



Where Innovation Gets Smart

Case study: Chamberlain Australia

Powering Industrial Roller Doors

Commercial roller doors found in factories and warehouses are big, heavy and powerful equipment. They are often the largest moving object in a facility and as such their operation needs to be carefully managed to ensure safety. As a result, Chamberlain Group turned to Genesys to develop their control systems which have become the industry standard for reliability and flexibility.

Chamberlain Group dominates the commercial garage door market in Australia, including roller shutters, grills and winches for a variety of applications.

A key product range is the Griffco eDrive +2.0, which is an operator for driving industrial/commercial roller shutters and grills. The eDrive includes a range of motors with a purpose-designed gearbox and an intelligent logic board for configuring multiple door settings and behaviour.

Genesys designed the logic board for the eDrive +2.0 with key features including monitoring of three-phase currents, management of infrared beams and mechanical bump switches for safety, and 430MHz wireless links to a door controller.



The Griffco eDrive +2.0

The eDrive +2.0 is managed by a Texas Instruments MSP430 microcontroller, with the primary function of managing two contactors – one for the forward direction and one for reverse. During

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commissioning, open and close limits are set for the door operation. The microcontroller keeps track of the door position and ensures the door limits are not passed.

However, because the safety of operation is the most critical feature, a secondary logic unit was included on the board to separately perform safety checks to ensure the microcontroller's operation is safe.

The secondary control unit is a Xilinx Cool Runner Complex Programmable Logic Device (CPLD) which is programmed with a machine descriptive language, rather than the C language used for the microcontroller. The CPLD enacts a state machine that detects safety-critical events like a power failure, stuck contactor, or a stop button being pressed.

This dual redundancy approach ensures fail-safe operation of the microcontroller, as the CPLD will stop the door if the MCU fails to respond appropriately. The approach also overcomes any software related problem that might otherwise compromise safety.

Another aspect of the product that required careful attention was the management of the high-voltage aspects of the device. The eDrive +2.0 draws up to 6 amps for the single-phase (240V)

models at up to 0.75kW and up to 2.5 amps for the 3 phase (415V) models at up to 1.1kW.

Managing high voltage systems such as this come with a higher regulatory burden and related safety standards that must be met. A rigorous design process to ensure voltage isolation measures are put in place including adequate PCB creepage and clearance distances, wiring insulation rates, among other measures. To ensure all design are compliant they were inspected and approved by an accredited independent test laboratory.

As with many other products, Genesys also designed a test jig for integration into the manufacturing process. The test jig automates the circuit board assembly's firmware programming, electrical testing and functional testing.

Chamberlain Group is a global company with an award-winning production facility in West Gosford NSW, having won the 2019 Hunter Valley Manufacturing Awards.



A typical configuration for the Grifco eDrive +2.0



Chamberlain Products Engineering Manager – Oceania, David Lockwood with an earlier version of the eDrive

The company dominates both the commercial and residential commercial and garage door market. On the commercial side, Chamberlain Group own the Grifco brand which it acquired in 2007.

All eDrive operators are manufactured at Chamberlain Group's West Gosford facility, including machining, injection moulding, laser cutting and final product assembly. The site includes an engineering team that carries out all testing and new product development. Visit their website at www.grifco.com.au.

About Genesys

Genesys Electronics Design is a product developer specialising in the design of electronic devices. We bring the power of the Internet of Things to make your product smart.

Our core services include:

- Product design
- Electronics engineering
- Software development (including apps)
- Product manufacturing management
- Regulatory compliance support

Genesys offers a fully bespoke design service where our customer owns the IP, which we develop for them. Alternatively, we offer a white-labelling process for building products on existing designs from our library, with a range of licencing options.

Genesys was founded in 1991 and has grown to more than 15 staff, with a combination of hardware and software specialists.