

Automated Fee Collection

Location – U.S.A.

Project Introduction: Miti Manufacturing produces portable decontamination equipment, the Rhino Boot (vehicle immobilizers), and automated fee collection systems. Bob Fulcher, owner of the company, had experience with the sale of stand alone, micro-controlled revenue collection systems designed to collect a variety of fees for parking lots, universities, and various national and state parks. The inflexibility of the micro-processor design was always the primary limiting factor with this type of collection system. The system, once designed and implemented, was difficult to change, update, interface, maintain, and monitor. Bob saw a need for a system that was much more flexible in design over the lifespan of the machine. The idea was to use a PC-based platform with a complete operating system rather than the old micro-controlled system. Such a platform would vastly increase not only the long-term design flexibility, but also ease client interfacing, remote terminal monitoring, maintenance, and support.

System Requirements: Originally, micro-controlled systems were used and proved to be effective; however, they were highly inflexible in design, difficult to interface, impractical to update, and required a high level of expertise to maintain and monitor. The next generation of Miti designed machines utilized a DOS-based Operating System, ISA slot cards, and other custom designed hardware. While this was an improvement over the micro-processor, it soon became evident that the ISA slot card system did not represent a long-term solution in the ever-changing and improving PC market. While waiting for the right industrial PC to become available, the Miti software package was continually developed and updated with the design being extremely flexible and user-friendly.

Long-term, some changes needed to be made, such as sourcing industrial grade equipment suitable for use in environmentally difficult conditions. The machines are often installed long distances from the nearest human resource thus making the need for reliable hardware a critical component of a successful product. The ideal product also required sufficient resources for interfacing all system components such as bill and coin acceptors, vending devices, card dispensers, credit card readers, touch screen, shock & motion sensors, video camera, alarms, etc. The two primary components required were the industrial PC along with the touch screen user interface. Both components must be highly durable and the touch screen must be viewable for outdoor direct sunlight application.

Project Implementation:

Advantech products used:

UNO-2171 – Intel Pentium M/Celeron M Embedded Fanless Computer with 2 x LAN, 4 x COM,

PC/104+, Windows Embedded XP on Compact Flash (no hard drive), and transfective (low power consumption and heat dissipation sunlight readable) LCD with touchscreen custom integration kit.

System Description:

The entire system is contained within a tamper resistant metal case and all access for customers and staff is via an 8.4" LCD touch screen. A motion sensor is used to detect presence at which time a voice prompt is used to instruct the customer on how to begin their transaction. A series of screens is navigated by the customer at the end of which the fee total is displayed and payment instructions are given, both visual and audio.



The machine records all events as they occur; all data storage is via hard-disk or other long-term storage media. Information is made available to staff in various reports and data-base formats and may be accessed via remote dial-up service or locally with a USB storage device.

Conclusions:

The biggest obstacle was sourcing hardware reliable enough for outdoor environments and with high enough temperature ratings. We overcame these obstacles by working with Advantech and their DTOS department.

There are currently 50+ units in the field with which contain the UNO-2171 along with a VGA display. Other machines are currently being built and readied for shipment. While the program is currently still in it's early stages, all indications are that the hardware is doing well and customers have been pleased with the new system.