



Case Study:

Advanced Controller Design Improves Disinfectant “Walk-Through” System Performance

The Customer:

Disinfectant “walk-throughs” are being deployed in many countries, in many kinds of applications, in crowded places such as shopping malls, hospitals and schools. Physically resembling the security metal detection stations at airports, walkthrough stations spray a disinfectant to eliminate any traces of contaminants that could be lingering on the individual, equipment, bags or even the uniforms they might be wearing—which in turn could spread disease.

This is how it works: A user enters the walk-through station and presses a “disinfect” button, which causes a gentle disinfecting mist to be sprayed onto the user. Indicator lights provide status of the procedure: Red (disinfecting process is underway) and Green (user may exit). The Red light remains ON for a period after the spray ends to allow for the disinfectant to settle. This delay before exiting is critical to assure the efficacy of the disinfecting process. The manufacturer of the system needed to avoid the problem of not letting disinfectant spray sit long enough by programming their system to effectively spray the user for the right amount of time, every time.

The Challenge:

The reliable and repeatable performance of the system controller is essential to its operation. The initial controller design consisted of DIN rail-mounted electronics in an electrical enclosure. The system was comprised of an AC/DC power supply, red/green LED indicators, relay with clock dial potentiometer for spray on/off time settings and external connections. While the design was functional, the large relay with mechanical time settings was difficult to calibrate and subject to reliability issues. In addition, the original system lacked the critical delay function. The entire controller package was quite large and not energy efficient.

The customer came to MJS Designs with a request to design a controller that would improve their disinfectant walk-through system’s functionality, size, and package cost.

The Solution:

MJS Designs engineered a completely new package for the system utilizing a commercial off-the shelf (COTS) enclosure from PolyCase. ~~The solution not only exceeded expectations, it was also delivered on-time and under budget.~~

An MJS-designed electronic control module (ECM) replaced the array of DIN rail mounted components. The ECM’s embedded microcontroller enabled the inclusion of advanced features such as system power monitoring, a 4-digit status display, deadtime control which prevents the “disinfect” button from being continuously pressed, and operator control of On and Off spray times.

The development process utilized a Microchip microcontroller board to prototype the functional operation. The next phase involved the design of a custom printed circuit board with efficient AC/DC power, microcontroller, socketed relays, USB interface, all in compliance with the customer's specifications. Waterproof external connections were designed to the customer's pinout profile. Microcontroller firmware was developed to control the entire process. The microcontroller is easily reprogrammable utilizing a windows-based GUI. MJS Designs developed test software for the client, at no added cost.

PCB Layout reviews with the customer followed. Electrical schematics and source code were provided along with the final PCB layout. A User Guide was developed by MJS Designs in conjunction with the customer inputs.

The Result:

The system sprayer's pressure regulator, with a pressure gauge and solenoid shut-off valves, are now activated by the advanced MJS-designed controller. The improved walk-through system more effectively removes airborne contaminants while also using less energy.

About MJS Designs, Inc

From their headquarters and technology center in Phoenix, AZ, MJS Designs Inc. excels at electronic system development, printed circuit board (PCB) design, PCB assembly and PCB repair. MJS Designs excels at delivering advanced electronic manufacturing solutions. Quality and speed are their forte for demanding applications, timelines and budgets.

MJS Designs can deliver to their customers a wide range of services which extend from simple to complex printed circuit board engineering design, CAD layout, prototyping, box/system build, cable assembly, procurement, volume assembly, test development, testing, and fulfillment. MJS Designs is ISO-9001: 2015, AS9100:2016/AS9100D, ANSI/ESD S20.20 - 2014 certified and NIST SP 800-171 compliant. The company has consistently exceeded the stringent Quality Management System (QMS) protocol. Their company is ITAR Registered and Licensed and their system delivers projects quickly, accurately and at competitive prices. Their customers will get the best overall value for their investments.

From concept to completion, low- or high-volume assembly and testing, MJS Designs is a versatile and cost-effective outsource solution. The company serves a wide variety of customers such as communications, commercial, government, automotive, medical, and industrial. MJS Designs pays great attention to quality and customer service which leads to an improved return on customer investment and enhanced bottom line.

MJS Designs has always collaborated closely with their client to understand their goals and needs from the prototype stage to the full production of the product. Their management team has extensive, proven technical expertise in the electronics and manufacturing industry. The leadership team has experienced project managers along with IPC Certified Interconnect Designers (CID+), with expert engineering personnel and dedicated production specialists who will produce the customer's project on time and within budget.