



# Modular I/O Design Brings Flexibility to Kiosk Integration

## Introduction

The future state of self-service is turning the kiosk into a ubiquitous life improvement. Across industries, the savings and service quality that the newly-coined “unattended service” kiosk technology brings for tasks such as returning library books, to paying parking fees will set kiosk integration projects on a high trajectory of innovation and profitability.

Kiosks designers must meet new challenges including ever-shrinking time-to-market schedules, varying environmental requirements, and added

needs for further intelligence and connectivity. Data transmission alone can involve many new requirements in today's kiosk design. The uplink must deliver the availability to ensure that all data can be sent with more frequency, and also allow a secure dial-in to monitor the status of the kiosk offered by new capabilities in remote management software. Such was the case when an established system integrator was called upon by the end user to implement a semi-outdoor kiosk solution, and the SI contacted Advantech for the equipment.

## Application Requirements

The majority of the end user's locations for the kiosks required a robust hardware platform to ensure a stable operation to minimize servicing. One of the main concerns was the selection of reliable components for dependable kiosk operation throughout all the locations, tolerating operating temperatures from 0 °C, to up to 40°C in some instances. Furthermore, the kiosk's functions and user interface required multiple I/O ports to interact with the various peripherals inside the kiosk chassis. Access to a wired internet connection was limited, so cellular communication was to be employed.

One key point of the specification was to decrease the associated costs generated by corrective maintenance. Thus, the SI was tasked to find an easy remote monitoring solution, to access the health of the kiosks' computers and manage functionalities such as the ability to remotely reboot or shutdown, remote on/off, and conduct software updates remotely. Naturally project delivery time was also a sensitive matter, so integration complexity, such as through component interoperability issues, was to be kept to a minimum.

## Solution

The System integrator sourced a robust embedded computer to ensure not only a reliable functionality for the kiosk, but also a system with the capability to offer the various I/O ports to connect the multiple peripherals that included display, card readers, barcode scanners and a printer. The team inquired with Advantech, which helped to select the [ARK-2230 embedded computer](#): a modular and fanless Intel system. Rated for an operating

temperature from -20 to 60 °C, the [ARK-2230 fanless PC](#) provided excellent expansion capabilities through the addition of a combination of Advantech's proprietary [iDoor Modules](#) or [ARK Plus expansion modules](#). Using these modules as building blocks, the integrator could select and to connect them to the ARK system for the custom number of isolated serial ports, digital I/O, USB, and parallel ports desired. Since [iDoor and ARK Plus Modules](#) ensure a secure fit, the ARK fanless embedded computers retain their environmental and safety ratings after configuration.

The application being ported to run on the [ARK-2230 embedded computer](#) provided the functionality for validating information to the kiosk user, and retrieving data from a database hosted in the cloud. For the interface of the kiosk design, the system integrator chose the Advantech [IDS-3115 open frame monitors](#): an ultra-slim open frame monitor with resistive touch capability, high brightness, and anti-reflective treatments included to enhance the interface interaction and visibility. With the supplied bracket kit, the open frame monitor was easily mounted in the kiosk cabinet, with the video inputs connecting to the [ARK-2230 embedded PC](#) via the VGA connection.

To meet the need for a stable internet connection, the Advantech's [SmartStart LTE Wi-Fi router](#) was added inside the cabinet to the ARK embedded PC's GbE port, which can act as a Wi-Fi Access Point to nearby kiosks while using LTE as the primary WAN connection. SmartStart modem comes pre-certified by the main cellular carriers in North America, and therefore spared the integrator of a task of a costly LTE certification process. Additional benefits to the integrator's

and the capability of a fallback to 3G/2G networks for areas with no LTE access.

The integrators also sourced a remote management option with Advantech, resulting in the selection of the company's [WISE-PaaS software](#). Two options from the [WISE-PaaS/Edge Sense](#) offering were implemented: [WISE-PaaS/RMM for remote monitoring, management, whitelist system protection](#), and [WISE-PaaS/OTA for remote software upgrades](#) for each kiosk. The [WISE-PaaS](#) front-end was installed in a VM running on [Microsoft Azure](#) so that credentialed engineers could access individual kiosks from any location or device. However, the real-time monitoring of all kiosks across the service network topology was performed in the control room in the corporate offices, only for a

group of officers with more specialized credentials.

For the control location's data visualization need, an Advantech [DS-980 UHD digital signage player](#) was installed near the control room to display the data from the [WISE-PaaS RMM](#) web user interface hosted in [Microsoft Azure](#). The [DS-980 digital signage media player](#) is capable of providing up to 6 independent displays with a 4K resolution, empowered by an Intel® i7 6700TE processor. The wall LCD displays selected to visualize the kiosk topology was the [DSD-3055 Digital Signage Display](#), a 55" display with a fanless design, offering an easy visualization of the status of all the kiosks deployed from every angle in the room.

## System Diagram



## Conclusion

Due to the proper selection of the equipment from a single source, the system integrator was able to speed-up the integration process. This list included the complete backbone for the kiosk (computer, monitor and router), management layer software with a prepared [Microsoft Azure](#) library, and control room equipment. Since the kiosk components were industrial grade with wide temperature tolerances, they were robust enough to meet all environmental requirements. The flexibility of the [ARK-2230 embedded computer's](#) modular expansion also provided easy I/O selections and configuration, giving the team a quick turn-around to focus efforts for installing the printer and barcode scanner peripherals. This streamlining of

integration resulted in instant ROI for the system integrator. Besides having the opportunity for future expansion or modifications, the addition of the [SmartFlex cellular router](#) provided a robust and reliable internet connection and fallback features to ensure a high-availability internet connection for all locations. [WISE-PaaS/Edge Sense](#) including [WISE-PaaS/RMM](#) and [WISE-PaaS/OTA](#) helped the customer conserve further time, effort and costs associated to on-site maintenance. In addition, the use of [WISE-PaaS](#) enabled all kiosks to be integrated with other software services on the cloud by configuration of its APIs, empowering the end user to take advantage of the benefits of implementing an IoT device remote monitoring and management platform.

For more information on  
Advantech's Embedded Computers check out  
**[Buy.Advantech.com/Go/Modular-Embedded-Computers](http://Buy.Advantech.com/Go/Modular-Embedded-Computers)** or call **877-825-4146**

**ADVANTECH**

*Enabling an Intelligent Planet*