Emergency Stop Button Interface

- **Objectives:** Provide Computer Interface for E-Stop Button
- **Solution:** **DGH D1701 Digital I/O Module**
- **Benefits:** Reliable interface to Vehicle Computer Control System
- **Results:** Small and low-cost interface for haul truck e-stop

Overview

An international manufacturer of large mining vehicles required a computer interface module that could detect switch closures inside their emergency stop (e-stop) buttons. An e-stop button is an electronic device designed to immediately stop a process, machine, or vehicle in the event of an emergency. These devices are essential to prevent dangerous situations, life-threatening injuries, damage to equipment, damage to property, or physical injuries to personnel.

The manufacturer's e-stop button was designed to incorporate advanced safety features, enhance operational safety, and comply with regulatory standards. As part of the design, the manufacturer required an embedded computer interface to communicate with the vehicle's onboard computer, allowing the computer to detect the e-stop depression and quickly shutdown the vehicle in the event of an emergency.

For increased safety, the e-stop buttons are strategically positioned near the operator in the cab and possibly other locations for easy activation in the event of an emergency. The operator would simply press the e-stop button to stop the vehicle.

Project

This e-stop button application required a small device that could sense switch contact closures, control annunciators, communicate with the vehicle's onboard computer system, operate over a wide environmental temperature range, withstand heavy vehicle vibration, and contain circuitry that can be encapsulated inside the manufacturer's hard potted dust and weatherproof enclosure.

Working with company engineers, DGH offered a hardware solution that met all the manufacturer's requirements using a highly customized version of their D1701 digital I/O module. This module contained an RS-232 serial port for communicating with the onboard computer, includes a wide operating

DGH D1701 Digital I/O Module

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temperature range specification, and contained discrete I/O lines for detecting the e-stop switch closure and controlling local annunciators.

DGH addressed two additional manufacturer requirements: small physical size and strong electrical connections to the module. To reduce the physical size, DGH was able to remove the module enclosure and I/O connectors. With the I/O connectors removed, the module could be soldered directly to pins mounted on the main circuit board inside the e-stop button enclosure. This significantly reduced the possibility of internal connection problems, especially during the process of hard potting the enclosure.

With the emergency stop button installed in a strategic location on the vehicle, the computer control system can communicate with the internal D1701 module to read the present button switch status. If the vehicle operator pressed the button, the next read of the D1701 would report the switch closure and request the vehicle to be stopped and shutdown. An audible annunciator is used to confirm the button being pressed and alert personnel of a pending emergency.

Additional emergency stop buttons may be positioned around a vehicle based on the number of locations where an operator can control or operate important vehicle functions. For example, being able to shut down the vehicle in case of an emergency during ground level maintenance.

Results

This industry-leading manufacturer has chosen DGH as their supplier of e-stop button computer interface modules for over a decade. With thousands of modules deployed in their e-stop button application, DGH has a proven track record of providing durable high-quality products for use in critical safety applications.

Operator safety is a top priority for this manufacturer. Communicating with the customized D1701 module, the vehicle computer can detect operator e-stop requests in real time and stop the vehicle in an emergency. Preventing physical harm to the operator and reducing damage to the vehicle. Usage of e-stop buttons not only enhances safety, but it can also reduce maintenance and repair costs.

About DGH Corporation

Established in 1985, DGH is an industry-leading manufacturer of data acquisition hardware for use in the process monitoring and control industry. Our products have been used worldwide in such industries as water & wastewater management, pharmaceutical, scientific laboratories, military, transportation, energy sectors, and power utilities.

As part of Jewell Instruments, LLC, DGH Corporation continues to innovate products for use in a wide range of data acquisition applications. Our products have been designed into OEM applications and used by systems integrators across many industries. Contact a member of our sales team today and see if DGH can provide a solution for you.

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