

Personal Eyewitness - Vehicle Accident Video Recorder



The Personal Eye Witness (PEW) Vehicle Accident Video Recorder provides robust and tamper-resistant recording of vehicle accidents. The PEW continuously records video into semiconductor memory, overwriting old video every thirty seconds, and stopping only after an accident triggers the vehicle airbags or other crash sensor.

The PEW uses Mitsubishi's Artificial Retina chip as an inexpensive image sensor, and Mitsubishi's M32R integrated CPU/DRAM chip to provide data compression and storage. The entire device will be able to sell for approximately US\$100 retail.

The intended initial market of the PEW is truck, bus, and taxi fleet owners, and their respective insurance companies. Current fraudulent insurance claims in the US are estimated at 10% of the US \$10 Billion/year insurance business.

PEW - Personal Eye Witness

Background and objectives: The Personal Eye Witness project goal is to produce a working prototype of a self-contained solid-state video recorder for vehicle accident data capture. The justification for this work is the large market in the US for any system that decreases liability or insurance costs for automobiles, taxicabs, trucks, and busses.

Technical discussion: A PEW unit is designed to be mounted in a car, truck, or bus, facing forward, and with a clear view of the road ahead. The PEW contains an image sensor such as the Mitsubishi M64282FP Image Sensor (Artificial Retina LSI), a CPU with low-power DRAM, such as the Mitsubishi M32R chip, a ROM, a rechargeable battery, a set of control switches, a small display, a serial or infrared interface, a power-input jack, an accelerometer, and a tamper- and impact-resistant case.

The ROM contains a small control program that repeatedly commands the image sensor to acquire an image, then compresses the image using asymmetrical compression, and stores the image in the low-power DRAM. Successive frames are written to DRAM until the DRAM is full, then the oldest frames are overwritten. Approximately 30 seconds of video at 5 frames per second are stored; every second or two the PEW indicates on the display that it is recording.

When a vehicle accident impact or other accident event occurs (as detected by the accelerometer), the CPU continues to store approximately ten seconds of video and then puts the PEW into a low-power memory retention mode, operating off of the internal battery in case vehicle power fails. The PEW can retain memory for approximately one week on the internal battery. After the accident, the PEW is recovered from the wreck and connected to a computer via the infrared or serial connection, and the contents of the DRAM read out. The images are decompressed and displayed as a 30-second video showing the vehicle accident.

The major improvement that the PEW has over other technologies is that it contains no moving parts and so can operate for the full lifetime of a motor vehicle without requiring any maintenance or repairs. With no moving parts, it can be designed to survive and continue recording even during high-speed collisions. Because the part count is so low and the parts are inexpensive, the total cost of the PEW is expected to be under US \$100 retail.

Collaboration: The primary collaborations for the PEW are with the Advanced Technology R&D center, the System LSI division, the Neural Network Dept. of the R&D center, and with Mitsubishi Electric America and VSIS.

Future Directions: We have built a working prototype of the PEW, and produced a demonstration video. We are approaching auto makers and corporations operating large numbers of cars, trucks, and buses. We will also be presenting a paper at the Society of Automotive Engineers annual meeting in March, to publicize this work and hopefully make marketing contacts.

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