

Self-Serviced Car Wash

Machine Automation

Taiwan

Project Introduction:

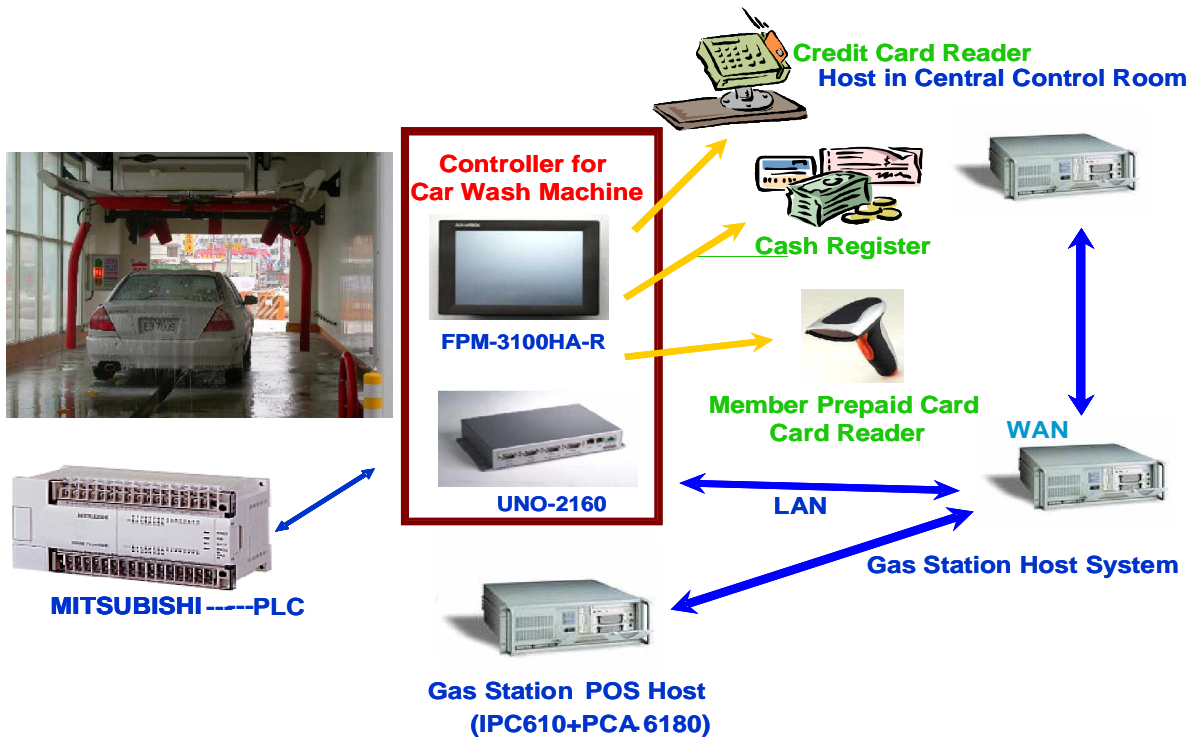
With rising wages and 24/7 service expectations, a leading chain of gas stations in Taiwan decided to create a self-serviced car wash. This required that the system was fully integrated with payment systems such as credit cards, cash cards, Modex, stored value cards and membership cards. But the first attempt failed since the operator interface was not visible in sunlight. With the new FPM-3100HA-R and UNO-2160, the second attempt at the application has been successful, and the customer is already busy developing new features.



System Requirements:

- § Installed outdoors in sunny Taiwan, the operator interface needed to be clearly visible in sunlight. The first integration used a screen with only 200 nits, which was far from enough. The result was that a printed sheet had to be attached on top of the screen to show the interface, and it had to be manned as customers still did not see the interface clearly enough to use the system.
- § The first integration also had I/O port limitations, which made it difficult to expand and connect equipment like card readers, bar code scanners, the cash register and central servers.
- § The system had to be able to link with the host system and banks through a local Ethernet network.
- § The application environment demanded high temperature and high water resistance.
- § Programming should be easy, using non-proprietary languages.

(SYSTEM DIAGRAM)



System Description:

To solve the sunlight problem, Advantech provided a new high luminance display for the first field test.

FPM-3100HA-R is a 10.4" sunlight-readable flat panel monitor designed for industrial applications outdoors or indoors. It provides high brightness of up to 1500 nits and a high contrast ratio of 500:1. It also features a long backlight lifetime, wide viewing angle, a reflective screen with tempered glass, and a hard anodic coating to prevent panel abrasion and acid corrosion. The field test was successful, so sunlight was no longer a problem.

For the controller, UNO-2160 quickly proved to be a good choice. The high temperature tolerance meant that an outdoor application would be no problem, and the compact size facilitated installation in the same compartment as the display. Vibration-resistant storage ensured that the operating system could run reliably. The Visual Basic program managed the PLC linkage and visual interface, and UNO-2160's flexible expansion options provided enough ports for all the planned device connections. COM ports with RS-232 were used to connect with the PLC, and a bar code reader.

The car wash had to connect with the POS server in the gas station, and Advantech products were also applied here.

IPC-610 was used for the chassis, while PCA-6180 was used for the CPU card.

IPC-610 is a 19" rackmount industrial computer chassis for mission-critical applications. This unit can accommodate a 14-slot PCI/ISA bus passive backplane or a standard ATX motherboard and supports versatile power supplies. A lockable door in the front secures the unit from any unauthorized access. One hot-swap filtered cooling fan maintains positive air circulation through the whole chassis. IPC-610 can withstand shock, vibration and dust.

PCA-6180 is a Socket 370 Intel® Pentium® /Celeron® Processor Card with VGA/ Dual LAN/ SCSI/ HISA (133 MHz FSB)

Project Implementation:

- Ÿ The hardware used in this project was FPM-3100HA-R for the touch screen display, UNO-2160 for the controller and a Mitsubishi® PLC for the car wash machine. The IPC-610 industrial PC with a PCA-6180 SBC is used for the industrial-grade servers in the POS system.
- Ÿ Programming is done with Microsoft® Visual Basic under Windows XP Embedded. All software is stored on a vibration-resistant CompactFlash® disk in UNO-2160.

Conclusions:

- The customer solved the main problem of sunlight glare by installing FPM-3100HA-R, which is designed for such applications.
- UNO-2160 proved to be a reliable controller that could be used to create unmanned payment facilities and control the car wash.
- With Visual Basic programs in Windows XP on a CompactFlash disk, the system is easily updated. Not using a proprietary language means program development is easier, and upgrading of the OS in the field is simply a matter of replacing the CompactFlash disk. For program updates, it is possible to connect with UNO-2160 through the Internet and upload the changes.
- Advantech provided a total solution and support services that made the project run smoothly.
- The customer has calculated a saving of NT\$144,000 per year on personnel expenses, and the increased machine utilization with car wash availability extended from 09:00~21:00 to 24 hrs, non-stop, 365 days a year, will also increase revenue.