutoCad
- Auto-Desk AutoCad-Electrical
- Auto-Desk Inventor
- Visual Studio 2010
- MS- Access
- MS-Visio
- Vista-Db (Sql)
- Corel Draw
- Flash
- Illustrator
- Tech Smith Snagit
- MS-Office Suite
- MS-Project 2003
- Acrobat
- PhotoShop
- In Design
- Dreamweaver
- Fireworks

Experience Work History

Gem Equipment of Oregon, Woodburn, OR

2013-Present

Clients: Food Manufacturing, Primary focus large french fry manufactures.

Roles: Controls Div Manager, Sr. Controls Engineer.

Responsibilities Accomplishments: Created a controls division from the ground up including set up of control panel shop, securing UL508a training and licenses. Established electrical design parameters, procedures, bill of materials, proposal bid worksheets, electrical cad engineering formats, vendor hardware and general panel design. I was responsible for creating the client operational review document format (ords) to clarify scope of work required on projects. Within the Controls Div. I provided training and supervision, to allow installation of in-house pre-wiring of control and high voltage wiring, as well as the building and manufacturing of control panels.

With my strong controls background I provided system integration of multi-faceted equipment designs. Panels ranged from basic (fvr) dump controls. Control systems for adjustable conveyor speed control. Automating mechanical equipment designs to provide turn key products like tray washers, fryers, blanchers and automatic grain malting equipment, to large scale factory process automation involving multiple panel design hydraulic and pneumatic system with over 100 i/o and multiple remote i/o units and drives.

WashTech Controls , Newberg, OR

1997-Present

Clients: Individual car wash owners and operators. business is closed.

Currently only supplying technical support to existing customers.

Roles: Owner and CEO of Wash Tech Controls. Lead software engineer , PLC programmer Sales Manager.

Company Objective: WashTech has focused on designing unique products for the self serve operator to enhance their ability to market their car wash , and increase revenue. Relocated the company to Portland in 2001. Changed company focus away from large equipment designs (bus , train and truck washes) to focused on tunnel wash equipment and self service wash equipment. I have designed many PLC based controls in all facets of the industry, included consulting, custom engineering ,and programming services to other manufacturers in the car wash industry. In 2008 I purchased MagCard Automation a credit card control company supplying services to the car wash industry. At this point we moved away from active car wash equipment sales, to a credit card and control systems focus. We have redesigned our credit card software to meet PCI compliant standards and using the latest programming technologies. Currently I am designing a wireless hardware technology that will replace the current RTU's and provide a chip and pin technology.

Elite Wash Systems , Paramount, CA

1989-1997

Clients: Individual car wash owners and operators. Auto Dealers , Large vehicles washes

Roles: Owner VP Elite Wash System . Sales Manager, Equipment design.

Company Objective: Elite Wash Systems began as local supplier of car wash parts and supplies and service to self serve car wash operators in the southern California. Equipment was provided for new construction as well as existing facilities After four years we began manufacturing drive thru wash equipment for auto dealers and large vehicle washes for busses, trucks and trains. These systems relied heavily on hydraulic and electro pneumatic controls, using basic electrical control systems. It was during this period that I took course in PLC programming and electrical design to convert our control panels to PLC based systems. In 1997 the company dissolved each partner went his way and I began WashTech Controls.

Experience Work History

Chemco Products , Carson, CA

1987 -1989

Clients: Individual car wash owners and operators.

Roles: Began as assembly and installation technician. Became Parts manger after a year then Division Manager.

Company Objective: Chemco products is a large chemical manufacturer in Southern California and began started a car wash division to sell car wash soaps. It quickly became a parts and supplier company . After 5 years the owners of Chemco products were looking to sell the division and focus on chemicals. I secured an investor and purchased the company from them in 1989 and began Elite Wash Systems.

Education

Contractor Training Course - Electrical focus

Tom Hopkins-Sales Training Program

Manufacturer Training / Certification - PLC and VFD's

Mitsubishi, Siemans ,Allen Bradley , Eaton

El Camino College - Real Estate Progarm

El Camoni College - Business Admin. Assoc Program

not completed

Organizations

- Boy Scout Leader for last 20 years.
- Instructor in local church fellowship.

Products Designs and Projects

• **Tote Dump and fruit conveyance system**

As part of a large factory process system in the Food and Bev industry. The tote dumper conveyes, lifts dumps 700# totes of berries into a fruit conveyance system. Fruit is then distributed into holding trays and stacked for drying. System operates at aprox 12000# per hour

• **CardLinks.** This project incorporates an embedded controller board with Zigbee wireless radios.

System has a Master and up to 99 slaves. Hardware integrates with a PC based application

• **CWConsole** – A PC based credit card and marketing card system designed to accept payment in a car wash location and turn on equipment.

• **Auto Teller payment Kiosk** – A PLC based controller for accepting and processing car wash payments and starting car wash equipment. System includes a micro PLC. 8" color HMI with custom designed graphics. Controller interfaces with many peripherals like bill validtators, Coin hoppers , Bar Code scanners and Magnetic card readers

• **BayCommander** – A PLC based controller (20 / 30 i/o) for operating and controlling self serve car wash equipment. Includes control of VFD's Operation of fluid solenoids valves, air control values , and operator interfaces. Including displaying instruction to a after market scrolling display

• **Touchless Truck Wash Controller** - A Project incorporating PLC's, C-More HMI and Durapulse VFD. Designed to wash mining transport and service vehicle. Vehicles are measured with a series photo eyes and process with special program washes to facility a unique series of vehicles

More projects and product examples are available upon request.