



The Realtime Group of Companies

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Case Study – Ignition Interlock Camera System

The Challenge:

To design and build a camera add-on to the existing in-car breath analyzer and ignition interlock system (used to prevent intoxicated drivers from starting their cars). The camera was needed to take a picture of the person blowing into the analyzer and to store that image for future retrieval by a trained technician to use as court evidence. The camera sub-system required storage of at least 1,000 pictures; the retrieval of pictures over USB to a PC; the lockout of unauthorized users of the USB interface; and the interface for commands from and statuses to the car's breath analyzer system. The cost target per unit was a substantial challenge.

The Solution:

A Multi-point Control Unit (MCU) was selected to control the camera sub-system. This solution gave the most peripheral interfaces at the least cost and space. A Freescale ARM MCU was chosen for its inclusion of a camera interface. A SRAM and flash chip were chosen next to provide temporary program data space and permanent code space. To store the large amount of picture data a 32MB NAND flash was chosen. With this space and data format, storage of up to 1,800 pictures was possible. A picture size of ¼ VGA was picked as the size format, with JPEG as the compression format for black and white color format (all to save space). This approach provides adequate quality with a small file size.

The camera is tethered away from the processing board, which is located under the dash. A small power board and the camera are housed inside a small plastic box attached to the end of a 50-inch cable to make it easy to mount the system in all types of vehicles. A USB interface was added to the sub-system for connection to a laptop PC. The ignition interlock system commands the camera sub-system to allow the USB interface to function. This keeps unauthorized users from accessing the interface. The PC will see the camera sub-system as a mass storage device. This approach was selected since it allowed the use of a PC with no additional software. Using this approach the PC can copy the picture(s) off the camera sub-system, but it cannot erase the image(s). Only a command from the ignition interlock system can remove the photo(s). The images are stored in the NAND flash with a flash file system as this helped protect the file system from sudden power low. The file system is translated into a FAT file system interface so the PC can retrieve the images.



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To Learn More About SmartStart:

The camera add-on to the existing in-car breath analyzer and ignition interlock system was developed for SmartStart Technology of Irving, Texas (see <http://www.smartstartinc.com/>).

SmartStart is the nation's premier provider of ignition interlock services and technology. Every day, their ignition interlock system prevents intoxicated drivers from endangering themselves, their families and their fellow citizens by separating drinking from driving. Driving under the influence has been a huge problem, but thanks to Smart Start and The Realtime Group, DUI offenders will think twice before drinking and driving.

The ultimate goal in recent years has been to help save lives with the use of the latest technology and The Realtime Group has proven that this ambition can be achieved. Through the use of most up-to-date technology, The Realtime Group has help build a device that prevents unnecessary deaths and injuries. The Realtime Group has been privileged to work on such a substantial and influential project.



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