DuraFlash™

eMMC case study – Commercial Fryer

Challenges

- Find Flash storage that could operate under stressful conditions – high heat and humidity

- Replace removable Flash with embedded flash that could be configured in same space as current storage device – reducing manufacturing design reconfiguration

- Maintain manufacturing costs in transition from removable to embedded Flash solution

Introduction

SMART Modular's Midwest Regional Sales Manager, Bill Karkula, had an idea. Seek out industrial manufacturers in the Midwest that use SD Cards that could be replaced with eMMC devices instead. The rationale was that eMMC and SD card are based on similar technology standards and have commonality in system hardware and software support. eMMC would work better than removable SD Cards in severe environments where high heat and humidity can cause oxidation of the contacts on the SD card and connector, resulting in poor electrical connectivity. eMMC, being a soldered down device without the need of a connector, alleviates the connectivity issue without major changes in product engineering and design.

A manufacturers' rep Karkula does business with had found a customer with just this problem. An Ohio based manufacturer of industrial-grade commercial kitchen appliances was receiving complaints from customers that their commercial deep fryers were breaking down due to SD card issues, which was leading to increased maintenance costs and damage to the company's reputation.

The Challenge

One of the main problems is commercial deep fryers are typically operated in fast food establishments with significant exposure to heat, humidity, grease and other particulates in a high-volume commercial kitchen. Commercial appliances like deep fryers utilize a small embedded computer to control all aspects of the appliance and cooking process to enable predictable and timely delivery of food products hundreds of times every day. The embedded computer of the particular deep fryer used a removable SD card to store operating and control software.
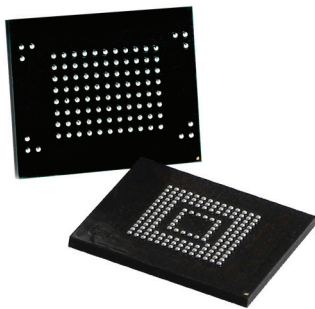

Removable SD Card contacts are contaminated in harsh environments

The intent of using removable storage such as SD Cards in small embedded computers is for its ease to install, use and replace. However, the contacts of the removable storage and connector are exposed to the environment. Oxidation and contamination of the contacts can cause intermittent disconnection or even permanent damage of the storage device. And this is what was happening to the commercial deep fryers. The water vapor and grease in the kitchens was entering into the SD card slots causing intermittent disconnections. While an SD Card solution was cost-effective in manufacturing, field failures due to the poorly performing storage device was starting to cost long-term damage to the company's reputation.

SMART® Modular Technologies

Solutions
DuraFlash eMMC

- Embedded solution where the connection between device and appliance doesn't disrupt during operation

- SMART Modular provide industrial grade Flash designed to operate in extended temperatures and harsh environments

The balls are soldered down on the board. Contaminants cannot get to the signals

The Solution

After consulting with SMART Modular, the commercial fryer manufacturer decided to replace the SD cards with SMART Modular's industrial grade eMMC. They chose SMART Modular's eMMC for the following reasons:

- eMMC is soldered down onto the system board, and as a result the connection between the device and the board is not exposed to the environment.

- SMART Modular's eMMC devices are industrial grade and are qualified to operate in extended temperature and in harsh environments.

- SMART Modular provides technical support to its customers. In this case, SMART formatted the eMMC device to look like an SD card, making for simplified migration.

- SMART's uniqueness in supplying customized solutions is that it also supports legacy products so there is slim chance of end-of-life (EOL) disturbing manufacturing.

With SMART Modular's help, the industrial manufacturer's commercial deep fryers have regained the reliability and usability as expected for a commercial kitchen appliance with minimal maintenance and the company's reputation has been restored.

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